Report on Study
(FINAL)

"Epidemiology of Outcome of Pregnancy in Diverse Cultures and in Selected Countries"

Principal Investigators:

L. P. Chow, M.D., Dr.P.H.
Rowland V. Rider, Sc.D.

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(Appendix bound separately)

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Many organizations and individuals in Taiwan and in Baltimore supported and assisted this study, and the following is only a partial list of those most closely involved in the field operation in Taiwan. Their assistance and that of many others is most gratefully acknowledged.

1. Field Research Staff

Chi I-cheng, M.D., Dr.P.H., served as the Field Director and was responsible for the entire field work. He prepared a number of preliminary reports which form the basis for some of the following report.

Ernest Y. T. Yen, M.D., Dr.P.H., was primarily responsible for the "clinic study." He prepared two preliminary reports on the methodology of that study and its substantive findings, and these also have been used in sections of the present report.

2. Supporting Organizations

a. National Health Administration, Republic of China

C. H. Yen, M.D., D.P.H., Director-General, C. K. Chang, M.D., M.P.H., Deputy Director-General, and C. M. Wong, M.D., Deputy Director-General of the National Health Administration strongly endorsed and supported this study. Their advice was frequently sought.

b. The Sino-American Joint Commission on Rural Reconstruction (JCRR)

S. C. Hsu, M.D., M.P.H., Chief, Rural Health Division, served as a member of the Advisory Committee and helped smooth out various problems encountered in the course of this study. JCRR also acted as co-sponsor of the project, allocated office space for the work in Taipei, and gave direct assistance in the accounting and auditing of the expenditures of the project.

c. National Defense Medical Center (NDMC)

C. T. Loo, M.D., Director, and Y. H. Chang, M.D., Chairman of the Department of Preventive Medicine, kindly agreed to make available the service of Dr. Chi I-cheng to serve as the Field Director. Both were members of the Advisory Committee.

The NDMC was another co-sponsor of the project.

d. Taoyuan County Health Bureau

L. T. Hsia, M.D., Director, was most cooperative and supported the field operation of this study. He made available office space for the project and dormitory facilities for its staff.

e. The National Taiwan University College of Medicine

H. Y. Wei, M.D., Dean, and P. Y. Wei, M.D., Professor and Chairman of the Department of Obstetrics-Gynecology, served on the Advisory Committee. They and K. P. Chen, M.D., Professor of Preventive Medicine, were consulted on numerous occasions.

The National Taiwan University College of Medicine was another sponsoring organization.

f. United States Naval Medical Research Unit 2 (NAMRU-2)

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3. Advisory Committee

The following individuals served as members of an Advisory Committee for this study. Their strong support and intelligent guidance did much to make possible the smooth operation of this project.

C. K. Chang, M.D., M.P.H., Deputy Director-General
National Health Administration

Y. H. Chang, M.D., Chairman
Department of Preventive Medicine
National Defense Medical Center

I. C. Fang, M.D., Board Chairman
The Chinese Center for International Training in Family Planning

S. C. Hsu, M.D., M.P.H., Chief
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T. C. Hsu, M.D., Commissioner of Health (now with WHO)
Director, Institute of Family Planning
Taiwan Provincial Institute of Family Planning

C. T. Loo, M.D., Director
National Defense Medical Center

H. Y. Wei, M.D., Dean
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P. Y. Wei, M.D., Professor and Chairman
Department of Obstetrics-Gynecology
National Taiwan University College of Medicine

Other individuals also gave assistance through advice and sometimes with special visits to Taoyuan to help solve specific problems. Only one of these will be mentioned:

General Yang Wen-ta, M.D., then of the Ministry for National Defense, now retired.

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APPENDICES
(bound separately)

Section One

Background and General Description

This report will give only such information regarding background and description of study judged helpful for understanding reasons for collecting and sources of data and for understanding conclusions stated regarding implications of the study relative to future studies performed elsewhere and family planning programs in general. In addition to background and descriptive information, the report will also contain findings of the study relative to specific objectives to be mentioned below plus some incidental findings considered of interest (including methodological findings and observations) and implications of the study in terms of recommendations for the conduct of future studies with statements of unsolved questions both methodological and substantive.

As may be surmised from the description of the study which follows, much more data have been assembled than could be analyzed to date. It is the intent of the principal investigators and their colleagues at the Johns Hopkins School of Hygiene and Public Health to continue analysis of the data for as long as such analysis seems valuable and interest in the analysis is maintained. It is also hoped that an occasional graduate student at the School will find suitable material for examination in the course of pursuing his studies.

I. General Description of the Study

A. General Objectives

The variable outcome of pregnancy has an important effect upon fertility, health, and population growth patterns. Pregnancy wastage is a problem throughout the world, and evidence has accumulated that an important portion of this is made up of induced abortions; but there is a scarcity of "epidemiological" studies to determine the extent of pregnancy wastage and particularly of induced abortions and their relationship to health, fertility levels, fertility control measures, demographic and other socio-economic variables. It is the objective of this project to increase this fund of knowledge and to establish the techniques by which this information is obtained so that inter-cultural and inter-country comparisons can be made which will assist those countries which desire to limit population growth to accomplish this in a manner which maximizes the population's well-being and the country's economic development.

B. Specific Objectives

1. Methodological

   Design, refine, test, and adapt methods and procedures for initiating and conducting outcome of pregnancy studies with emphasis on induced abortion.

2. Substantive

   Obtain information regarding the following topics and their interrelationships:

   (a) Categories of pregnancy wastage and estimates of their frequency

(b) Incidence, patterns, and trends in induced abortion specific for various sub-groups of women, including relations to timing and extent of contraceptive practice

(c) Evidence of complications from induced abortion by type and severity

(d) Selected psychological and mental health aspects of induced abortion

(e) Attitudes toward induced abortion by various groups of the population

(f) Selected demographic, economic, and social consequences of induced abortion

C. Research Plan

It was proposed originally that the study be carried out first in Taiwan and then in other countries, making such changes in methodology as cultural or administrative differences and lessons of experience in Taiwan dictated. Furthermore, original plans were to conduct an initial study in one county in Taiwan, expanding to an Island-wide study if the single county findings and experience suggested that this was desirable both from the standpoint of Taiwan's needs and from a judgement as to the contribution such extension would make to inter-country comparisons. The present report concerns simply the single county study in Taiwan, which developed into a major undertaking, and the bearing of the findings and experience of this study on future studies which will be discussed in the section on implications appearing later in the report.

II. General Description of the Single County Study in Taiwan

In broadest outline the study may be described as seeking information regarding outcome of pregnancy and related factors from two sources: (1) women exposed to the risk of pregnancy and (2) medical practitioners providing service to such women. As will be seen from the detailed description which follows, much greater emphasis in effort and attention has been devoted to gathering information from the women. Details concerning the methods by which information was obtained from these sources will be found in Section Two.

The county of Taoyuan is located in northern Taiwan near Taipei (see map in Appendix 1 which describes the sampling). This county was selected for its combination of convenient location, general similarity to the Taiwan mixture of urban and rural areas, existence of available facilities suitable for a study headquarters, and anticipation of cooperation on the part of medical and other leaders. Taoyuan had a population in 1969 estimated at 680,626 in an area of about 470 square miles.

Section Two

Methodology

A major objective of the study was to develop and refine techniques of studying outcome of pregnancy with emphasis on induced abortion. This section will describe the types of studies undertaken in order to make clear the methods used, and will also contain sub-sections devoted to findings from the different types of studies for the purpose of drawing conclusions regarding their relative merits. Occasionally reference will be made to administrative matters, such as recruitment, training, number of personnel in different categories, etc., but such matters will not be presented exhaustively. It should be mentioned at this stage, however, that an extremely valuable member of the staff was Dr. Chi I-cheng who served as the Field Director throughout the study. He is a senior member of the faculty of the Taiwan National Defense Medical Center, an epidemiologist, who received both an MPH and a Dr.P.H. from Johns Hopkins, the latter from the Department of Population and Family Health--now Population Dynamics. Dr. Chi served not only as Field Director, but also assisted in planning stages and in the analysis; and substantial parts of this report represent his contributions.

I. Description of Studies

A. Studies with Women as Primary Source of Information

The major comparisons for which these studies were designed are: (1) a one-shot KAP-type interview versus repeated interviews on a panel of women, (2) repeat interviews on a panel of women on whom a pregnancy test is routinely done versus such repeat interviews without a pregnancy test, and (3) a one-shot KAP-type interview conducted in a conventional fashion versus a similar survey using the randomized response technique, defined later, for eliciting information regarding induced abortions.

1. Repeat Interviews on a Panel of Women

a. General Description

Approximately 2,000 married women ages 15-49 were followed for nine rounds of interviews, one interview on each woman every six weeks. The women were selected in such a way as to represent the entire county, except for the aboriginal area representing about 2% of the Taoyuan population. The sampling scheme may be described as probability sampling using a stratified cluster system. A description of the sampling of both the women in the repeat interview panel and the women in the one-shot KAP survey is found in Appendix 1. It will be noted that a random half of the women selected for the repeat interviews were chosen to be in the group on which pregnancy tests were also done.

Questionnaires were prepared for each round. Some items in the questionnaires were repeated on every round; others were asked only on particular rounds. This system was felt to be

desirable in that a large amount of information could be obtained without exhausting a woman on any particular round; while at the same time the introduction of new topics on each round is believed to have helped maintain the interests of the respondents in the study.

An abbreviated summary of the topics included in the repeat interview series is as follows:

Topics covered on every round

- Items of identification
- General health status of respondent
- Results of sugar and albumin test
- Menstrual status and recent menstrual history
- Pregnancy status
  - According to respondent
  - According to pregnancy test (on fixed 50% sample)

Topics covered on second and later rounds

- Changes in family composition since previous round
- Details about terminations of pregnancy occurring to respondent since previous round
- Sterilization of respondent or husband since previous round

Non-repeating topics by round

Round 1
- General demographic characteristics of respondent (e.g., age, ancestry, marital history, etc.)
- Some socio-economic characteristics of respondent and husband
- Pregnancy history of respondent
- Respondent's opinion of her fecundity status

Round 2
- Knowledge about and Attitude toward contraception
- Additional socio-economic characteristics of respondent and husband

Round 3
- Practice of contraception (detailed history)
- Future intentions for practice of contraception

Round 4
- Knowledge about induced abortions

Round 5
- Attitude toward induced abortions

Round 6
- Some socio-cultural factors potentially affecting the practice of family planning (contraception and induced abortion)

Round 7
- Additional socio-cultural factors potentially affecting the practice of family planning (contraception and induced abortion)

Round 8
Practice of induced abortion

Round 9
Repeat, with some modifications, items relating to socio-economic status of the respondent

In Appendix 2 will be found copies of translations of the questionnaires. It will be noticed that it is Section E of Rounds 2 through 9 that is the variable section from round to round, and so only this section is translated for rounds after Round 2.

The interviewing was done by females generally in the age range 20-40, some married and some unmarried, recruited as much as possible from areas similar to those in which they were expected to carry out their interviewing. The interviewers were at least high school graduates, a few having had more advanced training. They were given special training for their task by Dr. Chi, the Field Director, and other senior members of his staff who had had some training and experience in interviewing.

Once the initial training was completed, the schedule of visits was established and took the form of one to two weeks of training for each round and four to five weeks of interviewing, thus separating the visits by six weeks. The timing of the training and interview periods for the nine rounds is given in Table 1.

Appendix 3 is the training schedule in preparation for the third round.

b. Success of Follow-up

Of 2,499 originally selected, 1,861 women were successfully interviewed at the first round of visit, a drop-out rate of 25.53%, which was much higher than was originally expected. Probably this is due largely to the recent industrialization of the Island, and hence the higher out-migration rate, which made the household registration system (from which the sample was drawn) less up-to-date than in former days.

By comparing the total eligible women in the county and those we successfully interviewed at the first round by age, as shown in Table 2, it is apparent that we have been more successful in interviewing the older women (35 years old and over) than the younger ones, probably due to more out-migration among the latter to cities bigger than Taoyuan, since it is not likely that the former would be more cooperative. When comparisons were made by study townships, however, it is found that a similar proportion of respondents in each township were successfully interviewed at the first round (Table 3).

Table 1.

Dates for Repeat Interview

Order of Visit	Training		Interview	
	Start	End	Start	End
1	4/01/70	4/25/70	4/27/70	5/26/70
2	5/27/70	6/06/70	6/08/70	7/06/70
3	7/07/70	7/18/70	7/20/70	8/21/70
4	8/22/70	8/29/70	8/31/70	9/28/70
5	10/03/70	10/09/70	10/12/70	11/07/70
6	11/16/70	11/21/70	11/23/70	12/19/70
7	12/24/70	12/31/70	1/04/71	1/30/71
8	2/08/71	2/13/71	2/15/71	3/13/71
9	3/22/71	3/27/71	3/29/71	4/29/71

Table 2.

Distribution of Currently Married Women Aged 15-49 in Taoyuan County, 1969 Year-End Population and Those Successfully Interviewed at Round One of Visits by Age

Age Group	Women in Taoyuan County		Successfully Interviewed at Round One	
	Number	Percent	Number	Percent
15-19	3,707	3.84	36	1.93
20-24	13,565	14.07	206	11.07
25-29	21,333	22.12	368	19.77
30-34	19,428	21.15	369	19.83
35-39	15,452	16.02	322	17.30
40-44	13,246	13.74	324	17.41
45-49	9,698	10.06	226	12.14
U. K.	--	--	10	0.54
Total	96,429	100.00	1,861	99.99

Table 3.

Distribution of Study Women in the Originally Selected Sample, and Those Successfully Interviewed at Round One of Visits by Township

Townships	In the Originally Selected Sample		Successfully Interviewed at Round One	
	Number	Percent	Number	Percent
Chungli	724	28.97	558	29.98
Tachi	703	28.13	516	27.73
Pingchen	355	14.21	265	14.24
Hsinwu	717	28.69	522	28.05
Total	2,499	100.00	1,861	100.00

Moved-out of the study area (14.61%), and ineligibility, e.g., registration errors in age and marital status (6.92%), form the main reasons of drop-outs for the first round.

If we use the number of women successfully interviewed at the first round as the basis of calculation, then the drop-out rate after that was satisfactorily low (Table 4). At the end of the study year, or at the ninth round, altogether only 6.82% of respondents seen at Round 1 had dropped out. Apparently the resistance to this repeat interview was relatively higher at the second and third round, but became negligible after this, as shown in the last column of Table 4. Refusals formed the main reason for the few subsequent drop-outs.

By township, Hsinwu, the most rural, showed the lowest drop-out rate (3.83%) during the study, while the most urbanized town, Chungli, the highest (9.14%), all from Round 1 through Round 9 (Tables 5 and 6). It is not possible at this time to determine the causes of these differences but presumably the mobility of the populations is a factor since the townships do differ in degree of urban development.

For each round on the average, about 2%-3% of the urine cases failed to give their urine, and only about 2% of all the respondents were rated as "poor in cooperation" by the interviewers.

Another way of examining success of follow-up in a study where the desire is to observe a panel of individuals continuously for a number of visits is illustrated in Table 7. From Table 7A one can easily see how many individuals were followed through a given number of rounds and among these what kind of gaps there were in the observation. From Table 7B one can easily obtain the number of respondents that were observed for a certain number of rounds whether or not the last round on which they were observed was the same.

The success in following cases selected for pregnancy testing, that is urine collection, is approximately the same as that for the others. Table 8 shows the record on this point. It has already been mentioned that the refusal rate of the urine cases who were interviewed to provide the urine sample was low (in the neighborhood of 2%-3%).

c. General Characteristics of the Respondents

The following characteristics will occasionally bear an important relationship with the substantive findings of the study but are selected for presentation at this point to give only a very general picture of the population that was observed.

Table 4.

Drop-Out Rate for Each Round of Visits, by Using the Number of Women Successfully Interviewed at the First Round and at Each Previous Round of Visit as the Base Population

Round Number	Number of Women Successfully Interviewed*	Percent of Drop-Out Based on Women Successfully Interviewed at	
		Round One	The Previous Rounds
1	1,861	--	--
2	1,807	2.90	2.90
3	1,770	4.89	2.05
4	1,762	5.32	0.45
5	1,752	5.86	0.57
6	1,747	6.13	0.29
7	1,747	6.13	--
8	1,737	6.66	0.57
9	1,734	6.82	0.17

*Beginning with Round 3, a small fraction of those seen at each round had missed one or more of previous rounds.

Table 5.

Drop-Out Rate by Township, Comparison of Number of Respondents Successfully Interviewed at Round 1 and Round 9

Township	Number of Successful Interviews at Round 1	Number of Successful Interviews at Round 9	Percent Drop-Out Rate
Chungli	558	507	9.14
Tachi	516	476	7.75
Pingchen	265	249	6.04
Hsinwu	522	502	3.83
Total	1,861	1,734	6.82

Table 6.

Number Seen at Each Round by Township and Percent Seen at Round 9 of Those Seen on First Round

Township	Number of Cases Actually Visited at Each Round									Percent Seen at Round 9 of Those Seen at Round 1
	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8	Round 9	
Chungli	558	542	527	522	515	515	510	509	507	90.9
Tachi	516	502	491	486	485	480	484	477	476	92.2
Pingchen	265	254	253	251	252	252	253	249	249	94.0
Hsinwu	522	509	499	503	500	500	500	501	502	96.2
Total	1,861	1,807	1,770	1,762	1,752	1,747	1,747	1,736	1,734	93.2

Table 7.

Number Seen According to Sequence of Rounds on Which Seen
A. Ordered by Last Round on Which Seen

Last Seen Round	Number of Missing Round	Round* 1	2	3	4	5	6	7	8	9	f	Sub-Total	Total
9	0	1	1	1	1	1	1	1	1	1	1,665	1,665	1,734
	1	1	1	1	1	1	1	1	0	1	2	50	
		1	1	1	1	1	1	0	1	1	1		
		1	1	1	1	1	0	1	1	1	5		
		1	1	1	1	0	1	1	1	1	7		
		1	1	1	0	1	1	1	1	1	15		
		1	1	0	1	1	1	1	1	1	15		
		1	0	1	1	1	1	1	1	1	5		
	2	1	1	1	1	1	1	0	0	1	1	12	
		1	1	1	1	1	0	1	0	1	1		
		1	1	1	1	0	0	1	1	1	2		
		1	1	1	0	1	0	1	1	1	1		
		1	1	0	0	1	1	1	1	1	1		
		1	0	0	1	1	1	1	1	1	6		
	3	1	1	1	1	1	0	0	0	1	1	4	
		1	1	1	1	0	0	0	1	1	1		
		1	1	0	0	0	1	1	1	1	2		
	4	1	1	1	0	0	0	0	1	1	1	3	
		1	1	0	0	0	0	1	1	1	1		
		1	0	0	1	1	0	0	1	1	1		
8	0	1	1	1	1	1	1	1	1		6	6	8
	3	1	1	1	0	1	0	0	1		1	2	
		1	1	0	0	0	1	1	1		1		
7	0	1	1	1	1	1	1	1			11	11	13
	1	1	1	1	0	1	1	1			1	1	
	2	1	1	0	0	1	1	1			1	1	
6	0	1	1	1	1	1	1				5	5	8
	1	1	1	1	1	0	1				1	2	
		1	1	0	1	1	1				1		
	4	1	0	0	0	0	1				1	1	
5	0	1	1	1	1	1					4	4	6
	1	1	1	0	1	1					1	2	
		1	0	1	1	1					1		
4	0	1	1	1	1						17	17	19
	1	1	1	0	1						2	2	

* 1 = Presence; 0 = Absence.

Table 7A (continued)

Last Seen Round	Number of Missing Round	Round* 1	2	3	4	5	6	7	8	9	f	Sub-Total	Total
3	0	1	1	1							15	15	15
2	0	1	1								18	18	18
1	0	1									40	40	40
0	0										638	638	638
Total													2,499

* 1 = Presence; 0 = Absence.

Table 7.

Number Seen According to Sequence of Rounds on Which Seen
B. Ordered by Number of Missing Rounds

Number of Missing Rounds	Round*									f	Total
	1	2	3	4	5	6	7	8	9		
0	1	1	1	1	1	1	1	1	1	1,665	1,665
1	1	1	1	1	1	1	1	1	0	6	56
	1	1	1	1	1	1	1	0	1	2	
	1	1	1	1	1	1	0	1	1	1	
	1	1	1	1	1	0	1	1	1	5	
	1	1	1	1	0	1	1	1	1	7	
	1	1	1	0	1	1	1	1	1	15	
	1	1	0	1	1	1	1	1	1	15	
	1	0	1	1	1	1	1	1	1	5	
2	1	1	1	1	1	1	1	0	0	11	23
	1	1	1	1	1	1	0	0	1	1	
	1	1	1	1	1	0	1	0	1	1	
	1	1	1	1	0	0	1	1	1	2	
	1	1	1	0	1	0	1	1	1	1	
	1	1	0	0	1	1	1	1	1	1	
	1	0	0	1	1	1	1	1	1	6	
3	1	1	1	1	1	1	0	0	0	5	10
	1	1	1	1	1	0	0	0	1	1	
	1	1	1	1	0	0	0	1	1	1	
	1	1	1	0	1	1	1	0	0	1	
	1	1	0	0	0	1	1	1	1	2	
4	1	1	1	1	1	0	0	0	0	4	12
	1	1	1	1	0	1	0	0	0	1	
	1	1	1	0	1	0	0	1	0	1	
	1	1	1	0	0	0	0	1	1	1	
	1	1	0	1	1	1	0	0	0	1	
	1	1	0	0	1	1	1	0	0	1	
	1	1	0	0	0	1	1	1	0	1	
	1	1	0	0	0	0	1	1	1	1	
	1	0	0	1	1	0	0	1	1	1	
5	1	1	1	1	0	0	0	0	0	17	19
	1	1	0	1	1	0	0	0	0	1	
	1	0	1	1	1	0	0	0	0	1	
6	1	1	1	0	0	0	0	0	0	15	17
	1	1	0	1	0	0	0	0	0	2	
7	1	1	0	0	0	0	0	0	0	18	19
	1	0	0	0	0	1	0	0	0	1	
8	1	0	0	0	0	0	0	0	0	40	40
9	0	0	0	0	0	0	0	0	0	638	638
											2,499

* 1 = Presence; 0 = Absence.

Table 8.

Comparison of Urine and Non-Urine Cases
as to Follow-Up Success

	Number Initially Selected	Successfully Seen at Round 1		Successfully Seen at Round 9		
		Number	Percent	Number	Percent of Those Originally Selected	Percent of Those Seen on Round 1
Urine Cases	1,252	921	73.6	852	68.1	92.5
Non-Urine Cases	1,247	940	75.4	882	70.7	93.8
Total	2,499	1,861	74.5	1,734	69.4	93.2

(1) Ancestry

Due to the fact that more Hakkanese speaking townships than Fukienese speaking ones were selected by the original sampling scheme, more than half of our respondents were Hakkanese speaking women (56.85%). Mainlander women formed only a very small portion (2.90%) of the study population. It should be pointed out that this division referred to as Hakkanese speaking and Fukienese speaking sub-divisions reflects the ancestry of the respondents. The ancestry of the husbands is slightly different and indicates that more Hakkanese women married Fukienese or Mainlander husbands than vice-versa (Table 9).

(2) Age

Very few women were married at ages 15-19 in Taoyuan. The mean age of our study women was 32.79 years of age, while that of the husbands was 39.47. Husbands are, on the average, about 6.68 years older than the wives (Table 10), when the wives' ages are limited to 15-49 years.

(3) Fertility History and Attitude Towards Fertility

The mean number of completed pregnancies, livebirths, and living children of our study women, as reported at the first interview, were 4.74, 4.45, and 3.99, respectively. About 36.16%, 32.07%, and 23.66% of our study women have had 6 or more pregnancies, livebirths, and living children, respectively (Table 11). (The respective proportions of women having had 6 or more livebirths and living children in KAP III* were 18.7% and 11.7%.) Judging from the difference between the figures for livebirths and living children, child mortality has probably been quite high. Twenty-three percent of our study women have reported one or more children died in the past. This figure is comparable to the level reported at the Taiwan KAP I survey (24.00%). The situation of pregnancy wastage will be discussed in a later section.

*Through 1970 three Island-wide KAP surveys were done. The first (KAP I) was carried out in October 1965 on currently married women aged 20-44. The sample size was 5,360. The second one (KAP II) was carried out in October 1967 on 4,989 sampled women with the same criteria. KAP III is different in approach. It contained 2,374 KAP II reinterviewed cases and 315 cases of the newly married who had their marriage registered during October 1967-October 1969. Both samples included only those who were 22-42 years old in October 1969.

Table 9.

Ancestry of Respondents and Husbands
of the Study Population in Taoyuan

	Respondents		Husbands	
	Number	Percent	Number	Percent
Fukienese	748	40.19	686	36.86
Hakkanese	1,058	56.85	952	51.15
Mainlander	54	2.90	223	11.98
Other	1	0.05	--	--
Total	1,861	99.99	1,861	99.99

Table 10.

Grouped Age of Respondents and Husbands of the Study Population in Taoyuan at the First Round of Visits

	Respondents		Husbands	
	Number	Percent	Number	Percent
15-19	36	1.93		
20-24	206	11.07	33	1.77
25-29	368	19.77	214	11.50
30-34	369	19.83	358	19.24
35-39	322	17.30	384	20.63
40-44	324	17.41	338	18.16
45-49	226	12.14	288	15.47
50-54	--	--	160	8.60
55-59	--	--	40	2.15
60+	--	--	10	0.54
Unknown	10	0.54	36	1.93
Total	1,861	99.99	1,861	99.99

Table 11.

Numbers of Pregnancies, Livebirths, and Living Children of the Respondents, as Reported at the First Round of Visits

	Pregnancies		Livebirths		Living Children	
	Number	Percent	Number	Percent	Number	Percent
0	61	3.28	64	3.44	65	3.49
1	139	7.47	152	8.17	169	9.09
2	171	9.19	203	10.91	221	11.88
3	263	14.13	299	16.07	332	17.85
4	290	15.58	275	14.78	335	18.01
5	264	14.19	271	14.56	298	16.02
6	245	13.17	223	11.98	201	10.81
7	160	8.60	163	8.76	139	7.47
8	106	5.70	108	5.80	61	3.28
9	76	4.08	51	2.74	29	1.56
10	49	2.63	27	1.45	10	0.54
11	12	0.64	12	0.64	--	--
12+	25	1.34	13	0.70	--	--
Total	1,861	100.00	1,861	100.00	1,860*	100.00

*One unknown.

Seventy-three percent of our study women reported not wanting any more children. For the remaining 27%, or women who did report wanting more children, they, on the average, wanted 1.76 more children. Expectedly, more of them wanted sons rather than daughters (50.81%); only 15.99% expressed the opposite desire (Tables 12 and 13). Ideal number of children as reported by the study women was 4.20 (median). Twenty-eight percent of the women thought that the ideal number of children should be five or more. Close to half (46.82%) expressed preference to have more boys than girls; 39.68% wanted same number of boys as girls; only 3.93% of them thought that the ideal sex distribution should be more girls than boys (Tables 14 and 15).

Fertility history was asked again at the eighth round of interview when the details on the information of induced abortion was sought. The means of the number of pregnancies and livebirths were 5.13 and 4.66 per woman, respectively. The discrepancies between these numbers and their counterpart numbers reported at Round 1 were 0.39 and 0.21, respectively. These differences arise from some combination of three reasons, (1) the occurrence of pregnancies and livebirths between Rounds 1 and 8, (2) the 124 respondents not seen on Round 8 but seen on Round 1 may be different as to pregnancy and livebirth experience, and (3) erroneous reporting on one or both rounds. This matter will be further explored elsewhere.

(4) Fecundity Status and Other Biological Characteristics

Seventy-nine percent of our study women were reportedly fecund at Round 1. (Those currently pregnant were included.) This figure is lower than that detected at the Taiwan KAP III (85.80%). One of the reasons may be due to the fact that in our study, elderly women aged 45-49 years old were included, while in the KAP III survey, only the 22-42 year old women were included.

Current pregnancy status is a topic of great interest since it reflects the extent of birth control measures taken by the population to some extent, if we can deem that fecundability of the Taiwanese women in general is similar. In Taoyuan 8.87% of the respondents reported pregnant at the interview, while in KAP III survey 9.3%. If we include also those reported "not sure" or "don't know" about their pregnancy status, the figures come up to 11.01% for Taoyuan, and 10.20% for Taiwan in KAP III, respectively (Table 16). However, as repeatedly stated above, the comparability between the Taoyuan and Taiwan figures is impaired by their different inclusiveness in age of the women. Age-standardized rate of pregnancy would be thus a better index for the comparison.

Table 12.

Number of Additional Children Wanted by Respondents in Taoyuan as Reported at Round Two of Visits

Number of Additional Children Wanted	Number	Percent
0	1,313	72.66
1	218	12.06
2	149	8.25
3	54	2.99
4	23	1.27
5	2	0.11
6	1	0.06
Others	43	2.38
Unknown	4	0.22
Total	1,807	100.00

Table 13.

Sex Preference for Additional Children Wanted as Reported at Round Two of Visits

	Number	Percent(1)*	Percent(2)*
No additional children wanted	1,313	72.66	--
Wants more boys than girls	251	13.89	50.81
Wants more girls than boys	79	4.37	15.99
Wants some number	64	3.54	12.96
No preference	55	3.04	11.13
Others	43	2.38	8.70
Unknown	2	0.11	0.40
Total	1,807	99.99	99.99

*Percent(1) is based on total interviewed, percent(2) on total after excluding those wanting no additional children.

Table 14.

Ideal Number of Children as Reported by Respondents in Taoyuan at Round Two of Visits

Ideal Number	Number	Percent
1	5	0.28
2	79	4.37
3	410	22.69
4	663	36.69
5	380	21.03
6	98	5.42
7+	30	1.66
Others	141	7.80
Unknown	1	0.06
Total	1,807	100.00

Table 15.

Sex Preference for Ideal Number of Children as Reported by Respondents in Taoyuan at Round Two of Visits

Sex Preference	Number	Percent
More boys than girls	846	46.82
More girls than boys	71	3.93
Same number of boys as girls	717	39.68
No preference	35	1.94
Others	134	7.42
Unknown	4	0.22
Total	1,807	100.01

Table 16.

Current Pregnancy Status as Perceived by Respondents in Taoyuan at Round One of Visit

	Number	Percent
Not pregnant	1,651	88.72
Not sure or don't know*	40	2.15
Yes, less than 3 months	17	0.91
Yes, 3-5 months	64	3.44
Yes, 6 months or more	84	4.51
Unknown*	5	0.27
Total	1,861	100.00

*"Don't know" means the respondents said that they did not know; "unknown" means that there was no relevant response indicated on the questionnaire for this item.

Length of menstruation was also asked at the first round of interview. Besides the 180 women who were in the middl of menstruation, and the 412 women who were either in the middle of pregnancy or already had their menopause, for most of the respondents (83.79%) among the remaining 1,269 women, the length of menstruation ranges from 2 to 5 days. Whether currently breast-feeding or not was asked only on those respondents who had children under 3 years of age (1,102 women). About 39.52% of them were breast-feeding at the time of interview.

(5) Literacy and Education

In the study population in Taoyuan 45.30% were illiterate, and only 3.17% had received senior high or more advanced education. In KAP III the respective figures were 34.30% and 5.5%. In general husbands have received more education than their wives in Taoyuan (16.71% of the husbands were illiterate, and 13.65% have had senior high or more advanced education). Reading of newspaper is considered an important index in education as well as in contact with outside world. Only 9.55% of our study women reportedly read newspaper every day, the comparable figure was 14.50% in KAP III.

(6) Religion

Most of the respondents declared their religion to be ancestry worship with or without Buddhism or Taoism (64.96% with and 28.96% without). Catholic Christians form only a very small portion (1.40%) of our study population; about an equal proportion were Protestants.

(7) Economic Level

A little more than half of the husbands (51.21%) were working as unskilled laborers. This includes farmers, miners, and other lowly paid manual workers. Only 5.70% of them can be classified as in the professional and managerial levels. Among the 1,022 women who answered the question on their family's total expenses per month, the median was NT$3,000.00, equivalent to US$75.00. The respondents were asked which of ten specified items of convenience their families had. These items were: running water, private toilet, radio, electric rice cooker, refrigerator, T. V. set, clothes washer, subscription to a newspaper. Only 1.77% of the respondents reported their families had none; the median was 4.38 items per family.

Respondents living in extended families comprised 41.91% of our study population, and 84.45% of them revealed their definite desire to live with their children in old age (81.04% wanted so in KAP I).

2. One-Shot KAP-Type Survey

a. General Description

As with the repeat interview panel, about 2,000 married women ages 15-49 were interviewed. Basically the sampling scheme was the same as that for those women in the repeat interview panel, but the clustering was slightly more concentrated. Appendix 1, as noted before, describes the sampling. Here, too, the total sample was divided into random halves. In this case one-half was given a usual type of interview, the other was subjected to the randomized response technique (RRT) explained later, for eliciting information regarding the induced abortion experience of the respondents.

Because this survey was to be compared with the repeat interview study, the contents of the KAP questionnaire closely resembled an accumulation of the questions asked on the nine rounds of the repeat interviews. A copy of the English translation of this questionnaire is found in Appendix 4.

The KAP survey was carried out by the same staff that did the repeat interviews in the period immediately following the ninth round. Special training took place from May 5, 1971, to May 17, 1971; the interviewing itself was done between May 19, 1971, and July 31, 1971. Special training was given chiefly because of the introduction of the RRT, but also because slightly different interviewing procedures were required in order to include in one interview the many topics covered over the course of nine interviews previously.

b. Success of Follow-up

Table 17 shows the experience regarding locating and interviewing those selected for this survey. Eighty-nine percent of the women selected for interview were successfully seen. Migration was again the leading cause for failure to interview the selected individuals. The percentages seen in the RRT group and the non-randomized response technique group (NRRT) were within a half a percentage point of one another.

c. General Characteristics of the Respondents

For the purposes of this introductory description it is sufficient to say that the respondents were similar to those described previously in connection with the repeat interview panel. There were some differences, of course, and these will be discussed when pertinent in comparing the substantive results from the two different surveys.

Table 17.

Outcome of Attempt to Interview Women Selected for KAP Survey

	f	%
Not completed; case lived in the original address, but		
Age did not meet the criteria	4	0.16
Marital status did not meet the criteria	9	0.36
Unmet by three or more visits	13	0.52
Refused	14	0.56
Due to physiological or psychological reasons	20	0.80
Subtotal	60	2.40
Not completed; not living at original address		
Case moved to other study townships	5	0.20
Cases moved to other Taoyuan area, but not the study township	10	0.40
Cases moved to other prefectures or cities, including new address unknown	135	5.41
Other reasons, such as cases dead	72	2.88
Subtotal	222	8.89
Completed; cases lived in the original address		
At the first visit	1,363	54.61
At the second visit	495	19.83
At the third visit	176	7.05
At the fourth or more visit	121	4.85
Subtotal	2,155	86.34
Completed; cases moved, but cases		
Moved to other study townships	29	1.16
Moved to other Taoyuan area but not study area	20	0.80
Moved to other prefectures or cities, including new address unknown	10	0.40
Others	0	0
Subtotal	59	2.36
Total	2,496	99.99

B. Studies with Practitioners Providing Service as Primary Source of Information

1. Practitioners' "KAP" Survey

a. General Description

This survey was carried out on medical practitioners, including practicing midwives, in Taoyuan County concerning their "KAP" relative to providing family planning service, including abortions, to individuals--not KAP relative to their personal family planning behavior, although an occasional question in this area was included. The universe of the study was all the private practitioners currently practicing medicine or midwifery and registered in their respective professional societies.

The questionnaire was designed to be self-administered by the respondents and anonymous. As a consequence, more "blanks" and "unknowns" appeared than in the usual face-to-face interview with probing. The questionnaire was administered at regular meetings of the societies concerned, and it generally took about twenty minutes for a questionnaire to be completed. A copy of an English translation of the questionnaire is in Appendix 5.

The field work for this phase of the study was carried out in March 1971, concentrated in the middle two weeks of that month.

b. Success of Follow-up

Approximately 92% of the registered physicians and midwives completed a questionnaire (Table 18). As usual, migration was the chief reason for failure to obtain a completed questionnaire.

c. General Characteristics of the Respondents

(1) By specialties of these medical and midwifery practitioners, their distribution in this study is shown in Table 19. Twenty-two of the 250 respondents (8.80%) were Ob-Gyn specialists (OG). As we will show in a later section, in spite of the small number relative to other types of practitioners, this is the main provider of induced abortion in this county. Our consumer study showed the same importance of this profession with regard to provision of induced abortion.

(2) A few comments on some of their background characteristics are in order before further comparisons are to be made among these specialties in their KAP concerning contraception and induced abortions.

Table 18.

Outcome of Interviews on the 272 Practicing Physicians and Midwives in Taoyuan

	Number	Percent
Completed	250	91.91
Not completed (moved away)	15	5.52
Not completed (retired or dead)	3	1.10
Not completed (unmet)	2	0.74
Not completed (other reasons)	2	0.74
Total	272	100.01

Table 19.

Distribution of the Respondents
Who Cooperated by Specialty in Taoyuan

	Number	Percent
Ob-Gyn doctor	22	8.80
Other physician	136	54.40
Herb doctor	39	15.60
Nurse or midwife	53	21.20
Total	250	100.00

OG are, in general, younger than general practitioners (GP) which in turn are much younger than the herb doctors (HD). Almost all of these three categories of physicians are exclusively male and currently married. As for the educational attainment, all of the OG are medical graduates at either the college level or, more likely, at the university level; while the GP are more spread in their education. A sizable number (13) of them have not received formal systematic medical training, though passed the licentiate examination; on the other hand, a few (6) of them have received graduate training. HD received lowest education with only one who has had university education. As for the practicing midwives (MW), their average age is in between those of the OG's and GP's; they are all females, and 88.68% were currently married. Most of them graduated from vocational midwifery schools (Table 20).

2. Clinic or Hospital Oriented Study

a. General Description

In this study the attempt was made to obtain directly from individuals providing induced abortion service information which would supplement that obtained through the medical practitioners' KAP and the more extensive surveys of the married women in the county. The goal would be to obtain this information through direct observation of clinic and hospital procedures. It was decided to use medical students as the observers in order to obtain reasonably well qualified individuals. To justify the medical students' spending their time on this project, it was organized as a kind of externship program, and for this purpose cooperation was obtained from the Medical Education Commission of the Ministry of Education, and their Executive Secretary, Dr. Y. T. Yen, was the director of the project.

With the help of the Taoyuan County Health Bureau and on the advice of its director and other leading public health men and practitioners, twenty hospitals (clinics) were contacted. Eighteen of these showed interest, and of these ten were selected for the study. These were selected for their clear agreement to cooperate and also for logistical reasons, distance from study headquarters being the main reason. Because of the very experimental nature of this study it was decided not to attempt obtaining a representative sample but a sample likely to give us some knowledge of the feasibility of getting information by this route.

Some of the characteristics of the ten hospitals in the sample are shown in Table 21. All hospitals selected for the study were in two urban areas, Chungli and Taoyuan. All study hospitals were equipped with telephones and could be reached from study headquarters at any time. The hospital most distant from headquarters was about ten miles away.

Table 20.

Age, Sex, Marital Status and Educational Level of Respondents by Specialty in Taoyuan

	OG		GP		HD		MW		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Total	22	100.00	136	100.00	39	100.00	53	100.00	250	100.00
Age of Cases										
20-24	-	--	1	0.74	-	--	-	--	1	0.40
25-29	-	--	3	2.21	-	--	2	3.77	5	2.00
30-39	5	22.73	17	12.50	1	2.56	7	13.21	30	12.00
40-49	7	31.82	34	25.00	2	5.13	16	30.19	59	23.60
50-59	8	36.36	51	37.50	12	30.77	22	41.51	93	37.20
60+	2	9.09	30	22.06	22	56.41	5	9.43	59	23.60
Unknown*	-	--	-	--	2	5.13	1	1.89	3	1.20
Sex										
Male	20	90.91	135	99.27	38	97.44	-	--	193	77.20
Female	2	9.09	1	0.74	-	--	52	98.11	55	22.00
Unknown*	-	--	-	--	1	2.56	1	1.89	2	0.80
Marital Status										
Single	-	--	1	0.74	1	2.56	1	1.89	3	1.20
Married	22	100.00	132	97.06	34	87.18	47	88.68	235	94.00
Divorced	-	--	1	0.74	-	--	-	--	1	0.40
Widowed	-	--	2	1.47	2	5.13	5	9.43	9	3.60
Unknown*	-	--	-	--	2	5.13	-	--	2	0.80

*Unknown here includes those with no answer.

Table 21.

Characteristic of Ten Study Hospitals, Taoyuan County, Taiwan, 1971

Hospital Coded Number	Location	Ownership	Specialty	Beds	Average Daily Outpatient Visits
1	Chungli	Private	Obstetrics-Gynecology	26	97
2	Chungli	Private	Obstetrics-Gynecology	7	32
3	Chungli	Private	Obstetrics-Gynecology	11	64
4	Chungli	Private	Obstetrics-Gynecology and General	72	100
5	Taoyuan	Private	Obstetrics-Gynecology	5	22
6	Taoyuan	Missionary	Obstetrics-Gynecology and General	100	60
7	Taoyuan	Private	Obstetrics-Gynecology and General	60	20
8	Taoyuan	Private	Obstetrics-Gynecology and Surgical	55	30
9	Taoyuan	Public	Obstetrics-Gynecology and General	25	20
10	Taoyuan	Private	Obstetrics-Gynecology and General	5	40

It was decided to use female senior medical students as observers in the study. Three medical schools provided thirteen female senior medical students. Training sessions in hospitals not included in the sample preceded the actual field operations. Daily supervision of the student observers was maintained. A study was carried out from mid-July 1971 for approximately four working weeks.

Schedules were prepared on which the information desired was collected. There were five interview schedules as follows:

(1) Patient care form

(2) Patient activity sheet

(3) Doctors activity time log

(4) Staff and facilities record

(5) Daily patient list

English translations of these schedules are in Appendix 6. Further detail concerning the conduct of this study is given in the section devoted to the presentation of some of its findings.

One important contribution of the study was that it provided an opportunity to examine the validity of information as to induced abortions obtained from interviewing women in the community and a special "validity study" was designed to determine this by selecting women known to have received an induced abortion in a clinic and a matched control to be interviewed "blind" at a subsequent date by one of our regular study interviewers. This "validity study" is presented as a special sub-section of this section on methodology.

II. Specific Methodological Findings

In the sub-sections which follow there will be presented, as relatively "free-standing" discussions, particular methodological findings. It should be recognized, however, that within the subsequent section presenting various substantive findings there will be additional information with particular methodological implications.

A. Use of the Randomized Response Technique for Estimation of Prevalence of Induced Abortion in Taiwan

1. Background for the Study

Induced abortion has a significant impact on the rate of population growth and is a public health problem of contemporary concern. Because of its illegality in many countries and its intimate nature in general, besides the other usual difficulties inherent to the interview survey method, its magnitude is either left largely to guess, or estimated with wide range.(1) It is generally believed that the conventional survey methods grossly underestimate its real incidence and prevalence.

The Randomized Response Technique (RRT) was developed by Warner to meet this and similar problems.(2) It was presumed that this technique would enable the respondents to provide truthful information on sensitive or highly personal questions and yet retain their privacy in personal interview surveys. A number of modifications in the original Warner proposal have been made and tried. Though a few trials were made in North Carolina(3) the technique has never been tested for its feasibility in a less developed society.

A study concerning the epidemiology of the outcome of pregnancy was carried out in Taoyuan, Taiwan in 1970-71. It was intended to determine, by using the interview method, the extent of pregnancy wastage and particularly of induced abortion and the relationship of induced abortion to

health, fertility levels, fertility control measures and other related matters.

In one phase of the study about 2,500 women were selected for interview and, to estimate the incidence of induced abortion, the RRT was applied to one-half of the women, using the two-question variation just mentioned, while the other half was subjected to the conventional interview technique. The reasons for doing this were as follow:

1. To test the feasibility and practicability of RRT in a different cultural setting where the literacy rate of women is low (ca. 50%).
2. To determine the efficacy of RRT, as compared with the conventional direct interview method, in detecting induced abortion.

2. Review of Literature

Since the original report by Warner in 1965 on the use of randomized response technique to estimate the proportion of a population having a sensitive characteristic,[1] considerable theoretical work and some field experiments have been done, mainly by Greenberg, Abul-Ela, Horvitz, Simmons, Daniel, Gould, Shah, Abernathy, and others.[4-11]

Warner originally considered a case where a population can be classified into two mutually exclusive groups, one having "sensitive" characteristics (e.g. induced abortion, etc.) and another not having such characteristics. The objective was to estimate the proportion of the total population who possess the "sensitive" characteristics, and for this purpose each of the respondents was asked to select by chance one of the following two "related" questions:

Question 1*: "I am a member of Group A." (Probability of selecting this question is P.)

Question 2*: "I am not a member of Group A." (Probability of selecting this question is 1-P.)

The respondent was to answer "Yes" or "No" to whichever question is selected. The interviewer does not know which of the two questions is actually selected through the randomizing process and, therefore, does not know to which question the respondent is answering.

The rationale of the RRT is that, since the respondent can answer a sensitive question without revealing his personal situation, there will be less embarrassment on her/his part, and she/he will be more willing to respond honestly.

Abul-Ela, et al. extended the use of RRT to estimate the proportions of three related but mutually exclusive characteristics of a population.(5) Later, following a suggestion of Simmons, Abul-Ela developed a modified method which is known as the "unrelated" question model.(6)

Horvitz, et al. have tried this unrelated question model for the estimation of incidence of abortion in North Carolina,(7) and Greenberg, et al. have studied the theoretical aspect of this model, results of which favored the unrelated question model to the original one in terms of statistical efficiency.(8) It has also been shown that if the probability (or proportion) of population having the unrelated and non-sensitive characteristic is known in advance, or can be estimated with reasonable precision, the efficiency of estimate will increase. A priori knowledge of this proportion, however, is not mandatory.

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*Similarly, two "related" questions may be: "I have ever had an abortion" and "I have never had an abortion."

Gould and his co-workers administered a set of unrelated questions to a group of respondents and repeated the set of questions (i.e., asked twice), rather than the usual method of asking only once.(9) Their purpose, however, was to study and develop models of respondent behavior. They applied these models to survey results on illegitimate births, in which survey randomized response was used.

Quantitative use of the RRT is a rather recent development and still needs to be improved.(10) Efforts are being made by Greenberg, et al. to develop a method by which the RRT questions may be used in a survey with self-administered questionnaires.(11) Field studies to test the feasibility of RRT under different cultural background in different countries have recently been started under the auspice of the World Health Organization.(12)

Some theoretical work on the RRT has been done at the Johns Hopkins University School of Hygiene, in connection with and as an extension of the current study, which will be discussed briefly at the latter part of this chapter.

3. Methodology

A total of 2,497 currently married women between 15 and 49 years of age were selected by a stratified probability sample in a county of Taiwan with approximately 79,000 eligible women (married, age 20-44) in that area. These 2,497 study women were randomly divided by village of residence into two groups. Both groups were asked the same questions on their background characteristics, their knowledge of, attitude toward, and practice of family planning, their knowledge of and attitude toward induced abortion,

their menstrual history and their perceived fecundity. As for the fertility history, only the livebirth history was asked of the RRT group before the technique was used, while whole pregnancy history, including probing questions on abortion, as usual was asked of the other group.

In order to reduce extraneous sources of difference between the two groups, each interviewer had approximately the same number of respondents in one group as in the other. In addition, the interviewers were advised to carry out the individual interviews at about the same pace in each group.

Fourteen female interviewers who were high school graduates were used in interview after intensive training on interview technique in general and RRT in particular.

Two questions which were "unrelated" were as follow:

1) "Have you ever had an induced abortion in your lifetime?" (Sensitive)

2) "Were you born in a year of the horse?"* (Innocuous)

The stones of "Go,"** which have two distinctive colors--black and white --were used as the randomizing device. The black stones represented the sensitive question, i.e., the one concerning induced abortions, and the white stones represent the innocuous question concerning whether the respondent was born in a year of the horse. Thirty-five black and fifteen white stones

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*Each lunar year in China is assigned an animal name; totally 12 animals were used, and they rotate every 12 years. The years of the horse relevant to our study population are roughly 1930, 1942, and 1954. Thus, we know the approximate proportion of women in the sample born in years of the horse in advance.

**"Go" is a kind of chess game which originated in China and is now popular in Japan. The playing pieces are stones, half of which are black and half white. Every stone is of the same shape and weight.

were used and put into an opaque cloth bag, thus making the proportion of times the sensitive question is asked 70% (P = .70), and relative frequency of asking the innocuous one 30%.

The interviewers were instructed to mix the stones thoroughly and to use the following wording to explain the reason for this approach and the way of doing it before each trial as follows:

> Mrs. _____, I have asked you many types of questions in the usual way, and you have answered them. Now, I want to use a kind of game to ask you one or two more questions. This is a new method. Only a few countries have used it. The purpose of using this method is that we want to find out whether it is a good method of obtaining information. So, we hope you will cooperate with us.
>
> Now, let me explain how to play this game: Here is a bag; in it there are stones from the game "Go," some colored black and the others white. Please take one stone out, and see for yourself what color it is, black or white. But don't let me know whether it is black or white, just be sure you remember which it is. If you take a black one, answer the question: "Have you ever had any induced abortions?" If you take a white one, answer the question: "Were you born in a year of the horse?" Let me repeat. The black one represents the question: "Have you ever had any induced abortions?" The white one represents the question: "Were you born in a year of the horse?" Can you remember it? Now, would you mind repeating once more to me? What does the black one represent? .... And the white one? .... (If respondent can remember it) Then, when you answer the question later, just answer "yes" or "no" according to the actual question you have picked. You don't need to say any other words; just answer "yes" or "no," so that we cannot know which question you answered. But when we add up all the answers we get, we can know what is the percentage of women who had an induced abortion and what is the percentage of women born in a year of the horse. But we cannot know which person answered which question.
>
> Now I will shake the bag and mingle the stones in it. Please take one stone from the bag, but don't show it to me; simply answer to the question its color represents. (After she takes one stone) Is your answer "yes" or "no"?

The interviewers were also instructed to turn their heads away from the respondents to show that the former would have no way of knowing what colored stones the latter had drawn. The RRT was carried out in the latter

one-third of the interviews, hoping that by then good rapport between the interviewers and the respondents had already been established, and the respondents are familiar with questions concerning induced abortion, which includes both illegal and therapeutic but excludes spontaneous abortions and stillbirths.

As in the North Carolina study, three additional questions were asked of the respondents in the RRT group to gain further understanding of their opinion about this approach.

4. Results

A. Participation of Respondents

The study interests included not only the estimation of prevalence of abortion but also the response and reaction of the respondents to the RRT.

Interviews were completed on approximately the same proportion in the two groups, RRT with 89% and NRRT (Non-RRT) with 88% (Table 1).

Table 1

Outcome of Attempts to Carry Out Interviews

	RRT Cases		NRRT Cases		Total	
	Number	%	Number	%	Number	%
Number of cases orginially assigned	1,251	100.00	1,246	100.00	2,497	100.00
Number of cases with interview not completed	139	11.11	143	11.48	282	11.29
Number of cases with interview completed	1,112	88.89	1,103	88.52	2,215	88.71

Table 2 summarizes some aspects of the performance of the 1,112 respondents who were selected for the RRT and for whom a completed interview was obtained.

Of these completed interviews among cases selected for the RRT, 91 cases or 8.2% were not administered the RRT, one through an interviewer's error and the others because they had already revealed that they had had one or more induced abortions. This is a problem "inherent" to the RRT when it is administered with the usual KAP type of survey.

There were, then, 1,021 women who were asked to participate in the use of the RRT. Six hundred ninety-two (692) or 68% of these cooperated and gave a useable response.

Table 2 describes further the 329 uncooperative respondents, 32% of the 1,021 who were asked to cooperate. About 7% of those asked to cooperate were apparently unable to understand what they were to do. Most of the remainder of the uncooperative gave definite information concerning their induced abortion history at the time they declined to cooperate. In effect, and frequently explicitly, the latter said that there was no need to carry out the RRT as they would willingly either admit to having had an abortion (occurring in 27 of 188 such cases) or let the interviewer know that they never experienced such an event (the remaining 161 of the 188 reported thus).

B. Estimation of Proportion with Induced Abortion

1) Estimate from the RRT responses:

As mentioned earlier, the RRT was used on a randomly selected half of a probability sample of about 2,500 women. Those not given the RRT were

Table 2

Outcome of Interview on Cases Selected for RRT Whose Interviews Were Completed

	Number	Percent of Total With Completed Interviews	Percent of Those Asked to Use RRT
Number of cases selected for RRT whose interviews were completed	1112	100.00	
1. Switched from RRT before RRT was applied (One was switched by mistake, the others because they had already revealed experience with induced abortion.)	91	8.18	
2. Asked to use RRT	1021	91.82	100.00
a. Cooperative RRT cases	692	62.23	67.78
(1) Answered "yes"	151	13.58	14.79
(2) Answered "no"	541	48.65	52.99
b. Uncooperative RRT cases	329	29.59	32.22
(1) Did not mention induced abortion	74	6.65	7.25
(2) Mentioned not having had induced abortion	161	14.48	15.77
(3) Mentioned having had induced abortion	27	2.43	2.64
(4) Could not understand question	67	6.03	6.56

asked directly how many induced abortions they had had. This was done in the course of obtaining a complete pregnancy history.

An estimate based on the RRT shows 28.6% of the respondents had had one or more abortions. The RRT estimate is obtained as follows, using notation similar to that of the article by Abernathy, et al.:[3]

$$\pi = \frac{\lambda - \pi_y(1 - P)}{P} \quad . \quad \text{By rearranging, } \lambda = P\pi_1 + (1 - P)\,\pi_y$$

where π_1 = the estimate of the proportion with one or more induced abortions

λ = proportion answering "yes," here = $\frac{151}{692} = 0.02182$

π_y = proportion born in year of the horse, estimated here as $\frac{42}{692} = 0.0607$

P = probability of selecting the "induced abortion question," fixed here at 0.7

1-P = probability of selecting the "year of horse question," fixed here at 0.3

Then, $\pi_1 = \frac{0.2182 - 0.0607\ (0.3)}{0.7} = 0.286 = 28.6\%$

2) Comparison with Non-RRT responses:

Of 1,102 respondents from whom direct information regarding their history of induced abortions was obtained, 140--or 12.7%--reported one or more induced abortions. The difference between the estimate for the RRT group, 28.6%, and that for the NRRT group, 12.7%, is large and highly significant statistically. Abernathy, et al. [3] as well as other references[7,8] give a theoretical justification for the estimate derived from the RRT and explain the calculation of its variance. The fact that the difference is in the direction which one would expect if the RRT

reduces underreporting supports the thesis that the RRT may be of value in the Taiwan culture, as it is believed to be in the North Carolina setting.

3) Comparison with previous KAP surveys and the results of the repeated interviews:

The increase in the reporting experience of induced abortion by RRT is remarkable, and actually the highest rate ever obtained in Taiwan, if we consider Taoyuan Prefecture is roughly a representative rural-urban agglomeration of Taiwan as a whole (Table 3).

Table 3

Rate Who Ever Had Induced Abortion Per 100 Women As Detected by Various Surveys in Taiwan

Name of Surveys	Rate	Sample Size	Type of Respondents
Island-wide KAP I (1965)	9.5 %	5,360	Married
KAP II (1967)	12.3 %	4,989	Women 20-44
KAP III (1970)*	13.8 %	2,558	Years Old
Repeat Interview in Taoyuan Prefecture**			
At Round 1 (May-June 1970)	8.38%	1,861	Married
At Round 8 (February-March 1971)	13.99%	1,737	Women 15-49 Years Old

*From Chow, L. P. Monograph, "Induced Abortion in Taiwan," 1970.

**In our Taiwan Outcome of Pregnancy Study, two main approaches were used. One was the prospective-type approach named as Repeat Interview, with nine rounds of visits in a year, each about six weeks apart. During Round 1, history of fertility in general, and in Round 8, history of induced abortion in particular were asked. The other was the retrospective-type approach, named as One-Shot KAP Survey. The present paper is based on data from the latter approach which was carried out during May-July 1970.

4) Correlates with selected characteristics of respondents:

It is also possible for the result of the RRT to be analysed by various socio-economic characteristics to examine their correlations. Table 4 shows the results of such analyses on selected variables.

Table 4 . Proportion of Women Who Had Had Abortions by Selected Demographic Characteristics--RRT Cases

Characteristics	Proportion Who Had Had Abortions	Sample Size
1) Age group:		
29 and below	25.1	304
30 and above	30.7	387
*2) No. of live births:		
0 - 1	17.6	243
2 +	33.0	449
*3) Education:		
No formal	38.4	204
Primary +	23.1	488
4) Use of contraceptives:		
Ever used	25.4	453
Never used	31.2	238
5) Farm background:		
With farm background	25.5	453
No farm background	29.2	397
*6) Working or not:		
Working now	29.8	548
Not working	19.2	144

Note: Total number of cases--692, and the average proportion--28.7%.

*Indicates that the difference between two sub-groups is statistically significant at 5% level.

The differentials shown above are consistent with the results of previous studies, except those for the level of education. Women without any formal

education had had a significantly higher abortion rate (38.4%) than those with at least primary education (17.6%), which is contrary to the previous findings, hence is a source of concern.

Table 5 . Proportion of Women Who Had Had Abortions among NRRT and RRT Groups by Education of Respondents

Education		NRRT Group		RRT Group	
No education		10.8	(100)	38.4	(356)
Primary and above		14.6	(100)	23.1	(158)
Total:	Rate	12.7	(100)	28.7	(226)
	Sample	1,103		692	

( )--Index. Rates for NRRT Group as 100.

Table 5 shows the proportion of women who had had abortions by education for both the RRT and the NRRT groups. It will be noted that for the NRRT group, the differential of abortion rate by education was consistent with the previous findings: positively correlated with the level of education.

The RRT has elevated the rate for the educated from 14.6% to 23.1%, or by 58%. For the non-educated, the augmentation was most remarkable, from 10.8% to 38.4%, or by 256%, which although is not entirely impossible, is less likely to be true.

Several explanations of this inconsistency seem possible:

(1) The non-educated had been strongly inhibited in revealing their experience of induced abortion by the usual survey, and the RRT had removed such inhibition. The result as obtained by the current trial of RRT is the "true" picture of abortion in Taiwan. The likelihood for this explanation, however, is small.

(2) While the RRT had helped the non-educated to respond "honestly", it had failed to remove the suspicion of the educated group entirely. More of them said "no" to whichever question they drew, in order to be "safe." The rate obtained by the RRT for the educated (23.1%) was a gross underestimation.

(3) The non-educated were unable to understand the RRT, and for "courtesy" or other reasons, said "yes" more, regardless of the questions and their true status. This should have resulted in an overestimation.

(4) At its worst, although less likely, the RRT respondents of both educated and non-educated groups were inconsistent, and the direction of error was uncertain.

Assuming that the second assumption above was true and that the rate for the educated had been grossly underestimated, while that for the non-educated was correct, and taking the educational differential of the NRRT group as given, then the adjusted rate among the 692 RRT women should have been 48.0%.

On the other hand, assuming that the rate for the educated (23.1%) was correct, and following similar procedures for adjustment, then the rate will become 21.4%, which still is substantially greater (69% higher) than the rate obtained from the NRRT group. Based on what we know about the people in Taiwan, the third possibility that there had been more erroneous affirmative responses from the non-educated seems to be more likely. On the other hand, it should also be probable that some of the educated might have given more negative answers than they actually should have given, and in general the "true" rate might fall somewhere between the range of 21.4% to 28.7%, disregarding other sources of possible bias (see page 53).

More specific analysis on individual response--including studying the response pattern to the innocuous question--should elucidate, at least in part, the question above.

5) "Maximum" estimate of proportion of women who had had abortion:

The proportion of those who had had an abortion was 28.6% by the RRT based on 692 responses, but the real interest is estimation of the proportion of women who had had abortion, among the 1,112 women who were originally intended for RRT.

Among the 91 "switched" cases (see Table 2), 90 had had at least one abortion, which was discovered before administering the RRT and during the course of asking their pregnancy histories. An additional 27 cases said that they had had an abortion, and 161 women said that they had never had an abortion. There were 74 women who did not cooperate but did not mention induced abortion and 67 women could not understand the RRT, totalling 141. Some of these 141 women must have had an abortion, and a high estimate will be to assume the proportion to be the same (28.6%) as the RRT cases and a low estimate is to assume it to be the same as that of the Non-RRT group (12.7%). Assuming further that the answer of "never had abortion" among the 161 women was an "honest" one, then the total number and proportion of women who had experienced at least one abortion among the 1,112 RRT group should be as follows:

Description	No. of women	No. of women who had had abortion	
		High estimate	Low estimate
Cooperative RRT	692	198	198
"Switched" from RRT to Non-RRT	91	90	90
Mentioned having had abortion	27	27	27
Mentioned not having had abortion	161	0	0
Did not mention or could not understand	141	40	18
TOTAL	1,112	355	333

By the high estimate, the total number of women who had had abortion will be 355, corresponding to 31.9% of the total 1,112 cases. By the low estimate, the number will be 333, and the proportion 29.9%.

The low estimate probably is a conservative one, because the assumed rate of 12.7% by the conventional interview is known to be grossly underestimated. Those who did not mention induced abortion (74), despite the fact that they understood the RRT, might consist more of women who had had abortion but who, for various reasons, do not want it to be known.

5. Discussion

Some thought should be given to the RRT before we can give credit to it as a better tool of detecting induced abortions. We will discuss this along two main lines, namely, (1) comparability of the original NRRT cases (1103) and the cooperative RRT cases (692), and (2) feasibility of this approach in the Taiwan setting and in general.

A. Comparability of the original 1102 NRRT cases and the 692 cooperative RRT cases

As stated above, NRRT and RRT cases were assigned randomly by sub-unit within village mainly because of administrative convenience. Theoretically, the two groups should be comparable from the beginning. However, since it is known that there is more heterogeneity among villages than within villages in terms of ancestry of cases and probably more so that of their husbands, and since there were 420 cases (37.77%) among the original 1112 RRT cases who could not participate in the RRT for various reasons, of which 91 cases switched over to NRRT mainly due to reported induced abortions, some

selectivity might have occurred in the 692 cooperative RRT cases from whom the higher rate of induced abortion was derived. It is thus thought necessary to compare the original NRRT cases with the original RRT cases, as well as with the cooperative RRT cases in those important characteristics such as nativity, age, education, and number of livebirths of the case (Tables I - XXVIII*).

First, the comparison between the original RRT and NRRT cases would reveal whether there had been some selection due to our original sampling scheme. In Tables I and II it is shown that the two groups are roughly comparable by township and by interviewer, as they should be, because of our administrative arrangements. However, difference in ancestry of respondents and marked difference in ancestry of husband were displayed between the two groups and are worth special attention. Ten percent more of the cases and 20% more of the husbands were mainlanders in the original RRT group than in the original NRRT cases (Tables III and IV). The possible reason for this is that by randomization we have selected villages in which most of the household heads are mainlanders, such as the living quarters of military officers or veterans, as the RRT villages. The relatively fewer livebirths, more education, and greater use of Mandarin language in the RRT group as compared with the NRRT group as shown in Tables V , VI and VII might be also partly due to the fact that more mainlanders are in the former group. Mainlanders are known to be more educated and less traditional because of selectivity of migration. Bias from this source will overestimate the proportion of abortions to some extent.

Comparison can then be advanced between the cooperative and the uncooperative cases within the RRT group to detect whether there had been

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*Tables I through XXVIII all appear in Appendix 7.

some self-selection by the respondents, as far as RRT technique is concerned. From Tables VIII through XXVIII, it is shown that, in general, respondents in the more urbanized town of Chungli with mainlander husbands, slightly younger age, and more education, and who have had fewer livebirths, were more likely to cooperate. They tend to have a more "modernized" attitude toward family planning and abortion. The greatest differential was shown in education of women. Distributions of ancestry of respondent are quite comparable.

Some difference may be noticed among interviewers: the proportion of non-cooperative respondents varies by interviewer from 23% to 55%, averaging 29%, but its effect on the result is not known.

In brief, we have drawn into the cooperative RRT group women with relatively higher socio-economic status, first by the process of sampling selection, and then by self-selection. The relatively higher induced abortion rate we derived in this group as shown previously by using the RRT technique might possibly be exaggerated by these selections, since data from others have shown that in Taiwan incidence of induced abortion is positively related to education.(13) Adjustment of the induced abortion rate derived above is apparently necessary.

Various methods for this adjustment should be possible, but what we have done so far is to apply the abortion rates specific to three major variables--education of respondents, dialect used by respondents, and ancestry of husbands--each separately, just to see the strength of bias.

The proportion of women who had had abortions among the 1,102 NRRT cases was 12.7%. Their rates specific to education, type of dialect used, and ancestry, are available. Applying these specific rates to the

distributions of the 692 RRT-cooperative group will result in the rates of 13.7%, 15.0% and 13.0%, respective to these three variables. Type of dialect used exhibited the strongest effect by inflating the rate from 12.7% to 15.0%, or by 11.8%.

Assuming that the observed rate among the 692 RRT-cooperative cases had also been inflated by 11.8%, then the "actual" rate should have been 25.6%, rather than 28.7% as observed.

The above adjustment obviously is an oversimplification, but it may be fair to say that although the bias introduced by non-cooperation with the RRT is in the direction of over-estimating the proportion, the effect should not be large. A substantial difference still exists between the estimate based on the RRT and that by the conventional survey method, allowing the possibility of biases from various sources.

B. Feasibility of RRT

Sound statistical reasonings are essential for a survey method, but equally important is its feasibility. The RRT, being a relatively new technique introduced for survey of sensitive problems, deserves special attention in this regard.

Feasibility of the RRT seems to be related with four factors: knowledge of the event on the part of the respondents, understanding of the procedures of RRT, willingness to play the "game", and willingness to respond honestly.

As mentioned earlier, it is unlikely for a woman to report an abortion which she has never had. Deliberate over-reporting of the event, therefore, is unlikely. However, there is a possibility, although not

large, for a woman to have an "induced abortion" performed by a doctor when she actually is not pregnant. This may be deliberate "over-surgery" of a doctor or his unintentional "mis-diagnosis".

Since induced abortion is a significant event for a woman, it should be reasonable to assume that she would not forget it if she has had one.

The ability for all or most of the respondents to understand the procedures of RRT will be a serious problem particularly in a country where the literacy is low. In Taiwan, where more women are educated than in most other "developing" countries, 7 percent of the respondents were unable to understand what they were supposed to do. Most of these women had had no formal education or only primary education (Table 6). This unfortunately will be a limiting factor for the RRT to be used in the developing world.

Not all the respondents who were asked to play the "game" were willing to do so. A total of 188 persons were unwilling in the sense that they were prepared to tell the "truth", either affirmative or negative, rather than going through this "tedious game". Twenty-seven (27) individuals who admitted to having had abortions definitely were telling the truth. However, question remains as to whether the 161 persons who were unwilling to play the game but who declared that they have never had abortions were revealing their status honestly. This in a sense is an indirect refusal of cooperation which indicates three possibilities: they indeed had never had abortions, they had had abortions but were unwilling to tell the truth no matter what technique is used, and they did not understand the RRT procedures well and it is an "excuse" to "cover up" their ignorance. Knowing the ways of thinking of people in the rural area in Taiwan, it is

Table 6

Education of Respondents Who Were Non-cooperative in the RRT
by Their Type of Non-cooperation

Highest Education	Could Not Understand the RRT		Reported "No Induced Abortion"		Reported "Had Induced Abortion"		No Comment on Induced Abortion		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
None	48	71.6	85	52.8	13	48.1	48	64.9	194	59.0
Primary	18	26.9	65*	40.4	12	44.4	26	35.1	121	36.8
Junior High	1	1.5	4	2.5	1	3.7			6	1.8
Senior High and Above			7	4.3	1	3.7			8	2.4
Total	67	100.0	161	100.0	27	99.9	74	100.0	329	100.0

*Includes 2 with some ill-defined education, estimated as "Primary."

our opinion that all of these three possibilities exist. Possible error from this source will be in the direction of underestimating the real proportion of women who had had abortions.

The flat refusal of 74 cases was another source of concern. It seems likely that the group consisted more of those who had experienced abortions, and the direction of bias from this source again is inclined toward an underestimation.

If RRT in general still underestimates the "true" proportion of women who had had abortions, the substantially higher estimate obtained by the technique should be meaningful. This is to say that the RRT, although it is still unable to discover all the abortions, can detect substantially more than the number usually detected by the conventional survey technique.

The last but not the least important consideration in this regard is the willingness of the respondents to respond to the question honestly. Aside from the understanding of the procedures of RRT as mentioned above, this probably is related to the degree of confidence the respondents have that this technique keeps "confidential" the sensitive information.

In order to assess the confidence of the respondents toward this new survey technique, the following three questions were asked of the 692 women who cooperated with the administration of the RRT: (1) whether friends or relatives would think there is a trick in RRT, (2) whether the respondent herself thinks there is a trick in RRT, (3) respondent's impression as to whether friends or relatives would answer honestly a direct question concerning induced abortion.

The timing of these questions, their exact wording, and various other factors in addition to characteristics specific to the respondents may influence answers. Strictly speaking, therefore, the results obtained by

Table 7

Respondent's Impression as to Whether Friends or Relatives Would Think There is a Trick in RRT

A. Taiwan*		B. North Carolina**	
	Percent		Percent
No	40.5	No	60.7
Some yes, some no	1.3	--	
Yes	34.1	Yes	20.8
Don't know	24.1	Not sure	18.5
Total	100.0	Total	100.0
Respondents	692	Respondents	4571

*"Do you think other women like yourself, your friends, and your acquaintances will think that there is a trick to this and that we can really figure out which question was answered?"

**"Do you believe other people will think that there is a trick to the box and that we really can figure out which questions they answer?"(4)

Table 8

Respondent's Opinion as to Whether There is a Trick in RRT

A. Taiwan*		B. North Carolina**	
	Percent		Percent
No trick	48.0	No trick	76.3
Yes	36.7	Yes	15.4
Don't know	15.3	Not sure	8.3
Total	100.0	Total	100.0
Respondents	692	Respondents	4571

*"When you selected a 'Go' piece, did you think we could figure out which question was selected?"

**"When you played the game, were you convinced that I would not know which question you were answering?"(4) Category labels in table correspond to table heading and not to North Carolina wording of question.

Table 9

Respondent's Impression as to Whether Friends or Relatives Would Answer Honestly a Direct Question Concerning Induced Abortion

A. Taiwan*	Percent	B. North Carolina**	Percent
None	6.2	No	65.8
Yes, few (less than half)	21.7		
Yes, some (about half)	13.0		
Yes, many (more than half)	42.6	Yes	16.9
Yes, amount unknown	2.5		
Don't know	14.0	Not sure	17.3
Total	100.0	Total	100.0
Respondents	692	Respondents	4571

*"How many women among your friends and acquaintances do you think would answer truthfully to a direct question about whether they have had an induced abortion? (Most, some, a few, nobody)"

**"If an interviewer, like myself, asked one of your friends if she had ever had an abortion, do you think your friend would answer truthfully?"(4)

this study are not comparable with those of the North Carolina study. Both sets of results, nevertheless, are shown in Tables 7 , 8 and 9 , just to illustrate the general reactions to RRT of two populations of different cultural settings.

The Taiwan respondents appeared to believe that a larger proportion of their friends would respond truthfully to a direct question regarding induced abortions than did the North Carolina women. This may be a partial explanation of why so many of the Taiwan women stopped the game before it proceeded to its real point by saying, in effect, "It is not necessary to go through with this, I will tell you. I have had (or have not had) an induced abortion." However, such a response is also consistent with suspicion that a trick is involved, for in such a case there would be no point in pretending the interviewer did not know the respondent's status after the "game."

Although abortion is illegal in Taiwan, the laws concerning it are losely enforced. The community, in general, "tolerates" the practice of abortion as a way of birth control, and there probably is less social stigma associated with the practice of abortion in Taiwan today than there was in North Carolina when the survey was done in 1969.(3)

Table 10 shows--for the Taiwan experience--the relationship between the respondent's own opinion about the possibility of some trick being involved and her impression as to how her friends might think about this. The marked agreement between a respondent's opinion and her estimate of the opinion of her friends is clear. About 70% of the women thought their friends would have the same opinion as theirs, regardless of their own impression concerning the existence of a trick.

Table 10

Relationship Between Respondent's Opinion about a Trick in RRT and Her Impression of Her Friends' Opinions (Percentages summing horizontally are in parentheses)

Respondent's Opinion	Respondent's Estimate of Friends' Opinions							
	No Trick*		Yes		Don't Know		Total	
No trick	240	(72.1)	51	(15.3)	42	(12.6)	333	(100.0)
Yes	33	(13.0)	169	(66.5)	52	(20.5)	254	(100.0)
Don't know	16	(15.2)	16	(15.2)	73	(69.5)	105	(100.0)
Total	289		236		167		692	

*The 9 (or 1.3% of 692) who reported merely that some friends would and some friends would not think there was a trick were included here in this tabulation--5 within the 240, and 2 each within the 33 and 16.

The Taiwan respondents professed more suspicion than did the North Carolina group. This might be a reflection of difference in the level of education between the two groups.

It has been "hypothesized" that the more educated and more sophisticated tend to be more skeptical. Another "hypothesis" on the contrary is that illiterate people are extremely suspicious, and that their suspicion is rooted partly in their inability to comprehend the reality of the matter. Both "theories" sound reasonable, but the present finding seems to suggest that the latter is more likely, which may be another limitation for application of the RRT in the less developed societies.

Both the Taiwan and the North Carolina groups claimed to be more believing themselves than they thought friends might be, although this finding was more marked in the North Carolina experience. Perception of more

suspicion of others may be an indication of a fundamental skepticism on their own parts. More publicity on the RRT probably will result in better understanding and acceptance of the method at least by the more educated in the community, leading to less suspicion and better cooperation.

6. Further Considerations about the RRT

Since better measurements to assess the incidence and prevalence of induced abortion are urgently needed to better estimate its impact on fertility, further studies on the theoretical aspects as well as the practical feasibility of the RRT are much needed. The experience gained in applying the RRT in Taiwan has prompted us to explore further several important points in regard to the use of this new survey technique.

With regard to the practicability and feasibility of RRT, the characteristics of respondents--particularly their level of education and literacy--are important considerations which have been discussed in some detail in a previous section. There are other considerations in the RRT such as the following:

A. Interviewers:

As in any type of social survey, adequacy of interviewers is of primary importance. In addition to the usual requirements for an adequate interviewer--including such factors as age, education, work experience, training, language and interviewing skills, etc.--more rigid requirements may be necessary for administration of RRT. Intelligence, thorough understanding of the technique, and skill of rapport building--as well as personality to gain the confidence of the respondents--are needed even more for this new technique.

Although no study has been made, the confidence of the interviewers themselves in the RRT probably will affect their ability in convincing the respondents to cooperate, which again may affect the survey results.

B. Questions:

It has been shown that the "unrelated question model" is superior to the "related question model" in the qualitative use of the RRT.(8) Taking this for granted, formulation of two "unrelated" questions, particularly of the innocuous one, requires careful thinking and is not as easy a task as it might appear to be.

For the sensitive question about abortion, the wording may be in the form of "ever had an abortion in the lifetime" or "ever had an abortion during a specified period of time (say, during the past 12 months)". In the Taiwan study, decision was made to adopt the former based on two considerations: (1) The respondents may have some trouble in recalling the exact dates of abortion they had had, and it is always easier to ask them their total experience in the past; and (2) this allows for comparability with the results of KAP surveys previously done. In some other studies, it might be possible to adopt the latter type of question, particularly for the purpose of estimating annual trend in the incidence of abortion.

More difficulty was encountered in deciding upon the innocuous question. In one of the surveys conducted in North Carolina, the sensitive and innocuous questions were as follow:

1) "I was pregnant at some time during the past 12 months and had an abortion which ended the pregnancy."
2) "I was born in the month of April."

Because the RRT was applied after the usual interviews on date of birth and other socio-economic characteristics of respondents, it makes little sense in the Taiwan study to use the innocuous question such as the above. After a series of discussions, it was finally decided to use the "born in the year of the horse" as the innocuous question, taking advantage of the particular cultural setting in Taiwan (and in China in general, as well as in Japan, Korea and other Asian countries with Chinese cultural heritage).

This question, though otherwise a good one, does have one weakness, which was not realized until some later time. Since the date, month and year of birth of respondents had already been asked, some sophisticated respondents might have suspected that we were asking a question to which we already had the answer and that it was a built-in "trick" to identify their responses. This indeed is a valid point, but the extent of its effect on the result is not known. Further thought will have to be given to developing a more satisfactory innocuous question that meets the following requirements:

1) It must be answered exactly in the same way as the respondents will answer the sensitive question, namely "Yes" or "No," or "True" or "False."

2) It must concern information for which the probability of occurrence among the survey population is known or can be reasonably accurately estimated.

3) It must concern a distinctive event (or characteristic) which is easily remembered or understood by the respondents.

4) There must be no way for the interviewers or investigators to "guess," based on the responses, to which questions the respondents have answered.

5) It should have some relevance to the survey which is being undertaken.

The experience or event which is to be surveyed by the RRT must be an indisputable one which the respondents will have no difficulty defining. For example, asking such questions as experience of drunken driving or cheating on examination may not be good subjects for RRT, because respondents might have trouble in defining the extent of drunkenness or cheating to "qualify" for the conducts.

Although Greenberg, et al. have proved theoretically the superiority of the "unrelated questions model" over the "related questions model," speaking from the psychological viewpoint, the latter model might have some advantage over the former. Supposing that a respondent is extremely cautious and is determined not/to reveal her sensitive characteristic, she can answer "no" to whichever question she draws, in which case she will be completely "safe." There is no such advantage for the "related questions model," because answering "no" to the question "I am <u>not</u> a member of Group A (sensitive characteristic)" in fact means that she does have such sensitive characteristic (abortion, crime, etc.), and the respondent cannot afford to give negative response indiscriminately.

C. Pictorial illustration of questions:

Different colors of beads were used in the North Carolina survey. In our study, the stones of "Go," which have black and white colors, were used as a randomizing device, each color representing one of the two questions.

The beads used in the North Carolina study were confined in a plastic box, on one surface of which the two questions were printed to remind the respondents. These were not done in the Taiwan study. An idea to draw pictures about the questions was suggested but not practised.

Pictorial illustration of questions should be useful and worth trying in the future studies. For example, in the case of the Taiwan study, illustrating a white stone of "Go" and a horse, and a black stone of "Go" and perhaps a clinic (or a doctor) might help women of low literacy to respond to a right question.

In this connection, Mauldin suggested exploring the desirability of "training" of respondents by having a few or several sets of less sensitive questions to precede the real one.(14) For example, the first set might deal with such characteristics as the place of residence, or others of known probabilities. In addition to familiarizing them with the RRT procedures, this will provide an independent estimate of the degree of understanding of the RRT by the respondents. In the Taiwan RRT trial, for example, there was some thought that the non-educated might not have understood the procedures and indiscriminately responded affirmatively.

D. Randomizing devices:

The randomizing device is a critical factor for ensuring the success of the RRT. Use of the stones of "Go" was not a bad idea because the game is popular and people are familiar with the stones of "Go" which are readily available.

In order for the RRT to work, however, the probability (P) of drawing a particular type of question must be constant. Should the probability fluctuate from one trial to another, then the theoretical basis of the RRT is lost. Putting stones of "Go" into a cloth bag as the randomizing device, in this regard, has a rather serious weakness. Although there should be 35 black stones and 15 white stones in each bag, giving a probability of responding to the sensitive question of 70% (P = .7), there is no assurance that one or two of these stones might not be lost due to the carelessness of the interviewers in the course of the entire survey.

A confined plastic box used in the North Carolina survey, in this respect gives a better assurance of a constant probability of P. Randomization (thorough mixing of both colors of stones) of stones within a cloth bag may not be thorough if done only casually.

Poker cards as a type of randomizing device share the same weakness because the total number of a set of cards and the proportion of each type within the set may change accidentally. Shuffling of cards to the extent that two types of cards are adequately mixed may also be difficult.

As an extension to the RRT trial in Taiwan, some thoughts have been given by the Hopkins group to developing other randomizing devices. Some

theoretical work on these new devices has also been done, one of which is presented in a draft-article describing a 'flask', see Appendix 8.

This device will be used for estimation of quantitative data such as number of induced abortions performed by the respondents in the past.

Other devices for which theoretical work is in progress include use of a device similar to a roulette wheel and one similar to a Japanese gambling machine called "Pa-chin-ko." Both of these devices can be used also for estimation of quantitative data on sensitive problems.

Randomizing devices may be mechanized and electrified. It should be possible to design a machine and by pushing a button on its panel, one of the two questions will appear at random with a pre-determined probability. The respondents may simply push the "Yes" or "No" button and the answers will be automatically registered, such as in the case of voting machines. Further elaboration of this mechanical device should enable registration of the basic characteristics of the respondent for cross tabulations. The respondents will be instructed to push appropriate buttons related to their characteristics. Computerization with multiple input terminals for RRT is not entirely out of question.

E. Use of RRT as a supplementation rather than replacement:

When the RRT is administered during a usual KAP survey, in which pregnancy history questions are usually asked at the beginning of the interview, information on induced abortion will be "accidentally" revealed. A careful

interviewer is always sensitive to a pregnancy interval (or birth interval) when it appears to be unduly long. Probing into such interval frequently discloses an event of induced abortion.

Speaking from the viewpoint of the survey objective, which is to detect as many abortions as possible, previous disclosure of abortion experience should not be a drawback. For the study on the practicability of the RRT, however, such disclosure of events will jeopardize the integrity of a sample, introducing some bias into the results.

Two solutions seem to be possible:

1) Administer the RRT prior to the pregnancy history questions, and

2) Use the RRT as a supplement to, rather than a replacement of, the conventional interviews so that the "maximum" rate of experience of abortion will be obtained.

Concerning the second thought, again there are two different approaches: (1) administering the RRT toward the end of the interviews to all of the respondents regardless of their answers to the extensive exploration on abortion with the pregnancy history questions, and (2) intensive inquiry on the experience of abortion with the pregnancy history questions, and administer--at a later time during the interview--the RRT to those who have never revealed any experience of abortion.

It might sound strange to ask questions on abortion with RRT after the respondents supposedly have already answered the related questions "honestly" but with an introductory statement such as the following, and ignoring the answers to the pregnancy history questions, it may still be possible to administer the RRT on all, or part of the respondents:

Now, let me tell you that we are particularly interested in the problem of abortion, because it is rather widely practised and will affect the birth rate. For improvement of our family planning program, we ought to know how many abortions are being done in this community. Unfortunately, there is still some sensitivity to this question. Some people feel that it is a personal matter and are reluctant to answer directly.

In order to overcome the embarrassment in answering to a question about experience of abortion directly, research people have recently designed a very clever method which is called RRT. By this technique there are two questions, which will be chosen at random by respondents who only answer "yes" or "no" (to whichever of the questions they happen to have picked up) according to their own real situation.

Let me show you how it works. Suppose I have had an abortion in the past .... (Followed by usual demonstration of RRT procedures.)

This, as you can see, is a kind of scientific game. Whichever of the two questions you pick up, just answer "Yes" or "No" honestly to your own experience or situation.

Now I would like to ask you to cooperate with the study by playing this "game."

....

The interest is to determine how many more abortions will be picked up by this supplementary administration of RRT. The practicability of the idea, however, requires field trials.

F. Difficulty of RRT procedures:

A fundamental weakness of the RRT is its complexity. Administration of two "related questions" seems to be the simplest, yet there always is possibility that the procedures will not be thoroughly understood by women in the rural areas. In this regard, the new "flask" device as designed by the Johns Hopkins group does have a drawback of being rather complicated. Testing of various new randomizing devices under different cultural settings and among populations of different educational backgrounds to determine their reactions and responses is essential.

G. Multiple trials of RRT question per respondent:

Two types of statistical errors exist in a survey utilizing the RRT: (1) error in selecting the respondent sample from the universe, and (2) error in selecting a question by the respondent. Increase of sample size will minimize both types of errors, but increase in the number of trials per respondent will minimize the second type of error, thereby increasing the efficiency of estimate.

The second type of error exists because, in spite of the fact that the probability of each respondent's selecting a statement is pre-determined (e.g., $P = 0.7$), the observed proportion of respondents actually selecting that statement is subjected to a sampling error and will not exactly equal P. This error, however, will become smaller, with a fixed sample size, by increasing the number of trials per respondent. In other words, the actual proportion of selection of a particular statement will asymptotically approach P if the number of trials per respondent increases.

It obviously is not possible to ask the respondents to respond too many times, and the maximum feasible number of trials may be less than three. It has been demonstrated by the Hopkins group that the efficiency of estimate of the RRT can be increased substantially by reducing the variance of estimate, by two trials for each respondent.

In multiple trials of RRT per respondent, there are also problems of willingness and knowledge of the respondents to respond to the questions honestly (reliability) and accurately (validity). Whether respondents will be more cooperative with multiple trials of RRT than with a single trial, therefore, is a critical problem. Our guess is that their cooperation will

be better by multiple trial, if the number of trials (k) is not too large, say less than 3, because they may have the feeling that the anonymity to the sensitive question is further ensured by increased chance of answering to the innocuous question.

This can be argued to the contrary: the respondents might become even more suspicious than in the case of single trial. This certainly is true if a respondent is answering all yes (or all no) under 2, 3, or 4 trials, in which p is substantially larger than 0.5 (e.g., p = 0.7 or larger). If p = 0.7, the probability of answering the sensitive question twice is much larger (0.7 x 0.7 = 0.49) than that of answering the innocuous question twice (0.3 x 0.3 = 0.09). One can guess which question the respondent is answering under this circumstance.*

An article entitled "Study on the Efficiency of Randomized Response Technique with Multiple Trials per Respondent" is found as Appendix 9. The article has been submitted to Demography for possible publication.

Use of multiple trials per respondent seems to be particularly relevant with the new "flask" randomizing device and the "roulette" device in estimating quantitative data. Theoretical work along this line is being contemplated as a further extension of the current study.

7. Future Plans

The major implication of the Taiwan RRT study rests with the fact that it was the first attempt to test this new technique outside of the United States. The substantially higher rate obtained by the RRT from Taiwan,

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*If the probability for the sensitive question to be selected is 0.7 (P = 0.7), by Bayes' theorem, the conditional probability for a respondent to have come from the group with the sensitive characteristic, given answering "1-yes", is

$$\text{Prob}(A \mid \text{1-yes}) = 0.70$$

and given answering "2-yes" is $\text{Prob}(A \mid \text{2-yes}) = 0.84$.

where literacy level is lower than in North Carolina, endorses further a claim that the RRT should be a useful technique to study various "sensitive" problems.

Reproduction is one of the most basic instincts and needs of man. The program objectives of family planning in reducing fertility and in preventing unwanted pregnancy cannot be achieved without better understanding of basic sexual behaviors of populations in various cultures. Such problems include induced abortion, teenage sexual practice and abortion, and extra-marital sexual behaviors, all of which are highly personal, and reliable answers for which cannot be expected by use of various "conventional" survey techniques. The results of RRT, as obtained by the North Carolina study and this study seem to offer high promise with regard to its utility in dealing with these problems.

Application of the RRT for studies related to family planning is a rather recent development. As a natural consequence and an extension of the trial in Taiwan, further theoretical work and field trials of several new randomizing devices are being contemplated at Hopkins.

Main interests in such trials include comparing the relative utility of the RRT models with other survey methods administered to populations of different characteristics by various types of interviewers under different circumstances and cultural settings. If confidentiality is the major problem in responding to sensitive questions, how does the RRT, which usually is more complicated, compare with "secret balloting," which may also have been designed in such a way as to deal with quantitative information on sensitive problems.

Further studies to be done on the RRT should include testing of the following factors:

1) Different models of RRT's
2) Different randomizing devices--e.g., flask, roulette, "pa-chin-ko", playing cards, etc.
3) Different wording of questions--sensitive and innocuous
4) Different problems--e.g., induced abortion, use of drugs, teenage pregnancy, extra-marital sexual behavior, etc.
5) Different cultural settings
6) Different characteristics of individuals--e.g., education, age, etc.
7) Different type of interviewer--e.g., lay interviewer, nurse, medical doctor, social worker, characteristics of interviewers, etc.
8) Places of survey--clinic, field
9) Individual vs. group approach--testing a group at the same time, e.g., study of use of drugs among groups of soldiers, or testing in a classroom
10) Purpose of use--qualitative vs. quantitative
11) RRT as supplementation to vs. replacement of usual survey
12) Number of trials--single vs. multiple trials per respondent

8. Summary

In connection with and as a part of the "Epidemiological Study on the Outcome of Pregnancies", the randomized response technique (RRT) was administered to a group of 1,112 married women of childbearing age in Taiwan, during a usual KAP survey, to determine their experience of induced abortion. Another comparable group of 1,103 respondents was asked the usual question

about their past experience of induced abortion, which is still illegal in Taiwan. Major observations include the following:

1) A substantially higher estimate of 28.7% was obtained by the RRT for the proportion of women who had had abortions in the past, compared with the corresponding rate of 12.7% among the usual KAP group. The highest corresponding rate which had ever registered in Taiwan from the previous KAP surveys done in Taiwan was 13.8%.

2) A total of 692 cases actually cooperated with the RRT, corresponding to 62.2% of the original group of 1,112. The other 420 cases (or 37.8%) failed to cooperate for various reasons.

3) Because of the rather low response rate, it is possible that some biases might have been introduced into the result. Two sources of bias seem to have existed: (1) in comparing the RRT and the NRRT (Non-RRT) groups, the RRT group was represented more by the mainlanders who in general were a little better educated and possessed more modernized attitudes because of selectivity in migration, and (2) within the RRT but between cooperative and non-cooperative ones, the cooperative group contained more educated, slightly younger women whose ancestors were from mainland provinces.

4) Bias from the above two sources would have been in the direction of overestimating the abortion rate. A rather simple analysis, nevertheless, shows that a substantial difference still exists between the results obtained by the RRT and those of the usual survey method, allowing for these selections.

5) A total of 188 persons refused to go through the RRT procedures and had answered the abortion question directly, either affirmatively (27) or negatively (161). The 27 affirmative answers should be plausible, but

accepting the 161 negative answers for granted may result in an underestimation. This group may consist of women who indeed had never had abortion, those who had had abortions but were determined not to tell, and women who could not understand the RRT but were simply putting off the interviewers.

6) Similarly, it is possible that the 74 persons who flatly refused to cooperate might consist more of women who had experienced abortion.

7) There were 91 cases which were switched from the RRT to NRRT, of which 90 cases were done so because they had revealed experiences of abortion during the interview on pregnancy history. Including these 90 and the above 27 cases, the "maximum" proportion of women who had had abortion among the original 1,112 sample women may range from 29.9% to 31.9%, depending on the level of assumption made with respect to the level of abortion among the other non-cooperative cases.

8) Previous disclosure of abortion experience among women who are intended for RRT does present a problem because it distorts the sample. It, nevertheless, is not entirely undesirable since the survey objective is to detect as many abortions as possible. In this regard, use of the RRT as a supplement to rather than replacement of the usual survey has been proposed, but its feasibility will have to be tested.

9) Analysis of the correlates of the results by selected demographic variables revealed that women of no education had had a higher abortion rate (38.4%) than the educated (23.1%), which is inconsistent with previous findings. Several explanations for this are possible. It is likely that more of the uneducated were indeed unable to understand the RRT, but because of "courtesy" or other reasons, said "Yes" more to whichever question they

picked up. Further analysis on the response pattern of the RRT group to the innocuous question will be of interest.

10) Among the 692 cooperative cases, 48.0% felt that there was no trick in the method, and 40.5% thought that their friends or relatives would not feel that there was a trick. A lower proportion of the latter might be reflecting the fundamental suspicion of the respondents to this RRT. Taiwanese women seemed to be a bit more suspicious than the women in the North Carolina study. Lower educational level among Taiwanese women might have accounted for this difference.

11) Contrary to the above, 77.3% of Taiwanese respondents said that their friends and relatives see no objection to responding to a direct question about abortion. This rate was lower among the North Carolina sample, being 16.9%. Although abortion is illegal, the related laws are loosely enforced and the community attitude toward performing induced abortion is largely understanding and tolerant. There probably was less embarrassment for the Taiwanese women to admit having had abortions than women in North Carolina when the study was done about three years ago.

12) Some discussion was advanced on the adequacy of RRT questions and of the randomizing devices used in the Taiwan study. Formulation of a good innocuous question is more difficult than it appears to be, and the "born in a year of the horse" question used in Taiwan does have a weakness because year of birth had already been asked at the beginning of the interview. It was possible to guess which question a respondent had picked, and sophisticated respondents might become suspicious, thus affecting their confidence in the RRT.

13) Use of white and black stones of "Go," a kind of chess game which is popular in Taiwan and Japan, as a randomizing device is a good idea because of the familiarity of people with the game and the stones. A rather serious drawback was that there was no assurance as to the consistency of the proportion of two types of stones in a bag. One or two stones might be lost accidentally during the survey, thus affecting the probability of selecting a specific type of question. Thorough mixing of stones within a cloth bag may be done only with deliberation.

14) Further discussions were given on other factors related to the RRT, such as adequacy of interviewers, pictorial presentation of questions, advantages and disadvantages of various randomizing devices and their possible improvement--including computerization of RRT--and desirability of multiple trials of RRT per respondent.

15) As a natural development of the Taiwan study, some theoretical work on RRT has been done and is continuing at Hopkins. New randomizing devices have been designed, which may be used to deal with quantitative information on sensitive problems. These ideas and devices, however, must be tested for their practicability and feasibility.

16) In conclusion, the RRT should be a useful tool for study of various sensitive problems of contemporary concern--e.g., use of drugs, crime, abortion, teenage pregnancy, etc., study of which urgently requires new survey techniques. The method, however, needs further improvement. The plan at Hopkins is to test various RRT models and devices among various types of populations under clinical and field conditions against the conventional survey methods and "secret ballot," by various types of interviewers to see their relative efficacy.

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B. The Validity Study

The field work of the Taiwan Outcome of Pregnancy Study was started from April 1970 in Taoyuan County with the intention to study the extent of pregnancy wastages and particularly of induced abortions, and their relationship to health, fertility levels, fertility control measures, demographic and other socio-economic variables. The approach has been a two-pronged one. That is: to get the needed information both from the consumer's as well as from the provider's side. For the latter, besides a self-administered KAP survey on the practicing physicians and midwives in the area, a so-called "Clinic Observation Study" was carried out by sending specially trained medical students (all females) to eight private clinics or hospitals in the area to observe their activities on a clerkship basis, through the arrangement of the local health officer. These clinics or hospitals were purposively selected and cooperative. Four of them specialized in Obstetrics and Gynecology, rendering care to pregnant women, and thought to be performing induced abortions. The students observed the frequency of patient visits, clinical procedures, cost, quality of care, and other matters related to induced abortion as well as other types of patient care given by these clinics.

During the one month's study period (July 16-August 14, 1971), altogether 169 induced abortions (IA) were observed and reported by the medical students. It is thought, that these 169 known cases of induced abortion would offer us an ideal opportunity to study the validity of women's verbal report on their recent experience of IA by a subsequent interview at their homes (on the average, about two months after IA was performed) by the trained interviewers on our regular staff. We called this "the Validity Study."

Besides the main purpose of measuring the validity of the verbal report on induced abortion as stated above, the study was arranged in such a way that the following problems will be studied at the same time, namely:

1. The utility of Randomized Response Technique (RRT) in detecting incidence of IA
2. The after-effects of IA in terms of complication, patients' satisfaction, and other variables related to quality of care
3. The "causative" factors which may have led the women to the use of IA

Methodology

1. By preliminary count, 169 cases have received induced abortion exclusively at the four Ob-Gyn clinics or hospitals and were directly observed by our medical students. Among these 169 cases, 127 were registered as living within the Taoyuan area, and with an exact address which could be successfully traced by our interviewers. The remaining 42 cases were either living outside the Taoyuan area or their addresses were not clear, or both, and thus will not be studied.
2. The patients who also visited the above clinics or hospitals during the same period, but for purposes other than induced abortion, were used as the universe for selecting matched controls.
3. The control cases were matched with the respective study cases by:
   (a) Last menstrual period: More than one month ago at the time of visit to the clinics
   (b) Township: Residence in same township as IA case
   (c) Marital status: Married or unmarried
   (d) Age: Within 10 years of the age of the IA case
   (e) Parity: No child, 1-2, 3-5, 6 or more

The criteria for selecting matched controls were, however, loosened a little bit on age and parity around the end of the matching because of practical difficulties.

4. The assignment made as to whether a case would be interviewed by the regular direct interviewing method (NRRT) or by the Randomized Response Technique (RRT) was decided by randomization. The numbers in the two groups are as follows:

	Number of Cases to be Interviewed		
	NRRT*	RRT**	Total
Study Cases	62	65	127
Control Cases	61***	64***	125
Total	123	129	252

*NRRT - Randomized Response Technique (defined later) not used.
**RRT - Randomized Response Technique (defined later) used.
***One less in both the RRT and NRRT controls because of the difficulties in matching.

5. Four seasoned interviewers were selected from the interviewing staff. They were kept "blind" concerning whether they were IA cases or matched controls. However, the interviews were arranged in such a way that one interviewer would interview both the IA case and her matched counterpart control, and preferably not far apart in time. Also, the number of RRT and NRRT cases were evenly divided among the four interviewers. The regular one-shot KAP questionnaire* was used as the schedule for interview.

*This is a regular KAP-type questionnaire on family planning as well as on IA used in one phase of our study, named as one-shot KAP survey. This KAP survey started about three and one-half months before this validity study started, and the interviewers were thus quite acquainted with it.

The readers should be reminded here that for any IA case and her counterpart control successfully interviewed by RRT, then, aside from an estimate on incidence of IA, all the relevant information concerning induced abortion and its outcome (including other types of pregnancy wastage) was not obtained. For those who switched to NRRT cases as well as those who did not cooperate with the RRT trial, however, all this information was asked.

6. There have been a few new problems encountered in this validity study, when compared with the previous KAP survey which led to some changes in the conduct of the study.

   (a) Geographic distribution of the respondents: Expanded to county-wide to include other townships than the four selected for the repeat interview and the KAP survey.

   (b) Personal characteristics of the respondents:

      (1) Cases were included in the study irrespective of their marital status. Thus a few reportedly unmarried women (7 in IA group, but only 2 in control, due to the difficulties in matching) were included in this study.* As a result, part of the questionnaire needed slight modification.

      (2) Some former repeat interview or KAP respondents (8 in IA group, and 4 in control group) were also included in this study; this required an adequate explanation of the additional interview in

*According to reliable sources, there are quite a few unmarried cases receiving IA but registered in the clinic as married. Such situations occur presumably partly to avoid embarrassment and partly for a financial reason, since the clinic charges may be about double for the unmarried. The false married status probably was one of the main reasons for the relatively large non-response rate.

order not to alarm these respondents that they were re-visited because of their recent IA. The interviews were much shortened for them since we had already most of the information we needed from one of the former surveys.

(3) It was more difficult to identify respondents this time as compared with the cases in repeat interview or KAP survey. This is especially true for the unmarried IA cases who tended to give false names and addresses when they requested IA at the clinics. How much this would vitiate some of the analysis on the validity of reporting is difficult to assess.

7. The policy of the field work was that if an IA case is to be discarded (cannot be successfully interviewed for reasons such as unmet, moved out, refusal, cannot be identified, etc.), its counterpart control would be automatically discarded. However, if the latter was unable to be interviewed, she would be replaced by a substitute matched control selected from the universe. Thus, there are a few (16) IA cases who were interviewed without a counterpart control. This happened because of difficulties in finding an adequate control, especially around the end of the field work.

8. The distribution of the IA case and matched controls and the outcomes of visits are shown in Table 1. At present there is no known reason for the greater success in completing interviews for those pre-assigned as RRT cases. (The RRT experience for those interviewed, part B of Table 1, will be discussed later.)

9. The field work started from September 6, 1971, about 50 days after the clinic observation study started and 20 days after the latter study ended. The bulk of the interviews of the validity study were done within 2 weeks

Table 1.

Interviewing Experience by Whether IA or Control Group

A. Success in Completing Interviews

	Pre-assigned as Non-Randomized Response Case (NRRT)			Pre-assigned as Randomized Response Case (RRT)		
	I.A.	Control	Total	I.A.	Control	Total
Interview not completed	17	18	35	11	11	22
Interview completed	45	43	88	54	53	107
Total	62	61	123	65	64	129
% completed	72.6	70.5	71.5	83.1	82.8	82.9

B. Success in Using Randomized Response Technique (RRT) When Interviewing

	I.A.	Control
"Switched" to NRRT interview schedule*	20	9
RRT attempted	34	44
Respondent cooperated	23	36
Respondent did not cooperate	11	8
Total pre-assigned and interviewed	54	53
% with RRT attempted of those pre-assigned and interviewed	63.0	83.0
% cooperating of those attempted	67.6	81.8

*These cases had already informed the interviewer that they had had an induced abortion before the attempt was made to use the RRT. For this reason, they were then asked the series of questions normally submitted to the NRRT group.

after it started, although the study was officially closed October 15, 1971.

Findings

I. Validity of Verbal Report on IA

The first part of our analysis is centered on the 45 cases originally assigned as NRRT cases, that is, to be interviewed by a conventional interview method, and whose interview was successfully completed.

Of these 45 cases, 18 did not report any IA at the interview. Among the remaining 27 cases who admitted IA, one reportedly had the most recent IA more than 3 months ago but less than a year; 3, more than a year; and 3 did not report an exact date. Only 20 reported the recent IA as within 3 months (Table 2).

If temporarily we deem any case who had reported an IA as a valid answer no matter how long ago these have reportedly occurred, then we will get an under-report rate of 18/45 = 40.00% (S.E. = 7.30%) (Table 2). If we adopt a more strict criteria, namely, only those reporting IA within 3 months as the correct report, then the mis- and under-report rate would amount to 55.56% (S.E. = 7.41%).

It would be interesting to learn the characteristics of women who are more likely to under-report. Unfortunately, the number of cases is somewhat too small to allow very definite conclusions. However, data on this point are presented in Table 3 for their possible value in suggesting hypotheses. For this purpose any case who has reported an IA is considered as a valid answer. The variables considered are presented in 3 categories: Group A Variables are those for which those reporting and those not reporting IA have very similar distributions, Group B Variables show differences of a size to be interesting but still statistically insignificant, Group C

Table 2.

Distribution of the 45 NRRT Cases on the Time of Their Most Recent Experience of Induced Abortion

Time Preceding Interview	Number	Percent	
		Of Total	Of Those Stating Time
Under 3 months	20	44.4	83.3
Over 3 months, but under 1 year	1	2.2	4.2
Over 1 year	3	6.7	12.5
Unknown	3	6.7	--
No IA	18	40.0	--
Total	45	100.0	100.0

Table 3.

Comparison Between Cases Who Did Report and Cases Who Did Not Report IA by Various Relevant Variables Among the 45 NRRT Cases

Group A Variables:
Variables with frequencies similar in the two groups

	Not Report		Report		Total	
	No.	%	No.	%	No.	%
By Urbanization of Past Living Place						
Taoyuan County	10	37.04	17	62.96	27	100.00
Other counties	6	40.00	9	60.00	15	100.00

Note: 3 unknowns were excluded from calculation

$\chi^2 = 0.020$ D.F. = 1 $0.8<P<0.9$

By Farming Background						
No	8	42.10	11	57.90	19	100.00
Yes	10	38.46	16	61.54	26	100.00

$\chi^2 = 0.004$ D.F. = 1 $P>0.9$

By Age at Marriage						
Under 20 years old	9	37.50	15	62.50	24	100.00
More than 20 years old	7	41.18	10	58.82	17	100.00

Note: 2 unmarried and 2 unknown cases were excluded from calculation

$\chi^2 = 0.008$ D.F. = 1 $P>0.9$

By Occupation of Husband						
White collar	6	40.00	9	60.00	15	100.00
Blue collar and others	11	39.29	17	60.71	28	100.00

Note: 2 no-job cases were excluded from calculation

$\chi^2 = 0.079$ D.F. = 1 $0.7<P<0.8$

By Number of Appliances						
4 or less	9	40.91	13	59.09	22	100.00
5 or more	9	39.13	14	60.87	23	100.00

$\chi^2 = 0.033$ D.F. = 1 $0.8<P<0.9$

By Number of Livebirths						
4 or less	10	41.67	14	58.33	24	100.00
5 or more	6	33.33	12	66.67	18	100.00

Note: 3 N.A.'s were excluded from calculation
"None" was pooled with "1-4" during calculation

$\chi^2 = 0.053$ D.F. = 1 $0.8<P<0.9$

Table 3 (continued)

Group B Variables:
Variables suggesting some differences between the 2 groups
but without showing statistical significance

	Not Report		Report		Total	
	No.	%	No.	%	No.	%
By Townships						
Chungli and Taoyuan City ,	9	60.00	6	40.00	15	100.00
Other counties	9	30.00	21	70.00	30	100.00
$\chi^2 = 2.60$ D.F. = 1		0.1<P<0.2				
By Vegetarian						
No	18	50.00	18	50.00	36	100.00
Yes	0	--	3	100.00	3	100.00
Note: 6 N.A.'s were excluded from calculation						
By Fischer's Exact Method P = 0.23						
By Outside Job						
No	11	32.35	23	67.65	34	100.00
Yes	7	63.64	4	36.36	11	100.00
$\chi^2 = 2.21$ D.F. = 1		0.1<P<0.2				
By Education						
Illiterate	4	28.57	10	71.43	14	100.00
Literate	14	45.16	17	54.84	31	100.00
$\chi^2 = 0.523$ D.F. = 1		0.3<P<0.5				
By Ancestry						
Fukienese	11	55.00	9	45.00	20	100.00
Hakkanese	6	27.27	16	72.73	22	100.00
Note: 3 mainlanders were excluded from calculation						
$\chi^2 = 2.29$ D.F. = 1		0.1<P<0.2				
By Age Group						
Under 30 years old	8	57.14	6	42.86	14	100.00
30 years old and over	10	34.48	19	65.52	29	100.00
Note: 2 unknown cases were excluded from calculation						
$\chi^2 = 1.17$ D.F. = 1		0.2<P<0.3				
By Number of Living Children						
4 or less	12	46.15	14	53.85	26	100.00
5 or more	4	25.00	12	75.00	16	100.00
Note: 3 N.A.'s were excluded from calculation "None" was pooled with "1-4" during calculation						
$\chi^2 = 1.09$ D.F. = 1		0.2<P<0.3				

Table 3 (continued)

Group C Variables:
Variables with frequencies which showed statistically significant differences by "Fisher's Exact Test"

	Not Report		Report		Total	
	No.	%	No.	%	No.	%
By Number of Dead Children						
No	11	30.56	25	69.44	36	100.00
Yes	5	83.33	1	16.67	6	100.00

Note: 3 N.A.'s were excluded from calculation

P = 0.023*

By Number of Previous IA						
None	18	52.94	16	47.06	34	100.00
Yes	-	--	11	100.00	11	100.00

P = 0.002*

*By Fisher's Exact Test

Variables show statistically significant differences.

Group A Variables: It seems that women who reported IA and those who did not are very similar in past living place (Taoyuan County vs. other counties), farm background (with vs. without), age at marriage (before vs. after 20 years of age), occupation of husband (white collar vs. blue collar), and number of household appliances (4 or less vs. 5 or more).

Group B Variables: Possibly, however, it is those who are more urbanized, non-vegetarians, holding an outside job, and literate who are more likely to hide their IA. "Demographically," it is the Fukienese rather than Hakkanese, the younger (below 30 years of age) rather than the older, and those having less (4 or less) living children, who are more likely to under-report. Generally it may be speculated that the less sophisticated and more prolific women are more honest in reporting. One might suppose that most of these Group B Variables are interrelated, but it does not seem worthwhile to go into a depth analysis unless we could accumulate more evidence.

Group C Variables: Marked and statistically significant differences were shown in two variables, namely, whether or not the respondent reported having had a child die and whether or not she reported having had a previous induced abortion. Those who have had no child deaths, and those who have had previous induced abortions before the present one, are more likely to report their recent IA experience honestly than those who did have child deaths or those who did not have a previous IA.

It is understandable that the more IA a woman has, the less she would feel inhibited in talking about it. This is an important finding worth further consideration when we make estimate on general incidence of IA and when we study the "habitualness" of IA.

An interesting finding here is the one concerning child death. One possible reason is that to have had a previous child death would give the women an unconscious guilty feeling which is more likely to lead a woman to hide their recent IA. Another possibility is, of course, the mistake of the medical students, that is, they may have erroneously classified a non-IA case as an IA case. However, this may be, the common characteristics of these five IA cases with reported child death are as follows:

A. The IA performed were all of high pregnancy order (6-8)

B. The dead children are all of earlier pregnancy order (1-3) and most of them died long ago

C. All cases have 4 or more living children

D. All except one have positive contraceptive history before the reported IA

All of these are suggestive that it would not be impossible that these 5 women would have an IA, if pregnant. Indeed, however, there is one case who had her IA due to incomplete spontaneous abortion. (There is also one case who has had 2 IA's in her life time, and another one who has had 2 child deaths.)*

Length of interval between the time of IA and interview did not show significant association with the validity of verbal report (Table 4). Possible reasons for this include:

A. The interval in general was short

B. All these under-reports were due to intentional hiding, thus not related with passage of time

*For the various characteristics of these 5 women, see Appendix 1.

Table 4.

Reported Timing of IA by Actual Interval
Between IA Operation and Interview

Actual Time	Under 3 Months	3 Months to 1 Year	Over 1 Year	Unknown	No IA	Total
Under 6 weeks	7	-	1	2	5	15
6-7 weeks	8	-	1	-	12	21
8-9 weeks	4	1	1	1	1	8
Unknown	1	-	-	-	-	1
Total	20	1	3	3	18	45

II. Trial of Randomized Response Technique (RRT)

A. The "Switched-Over" Cases

As shown in Table 1, originally, among the 127 IA cases, 65 were randomly assigned as the RRT cases. Among these 65 RRT cases, 54 were successfully interviewed. In the special study of RRT, q.v., in which 1,112 were interviewed only 8% were "switched," markedly less than the 20/54 or 37% among the cases here presumed to be all with a recent IA. The control group had 9/53 or 17% "switched," a ratio statistically significantly different from the 8% in the larger study and from the 37% of the IA. It seems likely that the high ratio of 37% among the IA group is largely but not entirely attributable to the fact that all interviewed could admit to an IA if they wished to. It does not seem worthwhile to pursue further at this time the reason for the controls here to exceed in "switching" those interviewed in the larger study.

B. The Cooperative and Uncooperative RRT Cases

Among the 34 IA cases on whom the RRT was attempted, 23 cooperated, giving a cooperation ratio of 68%. The somewhat higher ratio (82%) among the 44 control cases was not statistically significantly higher. The larger study, mentioned above, also had 68% cooperating.

C. On Estimating IA from RRT

The number of cases in the validity study are too few to make it worthwhile at this point to make an estimate of IA ratios. There are, however, some interesting observations that can be made concerning the application of the RRT because we "know" which respondents had an IA. (The method used to apply the RRT here was the same as that used in the larger study mentioned above and reference should be made to that section of this report for an explanation of the technique, of the formulae used in estimating ratios, standard errors, etc.)

We shall turn our attention then to the 23 IA cases who cooperated in the RRT. Seven of these responded "yes." From this we would estimate the proportion having had an IA as

$$\pi_1 = \frac{\lambda - \pi_y (1 - P)}{P} \quad (\lambda = 7/23 = 0.304348)$$

$$= \frac{0.304348 - 1/12\ (0.3)}{0.7}$$

$$= 0.399'$$

If all respondents answered truthfully, were correctly "known" to have had an IA, exactly 0.3 selected the innocuous question (and 0.7 the critical question), and exactly 1/12 were born in the year of horse. This estimate would have been 1.0. Since it is unlikely that the proportions selecting the innocuous question and having been born in the year of horse were sufficiently far from the estimates to produce such a big deficiency, one must assume either that some of the women were not answering truthfully regarding one or the other of the questions or the medical student observers made errors in IA status of some of the cases. The size of the latter error is probably small, so we may conclude that even with the RRT, complete truthfulness is not achieved.

III. Incidental Findings

A. "Discomfort" After the IA Operation

According to the observing students, all the observed IA cases were treated as outpatients. They will rest in the clinic for about 1-3 hours after the operation and return home on reduced housework activities for a couple of days. Complaint, discomfort and sequela were asked on the 53 cases who have reported an IA among the study

cases except those 23 cases who were interviewed by RRT. These 53 cases were consisted of the 27 cases who reported IA experience of the 45 NRRT cases, the 20 switch-over RRT cases, the 5 uncooperative RRT cases who confided IA experience at the RRT trial, and one other uncooperative IA case who reported IA, after the RRT trial. Twenty-one of these 53 (39.62%) cases who admitted IA have reported some discomfort after the operation, 18 within and 3 after one week after the operation. (This 40% ratio is very close to the 36% noted in the study of interval occurrence of induced abortion in the larger repeat interview study; and the proportions of these with discomfort reporting it to have occurred within one week of the operation also agree in these two sets of data.) In general, all the reported discomforts or complications were of mild nature, 10 with general weakness to be the main complaint; 8, abdominal pain; 2, infection of uterus; and one, bleeding. None have received re-operation.

B. Comparison of IA Cases and Controls on Selected Variables

Among the 70 or so paired comparisons, the following variables were found to be associated with IA at the 10% significance level. As compared to their matched controls, the IA cases:

1. Their husbands are less educated. (Although there is no difference in occupation of husband between IA cases and controls.)
2. Are less likely to be currently pregnant, but have had more pregnancies.
3. Have had more IA's in life time as well as in the past one year.
4. Are more likely to approve contraceptive practice for either family limiting or spacing purposes.

5. Are more likely to approve IA for family limiting purpose without using contraception.
6. Are less likely to want additional children and more serious about ideal number of children.
7. Are more likely to have had practiced contraception in the past and practice at the present.
8. Are more likely to know surgery as the method of IA. (If we compare all the IA's and the controls without considering whether they know existence of IA or not at the first place.)
9. Are more likely to approve IA for health reasons.
10. More of the IA cases think IA is legal in Taiwan.

IV. Methodological Considerations

A. More work with these data can be done but what are probably the chief findings have been given above. This validity study, however, turned out to have what may be considered a classical deficiency, namely:

1. This relatively small scale study had been too ambitious, trying to achieve more efficiency and to answer more questions than it actually could, and thus may have vitiated some of the capacity of this study to answer the prime question for which this study should be addressed to, i.e., the validity of the verbal reporting on induced abortion.
2. By using different sets of interviewers, female medical students in the clinic and our originally trained female interviewers in the field for this validity study offer us a good chance to completely keep the latter blind from knowing the identity of the interviewees, i.e., whether she is a study IA case or a control.

3. For events which are more likely to be under-reported rather than over-reported such as IA, our approach of from clinical records to home visit should be a better way of detecting under-report, rather than the other way around, that is to validate the positive interview results by clinic record as in most of the morbidity surveys.
4. With a short interval between the operation of IA and time of interview as in this study, and the traumatic nature in experience of IA, we might rule out the possibility of any under-report as due to memory failure. The remaining reason will be only intentional hiding, if we may also deem that by definition in this study, IA here would not be mixed up with spontaneous abortion or other types of pregnancy wastages. It would be a reasonable speculation that in an ordinary field survey on induced abortion, the under-report rate may be larger than that of this study.

C. The Feasibility and Utility of Field Urine Pregnancy Test in a Longitudinal Repeat Interview Study

Judging the practicality and usefulness of a pregnancy test in studying outcome of pregnancy is a complicated matter. In the following discussion many of the issues are raised and some tentative conclusions are given. Much data relevant to a thorough analysis is available, but such analysis will require more time and thought, including contribution from more individuals than have yet had the opportunity to work on the matter.

One approach is presented in this section, but even this approach needs further review and development.

A multi-phasic epidemiologic study on outcome of pregnancy in Taoyuan, Taiwan was set up in 1970, in order to determine the extent of pregnancy wastage in general and induced abortion in particular. One of the approaches used in this study was a forward-looking Repeat Interview, with nine rounds of visits, each about 6 weeks apart, thus spread over about a year. Direct interviewing method was used on about 2,000 currently married women with ages 15-49, selected by stratified probability sampling. Among the 2,000 study women about half were assigned, again randomly, as the urine cases; that is, during each round after the interview, urine was to be collected from them, and brought back to our laboratory for a pregnancy test. (Pregnosticon Test of Organon Inc. was used). The reason for doing this was to see whether a field urine test is feasible and whether this can detect unreported pregnancies and pregnancy wastage. The women were told that the urine was being collected for some tests concerning their health, but were not told that the urine was also for the testing of pregnancy. As a matter

of fact, the urine was checked for sugar and protein levels in the presence of the respondents at the time of interview.

In the nine rounds of interview, certain items were asked repeatedly such as health status, occurrence of sterilization operation, current pregnancy status, outcome of pregnancy if any, since last visit, breast-feeding status and L.M.P., while other information concerning the knowledge of, attitutde toward, and practice of contraception and induced abortion were distributed among the various rounds. In the first and the eighth rounds, fertility history was asked in detail, with the former more concentrated on fertility history and family composition in general, while the latter on fertility behavior related to practice of induced abortion.

A urine test was used in view of the considerations that pregnancy wastage, especially in the case of induced abortion, is usually under-reported in the interview and that the extent of under-report and how it is distributed in women with various characteristics are difficult to estimate. It was thought that a pregnancy test which can be easily performed in the field with high sensitivity and specifity might serve as a back-up and validation tool for the verbal report of pregnancy and its outcome.

The main purposes of this section are: (1) To see if the urine collection could be done and if it would affect the respondents' cooperation, their behavior and reporting on fertility--the Feasibility Study. (2) To examine the magnitude of discrepancies between, and the accuracies of, verbal report and urine test in their estimates of pregnancies and their outcomes--the Utility

Study, and (3) To study the possible reasons and distribution of the discrepancies--the Explanatory (Epidemiology) Study.

Administratively, urine cases were selected on the basis of the village to which the women were registered at the time of sampling. In other words, villages were used as clusters and were divided into urine and non-urine villages by randomization. For every study case in a urine village, the urine was to be collected, and a pregnancy test performed. Also, once assigned as a urine case, the respondent was always a urine case throughout the study even though she moved to a non-urine study village within the study area. Also, because respondents were to be repeatedly interviewed, each interviewer was assigned to a fixed group of respondents from the first until the last rounds if the situation permitted, thus holding a constant client-interviewer relationship to achieve maximum rapport. Those women who were suspected to be pregnant at the ninth round were followed up, again by 6 weeks' intervals, until the suspected pregnancy terminated, or the respondent proved to be not pregnant. Altogether 148 women were followed-up after the ninth regular round. The follow-up ended at the 6th round of follow-up, by which time all the known pregnancies had terminated.

1. "Feasibility" Study

   Whether the study women would agree to give their urine samples or not, and whether the act of urine collection would affect their subsequent cooperation and behavior in fertility or not have practical significance in deciding whether field urine pregnancy tests should be carried out or not.

In Table 1A, the number of urine cases remaining in the study after the first round of visits does not differ significantly from the counterpart number of the non-urine cases. Table 1B shows that after the 5th and 9th rounds, respectively, the proportion of urine cases differs only slightly and not statistically significantly from the non-urine cases.

Comparison on fertility history of the urine and non-urine cases reported in Round One, as shown in Table 2, indicate that the two groups are similar as to number of pregnancies, live births, and induced abortions. As for the reported interval occurrence of I.A. as well as of L.B. during the 9 rounds, the urine and non-urine cases are again similar. (Table 3).

We may conclude here that there is no evidence that the act of urine collection significantly affected the cooperation of urine cases as compared to the non-urine cases, and these two groups are comparable in fertility history and in reported interval fertility behavior.

In addition, the proportion of respondents from whom the interviewers failed to collect urine was small, averaging 2.1% with range from 1.3 to 3.0% over the 9 visits.

2. "Utility" Study

The "Utility" part of this study is of special interest since it is expected to supply pertinent irformation on the following questions: (1) Suppose we carry out a one-shot retrospective study with urine test, thus without the advantage of a longitudinal study to follow the suspected pregnancies until it is either proved and terminated, or disproved, how should we

Table 1A.

Original Assignment of Urine and Non-Urine Cases and Number of Cases Remaining in the Study at Conclusion of First Round of Visit

	The Outcome of Interview After the First Round of Visit					
	Before 1st Visit		Discarded		After 1st Visit	
	Number	Percent	Number	Percent	Number	Percent
Urine cases	1252	100.00	331	26.44	921	73.56
Non-urine cases	1248	100.00	308	24.68	940	75.32
Total	2500		639		1861	

$\chi^2 = 1.02$ D.F. = 1 P>0.2

Table 1B.

Outcome of Interviews of the Fifth and the Ninth Rounds of Visits (Percents given are based on number continuing in study "after 1st visit")

	Active After 1st Visit	Discarded		Active After 5th Visit		Discarded		Active After 9th Visit	
	No.	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Urine cases	921	56	6.1	865	93.9	69	7.5	852	92.5
Succeeded in collection				839				841	
Failed in collection				26				11	
Non-urine cases	940	53	5.6	887	94.4	58	6.2	882	93.8
Total	1861	109	5.9	1752	94.1	127	6.8	1734	93.2
			$\chi^2 = 0.165434$			$\chi^2 = 1.278643$			
			D.F. = 1			D.F. = 1			
			P>0.5			P>0.2			

χ^2 test was calculated by comparing urine cases versus non-urine cases.

Table 2.

Fertility History Obtained at the First Round of Visits by Urine or Non-Urine Cases

Number	Pregnancy		Livebirth		Induced Abortion	
	Urine	Non-Urine	Urine	Non-Urine	Urine	Non-Urine
0	25	36	27	37	836	869
1	53	86	62	90	46	53
2	87	84	102	101	24	6
3	134	129	160	139	10	8
4	146	144	132	143	3	3
5	133	131	140	131	2	--
6	131	114	114	109	--	1
7	84	76	79	84	--	--
8	48	58	53	55	--	--
9	33	43	27	24	--	--
10	27	22	14	13	--	--
11	8	4	8	4	--	--
12	12	13	3	10	--	--
Total	921	940	921	940	921	940
Mean	4.82	4.64	4.06	4.39	0.16	0.11
S.D.	2.48	2.64	2.38	2.51	0.58	0.49

Table 3.

Interval Fertility Behavior
For Urine and Non-urine Cases

	Study women in 5th round*	Cases with Interval Occurrence of I.A.		Cases with Interval Occurrence of L.B.	
Urine Cases	865	19	2.19%	126	14.57%
Non-urine Cases	887	21	2.37%	149	16.80%
Total	1752	40		275	

*These numbers from the middle round are presented merely as a base for ratios given in other columns.

interpret the combined results of verbal report and urine test on pregnancy to decide what would be the probability that a woman is truly pregnant or not and how many of the pregnancies would be ended in induced abortion. (2) Furthermore, on those cases with the discrepancy of a verbal report negative but urine test positive, what proportion of the discrepancy occurred because the women are intentionally hiding their pregnancy and what proportion because they really do not know their pregnancy status at that time. Also, for those with the opposite kind of discrepancy of verbal report of pregnant but urine test negative, what would be their reason for the positive reporting and negative testing. (3) We also want to find out whether if we carry out a one-shot retrospective study without the aid of urine test and follow-up, how much we may rely on the verbal report of "not pregnant", "not sure of their pregnancies", or "pregnant", so far as the pregnancy status and pregnancy outcomes are concerned?

a. General observation:

(1) The number of urine cases successfully interviewed was 921 at the first round, 865 at the fifth round, and 852 at the 9th round. As shown in Tables 4 and 5, no matter whether estimating prevalence of pregnancies or incidence of new pregnancies, the urine test usually solicits a higher ratio than the verbal report. Furthermore the trends over the rounds are smoother.

(2) Throughout the 9 rounds, 273 cases (31.56%, if we use the midyear study population of 865 urine cases as the

Table 4.

Discrepancy Between Verbal Report and Urine Test Result on Current Pregnancies (Prevalence of Pregnancies) by Round of Visits

Round No.	Based on Pregnancy Test: No. of Women Tested	Pregnant (1): No.	Pregnant (1): Percent	Based on Verbal Report: No. of Women Interviewed	Pregnant (2): No.	Pregnant (2): Percent
1	905	104	11.49	921	84	9.12
2	879	95	10.81	894	71	7.94
3	852	86	10.09	867	58	6.68
4	839	86	10.25	863	65	7.53
5	842	82	9.74	865	56	6.47
6	840	82	9.76	858	56	6.53
7	837	81	9.68	860	59	6.86
8	844	79	9.36	856	57	6.66
9	841	74	8.80	852	54	6.33

Note: (1) On urine cases only, excluding those failed in urine collection.

(2) On urine cases only, but including those failed in urine collection, but excluding those not sure or don't know whether pregnant or not.

Table 5.

Discrepancy Between Verbal Report and Urine Test Result on New Pregnancies (Incidence Pregnancies) by Round of Visits

Round Order	No. of Women Tested	New Pregnancies(1)	Rate per 1,000	No. of Women Interviewed	Report New Pregnancy (2) No.	Rate per 100
2nd	879	21	23.89	894	10	11.19
3rd	852	21	24.65	867	2	2.31
4th	839	24	28.61	863	10	11.59
5th	842	18	21.38	865	6	6.94
6th	840	17	20.24	858	14	16.32
7th	837	16	19.12	860	10	11.60
8th	844	10	11.85	856	9	10.41
9th	841	15	17.84	852	8	9.39
Total		142			79	

Notes: (1) New Pregnancies means those first time showed a positive urine test. This is counted by number of tests, not be women.

(2) New Pregnancies here means verbally reported as newly pregnant. Those reported not sure of pregnancies were not included.

denominator) have been identified as pregnant or possibly pregnant, that is either the verbal report was "pregnant" or "not sure about pregnancy", or the urine test was positive or some combination of these; or a termination of pregnancy was reported though in the previous round both verbally and by urine test, when available, the index was negative as to pregnancy status.

(3) One person may contribute 2 or more events (episodes) of suspected pregnancy during the 9 rounds of interview. For convenience, the analysis was made using events rather than women. These 273 women who have had suspected pregnancy altogether contributed 305 events (Table 6). They have been divided into the following 6 groups according to the first sign of their suspected pregnancy.

A Verbally not pregnant but test positive $\binom{0}{1}$*

A' Verbally not sure of pregnancy, but test positive $\binom{1}{1}$*

B' Verbally not sure of pregnancy, but test negative $\binom{1}{0}$*

B Verbally pregnant, but test negative $\binom{2\text{-}4,6,8}{0}$*

C Both verbally pregnant and test positive $\binom{2\text{-}4,6,8}{1}$*

D Both verbally not pregnant and test negative, but followed by reported termination of I.A. or S.A. $\binom{0}{0}$ 5 or 6*

S A few special cases difficult to classify.

Practically, there has been little difficulty in classifying most of the events into one or the other categories.

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*The numbers in the bracket are the punchcard codes used to classify: (1) the verbal report (top line), (2) urine test (2nd line) and (3) the outcome of pregnancy (3rd line - e.g., as in group D). For details of the coding, see Table 7.

Table 6.

Number of Events of Suspected Pregnancy Contributed by Cases

Events per case	No. of cases	No. of events contributed	%
1	242	242	79.34
2	30	60	19.67
3	1	3	0.99
TOTAL	273	305	100.00

Table 7.

Code for Methodological Study on Pregnancy Test

First Line - Current Pregnancy Status

At Round 1

0 - Not pregnant
1 - Not sure or don't know of pregnancy
2 - Pregnant within 3 months
3 - Pregnant 3-5 months
4 - Pregnant 6+ months
9 - Unknown

At Rounds 2-9

0 - Not pregnant
1 - Not sure or don't know of pregnancy
2 - Pregnant within 3 months
3 - Pregnant 3-5 months
4 - Pregnant 6+ months
5 - Inapplicable, Menopause
6 - Pregnant, number of months unknown
7 - Others
8 - Continuing pregnancy
9 - Unknown

Second Line - Urine Test Result

0 - Negative
1 - Positive
2 - Others
6 - Urine cases, failed in collection
7 - Non-urine cases
9 - Unknown

Third Line - Outcome of Pregnancy in the Interval Prior to the Visit
(Starts from the second round of visits)

0 - Not pregnant, or not sure in the previous round, and no reported termination in interval prior to the visit
1 - Pregnancy terminated in livebirth in interval prior to the visit
2 - Continuing pregnancy and no bleeding
3 - Continuing pregnancy and bleeding
4 - Pregnancy terminated in stillbirth in interval prior to the visit
5 - Pregnancy terminated in spontaneous abortion in interval prior to the visit
6 - Pregnancy terminated in induced abortion in interval prior to the visit
7 - Pregnancy or not sure of pregnancy reported in previous round and not sure of pregnancy reported at this round
9 - Unknown or others

As shown in Table 8, among the 305 episodes, 109 (35.74%) were first identified by both verbal report and urine test positive (Group C). This group is followed by Group A, (verbally not pregnant but urine test positive) 84 events, or 27.54%; Group B' (verbally not sure and urine test negative) 45 events, or 14.75%; and Group A' (verbally not sure but urine test positive) 39 events or 12.79%. Groups D and B only form a small portion of the total events (13 and 10 respectively). 5 events were classified as Group S due to lack of information because of drop-out. These events should be further divided into those identified at the first round and those identified later, in other words, a differentiation between the current pregnancies and the new pregnancies is needed. This is especially pertinent for Group C. For the most part we shall ignore this distinction in the following discussion.

(4) The discrepant categories (A, A', and B', B) will be further divided into: (1) Pregnancy established: Within subsequent two rounds, both verbal report and test become pregnant and positive, ($^{2\text{-}4}_{1}$,6,8) or the suspected pregnancy was succeeded by a reported termination. (2) Pregnancy not established: Succeeded by both verbally not pregnant and urine test negative for 2 subsequent rounds.

Table 8.

Classification of the 305 Suspected Pregnancy Events by how Identified*

	No. of events	%
$A(^{0}_{1})$	84	27.54
$A'(^{1}_{1})$	39	12.79
$B'(^{1}_{0})$	45	14.75
$B(^{2\text{-}4,6,8}_{0})$	10	3.28
$C(^{2\text{-}4,6,8}_{1})$	109	35.74
$D(^{0}_{0\ \ 5\text{ or }6})$	13	4.26
S	5	1.64
Total	305	100.00

*See text for definition of groups A through S.

b. Specific considerations (Tables 9 and 10)

(1) Attention will be first centered on category A, i.e., those women whose urine test became positive at the index round, while their verbal report was negative at that round.

Among the 84 Group A events contributed by 83 cases, 61 events (or 72.62%) proved to be "pregnancy established" and had a later reported termination. Most (49 events) terminated by L.B., 7 by I.A., and 5 by Spontaneous Abortion (including 1 stillbirth).

Of the 84 events, there were 23 events (27.38%) whose "pregnancies were not established". That is, the urine test turned to negative and there was no report of termination in a later round.

This is certainly a very interesting subgroup deserving detailed study. Among them were 4 cases who had just terminated their pregnancies prior to first positive urine test but did not report the termination until later rounds. It seems that when urine test showed a positive result but the respondent answered "not pregnant," more likely she is pregnant. But care should be taken that this might be due to the effect of a recent but un-reported or unrecognized termination of pregnancy.

We need to pursue further those remaining 19 events for which the pregnancy was not established.

It is speculated that, for those events of suspected pregnancies which were established at later rounds:

(a) Some may be intentionally hiding their pregnancy

Table 9.

Suspected Pregnancies by Whether Established and by Termination According to How Identified (Groups A Through S)*

	A		A'		B'		B		C		D		S	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Pregnancy not established	23	27.4	4	10.3	31	68.9	4	40.0	-	--	-	--	-	--
Pregnancy established:														
With reported termination as:														
L. B.	49	58.3	32	82.1	10	22.2	5	50.0	97	89.0	-	--	2	40.0
I. A.	7	8.3	2	5.1	3	6.7	1	10.0	3	2.8	10	76.9	-	--
S. A.	5**	6.0	1	2.6	1	2.2	-	--	3	2.8	3	23.1	-	--
Cases not successfully followed	-	--	-	--	-	--	--	--	6	5.5	-	--	3	60.0
Total	84	100.0	39	100.1	45	100.0	10	100.0	109	100.1	13	100.0	5	100.0

*See text for definition of groups A through S.

**Includes one stillbirth.

and from these cases, we might learn the capacity of the urine test to detect the purposive under-reporting. (b) Some may be not yet aware of their pregnancy, and from these cases we can learn the capacity of how early the urine test can detect a pregnancy as compared to verbal report. It would be difficult to differentiate the two groups. Temporarily we set up the following arbitrary criteria, taking into account the possible length of gestation when a woman would not be able to recognize her pregnancy.

No intention of hiding pregnancy or outcome:

	index round (i)	(i + 1)	(i + 2)
A_1	0 1	0 0 5 or 6	
A_2	0 1	2-4,6 1	
	or 0 1	0(1) 1	2-4,6 1

Intention of hiding pregnancy or its outcome possible (again showing index round and subsequent rouds as required for definition):

A_3	0 1	0 1	00 0 5 or 6	or	0 1	0(1) 1	0(1) 1	0 0 5 or 6	
A_4	0 1	0(1) 1	0(1) 1	2-4,6 1	...	0 0 1(4)			

For those pregnancies not established, they can be either:

(a) False positive urine test, or other technical errors

in urine test such as having used some pregnant women's urine. (b) The urine test was right, the women had been pregnant and already terminated, though unreported. Their distribution in code will be as follows:

A_5	0 1	0 0		or		0 1	2 1	0(1) 0
A_6	0 1	0(1) 1		0(1) 1	...	0 0		

This aspect of intentional hiding or not will be discussed further in later section.

(2) For Group A' (verbally not sure, urine test positive): To study this group and the one following has practical usage since there are so many "not sure" answers to their pregnancy status from the respondents when asked in the field. This answer is understandable since a delayed menstruation naturally suggests a pregnancy. However, a delayed menstruation is not necessarily a sign of pregnancy, this is especially true for elderly women close to menopause as well as for those with irregular cycles.

In total, 39 events belong to this group and are contributed by 37 cases. In only 4 cases (10.53%) were the pregnancies not established. So for most events in this group, they are pregnant, and among these pregnant, most terminated by L.B. (32, or 82.05%). Only 2 events ended in induced abortion and one in spontaneous abortion. So it seems that in this group the answer, "not sure of pregnancy" was probably not used preparatory to hiding L.A., but more likely used

when the respondent had a suspicion of the beginning of a pregnancy.

For the 4 events for which pregnancy was not established, it was noticed that all have had the L.M.P. more than a month prior to the index visit, which justifies their verbal report. No other information so far could be found to ascertain whether they have had an unreported I.A. or S.A. or not.

It could be speculated that: (1) For those with pregnancy eventually established: The women might have reported being not sure of their pregnancy because they truly suspected they might be pregnant, and this suspicion proved to be true either by correct suspicion or for a minority, just by coincidence. (2) For those with pregnancy not established: Maybe an I.A. was carried out but unreported by the (i + 1)th visit, or the verbal "not sure" may be due to the hypersensitivity among some highly susceptible women, or the women are intentionally trying to confuse the interviewer and the result of the urine test was false positive.

(3) For Group B' (verbally not sure, and urine test negative): There are totally 45 events in this group, contributed by 42 cases.

Among these 45 events, there were 31 events or 68.88% for which the pregnancies were not established. They may be the reported events from the uncooperative, hypersensitive, and susceptible cases based on their delayed period or some other symptoms, and proved to be not pregnant. The

result of the urine test was proved to be correct. Alternatively, an abortion could have occurred with the timing of the pregnancy and its termination such that the pregnancy test was unable to pick it up. The termination could have been spontaneous and unknown to the respondent, or either spontaneous or induced but concealed by the respondent.

As for those pregnancies established at subsequent rounds, there were altogether 14 events belonging to this subgroup. Among them, 10 events ended in L.B. and 1 in S.A., their urine test in the following round turned to be positive. The reason why urine test at this index round was negative may be because the time was too short after fertilization for the test. There is one case reported verbally definitely to be pregnant in later rounds but with no reported termination. (Urine test stayed as negative). She may have pathological conditions or be approaching menopause.

For 2 among the 3 events terminated with I.A.; the urine test remained negative, while the other one turned to positive at 3 rounds later, and may have been the start of another pregnancy, but indistinguishable by our criteria. It is not clear whether these 2 events are false induced abortions (that is, induced with no pregnancy), or the interval between the 2 respective rounds was so long that the women can correctly recognize a pregnancy and receive an I.A. without a positive urine test at a previous round.

In general, when verbally not sure of pregnancy and urine test was negative, about two-thirds of the events never

were established as pregnant. One third of them proved to be pregnant, mostly by L.B. but there were 3 events which were terminated reportedly by voluntary I.A.

(4) For Group B (verbally pregnant, but urine test negative): These are relatively rare events. In total, only 10 events contributed by 9 cases. For 6 events pregnancies were established, 5 terminated by live births and one by induced abortion. For the other 4, pregnancies were not established. In thinking of the high sensitivity of the test, and the fact of the voluntary report of the women that they are pregnant, the discrepancies which were followed by actual pregnancy may be a coincidence of reporting to be pregnant among the highly susceptible before the test could detect pregnancy or the test is fooled by a lowered HCG level beyond mid-pregnancy. For those pregnancies not established, their speculation (more likely due to some pathological condition) was proved to be wrong.

Three of the 4 events have had long intervals between L.M.P. and the index visit. One case contributed 2 such events. There is no suggestive evidence that any of these 4 events might have ended in unreported I.A.

(5) For Group C (verbally pregnant and urine test positive): This group is thought to have pregnancy proved. In total there were 109 events of this category contributed by 107 cases.

Of the 109 events, 6 events could not be successfully followed-up in subsequent rounds. All of the 103 remain-

ing events have been successfully followed and the respondents reported termination. (Ninety-seven terminated in live births, 3 in I.A. and 3 in S.A.).

It seems that our definition was correctly made. When a woman verbally first reported pregnancy and the urine test showed a positive result, then she is pregnant. Here, however, we should notice that to be fair in defending our definition, the women should be divided into 2 groups, as suspected earlier; those reported currently pregnant at the first round and those who reported new pregnancies at subsequent rounds.
Of the 6 events which we could not follow, five could not be followed because they moved, and one because she refused to be further followed.

(6) For Group D (verbally not pregnant and urine test negative but a termination as I.A. or S.A. by next round):
By definition, for these cases, pregnancy was also established.
Among the 13 events contributed by 12 cases, 10 I.A. and 3 S.A. were reported.
We would put much more confidence in the cases' subsequent reports of outcome, which they should be able to hide if they wanted to. They may have been scared by a delayed period and received an I.A. (either a true I.A. or false I.A.) in the interval. The other possibility for a negative test result in the index round is that the average interval of 6 weeks might be too long. Technical errors in urine examination is also possible.

(7) For the Group S:

These are the special events for which we have difficulty in categorizing, for the reason either that they did not have the necessary follow-up, or their answer was "unknown" concerning their pregnancies, or urine collection failed, and thus they do not fit in any of the above groups. Altogether only 5 events belong to this group, 2 reportedly terminated by L.B. and for the remaining 3 we lack follow-up information.

c. Summary

In the above, we have discussed what would be the probability of a woman's being truly pregnant, and what would be the outcome if truly pregnant when she was first suspected to be pregnant, with various conbinations of verbal report and urine test result based on the information obtained from a longitudinal study. The results can be summarized as in Table 10.

In general, for 77% of the suspected pregnancy events, the pregnancies were established, and 11.26% of the established pregnancies were reportedly terminated by I.A. Aside from groups C & D, which by definition should be pregnancy established, it is Group A' which has the highest predictive value on pregnancy, followed by Groups A and B. It is least likely for Group B' to be truly pregnant.

As for prediction on occurrence of I.A., aside from Group D, which by definition again showed the highest value, and Group S for which the number is too small, higher predictive value may be allotted to Groups A and B'. Group C showed the lowest value.

Table 10.

Numbers and Percentages of Established Pregnancies and Those Terminated in Induced Abortion by Various Combinations of Verbal Report and Urine Test Result Among the Suspectedly Pregnant Events

Groups*	Total of Suspected Pregnancies (1)	Pregnancy Established		Terminated in Induced Abortion		
		No. (2)	% (3)=(2)/(1)	No. (4)	% (5)=(4)/(1)	% (6)=(4)/(2)
A	84	61	72.62	7	8.43	11.48
A'	39	35	89.74	2	5.13	5.71
B'	45	14	31.11	3	6.67	21.43
B	10	6	60.00	1	10.00	16.67
C	109	103	94.50	3	2.75	2.91
D	13	13	100.00	10	76.92	76.92
Total	300**	232	77.33	26	8.67	11.21

*Defined in text.

**Five group E events were excluded.

The information we obtained on the outcome of pregnancies with the aid of urine test and follow-up visit should be of great value in a one-shot retrospective survey without urine test to estimate what might be the actual outcome when pregnancy status is based on verbal report only.

Condensing Table 10 into Table 11, it shows the predictive power of verbal report of pregnancy status.

Interpretation should be cautious here since the study population is limited here to the 300 "suspected pregnant events." It is interesting to notice, however, it was those who verbally answered not pregnant who had the I.A. rate either by the number of established pregnancies or by number of events. Only rarely did a woman report verbally pregnant at first and end later with an I.A.

If we look at these figures from a different angle, we would notice that among these 26 interval occurrences of I.A.*, about two thirds of them (17 events, or 65.38%) occurred in cases who verbally denied pregnancy when their pregnancies were first suspected, although this group comprises only one third of total suspected pregnancy events.

3. "Explanatory (epidemiological)" Study: (Only preliminary tabulations are available but not included in this report)

4. Tentative Conclusions and Comments:

   a. I.A. under-reporting is more due to intentional hiding because of the intimate nature and illegality in some countries. Under-reporting due to forgetfulness is rather unlikely due to the

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*Four events of I.A. occurred between the regular 9th round of visit and the 1st follow-up. The remaining 22 events were contributed by 20 women during the intervals of regular repeat interview, both among urine cases.

Table 11.

Numbers and Percentages of Established Pregnancies and Those Terminated in Induced Abortions by Verbal Report of Pregnancy Status Among the Suspectedly Pregnant Events

Verbal Report	Total of Suspected Pregnancies (1)	Pregnancy Established		Terminated in Induced Abortion		
		No. (2)	% (3)=(2)/(1)	No. (4)	% (5)=(4)/(1)	% (6)=(4)/(2)
Not pregnant (A + D)	97	74	76.29	17	17.53	22.97
Not sure (A' + B')	84	49	58.33	5	5.95	10.20
Pregnant (B + C)	119	109	91.60	4	3.36	3.67
Total	300*	232	77.33	26	8.67	11.21

*Five group S events were excluded.

traumatic experience of I.A. to a mother. (Of course memory may be deficient on some details around an I.A., such as expenses, decision-making process, etc.).

b. In this sense, a longitudinal study on I.A. without a highly sensitive and specific pregnancy test would be not much better than a one-shot retrospective study, since the former is supposed to be more capable in eliminating under-report due to memory failure than intentional hiding.

c. A longitudinal study without a good pregnancy test, (i.e., entirely on respondents' own verbal report) would face the following problems:

(1) The practical difficulties to correctly recognize a pregnancy early enough.

(2) Elderly women approaching menopause and women with irregular cycles would report more "don't know" or "not sure", for which there is no way to correctly identify their status of pregnancy.

(3) There is no way to detect the pregnancy and its outcome if the women want to abort their pregnancies and wish intentionally to hide the pregnancy.

d. It seems worth the trouble to carry out a urine test, even realizing that it would add some logistic problems, and the following technical ones:

Possible sources of bias in <u>Urine test</u>:

(1) Inherent to operation:

A. Obtaining wrong person's urine } Interviewer's fault (or
B. Mislabeling in field } interviewee's intention)

C. Mismanagement in laboratory (Wrong urine, mislabeling, technical error, etc.) -- technician's negligence.

(2) Inherent to the test itself: false positive or false negative test result

A. In general

B. At what period of pregnancy

False positive due to ovulating hormone

False negative after 2nd trimester of pregnancy

C. Storage and transportation of reagent.

e. A question thay may be further considered:

Whether 6 weeks is an adequate interval for a repeat interview with urine test to detect possible under-report of induced abortion.

Section Three

Substantive Findings

This section contains sub-sections emphasizing the "substantive" findings of the study as distinguished from particular "methodological" findings. It must be recognized that these two sorts of findings cannot be completely independently presented or discussed and there is, therefore, not only some duplication of material, but some "methodological" observations are found in this section which are not presented in their proper section as there were some substantive findings included in the section on Methodology which will not be repeated here.

I. The Interval Occurrence of Induced Abortions Reported During the One-Year Period of Repeat Interview

Epidemiologic studies on induced abortions are subject to many difficulties. The hospital-based studies usually have biased selection of cases, and can reveal only part of the problem. The usual KAP studies on a representatively selected sample, on the other hand, suffer from the disadvantages inherent in retrospective studies using the interviewing method, namely, the forgetfulness about and intentional concealing of the events by the respondents. The intimate nature and, in most countries, the illegal status of induced abortion certainly worsen the situation. Intensive studies on the natural history of induced abortion have been thus far rather rare.

In Taoyuan County of Taiwan, a prospective study was carried out on 1,861 currently married women within the childbearing age (15-49). The study population was selected by stratified probability sampling. The women were repeatedly interviewed by trained female interviewers about every six weeks for altogether nine rounds, approximately equivalent to a period of a year. By randomization, half of the study women were asked to give their urine at the end of each visit and a pregnancy test (Pregnosticon test) was performed at our laboratory. Usually, an interviewer interviewed the same respondents throughout the nine rounds.

In the first round of visits, effort was made to gather the fertility history and background characteristics of the respondents, and at the last (ninth) round information concerning the relevant changes in the respondents' socio-economic status was obtained. KAP-type questions on contraception as well as on induced abortion were spread over the seven rounds in between. However, the pregnancy status (starting from the first round)

and its outcome (starting from the second round) were asked in every round. Whenever an induced abortion was reported to have occurred in the interval, relevant information concerning the performance and result of that induced abortion was sought. It is hoped that the brevity of the interval and the rapport achieved between the respondents and our interviewers would eliminate most of the reporting errors, either unintentional or intentional.

Altogether 40 women reported interval occurrences of 44 induced abortions during the eight intervals between the nine rounds of visits. Four women reported two induced abortions during the year. Induced abortion is defined here as an artificial termination of pregnancy which successfully accomplished the purpose of preventing a livebirth.

This preliminary study is intended to: (1) Provide an estimate of the magnitude of induced abortion; (2) Study the differences between the respondents with interval occurrence of induced abortion and those, the majority, without; (3) Examine the relationship between induced abortion and birth control practice; (4) Study reasons, gestational age, cost, and a few other selected characteristics of induced abortion.

Either the 40 women with interval occurrence of induced abortions or the 44 induced abortions themselves will be used as the subject of study depending on the particular focus of analysis.

A. Induced Abortion Ratios

The number of interval occurrences of induced abortion by round of visits is shown in Table 1. From these data one can estimate the annual incidence rate to be 27.1 induced abortions per 1,000 married women age 15-49. This is calculated by weighting each interval's experience by the number of women reporting for the interval and

Table 1.

Number of Interval Occurrences of Induced Abortions, Other Fetal Deaths, and Livebirths by Rounds of Visits

Number of Round	Respondents	Number of Interval Occurrences of Induced Abortions	Number of Interval Occurrences of Other Fetal Deaths	Number of Interval Occurrences of Livebirths
2	1,807	7	2	42
3	1,770	9	5	28
4	1,762	3	4	26
5	1,752	6	3	34
6	1,747	5	2	33
7	1,747	6	1	35
8	1,736	3	3	41
9	1,734	5	-	36
Total	14,055	44	20	275

adjusting for the fact that the total period of observation was only about 48 weeks. A similar calculation using the number of women who have reported one or more induced abortions as the numerator, that is, 40 women, yields the estimate that 24.7 women per 1,000 will experience abortion in a year's period. The ratio of induced abortions to livebirths for this experience is 44/275 or 160.0 induced abortions per 1,000 livebirths. The data of Table 1 show no differences among the rounds which are statistically significant.

B. Reasons for Induced Abortions

Approximately two-thirds (30 of the 44, or 68.2%) of the induced abortions were done either to keep from having more children or to provide a longer interval between births. Nine of the remaining were for health reasons, all but one for the mother's (respondent's) health, and five gave answers that could not be categorized as to reason.

C. Comparison of Respondents with Induced Abortion and Other Respondents

In the comparisons which follow the respondents are divided into four groups according to their birth experience during the period of observation: Those with no known livebirths or fetal deaths during the period, those with at least one admitted induced abortion, those with some other fetal death (spontaneous abortion or stillbirth), and those with at least one livebirth.

1. Residence

The study was carried out in four of the twelve townships in Taoyuan County, namely, Chungli, the most urbanized of the four; Tachi, mountainous and rural township; Pingchen and Hsinwu, which are both rural. Table 2 shows that of the respondents interviewed

Table 2.

Respondents by Outcome of Pregnancy** and Township of Residence

Township	Induced Abortion		Other Fetal Death		Livebirth		No Birth		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Chungli	21*	52.5	4	20.0	91*	33.1	443	29.0	558*	30.0
Tachi	8	20.0	6	30.0	68	24.7	434	28.4	516	27.7
Pingchen	6	15.0	4	20.0	50	18.2	205	13.4	265	14.2
Hsinwu	5*	12.5	6*	30.0	66	24.0	446	29.2	522*	28.0
Total	40	100.0	20	100.0	275	100.0	1528	100.0	1861	99.9

Note: $P<0.01$, based on χ^2 test for entire table, 9 degrees of freedom. $0.05<P<0.10$ for table without I.A., 6 degrees of freedom.

*One respondent residing in Chungli had both a livebirth and an induced abortion in the study period. A Hsinwu respondent reported both an induced abortion and a spontaneous abortion in the period. These women are tabulated under each type of outcome experienced, but are included only once each in the township totals.

In addition, three Chungli residents and one from Tachi had two induced abortions each.

**In this table and similar tables to follow "outcome of pregnancy" refers to pregnancies occurring during the observation period, that is, between Rounds 1 and 9, and correspondingly "no birth" means no birth in this interval.

on Round 1, a larger proportion of the more urbanized Chungli township women were identified as having at least one induced abortion in the subsequent year than of women in more rural areas. This difference is statistically significant at less than the 1% level, suggesting a positive association between degree of urbanization and incidence of induced abortion. The distributions of the respondents with other outcomes of pregnancy do not differ among the townships.

2. Ancestry

Among the adult native residents of Taiwan, there are two major groups, the Fukienese and the Hakkanese. These two groups trace their ancestry to the inhabitants of two different locations on the Chinese mainland. They differ in dialect and various other cultural characteristics. The data in Table 3 give no evidence of a difference between them in propensity for induced abortions or other types of birth during the period of the study.

3. Age

Table 4A shows that a larger proportion of married women under age 35 years experienced an abortion during the study period than of married women above that age. One might suppose this to be importantly affected by the pregnancy rates in these ages, and the "no birth" column which shows the proportion not having a pregnancy termination supports this, there being a fairly steady increase in the proportion of married without a pregnancy termination from about 50% at the youngest age to about 100% at age 49.

Table 4B shows the distribution of respondents with terminations of pregnancy in the observation period by pregnancy outcome and

Table 3.

Respondents by Outcome of Pregnancy and Ancestry

	Induced Abortions	Other Fetal Death	Live-birth	No Birth	Total	Percent of Total Who Had Induced Abortion
Fukienese	19*	9	115	605	748	2.5
Hakkanese	20*	9*	154*	877	1,058*	1.9
Mainlander	1	2	5	46	54	1.9
Others	--	--	1	--	1	--
Total	40	20	275	1,528	1,861	2.1

Note: Comparing Fukienese and Hakkanese, $0.5<P<0.7$, based on χ^2 with 3 degrees of freedom.

*In addition, three Fukienese and one Hakkanese had two induced abortions each. Among the Hakkanese, one respondent had both an induced abortion and a spontaneous abortion, another had both an induced abortion and a livebirth. These women are counted only once in the "Total" column.

Table 4.

A. All Respondents by Outcome of Pregnancy and Age at Start of Observation Period (Percentages summing horizontally are in parentheses.)

Age in Years	Induced Abortion	Other Fetal Death	Livebirth	No Birth	Total
15-19	--	1 (2.8)	16 (44.4)	19(52.8)	36(100.0)
20-24	7*(3.4)	2 (1.0)	80*(38.8)	118(57.3)	206(100.0)
25-29	13*(3.5)	8 (2.2)	85 (23.1)	262(71.2)	368(100.0)
30-34	11*(3.0)	4 (1.1)	60 (16.3)	294(79.7)	369(100.1)
35-39	3 (0.9)	4 (1.2)	26 (8.1)	289(89.8)	322(100.1)
40-44	6*(1.9)	1*(0.3)	7 (2.2)	311(96.0)	324(100.0)
45-49	--	--	--	226(100.0)	226(100.0)
Unknown	--	--	1 (10.0)	9(90.0)	10(100.0)
Total	40 (2.1)	20 (1.1)	275 (14.8)	1528(82.1)	1861(100.0)

Note: Comparing the induced abortion column with all others as a group, and combining ages 15-24 and omitting the unknowns, the χ^2 with 5 degrees of freedom indicated $0.02<P<0.05$.

B. Respondents with a Pregnancy Termination by Outcome of Pregnancy and Age at Start of Observation Period (Percentages summing horizontally are in parentheses.)

Age in Years	Induced Abortions	Other Fetal Deaths	Livebirths	Total With a Pregnancy Termination
15-19		1 (5.9)	16 (94.1)	17(100.0)
20-24	7*(8.0)	2 (2.3)	80*(90.9)	88(100.0)
25-29	13*(12.3)	8 (7.5)	85 (80.2)	106(100.0)
30-34	11*(14.7)	4 (5.3)	60 (80.0)	75(100.0)
35-39	3 (9.1)	4 (12.1)	26 (78.8)	33(100.0)
40-44	6*(46.2)	1*(7.7)	7 (53.8)	13(100.0)
Unknown			1 (100.0)	1(100.0)
Total	40 (12.0)	20 (6.0)	275 (82.6)	333(100.0)

*In the age group 15-19 years one respondent had both an induced abortion and a livebirth. In the 40-44 years group one respondent had both an induced and a spontaneous abortion. These women are counted only once in the "Total" column. In addition, two in age group 25-29 and two in 30-34 group had two induced abortions each.

age of respondent. From the "Livebirth" column it is clear that married women who become pregnant are less likely to have the pregnancy terminate in a livebirth the older they become. By comparing the "Induced Abortion" column with the "Other Fetal Death" column it is seen that a substantial majority (the average is 40/60=67%) of the fetal deaths result from induced abortion.

4. Education

A smaller proportion of respondents with no education had an induced abortion during the observation period than did those receiving at least an elementary level education (Table 5A). However, those with no education had markedly fewer terminations of pregnancy than did the married women of elementary or junior high education (which form 93% of those with some education, 920/994). Table 5B shows pregnancy outcome by education among those women with a termination of pregnancy during the observation period. No educational differential appears.

5. Prior Pregnancy History

a. All Pregnancies

There is no statistically significant pattern in the proportion of married women who experienced an induced abortion during the period of observation relative to their number of prior pregnancies reported (Table 6A). A strong relationship between prior pregnancies and incidence of livebirths during the study period is found; the fewer the previous pregnancies the more likely is the married woman to have a livebirth. The proportion of women with no outcome of pregnancy in the period shows the opposite relationship with prior pregnancy since this

Table 5.

A. All Respondents by Outcome of Pregnancy and Educational Level
(Percentages summing horizontally are in parentheses.)

	Induced Abortion	Other Fetal Death	Livebirth	No Birth	Total
Not educated	10*(1.2)	7*(0.8)	87 (10.0)	764(88.1)	867(100.0)
Elementary	25*(3.1)	8 (1.0)	153*(18.8)	629(77.3)	814(100.0)
Junior high	4 (3.8)	5 (4.7)	26 (24.5)	71(67.0)	106(100.0)
Senior high	1 (2.0)	--	6 (12.2)	42(85.7)	49(99.9)
College	--	--	1 (10.0)	9(90.0)	10(100.0)
Other	--	--	2 (13.3)	13(86.7)	15(100.0)
Total	40 (2.1)	20 (1.1)	274 (14.8)	1528(82.1)	1861(100.0)

Note: Comparing the induced abortion column with all others as a group, and combining educational levels above elementary, the χ^2 with 2 degrees of freedom indicated $0.02<P<0.05$. The "no birth" column versus all others as a group, combining college and "other," χ^2 with 4 degrees of freedom indicated $P<0.01$.

B. Respondents with a Pregnancy Termination
by Outcome of Pregnancy and Educational Level
(Percentages summing horizontally are in parentheses.)

	Induced Abortion	Other Fetal Death	Livebirth	Total with Termination
Not educated	10*(9.7)	7*(6.8)	87 (84.5)	103 (100.0)
Elementary	25*(13.5)	8 (4.3)	153*(82.7)	185 (100.0)
Junior high and over	5 (11.1)	5 (11.1)	35 (77.8)	45 (100.0)
Total	40 (12.0)	20 (6.0)	275 (82.6)	333 (100.0)

Note: Keeping all cells, χ^2 with 4 degrees of freedom indicated $0.3<P<0.5$. Comparing the induced abortion column with a combination of the other two columns, the χ^2 with 2 degrees of freedom indicated $0.5<P<0.7$.

*In the "not educated" group one respondent had both an induced abortion and a spontaneous abortion. In the group with elementary education one respondent had both an induced abortion and a livebirth. These women are counted only once in the "total" column. In addition, one of the "not educated" and three of the "elementary" had two induced abortions each.

proportion is nearly the complement of the livebirth proportion.

Looking at the distribution of respondents with a termination of pregnancy in the period, one sees a statistically significant and positive relationship between number of prior pregnancies and proportion of termination which are induced abortions (Table 6B). There is a suggestion that this may be true also for other fetal deaths but the sample is too small to permit a definite conclusion on this point.

b. Livebirths

Among married women there is statistically significant variation in the proportion experiencing an induced abortion according to the number of their previous livebirths (Table 7A). Those who had no more than one livebirth prior to the observation period showed no induced abortion. A peak was reached among women with 2 or 3 prior livebirths.

If the distribution of outcomes is examined relative only to the 333 women with terminations of pregnancy, the relationship between number of prior livebirths and the proportion terminating as induced abortion is statistically significant and generally positive (Table 7B).

c. Fetal Deaths

(1) Spontaneous Abortions and Stillbirths

The distributions of respondents by outcome of pregnancy during the observation period show no statistically significant differences by occurrence either of prior spontaneous abortions or of prior stillbirths (stillbirths

Table 6.

A. All Respondents by Outcome of Pregnancy and Number of Prior Pregnancies (Percentages summing horizontally are in parentheses.)

Prior Pregnancies	Induced Abortion	Other Fetal Death	Livebirth	No Birth	Total
0	(0.0)	1 (1.6)	20 (32.8)	40(65.6)	61(100.0)
1	(0.0)	(0.0)	57 (41.0)	82(59.0)	139(100.0)
2	4 (2.3)	2 (1.2)	47 (27.5)	118(69.0)	171(100.0)
3	10*(3.8)	6 (2.3)	47*(17.9)	201(76.4)	263(100.0)
4	6 (2.1)	4 (1.4)	46 (15.9)	234(80.7)	290(100.1)
5	6*(2.3)	3 (1.1)	28 (10.6)	227(86.0)	264(100.0)
6	7*(2.9)	2 (0.8)	10 (4.1)	226(92.2)	245(100.0)
7	2 (1.2)	(0.0)	9 (5.6)	149(93.1)	160(99.9)
8	1 (0.9)	1 (0.9)	4 (3.8)	100(94.3)	106(99.9)
9	3*(3.9)	1*(1.3)	4 (5.3)	69(90.8)	76(100.0)
10+	1 (1.2)	(0.0)	3 (3.5)	82(95.3)	86(100.0)
Total	40 (2.1)	20 (1.1)	275 (14.8)	1528(82.1)	1861(100.0)

Note: Comparing the induced abortion column with all others as a group, and grouping prior pregnancies as 0-1, 2-3, 4-5, 6-7, 8+, the χ^2 with 4 degrees of freedom indicated $0.1<P<0.2$.

*One respondent with 3 prior pregnancies had both an induced abortion and a livebirth. One with 9 prior pregnancies had both an induced and a spontaneous abortion. These women are counted only once in the "total" column. In addition, two women with a prior history of 3, one of 5, and one of 6 pregnancies had two induced abortions each.

B. Respondents with a Pregnancy Termination
by Outcome of Pregnancy and Number of Prior Pregnancies
(Percentages summing horizontally are in parentheses.)

Prior Pregnancies	Induced Abortion	Other Fetal Death	Livebirth	Total
0 - 1	0 (0.0)	1 (1.3)	77 (98.7)	78(100.0)
2 - 3	14*(12.2)	8 (7.0)	94*(81.7)	115(100.0)
4 - 5	12*(12.9)	7 (7.5)	74 (79.6)	93(100.0)
6 - 7	9*(30.0)	2 (6.7)	19 (63.3)	30(100.1)
8 +	5*(29.4)	2*(11.8)	11 (64.7)	17(100.0)
Total	40 (12.0)	20 (6.0)	275 (82.6)	333(100.0

Note: Comparing the induced abortion column with all others as a group, and grouping prior pregnancies 6+, the χ^2 with 3 degrees of freedom indicated $P<0.01$.

*See footnote to Table 6A.

Table 7.

A. All Respondents by Outcome of Pregnancy and Number of Prior Livebirths
(Percentages summing horizontally are in parentheses.)

Prior Livebirths	Induced Abortion	Other Fetal Death	Livebirth	No Birth	Total
0	(0.0)	1 (1.6)	20 (31.3)	43(67.2)	64(100.1)
1	(0.0)	(0.0)	64 (42.1)	88(57.9)	152(100.0)
2	7 (3.4)	2 (1.0)	55 (27.1)	139(68.5)	203(100.0)
3	15*(5.0)	7 (2.3)	46*(15.4)	232(77.6)	299(100.0)
4	1 (0.4)	4 (1.5)	41 (14.9)	229(83.3)	275(100.1)
5	7*(2.6)	5 (1.8)	23 (8.5)	236(87.1)	271(100.0)
6	6 (2.7)	(0.0)	9 (4.0)	208(93.3)	223(100.0)
7	(0.0)	(0.0)	8 (4.9)	155(95.1)	163(100.0)
8	(0.0)	(0.0)	6 (5.6)	102(94.4)	108(100.0)
9	3*(5.9)	1*(2.0)	2 (3.9)	46(90.2)	51(100.0)
10+	1 (1.9)	(0.0)	1 (1.9)	50(96.2)	52(100.0)
Total	40 (2.1)	20 (1.1)	275 (14.8)	1528(82.1)	1861(100.0)

Note: Comparing the induced abortion column with all others as a group, and grouping prior livebirths as 0-1, 2-3, 4-5, 6-7, 8+, the χ^2 with 4 degrees of freedom indicated $P<0.01$.

*One respondent with 3 prior livebirths had both an induced abortion and a livebirth. One with 9 prior livebirths had both an induced abortion and a spontaneous abortion. These women are counted only once in the "total" column. In addition, two women with a prior history of 3 and two of 5 livebirths had two induced abortions each.

B. Respondents with a Pregnancy Termination by Outcome of Pregnancy and Number of Prior Livebirths (Percentages summing horizontally are in parentheses.)

Prior Livebirths	Induced Abortion	Other Fetal Death	Livebirth	Total
0 - 1	0 (0.0)	1 (1.2)	84 (98.8)	85(100.0)
2 - 3	22*(16.8)	9 (6.9)	101*(77.1)	131(100.0)
4 - 5	8*(9.9)	9 (11.1)	64 (79.0)	81(100.0)
6 - 7	6 (26.1)	0 (0.0)	17 (73.9)	23(100.0)
8 +	4*(30.8)	1*(7.7)	9 (69.2)	13(100.0)
Total	40 (12.0)	20 (6.0)	275 (82.6)	333(100.0)

Note: Comparing the induced abortion column with all others as a group, and grouping livebirths as 0-1, 2-3, 4-5, 6-7, 8+, the χ^2 with 3 degrees of freedom indicated $P<0.01$.

*See footnote to Table 7A.

are defined as fetal deaths, not induced, occurring after more than six months gestation) (see Tables 8 and 9).

(2) Induced Abortions

If the respondent reported a history of previous induced abortion, she was more likely to experience an induced abortion during the observation period than if she did not report a prior experience (Table 10A). When the relationship between prior induced abortion and outcome of pregnancy is examined among respondents with pregnancy terminations during the observation period, an extremely marked association is observed (Table 10B). This strong suggestion of recidivism is examined in more detail elsewhere in this report.

6. Knowledge of Induced Abortion and of the Extent of Its Use

On the fourth round the respondents were asked a number of questions regarding induced abortions, including the basic question as to whether they were aware of such an event as an induced abortion. Those indicating awareness of induced abortion were then asked for more detailed information, including their estimate of the number of their friends and neighbors who use induced abortion.

There is no detectable relationship between respondents' knowledge of the possibility of an induced abortion and outcome of pregnancy during the observation period remaining following the enquiry about knowledge (Table 11). For this comparison women known to have had an induced abortion prior to the query were excluded from consideration. Although the subject of induced abortion was not carried beyond the initial question if the respondent claimed a lack of knowledge, it is possible that the query itself removed the

Table 8.

All Respondents by Outcome of Pregnancy
and Number of Prior Spontaneous Abortions
(Percentages summing horizontally are in parentheses.)

Prior Spontaneous Abortions	Induced Abortion	Other Fetal Death	Livebirth	No Birth	Total
0	35*(2.1)	16*(1.0)	249*(14.9)	1378(82.2)	1676(100.0)
1+	5 (2.7)	4 (2.2)	26 (14.1)	150(81.1)	185(100.1)
Total	40 (2.1)	20 (1.1)	275 (14.8)	1528(82.1)	1861(100.0)

*Among respondents reporting no prior history of spontaneous abortion, one had both an induced abortion and a livebirth, another had both an induced and a spontaneous abortion during the study period. These women are counted only once in the "total" column. In addition, 4 other women in the group with no prior spontaneous abortion had two induced abortions each during the observation period.

Table 9.

All Respondents by Outcome of Pregnancy
and Number of Prior Stillbirths
(Percentages summing horizontally are in parentheses.)

Prior Stillbirths	Induced Abortion	Other Fetal Death	Livebirth	No Birth	Total
0	37*(2.1)	20*(1.1)	260*(14.6)	1462(82.3)	1777(100.0)
1+	3 (3.6)	(0.0)	15 (17.9)	66(78.6)	84(100.1)
Total	40 (2.1)	20 (1.1)	275 (14.8)	1528(82.1)	1861(100.0)

*Among respondents reporting no prior history of stillbirth, one had both an induced abortion and a livebirth, another had both an induced and a spontaneous abortion during the study period. These women are counted only once in the "total" column. In addition, 4 other women in the group with no prior stillbirth had two induced abortions each during the observation period.

Table 10.

A. All Respondents by Outcome of Pregnancy and Number of Prior Induced Abortions (Percentages summing horizontally are in parentheses.)

Prior Induced Abortions	Induced Abortion	Other Fetal Death	Livebirth	No Birth	Total
0	29*(1.7)	18*(1.1)	265*(15.5)	1395(81.8)	1705(100.0)
1	8*(8.1)	2 (2.0)	6 (6.1)	83(83.8)	99(100.0)
2	3 (10.0)	(0.0)	4 (13.3)	23(76.7)	30(100.0)
3+	(0.0)	(0.0)	(0.0)	27(100.0)	27(100.0)
Total	40 (2.1)	20 (1.1)	275 (14.8)	1528(82.1)	1861(100.0)

Note: Comparing the induced abortion column with all others as a group, and combining all with 1 or more prior induced abortions, the χ^2 with 1 degree of freedom and using Yates' correction indicated $P<0.01$.

B. Respondents with a Pregnancy Termination by Outcome of Pregnancy and Number of Prior Induced Abortions (Percentages summing horizontally are in parentheses.)

Prior Induced Abortion	Induced Abortion	Other Fetal Death	Livebirth	Total
0	29*(9.4)	18*(5.8)	265*(85.5)	310(100.0)
1+	11*(47.8)	2 (8.7)	10 (43.5)	23(100.0)
Total	40 (12.0)	20 (6.0)	275 (82.6)	333(100.0)

Note: Comparing the induced abortion column with all others as a group and using Yates' correction, $P<0.01$.

*Among respondents reporting no prior history of induced abortions, one had both an induced abortion and a livebirth in the observation period, another had both an induced and a spontaneous abortion. These women are counted only once in the "total" column. In addition, three other women in the group with no prior induced abortion and one respondent with one prior induced abortion had two induced abortions each during the observation period.

Table 11.

Respondents Interviewed on the Fourth Round Who Had Not Yet Had an Induced Abortion by Knowledge of Possibility of Induced Abortion and Outcome of Pregnancy Subsequent to Round 4
(Percentages summing horizontally are in parentheses.)

Knowledge of Induced Abortion	Induced Abortion	Other Fetal Death	Livebirth	No Birth	Total
Yes	9*(0.9)	6(0.6)	110(11.4)	836(87.0)	961(100.0)
No	5 (0.8)	1(0.2)	56(8.8)	571(90.2)	633(100.0)
Total	14 (0.9)	7(0.4)	166(10.4)	1407(88.3)	1594(100.0)

*Includes one respondent with two induced abortions subsequent to Round 4.

ignorance in most cases. This would make the subdivision into those with and those without knowledge of doubtful predictive value. It is of interest that 40% (633/1594) of those queried who had not already had an abortion claimed not to know of such a pregnancy outcome.

Among respondents interviewed on the fourth round who gave a definite estimate as to the number of their friends using induced abortions, there was found a positive and statistically significant relationship between the number of friends thought to be using induced abortions and the proportion of respondents who resorted to induced abortion during the observation period (Table 12A). This relationship is also true when proportion of pregnancy terminations resulting in induced abortion is examined (Table 12B).

7. Contraceptive Practice

On both the third and the ninth rounds the women in the study were asked whether they were currently practicing contraception. Those who were not practicing and were not known to be pregnant at the time were asked why they were not using a contraceptive. In Tables 13 and 14 the "inapplicable" category concerning use of contraception is made up of women who either were pregnant at the time of the interview or stated as the reason for not using a contraceptive that they considered themselves not fecund. Although the details relating the findings at Round 3 to outcome of pregnancy during the nine rounds of observation and the corresponding details considering "use" at Round 9 are slightly different, as would be expected, the essential findings are the same. Table 13 relates to the use information at Round 3, Table 14 at Round 9.

Table 12.

A. Respondents by Outcome of Pregnancy and Their Estimate of Number of Their Friends Who Use Induced Abortion (Percentages summing horizontally are in parentheses.)

Friends Using Induced Abortion	Induced Abortion	Other Fetal Death	Livebirth	No Birth	Total
Many	8*(5.9)	2 (1.5)	21 (15.6)	104(77.0)	135(100.0)
Some	4*(3.9)	--	17*(16.7)	82(80.4)	102(100.0)
A few	6 (1.9)	5 (1.6)	54 (16.9)	254(79.6)	319(100.0)
None	2 (1.0)	4 (2.1)	27 (14.1)	158(82.7)	191(99.9)
Unknown	13*(3.6)	5*(1.4)	58 (16.1)	286(79.2)	361(100.0)
Inapplicable (IA Unknown)	7 (1.1)	4 (0.6)	93 (14.2)	550(84.1)	654(100.0)
Total	40 (2.3)	20 (1.1)	270 (15.3)	1434(81.4)	1762(100.0

Note: Comparing the induced abortion column with all others as a group and considering only the respondents (747) who gave definite estimate as to the number of their friends who used induced abortion, χ^2 with 3 degrees of freedom indicated $0.02<P<0.05$.

B. Respondents with a Pregnancy Termination by Outcome of Pregnancy and Their Estimate of Number of Their Friends Who Use Induced Abortion (Percentages summing horizontally are in parentheses.)

Friends Using Induced Abortion	Induced Abortion	Other Fetal Death	Livebirth	Total
Many	8*(25.8)	2 (6.5)	21 (67.7)	31(100.0)
Some	4*(20.0)	--	17*(85.0)	20(100.0)
A few	6 (9.2)	5 (7.7)	54 (83.1)	65(100.0)
None	2 (6.1)	4 (12.1)	27 (81.8)	33(100.0)
Unknown	13*(17.3)	5*(6.7)	58 (77.3)	75(100.0)
Inapplicable (IA Unknown)	7 (6.7)	4 (3.8)	93 (89.4)	104(99.9)
Total	40 (12.2)	20 (6.1)	270 (82.3)	328

Note: Comparing the induced abortion column with all others as a group, combining "many" with "some" and "a few" with "none," and omitting those unknown or inapplicable, χ^2 with 1 degree of freedom indicated $P<0.01$.

*One respondent with "some" friends using induced abortions had both an induced abortion and a livebirth. One in the "unknown" group had both an induced and a spontaneous abortion. These women are counted only once in the "total" column. In addition, one woman in the "many" row, one in the "some" row and two in the "unknown" row had two induced abortions each.

Table 13.

A. Respondents by Outcome of Pregnancy and Whether Using Contraception at Round 3 (Percentages summing horizontally are in parentheses)

Use of Contraception	Induced Abortion	Other Fetal Death	Livebirth	No Birth	Total
Yes	22*(4.6)	3(0.6)	7(1.5)	450(93.6)	481(100.0)
No	15*(2.3)	13(2.0)	116(18.1)	497(77.5)	641(99.9)
Inapplicable**	3*(0.5)	4(0.6)	147(22.7)	495(76.4)	648(100.0)
Total	40 (2.3)	20(1.1)	270(15.3)	1442(81.5)	1770(100.0)

B. Respondents With a Pregnancy Termination by Outcome of Pregnancy and Whether Using Contraception at Round 3 (Percentages summing horizontally are in parentheses)

Use of Contraception	Induced Abortion	Other Fetal Death	Livebirth	Total
Yes	22*(71.0)	3(9.7)	7(22.6)	31(100.0)
No	15*(10.4)	13(9.0)	116(80.6)	144(100.0)
Inapplicable**	3*(2.0)	4(2.6)	147(96.1)	153(100.0)
Total	40 (12.2)	20(6.1)	270(82.3)	328(100.0)

*One respondent using contraception had both an induced abortion and a live-birth. One in the "inapplicable" group had both an induced and a spontaneous abortion. These women are counted only once in the "total" column. In addition, two women using and two not using contraception had two induced abortions each.

**"Inapplicable" is composed of those not using contraception either because they were pregnant or because they considered themselves not fecund.

Table 14.

A. Respondents by Outcome of Pregnancy and Whether Using Contraception at Round 9 (Percentages summing horizontally are in parentheses)

Use of Contraception	Induced Abortion	Other Fetal Death	Livebirth	No Birth	Total
Yes	22*(4.9)	--(0.0)	37(8.3)	386(86.7)	445(99.9)
No	9*(1.4)	16(2.5)	214(32.9)	413(63.4)	651(100.0)
Inapplicable**	6*(0.9)	4(0.6)	19(3.0)	610(95.6)	638(100.0)
Total	37 (2.1)	20(1.2)	270(15.6)	1409(81.3)	1734(100.0)

B. Respondents With a Pregnancy Termination by Outcome of Pregnancy and Whether Using Contraception at Round 9 (Percentages summing horizontally are in parentheses)

Use of Contraception	Induced Abortion	Other Fetal Death	Livebirth	Total
Yes	22*(37.3)	--(0.0)	37(62.7)	59(100.0)
No	9*(3.8)	16(6.7)	214(89.9)	238(100.0)
Inapplicable**	6*(21.4)	4(14.3)	19(67.9)	28(100.0)
Total	37 (11.4)	20(6.2)	270(83.1)	325(100.0

*One respondent not using contraception had both an induced and a spontaneous abortion. One in the "inapplicable" group had both an induced abortion and a livebirth. These women are counted only once in the "total" column. In addition, two women using and two not using contraception had two induced abortions each.

**"Inapplicable" is composed of those not using contraception either because they were pregnant or because they considered themselves not fecund.

It is clear from these tables: (1) Women using contraception at some point during the observation period are less likely to have a pregnancy which terminates during the period, and (2) Of those that do experience a termination of pregnancy during the observation period the individuals who used a contraceptive at some point in the period were much more likely to terminate their pregnancy with an induced abortion.

8. Respondent's Feeling About "Current" Pregnancy

At the earliest round on which a respondent realized and reported that she was pregnant she was asked how she felt about that current pregnancy. Eight of the 44 pregnancies resulting in induced abortions during the observation period were identified at an interview prior to the occurrence of the abortion. Also, it happened that eight of the 20 pregnancies terminated by spontaneous abortions or stillbirths were thus identified. Their statements as to their feeling together with those of 173 respondents the outcomes of whose pregnancies were either not yet known by the ninth round or were livebirths are shown in Table 15.

The proportion of respondents indicating remorse among those reporting on pregnancies which terminated as induced abortions (87.5%) is strikingly high and, although the number of cases is small, the difference between this and the corresponding proportions in the other groups is statistically significant.

(In passing it is interesting to note the difference between the distributions by feeling between respondents with early pregnancies and those with a mixture of gestational ages, i.e., pregnant on Round 1, among the pregnancies resulting in livebirth or not known

Table 15.

Respondent's Feeling About "Current" Pregnancy by Subsequent Outcome of Pregnancy

Feeling About Pregnancy	Induced Abortion		Other Fetal Death		Pregnancies Resulting in Livebirth or Outcome Not Yet Determined: Not Pregnant on First Round		Pregnancies Resulting in Livebirth or Outcome Not Yet Determined: Pregnant on First Round		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Very happy	1	12.5	2	25.0	60	34.7	81	48.2	144	40.3
Neutral	-	-	5	62.5	68	39.3	55	32.7	128	35.9
Remorseful	7	87.5	1	12.5	10	5.8	23	13.7	41	11.5
Other	-		-		29	16.8	9	5.4	38	10.6
Unknown	-		-		6	3.5	-	-	6	1.7
Total	8	100.0	8	100.0	173	100.1	168	100.0	357	100.0

Note: Fisher's exact test comparing proportion remorseful among induced abortion cases with other fetal death cases yielded $0.01<P<0.02$. Comparing proportion remorseful among induced abortion cases with all other cases, using χ^2 with Yates' correction indicated $P<0.01$.

by Round 9 as to outcome. Further study will be required to interpret these differences, particularly because of the large fraction with "other" or "unknown" feeling among the early pregnancies, but possibly those with early pregnancies are less likely to feel either "very happy" or "remorseful" than those with later pregnancies.)

D. The Decision Making Process

At the round at which it was ascertained that an induced abortion had recently occurred the respondent was asked, "Before you decided to have the induced abortion, with whom did you discuss the matter? Who were they? -- Anybody else?" In 16% of the instances of induced abortion the respondent stated that she discussed the matter with no one (Table 16). The women discussed the abortion with their husbands about 80% of the time, mostly (28 out of 36 instances) with their husbands only. In the 8 instances when others as well as husbands were consulted, mothers-in-law were most frequently mentioned. Not once were medical or allied personnel mentioned, although health was the stated reason for 3 of 8 induced abortions discussed with others in addition to husbands, whereas health was the reason in only 3 of 28 when the discussion was reported to be with the husband only. This difference is statistically insignificant, but intriguing.

E. Selected Characteristics of Induced Abortions: Gestational Age, Attendant, Method, Subsequent Discomfort, Cost (Table 17)

The distributions of the selected characteristics of the induced abortions occurring during the observation period are presented in Table 17. These distributions have been subdivided according to whether or not the reported reason for the induced abortion was health.

Table 16.

Tabulation of Individuals With Whom the Question of Having an Induced Abortion Was Discussed by Whether or Not the Abortion Was Induced for Health Reasons

	Reason for Induced Abortion		Total	
	Health	Other	Number	Percent
No one	1	6	7	15.9
Husband only	3	25	28*	63.6
Husband and others	3	5	8*	18.2
Friends or neighbors	-	1	1*	2.3
Total induced abortions	7	37	44	100.0

*Four women had two abortions each within the observation period. Two of these reported that they discussed each induced abortion with their husbands; one reported discussing her earlier abortion with her husband only and her later one with others as well as her husband; the other respondent said the earlier of her two abortions she discussed with friends or neighbors and the later with her husband.

Table 17.

Various Characteristics of Induced Abortions by Whether Done for Health or Other Reasons

	Reason for Induced Abortion		Total	
	Health	Other	No.	%
Number of induced abortions	7	37	44	100.0
a. Gestational Age (completed months)				
1	2	26	28	63.6
2	4	10	14	31.8
3	1	1	2	4.5
b. Attendant				
Ob-Gyn M. D.	5	32	37	84.1
Other M. D.	1	3	4	9.1
Herb doctor	1	--	1	2.3
Self	-	1	1	2.3
Other	-	1	1	2.3
c. Method used				
Surgical	5	32	37	84.1
Drugs	1	1	2	4.5
Other	-	1	1	2.3
Unknown	1	3	4	9.1
d. Subsequent discomfort				
None	2	26	28	63.6
Yes, in first week	5	9	14	31.8
Yes, only after first week	-	1	1	2.3
Yes, in first week and later	-	1	1	2.3
e. Cost in NT$ (NT$40 = US$1)				
Under 200	1	2	3	6.8
200-399	3	27	30	68.2
400-599	1	6	7	15.9
Unknown	2	2	4	9.1

1. Gestational Age

Two of the induced abortions were reported to have been done at 3 months of gestation, all others of the 44 were done earlier. The respondents stated that obstetrician-gynecologist specialists performed a surgical induced abortion in each of the 3-month abortions.

2. Attendant

Forty-one of the 44 abortions, i.e., 93%, were performed by qualified physicians, mostly (37 of 41) obstetrician-gynecologist specialists.

3. Method

Of the 40 induced abortions for which respondents reported the method 37, i.e., 92.5%, were performed by a surgical procedure. Only one of these was described in such a way as to indicate that it clearly was by the suction technique, although it is possible that some others were by this method.

Two reported that the induced abortions were induced by drugs. The one of these done for health reasons was done by an herb doctor. The other drug induced abortion was reported to have been done by the respondent herself. Incidentally, the latter reported that she had not discussed the abortion with anyone.

4. Subsequent Discomfort

The question asked was, "Did you feel any discomfort following the induced abortion? (If yes,) What kind of discomfort? When was this?" The general nature of the question together with its being asked relatively soon after the event probably contributed to the relatively high proportion answering positively, 16 of 44, i.e., 36%, and to the fact that most instances, 14 of 16, were

identified as occurring in the first week after the abortion.

5. Cost

The respondent was asked for the cost of the induced abortion per se, and, for example, was not to include costs that might be associated with treatments of complications, if any. The maximum reported cost was in the NT$400 to NT$599 class, US$10 to US$14. Most, 68%, reported a cost in the NT$200 to NT$299 class, US$5 to US$7.49.

F. Willingness to Have Another Induced Abortion

Both at the round at which the induced abortion was reported and at Round 8 in association with probing for a complete history of induced abortions, those respondents who admitted an abortion were asked, "Suppose you get pregnant again, would you have another induced abortion? Why?" In Table 18 the responses are tabulated for both times of questioning, using the response following the second induced abortion for the four women with two induced abortions in the observation period.

The numbers are too small to establish the statistical significance of differences of the size shown in Table 18. Two features seem to merit attention as suggestive, (1) the somewhat larger proportion reporting on Round 8 that they might resort to induced abortion than on the round of reporting the induced abortion, and (2) the fact that 5 of 12 switched from "No" on an earlier round to "Yes" on Round 8, whereas no one switched in the reverse direction.

Table 18.

Respondents' Opinion as to Whether They Might Resort to an Induced Abortion Again, Having Had an Induced Abortion in Study Period, by Response at the Round Following the Induced Abortion and at Round 8

Response When Reporting Induced Abortion	Response at Round 8			No Response	Total	
	No	Yes	Undecided		No.	%
No	7	5	3	3	18	45.0
Yes	-	7	2	1	10	25.0
Undecided	3	2	6	1	12	30.0
Total:No.	10	14	11	5*	40	100.0
% of 35 responses	28.6	40.0	31.4		100.0	

*Three women were not interviewed on the eighth round; two women experienced their first abortion between the eighth and ninth round.

G. Summary Listing of Findings

The following list presents without discussion most of the findings from the examination of the pregnancy terminations experienced during the observation period, that is, between Rounds 1 and 9, an approximately 48-week interval. The associations mentioned are statistically significant, but the text should be consulted for the magnitude of the association and other qualifying remarks. In particular, when proportions are listed below, it should be borne in mind that they have large confidence limits in many cases since, for example, the number of women with induced abortions is only 40 and the number of induced abortions is 44.

		Discussed on Page
18.	Approximately 93% had the induced abortion performed by qualified doctors (MD's), mostly (37/41) by Ob-Gyn MD's	161
19.	About 93% of the abortions were done by surgical methods (only one known to be by suction)	161
20.	About 1/3 of the induced abortions were followed by "discomfort" sufficient for respondent to mention	161
21.	All induced abortions cost less than US$15; about 2/3 in range US$5 to US$7.49	162

II. The Habitualness of Induced Abortion

1. The Problems

Two contradictory speculations have been made concerning the question as to whether women will repeatedly resort to induced abortion when they accidentally become pregnant: (1) a woman who has had an abortion will be more likely to have another one because once the emotional barrier against abortion is overcome by one experience, she feels much more at ease having another one--i.e., there is habitualness in the practice of abortion, or (2), since induced abortion is an unpleasant experience both physically and psychologically, a woman will be more reluctant to have another one and will try to avoid another unwanted pregnancy by the more consistent use of contraceptives or by other means. Both hypotheses sound reasonable, and it would be of considerable programmatic value as well as of academic interest, to study if such an habitualness does indeed exist.

Should the first hypothesis be true, then an educational program for the prevention of induced abortions should be concentrated on the group of women who have had an abortion, or to those who possess specific characteristics associated with practicing abortion. In case the second hypothesis is true, then women who had experienced one abortion will be the most susceptible to a family planning message. A family planning program strategy may be modified accordingly to be certain to reach this specific group of women who need these services the most.

2. The Materials

The current study is based on the result of interviewing a total of 1,192 married women of childbearing age, from 15 to 49, as a part of the "Epidemiological Study on the Outcomes of Pregnancy" in Taiwan. Under this phase of the study, a probability sample of about 2,500 women were chosen from a total of about 89,000 eligible women in Taoyuan county, the study area, for a cross sectional KAP survey. The total sample was again divided into two comparable sub-groups; to one group, the randomized response technique (RRT)* was administered for the detection of abortion, and with the other group, the usual KAP type of interviews were conducted. The present analysis is based on the responses of the latter group of women. It is not possible to do the same analysis for the RRT group because identification of an individual's response is not possible by the RRT.

3. The Result

The distribution of the women on the sample by their past experiences with induced abortion is shown in Table 1 below.

Table 1

The Distribution of Respondents by the Number of Induced Abortions Experienced

No. of Induced Abortions Experienced (X)	Number of Women Who Had Had: Exactly X Abortions	At Least X Abortions
0	965	1,191
1	148	226
2	55	78
3	9	23
4	5	14
5	4	9
6+	5	5
Total	1,191**	

*RRT is reported under Chapter of this Report.
**One unknown is excluded.

A total of 355 induced abortions were reported from the 1,191 women who were included in the sample and who were successfully interviewed; the average was 0.298 abortions per respondent, or 1.57 abortions for each of the 226 women who reported having had at least one abortion. The proportion of women who had ever had an abortion is 19.0 percent.

A. Selectivity and standardization

It is known that the prevalence of abortion is correlated with various demographic characteristics such as age, parity, level of education, place of residence, and others. Tables 2A through 2D show the differential abortion rates by four selected variables: age, number of living children, level of education, and ancestry of respondents.

Among those who had had one abortion, the proportion of women who had had two or more abortions (34.8%) is significantly higher than the proportion of women who had had one abortion (19.0%) among the total number of women. This suggests the possibility that the chance is greater for a woman to have another abortion after she has had one. This comparison may not be valid because the composition by various socio-demographic variables of the total sample of women and the composition of those who had had at least one abortion are significantly different. Standardizing the observed rate of 19.0 percent with the above four variables, however, has augmented it from 19.0 percent to a range of 19.6% to 22.5%, which is significantly lower than the rate observed among the latter group of women (34.8%). (Table 3)

Table 2. Abortion Rates Specific to Selected Variables

A : Age Group of Women

(1) Age group	(2) Total no. of women	(3) No. of women with one or more abortions	(4) Abortion rate I (3)/(2)	(5) No. of women with 2 or more abortions	(6) Abortion rate II (5)/(3)
15-19	30	1	3.33	0	0
20-24	123	10	8.13	1	10.00
25-29	195	20	10.26	7	35.00
30-34	266	65	24.44	17	26.15
35-39	226	51	22.57	25	49.02
40-44	187	48	25.67	19	39.58
45-49*	166	32	19.28	10	31.25
Total	1,193**	227	19.03	79	34.80

*Including 2 women aged over 50
**Excluding 1 unknown

B : Number of Living Children

(1) No. of living children	(2) Total no. of women	(3) No. of women with one or more abortions	(4) Abortion rate I (3)/(2)	(5) No. of women with 2 or more abortions	(6) Abortion rate II (5)/(3)
0	36	0	0	0	0
1	100	3	3.00	0	0
2	126	15	11.90	4	26.67
3	196	41	20.92	17	41.46
4	214	49	22.90	15	30.61
5	176	37	21.02	12	32.43
6	145	39	26.90	13	33.33
7	74	14	18.92	7	50.00
8	56	12	21.43	7	58.33
9	40	6	15.00	1	16.67
10+	31	11	35.48	3	27.27
Total	1,194	227	19.03	79	34.80

C : Education of Respondents

(1) Education	(2) Total no. of women	(3) No. of women with one or more abortions	(4) Abortion rate I (3)/(2)	(5) No. of women with 2 or more abortions	(6) Abortion rate II (5)/(3)
Non-Educated	586	94	16.04	27	28.72
Elementary	489	103	21.06	40	38.83
Junior High	65	15	23.08	5	33.33
Senior High	45	14	31.11	6	42.86
College	5	0	0	0	--
Other	3	0	0	0	--
Total	1,193*	226*	18.94	78*	34.51

*Excluding 1 unknown.

D : Ancestry of respondents

(1) Ancestry	(2) Total no. of women	(3) No. of women with one or more abortions	(4) Abortion rate I (3)/(2)	(5) No. of women with 2 or more abortions	(6) Abortion rate II (5)/(3)
Fukinese	463	72	15.55	26	36.11
Hakkanese	651	116	17.82	34	29.31
Mainlander	69	35	50.72	18	51.43
Other	11	4	36.36	1	25.00
Total	1,194	227	19.01	79	34.80

Table 3. Abortion Rates Standardized by Four Major Variables

Abortion Rates	Rate (%)	Index
Observed	19.0%	100
Standardized by:		
Age group	21.5%	113
Education	19.6%	103
No. of live births	22.1%	116
Ancestry of husbands	22.5%	118

B. Test of independence of events

In studying the existence of habitualness of induced abortion, our first attempt is to test an hypothesis of independence of occurence of abortion.

Assuming that the first experience of abortion will not affect a woman in receiving the second abortion, and that each abortion occurs independently, the number of induced abortions should be distributed as a Poisson distribution.

There were a total of 355 abortions experienced by the respondents, averaging 0.298 abortions per respondent. Assuming a Poisson distribution*, the expected number of respondents by the number of induced abortions experienced will be as shown in Table 4. A test for the goodness of fit by X^2 indicates that the difference between these two sets of distribution is statistically significant ($P < 0.01$). The hypothesis that the number of induced abortions is distributed as a Poisson distribution, therefore, is rejected. In other words, induced abortions do not occur independently of each other and there may be habitualness in performing induced abortions.

*Poisson distribution is expressed by

$$f(x) = \frac{\lambda^x}{x!} e^{-\lambda} \qquad x = 0, 1, 2, \ldots$$

$\lambda = 0.298$ in this case

Table 4. Distribution of Respondents by the Number of Induced Abortions Experienced

No. of I.A.	Observed		Expected	
	f	%	f	%
0	965	81.02	884	74.22
1	148	12.43	264	22.13
2	55	4.62	39	3.30
3	9	0.76	4	0.33
4	5	0.42	0	0.02
5	4	0.34	0	0
6+	5	0.42	0	0
		100.01	1,191	100.00

The distribution of women by the number of induced abortions experienced may also be assumed to negative exponential--that is, the conditional probability of i-th abortion (X_i), given (i-1)th abortion (X_{i-1})--Prob.(X_i/X_{i-1}) for i - 1, 2, 3 ..., is a constant. Table 5 presents the observed distribution and the expected values assuming a geometric distribution.

Table 5. Distribution of Women by Number of Abortions Experienced Observed and Expected by Assuming A Geometric Distribution

No. of I.A.	Observed		Expected	
	f	%	f	%
0	965	81.02	917	77.04
1	148	12.43	211	17.69
2	55	4.62	48	4.06
3	9	0.76	11	0.93
4	5	0.42	3	0.21
5	4	0.34	1	0.05
6	5	0.42	0	0.01
			1,191	99.99

A text by X^2 for the goodness of fit indicates that the distribution of the observed and the expected values differ significantly ($P<0.001$). The hypothesis of a geometric distribution for induced abortions experienced therefore is also rejected.

Because the distribution of women by the number of abortions experienced is neither that of Poisson nor of exponential (negative), it is suspected that there may be some habitualness in the practice of induced abortion; that is, a woman after having one abortion is more inclined to have another one.

The abortion ratio of (X_i/X_{i-1}) above, which is a useful indicator for the measurement of habitualness, nevertheless has the following weaknesses:

1) Women who have had an abortion are those who had been subjected to stronger demographic pressure, hence tend to be more strongly motivated toward family planning practice. After one abortion, more of these women will be practicing contraceptive methods to prevent further pregnancy. Fewer of them would become pregnant again, hence there is less chance for them to have another abortion performed if no habitualness indeed exists. If a ratio observed is lower than expected, the possibility of habitualness can not be excluded; however, if the ratio is higher than expected, it is certain that there exists some habitualness in abortion practice.

2) The sample consisted of women of all ages who have been observed only until the cut-off date, which is when the survey was undertaken. Younger women's abortion experiences will not be observed throughout the whole reproductive period. For example, a woman 25 years old may have had only one abortion up to the cut-off date, but she may have more abortions in the future if she is observed for a longer period of time. Theoretically

speaking, in order to determine habitualness, it is necessary to observe an age cohort of women for the entire reproductive span, which cannot be done by a cross sectional survey of this type.

In order to overcome the technical difficulties above, two methods of approach seem to be possible--the life table method and the simulation technique.

1) Life table method

Use of the life table method should be feasible except that abortion is a recurring event. A specific method will have to be developed for this purpose, as in the case of computing the all segment life table rates of the IUD.

2) Simulation technique

The first step of simulation is to construct transition probabilities estimating the probability that a woman who had had n induced abortions at age x will proceed to n+1 abortion status before age x+1 (for n=0,1,2,..., and $15 \leq x \leq 45$). Based on these transitional probabilities and following the simulation technique it should be possible to construct the distribution of women by the number of induced abortions experienced until they reach the end of their reproductive span--age 45.

B. Indices of habitualness of induced abortion

Having disproven independence of occurrence of induced abortion, it will be useful to develop some indices to determine the existence of habitualness and applying these indices to see if habitualness indeed exists among the population under current study.

1) Abortion progression ratios based on number of women

Two types of ratios may be used:

a) The ratio of the number of women who had had (i+1) abortions to those who had had i abortions (X_{i+1}/X_i, i = 0, 1, 2, ...). This ratio was presented in an earlier session.

b) The ratio of the number of women who had had <u>at least</u> (i+1) abortions to those who had had <u>at least</u> i abortions $\left(\sum_{j=i} X_{i+1} \Big/ \sum_{j=i} X_j \quad i = 0,1,2 \ldots\right)$

The ratios obtained from the current study are shown in Table 6.

It will be noted that the latter progression ratio is superior because it indicates a smoother trend.

Table 6. Progression Ratios of Abortion based on Number of Women

Ratio	Value of i					
	0	1	2	3	4	5
X_{i+1}/X_i	.15	.37	.16	.55	.80	1.10
$\sum_{j=i} X_{i+1} \Big/ \sum_{j=i} X_j$	.19	.35	.30	.61	.64	.56

2) Progression ratios of abortion based on the parity status of women

Assume that of a group of women who have had had an abortion, some of them will become pregnant again after a varied length of time, some of whom would resort to a second abortion. This ratio is expressed as follows:

$$R_i = \frac{\sum_{j=i} X_{j+1}}{F_i} \qquad \text{and} \quad 0 \leq R_i \leq 1$$

where:

$\sum_{j=i} X_{j+1}$ is the number of women who had more than i abortions

F_i is the number of women who become pregnant after having had i abortion.

Table 7 indicates the values obtained from the current study by the above formula.

Table 7. Progression Ratios of Abortion Based on the Parity Status of Women

Ratio R_i	Value of i :						
	0	1	2	3	4	5	6
$R_i = \frac{\sum_{j=1} X_{j+1}}{F_i}$	.19	.56	.55	.88	1.00	1.00	--

It is striking to note from the table above that after women have had three induced abortions and they become pregnant again, 88 percent of the pregnancies were terminated in abortion. This probability was 100 percent for those who had had four or more abortions. All of the analyses above suggest that there exists habitualness of induced abortion practices.

4. Discussion - Habitualness, Selectivity, or Learning Process?

It is now obvious that induced abortions do not occur independently of each other and that there seems to exist habitualness in abortion practice.

Such habitualness may only be the result of a repeated selection of women who possess specific characteristics which make them more prone to have an abortion.

It is known that women who have had an abortion are rather selected in terms of specific demographic variables such as age, parity, level of education, place of residence and others. These women usually do not wish to have any more children, hence are more likely to terminate subsequent unwanted pregnancies by abortion. Because of this selectivity, the chance is higher for

a woman who has had one abortion to have another one.

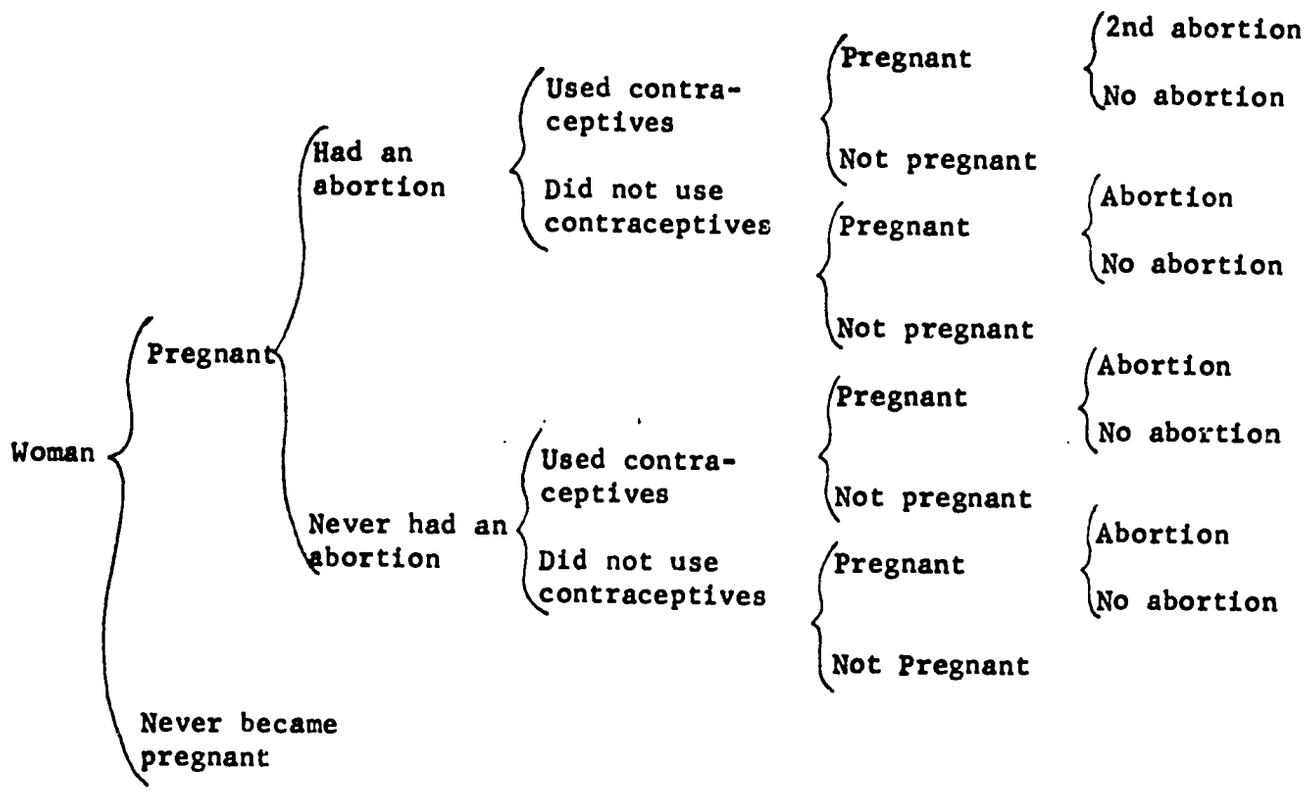
A woman may be more liable to have an induced abortion if she is highly fecund and is subject to a higher risk of pregnancy, or if she has an easy access to medical facilities which perform abortions.

A real concern of abortion from the programmatic viewpoint is whether an abortion will leave any learning effect on a woman's subsequent behavior with respect to resorting to another abortion. She may learn through the unpleasant experience of abortion not to become pregnant again so that further abortion will not be needed, or may learn to repeat it after finding out that induced abortion is not that difficult to have after all.

By the analyses above, it has been shown that some selectivity does exist; however, since we are not certain as to which variables other than the usual demographic characteristics of age, parity, education, etc., are associated with the practice of induced abortion, it is not possible to say whether or not the learning effect of abortion indeed exists. The impression, nevertheless, is that selection alone probably cannot explain the strong upward trend of abortion ratios presented in the analyses, and that there may be some learning effect in abortion. This is to say that once a woman has experienced an abortion, she might find it easier emotionally to undergo another abortion.

From the demographic point of view, particularly with respect to the demographic impact of induced abortion, we are not so much concerned with the question of abortion rates as we are concerned with the question of how soon after an abortion a woman will again conceive accidentally, requiring another abortion. As illustrated in Table 8, the interest is to study at various stages the difference between groups of women who have had abortions and those who have not had abortions, standardizing various variables which are known to be associated with the practice of abortion.

Table 8. Illustration of Interaction Among Pregnancy, Contraceptive Practice, and Abortion and Variables for the Study of these Interactions



Subjects of study	Selectivity	Fertility control practice	Probability of conception	Abortion ratios and habitualness
Specific questions to be asked or variables to be examined (examples)	Demographic, Medical & Psychological variables Reproductive history Fertility control practice	Who uses what methods? How many of them use it? When did they start using? Consistency of use Successfulness of use	Monthly or annual probability of conceiving Interpregnancy interval	

III. Medical Practitioner's KAP Survey
The Taiwan Outcome of Pregnancy Study

In spite of the fact that many studies have been carried out throughout the world in recent years on women of childbearing age concerning their KAP (knowledge, attitude, and practice) of contraception and, to a lesser extent, of induced abortion, similar studies have been rather rarely carried out on the providers, i.e., the people who give the service. The negligence is not justifiable, whatever the possible reasons for this. For contraception, the effectiveness of most of the prevailing methods and, hence, their acceptability is partly decided by the quality of professional advice and guidance. As for induced abortion, the safety, health, and well-being of the women who receive the operation and, hence, of their families almost entirely rest on the competency of the professional care and service given to them by the providers, while the women themselves can do very little about it, beyond announcing their wishes early in pregnancy. The provider study is especially important at the present transitional stage when birth control together with induced abortion have become and will be more prevalent, while very few of the currently practicing physicians and midwives have had any adequate and systematic training and preparation when they were in their medical or midwifery schools in providing the service. Furthermore, some of the practicing physicians and midwives might have received some special training in family planning since the national program has started while others have not and, hence, their KAP concerning contraception and possibly also induced abortion might have a large variance among the practitioners and, thus, worth detailed study.

Taoyuan County of Taiwan was selected as the site for the multi-phasic Outcome of Pregnancy Study in Taiwan. Besides a repeat interview study and a one-shot KAP survey on the local currently married women of childbearing age, a KAP survey was also carried out on the medical practitioners, including practicing midwives in this county, concerning their KAP toward family planning, including induced abortion; emphasis was on their professional, as opposed to personal, KAP.

To carry out this type of study and to solicit the cooperation from these social elite and professionals was not easy since contraception is still more or less an intimate and delicate topic, and induced abortion still illegal, but it is generally known that several of the practitioners are rendering such service for economic gains which, in certain cases, are considerable.

Because of the sensitivity of the topic, this survey was carried out with great care. First, the chairmen of the local medical (western-type medicine as well as herb medicine) and the midwifery societies were contacted and approval obtained. Then, it was announced at one of their regular meetings that such a survey would be carried out and the "why," "how," and "what" were explained with the presence of the local health officer. The questionnaire was designed to be self-explanatory. Most of the questions were of the multiple choice type. The whole questionnaire was anonymous and to be self-administered. The "interviewers" were only responsible for delivering the introductory letter from their respective chairmen and the questionnaires to the right persons, to make the prepared opening remarks, and to urge the practitioners to complete and return the questionnaires. The interviewers were instructed not to make any suggestions nor do any checks on the questionnaires. Understandably, more blanks and unknowns would appear in the questionnaires than in the case of a regular face-to-face interview with

probing. It was also observed by our interviewers that some practitioners filled the questionnaire rather casually, especially those questions which looked difficult for them to answer. The validity of some of their answers is thus doubtful and should be interpreted with reservation in spite of their overt cooperation. The administration of the questionnaire, generally, took about 20 minutes.

The universe of our study was all the private practitioners who were currently practicing medicine or midwifery and were registered in their respective professional societies. The actual field work started from March 9, 1971, and took about 2 weeks. The superficial cooperation was very good. Out of the 272 registered practitioners, 250 (91.9%) completed their questionnaires. No overt refusal was encountered. The main reason for "not complete" was the migration-out of the practitioners (Table 1).

The aims of this study were the following:

1. In general, to study the KAP of these providers on contraception and induced abortion in order to assess the adequacy of their knowledge as a provider, to detect their professionally-felt need, and their actual practice in their service by specialties.
2. To compare the professionally-felt need and the consumer's demand in contraception as well as in induced abortion in a few important aspects.
3. To learn the difference in the background characteristics and knowledge and attitudes between the providers who render induced abortion services and those who do not.

The results from this study should not only shed some light on how the future providers of IA can be persuaded and trained (if the future policy requires), but also how the care given by the present providers can be improved both in quality and efficiency.

Table 1.

Outcome of "Interviews" on the 272 Registered Practicing Physicians and Midwives in Taoyuan

	Number	Percent
Completed	250	91.91
Not completed (moved away)	15	5.52
Not completed (retired or dead)	3	1.10
Not completed (unmet)	2	0.74
Not completed (other reasons)	2	0.74
Total	272	100.01

Preliminary Findings

A. Comparisons Among Specialties

1. The distribution of the practitioners by specialties is shown in Table 2. Twenty-two out of the 250 respondents (8.80%) were Ob-Gyn specialists (OG). As we will show in a later section, in spite of the small number relative to other types of practitioners, these are the main providers of IA in this county. Our consumer study showed the same importance of this profession with regard to provision of IA.

2. A few comments on some of their background characteristics are in order before further comparisons are to be made among these specialties in their KAP concerning contraception and induced abortions.

OG are, in general, younger than general practitioners (GP) which, in turn, are much younger than the herb doctors (HD). Almost all of these three categories of physicians are male and currently married. As for the educational attainment, all of the OG are medical graduates at either the college level or, more likely, at the university level; the GP are more spread in their education. A sizable number (13) of them have not received formal systematic medical training, although they passed the licentiate examination; on the other hand, a few (6) of them have received graduate training. HD received lowest education with only one who had university education. As for the practicing midwives (MW), their average age is between those of the OG and GP; they are all females, and 88.68% were currently married. Most of them graduated from vocational midwifery schools (Table 3).

3. Knowledge Concerning Contraception and Induced Abortion

Knowledge on contraceptive methods, national family program, vital rates and induced abortion was asked. Most of the questions were

Table 2.

Distribution of Practitioners Registered and Seen by Specialty in Taoyuan

	Registered	Seen	Percent Seen	Percent Distribution of Those Seen
Ob-Gyn Doctor	167	22	94.6	8.80
Other Physician		136		54.40
Herb Doctor	44	39	88.6	15.60
Nurse or Midwife	61	53	86.9	21.20
Total	272	250	91.9	100.00

Table 3.

Age, Sex, Marital Status and Educational Level of Respondents by Specialty in Taoyuan

	OG		GP		HD		MW		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Total	22	100.00	136	100.00	39	100.00	53	100.00	250	100.00
Age of Cases										
20-24	-	--	1	0.74	-	--	-	--	1	0.40
25-29	-	--	3	2.21	-	--	2	3.77	5	2.00
30-39	5	22.73	17	12.50	1	2.56	7	13.21	30	12.00
40-49	7	31.82	34	25.00	2	5.13	16	30.19	59	23.60
50-59	8	36.36	51	37.50	12	30.77	22	41.51	93	37.20
60+	2	9.09	30	22.06	22	56.41	5	9.43	59	23.60
Unknown*	-	--	-	--	2	5.13	1	1.89	3	1.20
Sex										
Male	20	90.91	135	99.27	38	97.44	-	--	193	77.20
Female	2	9.09	1	0.74	-	--	52	98.11	55	22.00
Unknown*	-	--	-	--	1	2.56	1	1.89	2	0.80
Marital Status										
Single	-	--	1	0.74	1	2.56	1	1.89	3	1.20
Married	22	100.00	132	97.06	34	87.18	47	88.68	235	94.00
Divorced	-	--	1	0.74	-	--	-	--	1	0.40
Widowed	-	--	2	1.47	2	5.13	5	9.43	9	3.60
Unknown*	-	--	-	--	2	5.13	-	--	2	0.80

*Unknown here includes those with no answer.

open ended, although answers in the form of multiple choices also were provided in the questionnaire. The results are shown in Table 4.

It is apparent that OG has the best and most correct knowledge in answers to these four sets of questions. It is also interesting to notice that the MW appears to excell the GP in knowledge about contraceptive methods. But when comes to vital rates, it was the GP who knows more than the MW. As for knowledge on family planning program and IA, there is no apparent difference between GP and MW. HD has rarely given a correct answer.

There are a few other rather unexpected points deserving special attention.

(a) More of the MW (who introduce the cases for IUD insertion) know the correct answer with regard to the insertion fee of IUD by doctors rather than the OG who themselves insert the IUD and receive the fee.

(b) It was the MW followed by GP rather than the OG who gave the highest proportion of answer concerning loop as one of the contraceptive methods known to them. (However, GP not statistically significantly different from OG.)

(c) In questions concerning vital rates, the proportion answered "don't know" or "not recorded" is very high, usually close to or more than 50%, except to the questions on the current population size on Taiwan and on whether high birth rate and low death rate would create a high dependence ratio (probably easier to make a guess). This under-report would certainly, to some extent, vitiate the comparison and probably reflect the pre-occupation with their clinical profession and isolation from outside world.

Table 4.

Percentages and Ranks According to the Percentage of Correct Answers to Questions Related to Knowledge of Contraception, Family Planning Programs, Vital Rates and Knowledge of Induced Abortion by Specialty in Taoyuan

	Number of Respondents and Percentages and Ranks of Correct Answers Given by Each Profession				
	OG	GP	HD	MW	Total
Number of Respondents	22	136	39	53	250
A. Knowledge of Contraception					
Proportion of knowing:					
One or more methods	81.82(1)	72.05(3)	53.85(4)	79.25(2)	79.40
Loop	59.09(3)	69.12(2)	23.08(4)	73.59(1)	62.00
Oral pills	72.73(1)	56.62(3)	20.51(4)	64.51(2)	54.00
Time of ovulation	86.36(1)	72.79(3)	25.64(4)	77.36(2)	67.60
Hormones contained in oral pill	54.55(1)	15.44(3)	-- (4)	33.96(2)	20.40
Ratios of answers ranked as (1)	4/5	0/5	0/5	1/5	
Ratios of answers ranked as (4)	0/5	0/5	5/5	0/5	
B. Knowledge of Family Planning Program					
Proportion of knowing:					
IUD was the principal method	77.27(1)	69.85(2)	33.33(4)	64.15(3)	63.60
Army regularly conducts FP training to new recruits	18.18(1)	13.24(3)	10.27(4)	16.98(2)	12.80
Women 30 years or older showed the greatest decline	77.27(1)	55.88(4)	69.30(3)	71.70(2)	63.20
The long range goal was to reduce the national increase rate from 3% to 2% in 10 years	40.91(1)	27.94(2)	17.95(4)	18.87(3)	25.60
Doctor's fee for inserting an IUD is NT$30	45.46(2)	35.29(3)	7.69(4)	60.38(1)	37.20

Table 4 (continued)

	Number of Respondents and Percentages and Ranks of Correct Answers Given by Each Profession				
	OG	GP	HD	MW	Total
The national population policy was announced in 1969	18.18(1)	11.03(2)	5.13(3)	3.77(4)	9.20
Ratios of answer ranked as (1)	5/6	0/6	0/6	1/6	
Ratios of answer ranked as (4)	0/6	1/6	4/6	1/6	
C. Knowledge of Vital Rates					
Proportion of knowing:					
Definition of crude birth rate	45.46(1)	39.71(2)	5.13(4)	26.42(3)	32.00
Definition of national growth rate	31.82(2)	34.56(1)	12.82(4)	15.09(3)	26.80
Crude birth rate of Taiwan	13.64(1)	8.82(2)	2.56(3)	1.89(4)	6.80
Crude death rate of Taiwan	36.36(1)	27.94(2)	7.69(4)	16.98(3)	23.20
Population of Taiwan	22.73(3)	38.97(1)	30.77(2)	18.87(4)	32.00
Double time for Taiwan	18.18(3)	41.18(1)	23.08(2)	13.21(4)	30.40
Whether dependency ratio would be high or low if birth rate is high and death rate is low	68.18(1)	57.36(2)	28.21(4)	47.17(3)	51.60
Ratios of answers ranked as (1)	4/7	3/7	0/7	0/7	
Ratios of answers ranked as (4)	0/7	0/7	4/7	3/7	
D. Knowledge of IA					
Proportion of knowing:					
One or more methods	36.37(1)	24.27(3)	15.38(4)	28.30(2)	24.80
Best time for IA	90.91(1)	90.44(2)	79.49(4)	81.13(3)	86.80
Ratios of answers ranked as (1)	2/2	0/2	0/2	0/2	
Ratios of answers ranked as (4)	0/2	0/2	2/2	0/2	

Note: Figures in parenthesis are the ranks assigned according to the proportion of correct answers.

(d) The proportion who answered correctly as to the best time for IA is very close between OG and the GP's.

We shall use two questions to make comparison on knowledge, one on contraception, and the other one on IA between the providers (OG only) from this study, and the consumers, from the data of the repeat interview as in Table 5.

The OG as the main providers do have a better knowledge than the general consumers. However, this is not always true for other types of providers, for instance, GP knows oral pill about the same proportion as the consumers know oral pills as a method of contraception, while much less of HD know oral pills as compared with the consumer.

4. Attitude Toward Contraception and IA

It is apparent from Table 6 that, by specialty, the 22 OG gave very markedly and the most liberal answers toward either family planning or induced abortion. Whether this attitude of OG was formed during their training in medical school or their professional practice or due to the fact that most of them (17 out of 22) have received ad hoc training when the national family planning program started, or due to some other intrinsic factors, such as their younger age, their status as a specialist, the area they practice, etc., deserves further consideration.

Two questions were asked with regard to the most significant reason, to their mind, for approving or opposing contraception. Health of mother, followed by economic reason, were the ones mentioned by all the four categories of providers with a little variation among them. Very few respondents in any of the four categories of respondents gave any definite answer to the question as their main reason for

Table 5.

Comparison Between Providers (OG) and Consumers on Their Knowledge of Oral Pills and Best Time for Induced Abortion in Taoyuan

	Proportion with Correct Information	
	Providers (OG)	Consumers
Knowledge of oral pills	72.73%	56.00%
Knowledge of best time for IA	90.91%	40.69%
Number of respondents	22	1807 re oral pills 1762 re IA

Table 6.

Number of Respondents and Percentages and Ranks of the Professionals Who Gave Approval to Family Planning and Induced Abortion

	OG	GP	HD	MW	Total
Number of Respondents	22	136	39	53	250
Approve contraception:					
For family limiting	100.00(1)	97.79(2)	92.31(4)	94.34(3)	96.40
For family spacing	100.00(1)	95.59(2)	89.75(4)	90.57(3)	94.00
Which category of people should practice contraception when categories are subdivisions of:*					
Sex	68.18(1)	60.29(3)	58.97(4)	66.04(2)	62.00
Socio-economic	90.91(1)	80.15(3)	79.45(4)	81.13(2)	81.20
Rural-urban	100.00(1)	88.97(4)	89.75(3)	92.45(2)	90.80
Family size	18.18(2)	9.56(3)	7.69(4)	20.76(1)	12.40
Would assist patient to practice family planning	95.46(1)	83.09(3)	69.23(4)	92.45(2)	84.00
Approve IA:					
For health reasons	90.91(2)	93.98(1)	74.36(4)	84.91(3)	88.40
Fetus may be deformed	90.91(1)	83.82(3)	84.62(2)	79.25(4)	83.60
Economic reason	72.73(2)	74.27(1)	64.10(4)	67.93(3)	71.22
Rape	90.91(1)	60.29(3)	43.59(4)	62.26(2)	60.80
Proportion of 1's	8/11	2/11	0/11	1/11	
Proportion of 4's	0/11	1/11	9/11	1/11	

*The percent answering "all should" is given; this answer is considered as the correct and most liberal attitude.

Note: Figures in parentheses are the ranks assigned according to the proportions shown.

opposing contraception, suggesting that little resistance would be aroused toward family planning program from these health-professional people.

By pooling the four types of providers together to study their attitude toward IA, health of mothers (88.40%) and possible deformity of fetus (83.60%) were the main reasons for them to approve IA, which was followed by economic reasons (71.22%) and rape (60.80%). It is possible that the high approval rate they gave to health and deformity was because of their own health-related profession, while the lower rate they gave to rape might be because of its controversial nature, and to economic reason due to the fact that they may have thought contraceptive methods are more recommendable.

Comparison of the attitude toward IA between these providers (all the four types) and the general consumers shows interesting contrast. From the latter, more approval of IA for rape was given (68.78%) and for economic reasons (58.44%). While the proportion of women who gave approval to IA for health reasons was rather low (54.15%), and the lowest proportion of approval was given for mental health reasons (34.47%). This is considered as a point reflecting the different value system each of these two categories of people have.

5. Practice of Contraception and of Induced Abortion

Behavior is influenced by the attitudes which the people hold and the knowledge they have. It would be interesting to see how these were reflected among these different types of providers in their service to the clients as far as contraception and IA are concerned.

As shown in Table 7, no doubt that the OG are again the most active in their practice of providing the services both of contraception and of IA. MW are quite active in their service in family planning, such as

Table 7.

Number of Respondents and Percentages and Ranks of the Professionals Who Received IUD Instruction and Provided Various Types of Service in Family Planning, Including Induced Abortion, in Taoyuan

	OG	GP	HD	MW	Total
Number of Respondents	22	136	39	53	250
Received any instruction concerning insertion of IUD	77.27(1)	27.94(3)	0.00(4)	33.96(2)	29.20
Whether in last 12 months:					
Advised patient to practice	100.00(1)	63.24(3)	48.71(4)	83.02(2)	68.40
Fitted diaphragm	36.37(1)	4.42(3)	0.00(4)	15.09(2)	8.80
Explained use in contraceptives	100.00(1)	57.35(3)	41.02(4)	81.13(2)	63.60
Inserted IUD	95.47(1)	16.18(3)	2.56(4)	24.53(2)	22.80
Instructed patient for use of oral pill	86.37(1)	41.91(3)	25.63(4)	67.93(2)	48.80
Performed tubal ligation	63.64(1)	11.77(2)	0.00(4)	1.89(3)	12.40
Performed vasectomy	31.82(1)	11.76(2)	0.00(4)	1.89(3)	9.50
Performed D & C to complete incomplete abortion	72.73(1)	8.83(2)	0.00(4)	1.89(3)	11.60
Performed IA	45.46(1)	5.15(3)	7.69(2)	3.78(4)	8.80
Proportion of 1's	10/10	0/10	0/10	0/10	
Proportion of 4's	0/10	0/10	9/10	1/10	

Note: Figures in parentheses are the ranks assigned according to the proportions shown.

giving instructions, fitting diaphragm, and inserting IUD, but whenever delicate operational procedures are required, GP contributes more in actual work in either sterilization operation or IA than the MW. The activities of HD in the field of contraception is almost negligible.

Of great interest here is the fact that in spite of the illegality of IA and the general over-cautiousness of private practitioners in Taiwan, there were 16 out of the 22 OG (72.73%) who answered that they have performed D & C to complete incomplete abortion, a usual disguise for straight IA. Twelve of them or 54.55% declared having done more than 20 times during last 12 months. Close to half (10 out of 22, or 45.46%) of these doctors have frankly admitted that they performed IA, and for all who admitted the performance of IA's, 6 admitted that they have done 50 or more IA's in the past 12 months, i.e., at least 4 to 5 IA's each month on the average. Methods used by the OG was almost exclusively D & C. There were 12 and 7 out of the 136 GP who also declared that they have done IA either for completion of incomplete abortion or for IA <u>per se</u>, respectively. These are only small proportions (8.83% and 5.15%, respectively) among their own specialty, but represent about 40% of all physicians engaging in these practices. It seems that in order to evaluate the care received by the women so far as IA is concerned, this latter group should not be neglected. On the other hand, however, even among the GP who were providing IA service, they have done this with much less frequency and some are more likely for true therapeutic reasons. There are three HD and two MW who admitted that they have done IA's and with much less frequencies.

6. Personal Fertility Ideals and Behavior

The practitioners were asked three questions concerning their own fertility ideals and behavior. They are: What is their ideal number of children, how many do they actually have (both including sex distribution), and whether they had ever practiced contraception.

By specialties, the ideal numbers (children in general and boys in particular) are shown in Table 8. The OG have reported the lowest ideals, GP and MW reported a greater ideals and are similar to each other, while the HD are most conservative. For all the practitioners, the means of ideal numbers of children and boys are 3.30 and 1.89, respectively. The mean of ideal number of children reported by respondents from one of our consumer study on currently married women aged 15-49 which was carried out about one year before, was 4.51, about one more than that reported by the providers.

If we turn our attention to their actual fertility, the means of living children (and boys) for these four types of practitioners are shown in Table 9. The OG have the least number, followed by MW and GP, and HD the most proliferate. Whether this pattern was due to the differences in age, in education, in their special professional training, or more directly the usually close relationship between the fertility ideals and behavior will not be investigated here. For the providers in total, the means of the number of living children is 4.41; and that for living boys is 2.59. The former is about 0.5 more than the mean we obtained from the consumer study in the same area. (The mean for the latter is 3.99.)

Table 8.

Ideal Numbers of Children and Boys for a Middle Class Family in Taiwan as Reported by Specialties

	OG		PD		HD		MW		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
A. Ideal Number of Children										
Two	7	31.82	19	13.97	3	7.69	8	15.09	37	14.80
Three	6	27.27	60	44.12	11	28.21	23	43.40	100	40.00
Four	5	22.73	46	33.82	14	35.90	18	33.96	83	33.20
Five	1	4.55	7	5.15	5	12.82	4	7.55	17	6.80
Six	-	--	1	0.74	4	10.26	-	--	5	2.00
Seven or more	-	--	-	--	1	2.56	-	--	1	0.40
No answer*	3	13.64	3	2.21	1	2.56	-	--	7	2.80
Total	22	100.01	136	100.01	39	100.00	53	100.00	250	100.00
Means	3.00		3.33		3.97		3.41		3.30	
B. Ideal Number of Boys										
One	7	31.82	21	15.44	3	7.69	8	15.09	39	15.60
Two	11	50.00	104	76.47	25	64.10	40	75.47	180	72.00
Three	1	4.55	8	5.88	9	23.08	5	9.43	23	9.20
Five	-	--	-	--	1	2.56	-	--	1	0.40
No answer*	3	13.64	3	2.21	1	2.56	-	--	7	2.80
Total	22	100.01	136	100.00	39	99.99	53	99.99	250	100.00
Means	1.68		1.90		2.24		1.94		1.89	

Table 9.

Actual Numbers of Children and Boys of the Respondents by Specialties

	OG		GP		HD		MW		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
A. Actual Numbers of Children										
Though married, none	-	-	9	6.62	-	--	2	3.77	11	4.40
One	-	--	6	4.41	1	2.56	3	5.66	10	4.00
Two	3	13.64	9	6.62	6	15.39	7	13.21	25	10.00
Three	11	50.00	21	15.44	8	20.51	14	26.42	54	21.60
Four	4	18.18	22	16.18	5	12.82	8	15.09	39	15.60
Five	2	9.09	27	19.85	7	17.95	7	13.21	43	17.20
Six	1	4.55	15	11.03	-	--	6	11.32	22	8.80
Seven	1	4.55	9	6.62	2	5.13	2	3.77	14	5.60
Eight	-	--	9	6.62	2	5.13	2	3.77	13	5.20
Nine	-	--	2	1.47	2	5.13	1	1.89	5	2.00
Ten	-	--	3	2.21	1	2.56	-	--	4	1.60
Elever	-	--	1	0.74	1	2.56	-	--	2	0.80
Twelve	-	--	1	0.74	2	5.13	-	--	3	1.20
Fifteen	-	--	1	0.74	-	--	-	--	1	0.40
N.A. (unmarried)	-	--	1	0.74	1	2.56	1	1.89	3	1.20
No answer	-	--	-	--	1	2.56	-	--	1	0.40
Total	22	100.01	136	100.01	39	99.99	53	100.00	250	100.00
Means	3.55		4.60		5.00		3.87		4.41	

Table 9 (continued)

	OG		GP		HD		MW		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
	B. Actual Numbers of Boys									
Though married, none	2	9.09	11	8.09	1	2.56	6	11.32	20	8.00
One	8	36.36	25	18.38	3	7.69	13	24.53	49	19.60
Two	8	36.36	43	31.62	9	23.08	18	33.96	78	31.20
Three	2	9.09	34	25.00	13	33.33	7	13.21	56	22.40
Four	1	4.55	9	6.62	7	17.95	6	11.32	23	9.20
Five	1	4.55	5	3.68	-	--	2	3.77	8	3.20
Six	-	--	5	3.68	3	7.69	-	--	8	3.20
Seven	-	--	1	0.74	1	2.56	-	--	2	0.80
Eight	-	--	1	0.74	-	--	-	--	1	0.40
Ten	-	--	1	0.74	-	--	-	--	1	0.40
N.A.	-	--	1	0.74	1	2.56	1	1.89	3	1.20
No answer	-	--	-	--	1	2.56	-	--	1	0.40
Total	22	100.00	136	99.29	39	99.98	53	100.00	250	100.00
Means	2.25		2.88		3.46		2.56		2.82	

As for the experience in contraception, the OG, GP, MW are very close together at about 41% of the married practitioners having practiced. Married HD is again lagging behind (22%). For the time being again, we have not taken into consideration age, education, and fecundity differences among these different types of practitioner. The ever practice rate we got from our consumer study carried out about 7 months ago was 36.10%.

Conclusion

A survey on KAP of contraception and induced abortion was carried out on all the registered medical and midwifery practitioners in Taoyuan as one phase of the provider study side by side with the consumer study which was carried out on the currently married women age 15-49 in the same area. Emphasis was on professional rather than personal KAP. The implications from the above findings can be summarized as follows:

1. About half or more of the practicing OG were performing IA. They are the main providers of IA. Proportionally a very few GP admittedly also perform IA but they should not be neglected in studying the quality of care of IA in this area since they represent nearly half of the physicians providing such services. Three HD and two MW reportedly have performed an IA occasionally.
2. Among medical practitioners, the OG are in general the youngest and best educated, and more of them have received special training in family planning. They are the best informed in their knowledge of contraceptive methods, the national family planning program, vital rates, and induced abortions. They showed the most liberal attitude toward family planning, including IA. All these probably explain their greater activity in the service involving contraception and IA, besides

what may be the main reason, simply that they are specializing in obstetrics and gynecology and women know to go to them when wishing an IA, a fact which was clear from our consumer's study.

3. Care should be directed to detect the characteristics of the GP's who also perform IA when quality of care to IA is considered. GP are inferior in their knowledge in contraceptive methodology to MW, although superior in their knowledge of vital rates in Taiwan. Knowledge on family planning program and IA is similar between these two professions. MW showed a more liberal attitude toward family planning and induced abortion, and have professed greater effort in education concerning family planning. This is probably also due to fact that next to OG more of them have received special training in family planning. Their being inferior in practice in those sophisticated procedures in family planning such as sterilization and induced abortion than the GP is probably mainly due to the limitation of their professional abilities as a midwife.

4. HD can probably be ignored as a provider of family planning. However, 3 out of the 39 HD declared that they have performed IA in past 12 months.

5. In questions on vital rates, we have obtained the smallest proportion of correct answers, and the largest proportion of "no answers," suggesting that people are more concerned about their own personal and familial welfare than that of the nation. In this, of course, providers are no exception. The conventional mass communication have not succeeded in reaching these professionals in this aspect.

6. A few comparisons between the providers, excluding HD, and the consumers (from the result of the repeat interview study) showed that the OG as one type of provider does know better and more correctly than the consumer contraceptive methodology and the best time for IA. But as the suppliers and receivers, they do place different emphasis in permissible reasons for IA. The former are more health-oriented, while the latter are more conscious about social acceptance.
7. The providers have, on the average, one less child in fertility ideals, but 0.5 more in actuality. The ever practice rate is similar to that of the consumer. Age and time factor, however, were not taken into consideration.

IV. "Clinic" Study

In the course of the following presentation of results from the "Clinic" study some description of methodology will be found. A more general discussion of the operation of this study has been presented on pages 33 through 36. The material which follows was in large part prepared by Dr. Y. T. Yen who directed this clinic oriented part of the total study.

A. The Observed Patient Population

During the study period there were 7,282 clinic patient-visits in ten study hospital clinics. Fifty-seven percent of patient-visits (new patients, or old patients with new illness) were directly observed by the medical student interviewers to record the processes involved in the clinic care. Among 4,160 patient-visits recorded, 5% were clinic visits for induced abortions. The distribution of the recorded patient-visits and the induced abortion visits in ten study clinics during the study period is shown in Table I. Five clinics (Clinic F, G, H, I, J) receiving no induced abortion visits and one clinic (Clinic E) yielding only two induced abortion visits during the study period were excluded from the analysis of the observed patient care records. Thus the total sample size of patient-visits for analysis was 2,016 from four clinics (Clinic A, B, C, and D) which were specialized gynecological and obstetrical clinics.

Patients' presenting problem areas were grouped into twelve categories according to diagnosis or symptom complex presented. The diagnosis and symptom complex included in the twelve categories of the problem areas were as follows:

1. Pregnancy -- including prenatal and puerperal care, cesarean section, and ectopic pregnancy.
2. Cervical Conditions -- including cervicitis, cervical erosion, endocervical polyp and cervical carcinoma.

Table 1.

Distribution of Recorded Patient-Visits in Ten Study Clinics, Taiwan, 1971

Hospital Identification Number	Clinics Identification Code	Number of Patient-Visits Recorded	Number of Patient-Visits for Induced Abortion	Percent of Induced Abortion Visits
1	A	578	92	16
2	B	449	29	6
3	C	496	30	6
5	D	493	38	8
4	E	668	2	0.3
6	F	805	0	0
7	G	382	0	0
8	H	232	0	0
9	I	40	0	0
10	J	17	0	0
Total		4,160	191	5

3. Menstrual Disturbances -- including amenorrhea, hypermenorrhea, dysmenorrhea and irregular menstrual cycle.
4. Abnormal Discharges -- including bleeding, spotting, leukorrhea and purullent discharges.
5. Induced Abortions.
6. Systemic Disorders -- including lower abdominal pain, headache, lumbago, general malaise and anemia.
7. Contraceptives -- including insertion of loops or rings and the after care for the intrauterine devices.
8. Vaginal Conditions -- including trichomonas vaginitis and non-specific vaginitis.
9. Uterine Disorders -- including endometritis and myoma uteri.
10. Genitalia Conditions -- including Vulvitis, bartholinitis, and genitalia pruritus.
11. Urinary Disorders -- including cystitis, urethritis and renal diseases.
12. Other Abortion -- including spontaneous abortions, habitual and threatened abortions.
13. Miscellaneous Conditions -- including sterility, mastitis, hydatidiform mole, adnexal conditions (ovarian cyst, salpingitis), and gonorrhea.

The frequency and percent distribution of 2,016 patient-visits in four study clinics were shown in Table 2.

During the study period only two patient-visits were made by male patients who came to the clinics for minor injuries and were not included in the recording patient care forms. Thus all the patients included in the analysis were female patients. Although four clinics studied all specialized in gynecological and obstetrical services, ten percent of the patient-visits were systemic disorders and urinary tract disturbances.

Table 2.

Distribution of Problem Areas in Four Gynecological and Obstetrical Clinics, Taiwan, 1971

Category of Problem Areas	Number of Patient-Visits	Percent of Total
Pregnancy	447	22.2
Cervical Conditions	313	15.5
Menstrual Disturbance	239	11.9
Abnormal Discharges	194	9.6
Induced Abortions	189	9.4
Systemic Disorders	166	8.2
Contraceptives	114	5.7
Vaginal Conditions	99	4.9
Uterine Disorders	89	4.4
Genitalia Conditions	52	2.6
Urinary Disorders	43	2.1
Other Abortions	40	2.0
Miscellaneous	31	1.5
Total	2,016	100.0

As shown in Table 2, pregnancy was the most frequent problem encountered in the clinic. However obstetrical services (including pregnancy and abortion services) only accounted for 34% of the total patient-visits, less than gynecological services which accounted for 56% of the total patient-visits.

Among gynecological problems, cervical conditions, menstrual disturbances and abnormal discharges were the most common problems encountered. Cervicitis, amenorrhea and bleeding discharges dominated the picture. Contraceptive services including insertion and removal of the intrauterine devices (loops and rings) accounted for 6.0% of the total patient-visits.

Seventy percent of the total patient-visits were diagnosed (working diagnosis) by the clinic doctors. Pregnancy, cervicitis, abortions and vaginitis headed the list of diagnoses. Malignancy and venereal diseases were very rare conditions. (less than 0.3% of the total patient-visits).

Medications were prescribed in 85% of the total patient-visits. Among 1,723 patient-visits in which medications was prescribed, a total of 6,547 medication items was found, an average of 3.8 medication items per patient-visit. Twenty-four percent of the drugs used were antibiotics. Vitamins and nutrients accounted for 13 percent, analgesics-antipyretics 12 percent, antacids and digestants 8 percent, sulfadrugs 7 percent, uterotonics 6 percent, and hormones 5 percent. The rest included parasympatholytics, transquilizers, and antihistaminics.

Eleven percent of the total patient-visits were services for abortions. Two percent of the total patient-visits were other types of abortions. Services for induced abortions accounted for 9.4% of the total patient-visits. Induced abortions were the fifth commonest problem encountered in the clinic, next to pregnancy, cervical condition, menstrual disturbance, and abnormal discharge. The number of the patient-visits receiving induced abortions accounted for 10% of the patient-visits for specific gynecological and obstetrical

problems. Moreover, the number of the patient-visits receiving induced abortions accounted for 28% of the patient-visits for pregnancy services.

The number of the patient-visits receiving induced abortions in four study clinics was shown in Table 3. The difference in proportion of visits for induced abortions in four clinics was significant at p = 0.1% level by chi-square test.

B. Patients Receiving Induced Abortions.

Among 2,016 total patient-visits observed in four study clinics, 189 patient-visits were paid for induced abortions and the remaining 1,827 patient-visits were made for other services. Among those 189 patients whose induced abortion visits were recorded 9 patients made the returned visits to the clinics for after care. The 9 returned visits were not included in the analysis of the patient-visits for induced abortions. Thus for induced abortion visits 189 patient-visits equaled to 189 patients, namely a patient made one visit. However for patients receiving other services 1 percent of the total 1,82 patient-visits were returned visits. Thus 1,803 patients made 1,827 patient-visits. Patient-visits were used to compare the demographical characteristics of patients receiving induced abortions and other services. Patients receiving other services were termed as other patients in the following tables. The population of the other patients was selected for controls.

1. Demographical Characteristics of Patients Receiving Induced Abortions.

All patients included for the analysis were women patients.

The demographical characteristics compared between induced abortion patients and other patients included age distribution and marital status. The information on patients' and their husbands' occupations and education was discussed. Menstrual, contraceptive, and pregnancy histories of the patients receiving induced abortions and other services were also discussed.

The age distribution of the patients receiving induced abortions and other

Table 3.

The Number of Patients Receiving Induced Abortions in Four Clinics, Taiwan, 1971

Clinic	Number of Total Patient-Visits	Number of Patient-Visits for Induced Abortions	Percent of Induced Abortion Visit
A	578	92	15.9
B	449	29	6.5
C	496	30	6.1
D	493	38	7.7
Total	2,016	189	9.4

services was shown in Table 4. The average age of the induced abortion patients was 33.2 years and the average age of other patients was 32.7 years. The difference in age distribution between patients receiving induced abortions and other patients was significant at p = 0.1% level by chi-square test. The patients receiving induced abortions were mostly in the age group of 30 to 39 years whereas the patients receiving other services were mostly in the age group of 20 to 29 years. Induced abortions were used for the termination of the unwanted pregnancies (pregnancies beyond the ideal number of the children) The average age of marriage was around 23 years. The birth interval of 2 years and an ideal number of children of 3 would reach the age of 30. The preference of male child would possibly increase the wanted pregnancies of 2. Thus the high risk age group for induced abortions was in the age bracket of 30-39.

The past pregnancy history of the patients receiving induced abortions and other services was shown in Table 5. Induced abortion patients have had more pregnancies than other patients thus increased the possibility of having more unwanted pregnancies. The difference in the two groups of the patients on the possibility of having had past pregnancies was significant at p = 0.1% level by chi-square test. The average number of past pregnancies (excluding present pregnancy which was terminated by induced abortion) was 4.02 for a patient receiving induced abortion while the average number of past pregnancies was 3.73 for a patient receiving other services.

A statistically significant difference was found between patients receiving induced abortions and other services in terms of the contraceptive experiences as shown in Table 6. It should be noted that only 30% of the patients receiving induced abortions and only 23% of the patients receiving other services in the gynecological and obstetrical clinics ever tried contraceptives. As shown in Table 7, the majority of patients receiving induced abortions have had primary

Table 4.

Age Distribution of Patients Receiving Induced Abortions and Other Services in Four Clinics Taiwan, 1971

Age (Years)	Percent Distribution	
	Induced Abortion Patients (N=182 Patient-Visits)	Other Patients (N=1756 Patient-Visits)
Less than 19	2	4
20 - 29	31	43
30 - 39	49	33
40 - 49	18	15
Older than 50	0	5
Total	100	100
Unknown (patient-visits)	7	71

Table 5.

Past Pregnancy History of Induced Abortion Patients and Other Patients in Four Clinics, Taiwan, 1971

Past Pregnancy (Excluding Present Pregnancy)	Percentage Distribution	
	Induced Abortion Patients (N:189 Patient-Visits)	Other Patients (N:1827 Patient-Visits)
Ever had pregnancy	91	74
Never had pregnancy	9	26
Total	100	100

Table 6.

Contraceptive Use of Patients Receiving Induced Abortions and Other Services in Four Clinics, Taiwan, 1971

Use of Contraceptives	Percentage Distribution	
	Induced Abortion Patients (N:189 Patient-Visits)	Other Patients (N:1827 Patient Visits)
Ever used (including current use)	30	23
Never used	70	77
Total	100	100

Table 7.

Education of Patients Receiving Induced Abortions in Four Clinics, Taiwan, 1971

Educational Level	Number of Patients (N:100)	Percentage Distribution
None	34	34
Primary school	46	46
Junior high school	16	16
Senior high school	4	4
Total	100	100
Unknown (patient-visits)	89	

school education and as disclosed in Table 8, their husbands received primary school or junior high school education. The induced abortion patients and their husbands should be susceptible to contraceptive education. The study area (Taoyuan County) has had an active family planning program since 1964 and was a demonstration area for the intensive village health education programs which including family planning education campaigns. A vigorous family planning education program provided at the private gynecological and obstetrical clinics for the visiting patients seemed advisable.

As seen in Table 9, the majority of patients receiving induced abortions were housewives and the majority of their husbands were farmers as shown in Table 10. Thus the existing home visiting activities of the pre-pregnancy health workers and the family planning education activities of the village health education nurses needed to be strengthened.

The use of contraceptives by both patients receiving induced abortions and other services was mainly loops and rings (Ota rings). The oral pills, condoms, foam tablets, rhythm methods, and tubal ligations were used by a few patients.

No contraceptive failures were mentioned by the patients receiving other services. However the patients receiving induced abortions reported 13% failure rate. Unfortunately the unwanted accidental pregnancies resulting from the failure of the contraceptives did not terminate themselves by spontaneous abortions. Table 11 showed the experiences of spontaneous abortions by the patients receiving induced abortions and other services. (no significant difference obtained by chi-square test). Thus the unwanted pregnancy of the patient receiving induced abortion had to be terminated by induced means. The number of past induced abortions received by two groups of the patients was shown in Table 12. The difference of past history on induced abortions between two patient population was significant at $p = 0.1\%$ level by chi-square

Table 8.

Education of the Husbands of the Induced Abortion Patients in Four Clinics, Taiwan, 1971

Husbands' Education	The Number of Husband (N:50)	Percent Total (%)
None	8	16
Primary school	25	50
Junior high school	11	22
Senior high school	6	12
Total	50	100
Unknown (number of husband)	124	

Table 9.

Occupation of Patients Receiving Induced Abortions in Four Clinics, Taiwan, 1971

Occupation	Number of Patients (N:58)	Percent Total
Housewife	50	86
Laborer	5	9
Other, farmer		
Saleslady, government employee	3	5
Total	58	100
Unknown (number of patients)	131	

Table 10.

Occupation of Induced Abortee's Husbands in Four Clinics, Taiwan, 1971

Husband's Occupation	Number of Husbands (N:93)	Percent Total
Farmers	33	35
Soldiers	18	20
Laborers	17	18
Businessmen	13	14
Government employees	8	9
Teachers	2	2
Unemployed	2	2
Total	93	100
Unknown (number of husbands)	81	

Table 11.

Spontaneous Abortions Experienced by Patients Receiving Induced Abortions and Other Services in Four Clinics, Taiwan, 1971

Spontaneous Abortions	Percentage Distribution	
	Induced Abortion Patients (N:189)	Other Patients (N:1827)
Ever had experienced	4	3
Never had experienced	96	97
Total	100	100

Table 12.

Induced Abortions Received in the Past by Patients Visiting Four Clinics, Taiwan, 1971

Frequency of Past Induced Abortions (Excluding Present Visit for Induced Abortion)	Percentage Distribution	
	Current Induced Abortion Patients (N:189)	Other Patients (N:1827)
0	71	90
1 - 3	25	8
More than 4	4	2
Total	100	100

test. The average number of past induced abortions experienced by a patient receiving current induced abortion was 0.61 and the average number of past abortions received by a patient with other service was 0.21, a threefold difference.

Current medical indications for induced abortions included: serious heart diseases, advanced hypertensive cardiovascular diseases, marked impairments of renal functions, cervical malignancies, maternal infection of rubella in the first eight weeks of pregnancy, and active psychoses. No above mentioned illnesses were found by patients receiving induced abortions. However pregnancies did terminate purely for social reasons. Table 13 showed the marital status of the patients receiving induced abortions and other services. The difference of the married rate between two patient populations was significant at p = 1% level by chi-square test. An illegitimate child did not yet gain due social acceptance in the present day Taiwan so the pregnancies of the unmarried women usually had to resort to the induced abortion for termination.

Menstruation of the patients receiving induced abortions was more regular than the menstruation of the patients receiving other services. The difference was significant at p = 1% level by chi-square test as shown in Table 14. Women with regular menstruation detected easily the missed menstrual periods to prepare for induced abortions. The menstrual periods of the patients receiving induced abortions were usually shorter than the menstrual periods of the patients receiving other services. Shorter menstrual duration yielded less amount of menstruation. Most patients did not suffer from menstrual pains and usually maintained a 28 day menstrual cycle regardless of patients receiving induced abortions or other services.

2. Process of Receiving Induced Abortions.

There were 4,234 patient-visits in the four study clinics during the four-week study period. 257 patient-visits, or 6% of the total patient-visits

Table 13.

Marital Status of Patients Receiving Induced Abortions and Other Services in Four Clinics, Taiwan, 1971

Marital Status	Percentage Distribution	
	Induced Abortion Patients (N:189)	Other Patients (N:1654)
Unmarried	9	6
Married	91	94
Total	100	100
Unknown (number of patient-visits)	0	173

Table 14.

Regularity of Menstruation in Patients Receiving Induced Abortions and Other Services in Four Clinics, Taiwan, 1971

Regularity of Menstruation	Percentage Distribution	
	Induced Abortion Patients (N=107)	Other Patients (N=899)
Regular	82	63
Irregular	18	37
Total	100	100
Unknown (number of patient-visits)	82	928

were made for induced abortions. Fourty-eight percent of the total patient-visits, namely, 2,016 patient-visits, were directly observed by the student interviewers for recording the process involved in the services received. Among 2,016 patient-visits recorded, 189 patient-visits, or 9.4% of the total patient-visits recorded, were services for induced abortions. Thus for induced abortion services performed in the study clinics during the study period, out of total 257 patient-visits 189 patient-visits were actually observed and recorded, a 74% coverage. Since each patient included in the analysis (i.e., 189 patient-visits) paid only one visit to the clinic for immediate induced abortion service, 189 patient-visits equaled to 189 patients. All the discussions followed were based on the information analyzed from 189 patients unless otherwise indicated.

Eighteen percent of patients receiving induced abortions did not present specific chief complaints when they visited the clinics. They simply told the receptionists that they wanted to see the doctors and usually they would be examined by the doctors for the pelvic examinations directly and finally received the services for induced abortions. Fees were paid by cash (checks and credits were not accepted, and insurance did not cover for induced abortions unless medically indicated) before patients left the clinic. Although the patient did not present specific complaints for visiting the clinic she did have specific purpose in her mind to see the doctor. She was well determined to terminate her pregnancy before coming to the clinic. At least she did prepare enough money to receive induced abortion service.

Among 156 patients presenting chief complaints during their visits to the clinics, a total of 221 complaints were found, an average of 1.4 complaints per patient presenting chief complaints. The distribution of the chief complaints was shown in Table 15.

Forty percent of chief complaints were missed periods. The majority (63%)

Table 15.

Chief Complaints of Patients Receiving Induced Abortions in Four Clinics, Taiwan, 1971

Chief Complaints	Number of Patients Complained	Percent Total
Missed periods	83	39
Morning sickness	43	19
Asking for termination	38	17
Bloody discharge	37	17
Lower abdominal pain	14	6
Irregular menstruation	3	1
Leukorrhea	3	1
Total	221	100

of patients who visited doctors for missing periods were within forty days from the last menstrual period. Twenty six percent of patients who complained missing periods visited clinics after missing two menstrual periods. Seven percent visited the clinics when they missed three periods. Four percent visited the clinics right after they missed the first period. It was interesting to note that almost all patients receiving induced abortions visited doctors before 12 weeks of gestation, and mostly within 8 weeks. Patients demanding induced abortions were seldom turned down by the doctors for unsuitable gestation period. It might be that induced abortions were widely known among women despite the fact that there were no promoting education programs for induced abortions.

Nineteen percent of chief complaints belonged to the symptoms of early pregnancy, the morning sickness symptom complex which included anorexia, nausea, epigastralgia, vomiting, headache, dizziness, general malaise, and weakness of the extremities. Lower abdominal pain and lumbago (comprised of 6% of the total complaints) and the increase of the leukorrhea (1% of the total complaints) were also symptoms related to the pregnancy. The patients with pregnancy symptoms visited clinics for the confirmation of the suspected pregnancy for termination.

Seventeen percent of chief complaints were simply the request for the termination of the pregnancy. The patients were highly motivated and well determined to receive the termination service. Their purposes to visit the clinics were very specific. Bloody discharge constituted seventeen percent of the total chief complaints. The complaint of bloody discharge ranged from vaginal discharges tinted with blood to actual vaginal bleeding. The majority of cases complained of vaginal spotting. Most of the bleeding was bright red in colour. Six patients who bled in dark brown clots were possibly those for whom therapeutic abortions were advisable.

One percent of chief complaints were irregular menstruations which might be the inter-cycle bleeding and could be grouped with the complaints of bloody discharges.

Seventy-seven percent of the patients receiving induced abortions were new patients who paid first visits to the clinics where they received induced abortion services. However all 189 patients received no systemic physical examinations before conducting induced abortions. Induced abortions were not done under general anethesia and the patients demanding induced abortions were generally a selected healthy group without serious systemic illness which contraindicated the practice of the induced abortions. No patients receiving induced abortions have had past histories of serious systemic diseases as stated before.

All 189 patients received pelvic examinations for determining the size and position of uterus. No abnormalities were found on the external genitalia. The majority of the vaginal discharges were normal in appearance. Only four cases were found to be actual bleedings, a ten percent positive rate for complaints of bloody discharges. Vaginal discharges of few patients were found to be yellowish or whitish in colour. No suspected signs of the malignancy were present. No Papanicolou smears were taken.

The cervix of a patient was found to be eroded and local treatment was given before the conduction of the induced abortions.

Eighty percent of the patients' uterus were increased in size, mostly in goose egg size, a few in fist size. Retroversiflexion of the uterus was found in one fourth of the patients and the rest assumed the position of anterversiflexion. One case of double uterus was found.

All patients were free from adnexal disorders by bimanual examinations.

Pregnancy was the prerequisite for performing induced abortion. All 189 patients were found to be pregnant. Definite pregnancy of ninety percent of

cases was determined by subjective symptoms and objective signs from pelvic examinations. Four cases were found to be pregnant with rings in situ. Seven percent of cases were diagnosed as pregnant by the aid of laboratory examination. All four clincs sent out speciments for pregnancy tests at nearby laboratories. Immunological (hemagglutination inhibition) tests were employed and results were sent back to the clinics at once. All cases receiving pregnancy tests showed positive results.

Twelve percent of patients received the working diagnoses of inevitable or incomplete abortions which usually required surgical intervention which was induced abortion. The remaining patients did not receive specific obstetric and gynecological working diagnoses. Because the remaining 88% of patients also received services in induced abortions the practice of the induced abortions could be done mainly for social reasons. On an average a patient receiving induced abortion spent an hour in the clinic. Twenty minutes were used for services of induced abortion. No admissions were required and induced abortions were done on the first visit to the clinic.

Once the indication (either medical or social) for induced abortion has been established the patient was given oral hypnotics and analygesics. A few patients were given intravenous injection of hypnotics for rapid induction. Sulbital was the common drug used for the pre-medication. No general or spinal anesthesia were performed. Procaine solution was used for local anesthesia.

No shavings of the pelvic regions were done.

Ten percent of patients receiving induced abortions in Clinic A were done by vaccum suction methods. The remaining patients all received induced abortions by the standard D & C technique. Sounding of the tuerus was followed by the grasp of the cervix by the tenaculum. Dilatation of the cervix was made by the Hegar dilators and curette was used to evacuate the uterine contents.

Ergometrine (uterotonic ergot preparation) was given intramuscularly to

the majority of patients. No blood preparations were available and no blood replacements were performed due possibly to small amount of blood loss from the procedures of the induced abortions. Only one patient received 5% glucose infusion therapy and eleven percent of patients received 20% glucose supply (20 c.c. to 50 c.c. intravenously). Several patients received intravenous injection of vitamins (B Complex) and nutrients (essential amino acids). A few patients received intramuscular injection of antibiotics (tetracyclines) and analygesics.

Evacuated uterine contents were inspected grossly by the doctors although no pathological examinations were done.

One case of bleeding complication was found after induced abortion was done. The bleeding was controlled easily and might not be due to the incomplete evacuation of the fetal tissue from the uterus. The complication rate was 5 per 1,000 induced abortions performed.

Four patients were inserted with Ota rings and three patients were inserted with loops. Five patients were given oral contraceptives and one patient was advised to try the traditional contraceptive method. Family planning was not vigorously promoted by the doctors to prevent future recurrence of unwanted pregnancies. Integration of preventive and curative medicine in the daily practice of physicians seemed desirable.

Twenty minutes were required for patients to rest after receiving induced abortions for observation of the changes followed. Two patients were asked to make return visit.

On an average 2.7 medications were prescribed for a patient receiving induced abortion. The details were presented in Table 16. Antibiotics and sulfadrugs accounted for 40% of the total medications used. The vigorous administration of the antibiotics and sulfadrugs might be the reasons for rare occurrence of the infections following the induced abortions which were

Table 16.

Medications Prescribed for Patients Receiving Induced Abortions in Four Clinics, Taiwan, 1971

Drugs	Frequency of Prescription	Percentage Distribution
Sulfadrugs	132	25
Uterotonics	118	23
Hypnotics and analgesics	98	19
Antibiotics	73	14
Vitamins and nutrients	62	12
Stomachics and hormones	32	7
Total	515	100

usually done in the examination rooms rather than done in the operating rooms.

The average fees charged for patients receiving induced abortions and patients receiving other services were shown in Table 17. The average fees charged for patients receiving induced abortions were three times higher than the average fees charged for patients receiving other services. The average fees charged for patients receiving induced abortions in four clinics were shown in Table 18. The range of the average charge in four clinics was from NT$ 223 to NT$ 316 (NT$ 40 = 1 US$), a difference of 1.4 times. The average fees charged for patients receiving induced abortions by marital status were shown in Table 19. The fees charged for unmarried patients were twice as high as the fees charged for married patients. A few unmarried patients were charged as high as NT$ 700, almost twice of the fees charged for an average unmarried patient. Induced abortions were still illegal in Taiwan at present. In the past physicians who performed induced abortions for unmarried women were often involved in the court suits. Thus the higher fees charged to the unmarried pregnant women for induced abortions above the fees charged for married pregnant women represented the expenses possibly involved in the court settlement.

C. Summary

1. During the study period, 6% of the total patient-visits made in four study clinics were services for induced abortions. 2,016 patient-visits (48% of total 4,234 patient-visits) including 189 patient-visits for induced abortions (74% of the total 257 induced abortion visits) were directly observed for record analysis. The rate of the induced abortion services was thus 9.4% of the total patient-visits analyzed.

2. Induced abortion services were the fifth most frequent type of services offered by the gynecological and obstetrical clinics, following

Table 17.

Average Fees Charged for Patients Receiving Induced Abortions and Other Services in Four Clinics, Taiwan, 1971

Services Received	Average Fees Charged (NT$)
Induced abortions (N 184)	252
Other services (N 1822)	75

Table 18.

Average Fees Charged to Patients Receiving Induced Abortions in Four Clinics, Taiwan, 1971

Clinic	Average Fees Charged Per Patient (NT$)
A	223
B	312
C	316
D	225

Table 19.

Average Fees Charged for Induced Abortion Patients by Marital Status in Four Clinics, Taiwan, 1971

Marital Status	Average Fees Charged (NT$)
Unmarried patients (N 15)	436
Married patients (N 169)	236

pregnancy, cervical conditions, menstrual disturbances, and abnormal discharges.

3. The average age of the patients receiving induced abortions was 33.2 years, only slightly older than the patients receiving other services. The age distribution of those with induced abortions was, however, much concentrated in its model age group than were other patients. The induced abortion patients have had more unwanted pregnancies which were more likely to be terminated by induced abortions. The majority of the induced abortees were housewives with primary education marrying farmers with similar educational background. The induced abortees often tried intrauterine devices with 13% of failure rate. The unwanted accidental pregnancies were not easily terminated by spontaneous abortions. Nine percent of induced abortion patients were unmarried women.

4. The patients receiving induced abortions usually presented the chief complaints of missed periods and early symptoms of the pregnancy. Suspected pregnancy was confirmed chiefly by pelvic examination. Patients complained of vaginal bleeding were somethimes suspected as inevitable or incomplete abortions. The patients fearing undesirable pregnancies visited the clinics often without any specific complaints. Both medical and social indications for induced abortions prompted the use of local anesthesia to perform dilatation and curettage technique. Twenty minutes were required to complete the procedures. Uterotonics, antibiotics and sulfadrugs were vigorously instituted and the complication was rarely occured.

5. A fee for an average patient receiving one induced abortion service was NT$ 252 (NT$ 40 = US$ 1). However a higher fee was charged for an unmarried patient demanding desperately for induced abortion.

V. Knowledge of and Attitude Toward Induced Abortion*

In spite of the numerous surveys of women's KAP on "family planning" in Taiwan as well as in other countries, thorough and systematic questioning of the KAP on induced abortion has been rather rare. Specific attention was given to the matter in the present study. Questions on knowledge concerning induced abortion were concentrated in Round 4 in a series of nine visits made to the panel of women selected for this part of the study. Attitude was specially covered in Round 5. The specific questions asked on these rounds are given in Appendix 2. In Appendix 4 (section C of the questionnaire) are found the corresponding questions asked in the one-shot KAP interview. Whenever possible, the findings in the two different groups of interviewed women will be shown. It should be pointed out, however, that the detailed analysis which might explain reasons for some of the discrepancies between the two groups has not been completed.

A. Knowledge

Of the women who professed some knowledge regarding the possibility of induced abortion, an open-ended question was asked as to what specific methods they knew. Table 1 shows the results of this question for both the repeat interview panel and the group of women subjected to a one-shot KAP-type of interview. Although some differences in percentage distribution of answers between the two groups exists, the ordering of the different methods as to proportion of the respondents knowing them is the same and the percentages not grossly different. About 50% knew of surgery (from their answers they meant primarily D and C) as a method of inducing abortion. This was followed in frequency by "western drugs" and "herb drugs," with both in the neighborhood of 5%-7% of the respondents mentioning them. One might

*The few tabulations with comment presented here are but a little of the available data. Related material has already been presented in scattered fashion in the preceding pages. Future analysis will explore these areas further.

Table 1.

Number and Percentage of Respondents Knowing Various Mrthods Among the Respondents Who Knew of the Existence of Induced Abortion as Reported on the One-Shot KAP Interview and at Round Four of the Repeat Visits*

Methods for Induced Abortion	Repeat Interview Panel		One-Shot KAP	
	Number	Percent	Number	Percent
Surgery	589	53.16	776	44.17
Western drug	75	6.77	126	7.17
Herb drug	62	5.60	105	5.98
Vacuum suction	15	1.35	23	1.31
Saline injection	3	0.27	4	0.22
Intentional "accident"	3	0.27	4	0.22
Other methods	63	5.69	4	0.22
Respondents "knowing" at least one method	625*	56.41*	806*	45.87*
Respondents "knowing" no specific method	483	43.59	951	54.13
Total aware of induced abortion	1,108	100.00	1,757	100.00
Number not aware of induced abortion	654		457	
Total interviewed	1,762		2,214	
Percent of interviewed aware of IA		62.9		79.4

*The answers from each respondent may be more than one. The numbers and percentages by method, therefore, add to more than the number or proportion with knowledge of at least one method.

suppose that the differences between the two groups are substantially due to interviewing technique, but without specific analysis one cannot rule out the possibility of other factors such as a slight difference in characteristics of the respondents due to the heavy clustering in the sampling, and the fact that the one-shot interview was carried out several months after the fourth round of the repeat interviews and in Taiwan generally and in Taoyuan in particular increasing publicity has been given to induced abortions at the time of the study. It is interesting to note that although only a few respondents knew of vacuum suction technique, it is not unknown.

Further inquiry along the same line investigated the respondents' knowledge concerning places where an induced abortion can be performed and the type of person available for carrying out the induced abortion. Tables 2 and 3 give the results of this investigation. The same remarks regarding details of the distributions can be made, namely, some noticeable but not very large differences with ordering remaining the same. Clearly, the vast majority, 80%-90%, of the respondents think of private doctors' clinics as the main place to go for an induced abortion and of obstetricians-gynecologists as the chief professional from whom to obtain an induced abortion.

When the question of cost was asked, approximately one-half who knew that the Ob-Gyn was a source of induced abortion could not estimate what the charge would be. Among the 556 women in both surveys combined who reportedly did know the cost, 56% (310) answered between NT$200 and NT$300, equivalent to US$5 and US$7.50. This corresponds to the modal class of cost as reported by those who underwent an induced abortion between Rounds 1 and 9.

Table 2.

Number and Percentage Mentioning Specific Places to Go for an Induced Abortion, Among the Respondents Knowing Where to Go for Induced Abortion and Who Also Reportedly Knew Surgery, Vacuum Suction or Saline Injection As Methods of Induced Abortion*

Places for Induced Abortion	Repeat Interview Panel		One-Shot KAP	
	Number	Percent	Number	Percent
Private doctors' clinics	471	86.42	584	82.49
Public hospital	116	21.28	280	39.55
Midwife's clinic	19	3.49	8	1.1
Missionary hospitals	3	0.55	3	0.42
Other places	15	2.75	62	8.76
Total respondents (see table heading)	545*		708*	

*A respondent may mention more than one place to go for induced abortion, and so the numbers by category add to more than the number knowing at least one place.

Table 3.

Number and Percentage of Respondents Knowing Which Type of Medical Professionals to Go to for Induced Abortion Among the Respondents Who Knew Surgery, Vacuum Suction or Saline as Methods*

Medical Professionals	Repeat Interview Panel		One-Shot KAP	
	Number	Percent	Number	Percent
Ob-Gyn doctors	530	89.68	619	79.36
Midwife	16	2.71	26	3.33
Other types of physicians	14	2.37	11	1.41
Unqualified physician	12	2.03	9	1.15
Nurse	8	1.36	8	1.03
Herb doctor	4	0.68	8	1.03
Total respondents (see table heading)	590*		780*	

*A respondent may mention more than one professional.

Notice that the above questions were asked as open-ended questions, and the answers given by the respondents to each question may be more than one category (except for cost). Whenever the respondent gave a positive answer, a probe question followed to ask if she knew any more categories of methods, places, procedures, etc.

The above findings revealed that in spite of the fact that more than one-third of the respondents reportedly did not know that there was such a thing as an induced abortion, among those who knew, the respondents were reasonably well informed about the service. The medical care received by the respondents for induced abortion was thus most likely to be under qualified professionals, a phenomenon not likely in other developing countries. This was confirmed by both our interval occurrence study and medical practitioners' KAP study, q.v.

It is also of interest to learn in this connection that for the 2,867 women who knew of the existence of induced abortion, the majority thought that an induced abortion should be performed prior to the third month of pregnancy. However, about one-fourth of the women indicated that they did not know the best time for an induced abortion (Table 4).

B. Attitude

In both repeat interviews and the one-shot KAP a section of the interview was devoted to determining under what circumstances the respondents approved of induced abortion. The approach used was to describe briefly various circumstances which might precede an abortion and ask if the respondent would approve of an abortion in those circumstances. The details of these questions are in the appendices as noted above,

Table 4.

Respondents' Opinions As to Best Month of Pregnancy for Induced Abortion by the 1,108 Respondents Who Knew of Induced Abortion

Preferred Month	Repeat Interview Panel		One-Shot KAP	
	Number	Percent	Number	Percent
First	197	17.78	450	25.61
Second	502	45.31	768	43.71
Third	18	1.62	33	1.88
Later than third	--	--	2	0.11
Other (no best given; or "the earlier, the better;" or only range given)	28	2.53	83	4.72
Don't know	363	32.76	421	23.96
Total	1,108	100.00	1,757	99.99

but one example is "Suppose a married woman who doesn't want more children but doesn't want to use any contraceptive method either discovers she is pregnant and wants to get rid of her pregnancy. Do you approve or disapprove of her doing so?" Table 5 shows the proportion of respondents indicating approval, disapproval, or not choosing one of these positions. The latter group includes women who refused to answer, simply stated they did not know or have an opinion, or gave some other answer that the interviewer could not classify as approval or disapproval. In the table the circumstances are ordered in descending order of proportion approving among the respondents in the panel of women given repeat interviews. As will be seen, the proportion stating disapproval rises from about 10% for pregnancies following rape to about 43% for pregnancies in women whose complaint is that they become nervous and emotionally disturbed during pregnancy.

The respondents who had one or more induced abortions according to their report at Round 8 of the repeat interviews were asked "If you become pregnant again, do you think you would or would not have an induced abortion?" About 20% were undecided; about 60% said that they would, whereas the remaining approximately 20% were of the opinion that they would not have another induced abortion. The reasons the latter group gave were that their experience with induced abortion was too traumatic or they believed induced abortion was harmful to their health, about half of the negative group, or they wanted more children "now," most of the other women saying they would not have another induced abortion (Table 6.)

Table 5.

Proportion Approving, Disapproving, or Other of Induced Abortion Under Given Circumstances for the Panel of Women Given Repeated Interviews and for Respondents in the One-Shot KAP Survey

Reason for Induced Abortion*	Percentage Distribution			
	Approves	Unknown	Disapproves	Total**
Pregnancy from rape: Panel**	68.8	22.2	9.0	100.0
One-shot**	69.0	20.9	10.1	100.0
Premarital pregnancy: Panel	60.8	18.2	21.0	100.0
One-shot	54.5	17.5	28.0	100.0
Married, but very poor: Panel	58.6	17.6	23.9	100.1
One-shot	65.7	11.7	22.6	100.0
Possible fetal deformity: Panel	54.5	18.8	26.7	100.0
One-shot	59.2	17.8	23.0	100.0
Married, failure of contraception: Panel	51.1	19.5	29.4	100.0
One-shot	58.6	15.0	26.5	100.1
Health of pregnant woman: Panel	45.1	19.6	35.3	100.0
One-shot	47.3	18.0	34.7	100.0
Unwanted pregnancy without contraception: Panel	43.7	20.0	36.2	99.9
One-shot	41.3	17.1	41.6	100.0
Pregnant woman emotionally disturbed by pregnancy: Panel	35.0	21.7	43.3	100.0
One-shot	39.9	16.9	43.1	99.9

*Appendix 2 (Round 6) and Appendix 4 (section D) give complete wording of questions asked.

**Based on 1752 of "panel" of women at their fifth round, and on 2214 women responding to the "one-shot" KAP-type survey.

Table 6.

Whether Would Resort to Induced Abortion if Pregnant Again and Reason for Opinion According to the Respondents Who Had One or More Induced Abortions as Reported at Round 8 of Repeat Visits

Opinion and Reason	Number	Percent
No	50	22.5
Past experience was traumatic or it is harmful to health	27	12.2
Want more children now	21	9.5
Other reason	2	0.9
Yes	130	58.6
Not sure, or doesn't matter	42	18.9
Total	222*	100.0

*Fifteen reportedly not fecund any more or separated from husband, 5 saying they would not become pregnant because of practicing contraception, and 1 unknown are excluded.

Section Four
Summary, Implications, and Recommendations

I. Summary Findings

The following summarizes major findings obtained by the methodological and the substantive parts of this study.

A. Methodological Findings

1. Randomized Response Technique

In connection with and as a part of the "Epidemiological Study on the Outcome of Pregnancies", the randomized response technique (RRT) was administered to a group of 1,112 married women of childbearing age in Taiwan, during a usual KAP survey, to determine their experience of induced abortion. Another comparable group of 1,103 respondents was asked the usual question about their past experience of induced abortion, which is still illegal in Taiwan. Major observations include the following:

a. A substantially higher estimate of 28.7% was obtained by the RRT for the proportion of women who had had abortions in the past, compared with the corresponding rate of 12.7% among the usual KAP group. The highest corresponding rate which had ever registered in Taiwan from the previous KAP surveys done in Taiwan was 13.8%.

b. A total of 692 cases actually cooperated with the RRT, corresponding to 62.2% of the original group of 1,112. The other 420 cases (or 37.8%) failed to cooperate for various reasons.

c. Because of the rather low response rate, it is possible that some biases might have been introduced into the result. Two sources of bias seem to have existed: (1) in comparing the RRT and the NRRT (Non-RRT) groups, the RRT group was represented more by the mainlanders who in general were a little better educated and possessed more modernized attitudes because of selectivity in migration, and (2) within the RRT but between cooperative and non-cooperative ones, the cooperative group contained more educated, slightly younger women whose ancestors were from mainland provinces.

d. Bias from the above two sources would have been in the direction of overestimating the abortion rate. A rather simple analysis, nevertheless, shows that a substantial difference still exists between the results obtained by the RRT and those of the usual survey method, allowing for these selections.

e. A total of 188 persons refused to go through the RRT procedures and had answered the abortion question directly, either affirmatively (27) or negatively (161). The 27 affirmative answers should be plausible, but accepting the 161 negative answers for granted may result in an underestimation. This group may consist of women who indeed had had an abortion, those who had had abortions but were determined not to tell, and women who could not understand the RRT but were simply putting off the interviewers. Similarly, it is possible that the 74 persons who flatly refused to cooperate might consist more of women who had experienced abortion.

f. Among the 692 cooperative cases, 48.0% felt that there was no trick to the method, and 40.5% thought that their friends or relatives would not feel that there was a trick. A lower proportion of the latter might be reflecting the fundamental suspicion of the respondents to this RRT. Taiwanese women seemed to be a little more suspicious than the women in the North Carolina study. Lower educational level among Taiwanese women might have accounted for this difference.

g. Contrary to the above, 77.3% of Taiwanese respondents said that their friends and relatives see no objection to responding to a direct question about abortion. This rate was lower among the North Carolina sample, being 16.9%. Although abortion is illegal, the related laws are loosely enforced and the community attitude toward performing induced abortion is largely understanding and tolerant. There probably was less embarassment for the Taiwanese women to admit having had abortions than women in North Carolina when the study was done about three years ago.

h. Discussions were given on various factors related to the RRT, in general, such as adequacy of interviewers, pictorial presentation of questions, advantages and disadvantages of various randomizing devices and their possible improvement--including computerization of RRT--and desirability of multiple trials of RRT per respondent.

i. As a natural development of the Taiwan study, some theoretical work on RRT has been done and is continuing at Hopkins. New randomizing devices have been designed, which may be used to deal with quantitative information on sensitive problems. These ideas and devices, however, must be tested for their practicability and feasibility.

j. In conclusion, the RRT should be a useful tool for study of various sensitive problems of contemporary concern--e.g., use of drugs, crime, abortion, teenage pregnancy, etc , study of which urgently requires new survey techniques. The method, however, needs further improvement. The plan at Hopkins is to test various RRT models and devices among various types of populations under clinical and field conditions against the conventional survey methods and "secret ballot," by various types of interviewers to see their relative efficacy.

2. Validity Study

Through the observations made by medical students at eight selected clinics in the study area for a period of 30 days, a total of 169 induced abortions were witnessed. 127 of these cases lived within the Taoyuan areas which were studied. An equal number of cases who had visited the above clinics for purposes other than induced abortion were selected, matched by dates of last menstruation, township of residence, marital status, age and parity. Trained interviewers were assigned to interview both groups. The randomized response technique and the usual interview were used to detect episodes of induced abortions. The interviewers were kept blind as to which cases had had induced abortion. The findings are as follows:

a. Validity of Verbal Report on IA

The first part of our analysis is centered on the 45 cases originally assigned as NRRT cases, that is, to be interviewed by a conventional

interview method, and whose interview was successfully completed.

Of these 45 cases, 18 did not report any IA at the interview. Among the remaining 27 cases who admitted IA, one reportedly had the most recent IA more than 3 months ago but less than a year; 3, more than a year; and 3 did not report an exact date. Only 20 reported the recent IA as within 3 months.

If temporarily we deem any case who had reported an IA as a valid answer no matter how long ago these have reportedly occurred, then we will get an under-report rate of 18/45 = 40.00% (S.E. = 7.30%). If we adopt a more strict criteria, namely, only those reporting IA within 3 months as the correct report, then the mis- and under-report rate would amount to 55.56% (S.E. = 7.41%).

It would be interesting to learn the characteristics of women who are more likely to under-report. Unfortunately, the number of cases is too small to allow definite conclusions. The following impressions, nevertheless, have been obtained:

(1) Women who are more urbanized, non-vegetarians, holding an outside job, and literate are more likely to hide their IA. It is the Fukinese rather than Hakkanese, the younger (below 30 years of age) rather than the older, and those having less (4 or less) living children, who are more likely to under-report IA. Generally, it may be speculated that the less sophisticated and more prolific women are more honest in reporting.

(2) Those who have had no child deaths, and those who have had previous induced abortions before the present one, are more likely to report their recent IA experience honestly than those who did have child deaths or those who did not have a previous IA.

b. Validity of randomized response technique

Of 127 IA cases, 65 were randomly assigned as the RRT cases, of which 54 were successfully interviewed, but only 23 cases cooperated with the RRT. An estimate based on the responses of these 23 cases yielded the proportion of the respondents who have had an abortion to be 39.9%. Since the sample size is so small, no conclusive statement can be made, but the impression was that even with RRT, completely honest answers about induced abortions are difficult to get. Possible alternative explanations are: a. The RRT procedures were not correctly understood by the respondents who unintentionally responded erroneously, or b. There was misunderstanding on the part of medical students in reporting the events.

c. Other incidental findings:

Among the 70 paired comparisons, the following variables were found to be associated with IA at the 10% significance level. As compared to their matched controls, the IA cases:

(1) Their husbands are less educated. (Although there is no difference in occupation of husband between IA cases and controls).

(2) Are less likely to be currently pregnant, but have had more pregnancies.

(3) Have had more IA's in lifetime as well as in the past one year.

(4) Are more likely to approve contraceptive practice for either family limiting or spacing purposes.

(5) Are more likely to approve IA for family limiting purpose without using contraception.

(6) Are less likely to want additional children and more serious about ideal number of children.

(7) Are more likely to have had practiced contraception in the past and practice it in the present.

(8) Are more likely to know surgery as the method of IA. (If we compare all the IA's and the controls without considering whether they know the existence of IA or not in the first place).

(9) Are more likely to approve IA for health reasons.

(10) More of the IA cases think IA is legal in Taiwan.

d. Methodological findings

(1) By using different types of interviewers, female medical students in the clinic and lay female interviewers in the field for a validity study offer us a good chance to completely keep the latter from knowing the identity of the interviewees, i.e., whether she is a study IA case or a control.

(2) For events which are more likely to be under-reported rather than over-reported such as IA, our approach of from clinical records to home visit should be a better way of detecting under-report, rather than the other way around, that is, to validate the positive interview results by clinic record as done in most of the morbidity surveys.

(3) With a short interval between the operation of IA and time of interview as in this study, and the traumatic nature in experience of IA, we might rule out the possibility of any under-report as due to memory failure. The remaining reason will be only intentional concealment, if we may also deem that by definition in this study, IA here would not be mixed up with spontaneous abortion or other types of pregnancy wastages.

(4) The rate of under-reporting by the usual interview was high--at more than 40%. Even use of the RRT was unable to produce completely

honest responses. It would be reasonable to speculate that in an ordinary KAP type of field survey the under-report rate on induced abortion would be higher.

3. Pregnancy Test

   a. A totalof 305 suspected pregnancies were either reported verbally or detected with the pregnancy test, 77% of which were established by subsequent follow-up. Of these established pregnancies, 11.3% terminated in induced abortion.

   b. Of the 305 reported or detected events, 84 were verbally negative but pregnancy test positive (V-,T+). For 72.6% of these 84, pregnancy was established. There probably was some deliberate concealment pregnancy (to justify subsequent abortion?) and possibly some false positives in the pregnancy test.

   c. Thirty-nine (39) cases were verbally not sure of pregnancy but gave positive reactions to the pregnancy test (V?, T+). For 89.7% of these cases, pregnancy was established.

   d. Forty-five cases (45) responded verbally not sure as to pregnancy, but showed negative test (V?, T-). Nearly one-third (31.1%) of these cases proved to be pregnant, indicating the possibility of false negative pregnancy tests.

   e. Ten (10) cases reported being pregnant verbally, but their pregnancy tests were negative (V+, T-). For 60.0% of them, pregnancies were established. This is another possible example of false negatives of the pregnancy test.

   f. A total of 109 cases were positive both verbally and by the test (V+,T+). For all of them, pregnancies were established. If a woman admits her pregnancy and her urine shows a positive reaction in the pregnancy test, it is almost certain that she is pregnant.

   g. An interesting finding is that for 13 cases which were negative by both the verbal response and pregnancy test--but who were identified by an early termination of pregnancy--10 of them terminated in induced abortions and 3 in spontaneous abortion.

   h. The pregnancy test seemed to have its highest utility in predicting pregnancy when a respondent is still uncertain as to her pregnancy status and when her urine shows a positive reaction. The predicting value of the test is lower when the respondent gives a negative response.

   i. The pregnancy test definitely will have some value in detecting a pregnancy when a response is still uncertain, but the possibility of false negative and false positive lessen its value. Whether the test should be used in a field study such as this depends largely on the specific objectives of the study. General impressions about

the utility and feasibility of use of pregnancy test include the following:

(1) Under-reporting of IA is due more to respondents' intentional concealment inview of the sensitivity and illegality of the event. The possibility of memory lapse is probably rather small for an induced abortion.

(2) In this sense, a longitudinal survey on IA without a highly sensitive and specific pregnancy would not be much better than a one-shot retrospective survey, since the former is supposed to be more capable in eliminating under-report due to memory failure than intentional concealment of events.

(3) A longitudinal study without a good pregnancy test, (i.e., entirely on respondents' own verbal report) would face the following problems:

   (a) The practical difficulties to correctly recognize a pregnancy early enough.

   (b) Elderly women approaching menopause and women with irregular cycles would report more "don't know" or "not sure", for which there is no way to correctly identify their status of pregnancy.

   (c) There is no way to detect a pregnancy and its outcome if a woman wants to abort her pregnancy and wishes intentionally to hide the pregnancy.

(4) It seems worth the trouble to carry out a urine test, even realizing that it would add some logistic problems, as well as technical ones such as the following:

   (a) Problems which are inherent to operation

      (a-1) Obtaining wrong person's urine
      (a-2) Mislabelling in field
      } Interviewer's fault (or interviewee's intentional)
      (a-3) Mismanagement in laboratory (Wrong urine, mislabelling, technical error, etc.) -- technician's negligence.

   (b) Problems which are inherent to the test itself: false positive or false negative

      (b-1) In general
      (b-2) At what period of pregnancy
            False positive due to ovulating hormone
            False negative after 2nd trimester of pregnancy
      (b-3) Storage and transportation of reagent.

(5) A question that may be further considered is whether 6 weeks is an adequate interval for a repeat interview with urine test to detect possible under-report of induced abortion.

B. Findings from the Substantive Studies

1. Interval Occurrence Study

A total of 44 induced abortions were identified through repeated interviews between Rounds 1 through 9, and more specific analyses were made on these cases which occurred during the study interval of about 48 weeks. Major findings from this study include the following:

a. Induced abortion ratios

27.1 induced abortions per 1,000 married females per year
24.7 married females will have induced abortion per 1,000 married females per year
160 induced abortions per 1,000 livebirths

b. Reasons for induced abortion

About 2/3 for either limitation or spacing
About 1/5 for health reasons
About 1/7 for miscellaneous reasons not categorized

c. Married females in urban areas more likely to have induced abortions than those in non-urban

d. No detectable difference in induced abortion incidence betweer Fukienese and Hakkanese

e. The older the married female the less likely is her pregnancy to terminate in livebirth

f. Married females with no education are less likely than others to have an induced abortion, but no educational difference as to proportion of pregnancy terminations resulting in induced abortion

g. No relationship between number of prior pregnancies and proportion of married females having induced abortion, but marked positive relationship between prior pregnancies and proportion of pregnancy terminations resulting in induced abortion

h. Positive relationship between number of prior livebirths and proportion of pregnancy terminations resulting in induced abortion

i. No relationship between the number of prior spontaneous abortions or prior stillbirths and proportion of married females with induced abortions or proportion of pregnancy terminations resulting in induced abortion

j. Evidence of recidivism. Positive relationship between number of prior induced abortions and proportion of females having induced abortions and very marked positive relaticnship between number of prior induced abortions and proportion of pregnancy terminations resulting in induced abortion

k. Forty percent of married women who had not had an induced abortion reported that they had not heard of such an event

l. No detectable relationship between knowledge of induced abortion and subsequent occurrence of induced abortion

m. Positive relationship between number of friends thought to be practicing induced abortion and both the proportion of married females with induced abortion and proportion of pregnancy terminations resulting in induced abortion

n. Contracepting women less likely to have pregnancy terminating in a year overlapping interview providing information of contracepting, and of these contracepting women who do have pregnancy terminations in such interval induced abortion more likely

o. Married females whose pregnancies terminated in induced abortion more frequently expressed remorse about their pregnancy than women with pregnancies not so terminated

p. About 16% of women with induced abortions discussed the matter with no one prior to the abortion; about 82% discussed the subject with their husbands

q. About 95% of the induced abortions were performed prior to third month of gestation

r. Approximately 93% had the induced abortion performed by qualified doctors (MD's), mostly (37/41) by Ob-Gyn MD's

s. About 93% of the abortions were done by surgical methods (only one known to be by suction)

t. About 1/3 of the induced abortions were followed by "discomfort" sufficient for respondent to mention

u. All induced abortions cost less than US$15; about 2/3 in range of US$5 to US%7.49

2. Habitualness of Induced Abortion

Two contradictory speculations have been made concerning the question as to whether women will repeatedly resort to induced abortion when they accidentally become pregnant: (1) A woman who has had an abortion will be more likely to have another one because once the emotional barrier against abortion is overcome

by one experience, she feels much more at ease having another one--i.e., there is habitualness in the practice of abortion; or (2) Since induced abortion is an unpleasant experience both physically and psychologically, a woman will be more reluctant to have another one and will try to avoid another unwanted pregnancy by the more consistent use of contraceptives or by other means. Both hypotheses sound reasonable, and it would be of considerable programmatic value as well as of academic interest to study if such habitualness does indeed exist.

The results of this analysis suggest that induced abortions do not occur independently of each other and that there seems to exist habitualness in abortion practice.

Such habitualness may only be the result of a repeated selection of women who possess specific characteristics which make them more prone to have an abortion.

It is known that women who have had an abortion are rather selected in terms of specific demographic variables such as age, parity, level of education, place of residence, and others. These women usually do not wish to have any more children, hence are more likely to terminate subsequent unwanted pregnancies by abortion. Because of this selectivity, the chance is higher for a woman who has had one abortion to have another one.

A woman may be more liable to have an induced abortion if she is highly fecund and is subject to a higher risk of pregnancy, or if she has an easy access to medical facilities which perform abortions.

A real concern of abortion from the programmatic viewpoint is whether an abortion will leave any learning effect on a woman's subsequent behavior with respect to resorting to another abortion. She may learn through the unpleasant experience of abortion not to become pregnant again so that further abortion will not be needed, or may learn to repeat it after finding out that induced abortion is not that difficult to have after all.

By the analyses, it has been shown that some selectivity does exist; however, since we are not certain as to which variables other than the usual demographic characteristics of age, parity, education, etc., are associated with the practice of induced abortion, it is not possible to say whether or not the learning effect of abortion indeed exists. It is, therefore, suggested that further studies be undertaken along this line to answer the question.

3. KAP Study of Medical Practitioners

A survey on KAP of contraception and induced abortion was carried out on all the registered medical and midwifery practitioners in Taoyuan. Emphasis was on professional rather than personal KAP. The major findings are summarized as follows:

a. About half or more of the practicing obstetricians-gynecologists (OG) were performing IA. They are the main providers of IA. Proportionally a very few GP admittedly also perform IA, but they should not be neglected in studying the quality of care of IA in this area since they represent nearly half of the physicians providing such services. Three herb doctors (HD) and two midwives (MW) reportedly have performed an IA occasionally.

b. Among medical practitioners, the OG are in general the youngest and best educated, and more of them have received special training in family planning. They are the best informed in their knowledge of contraceptive methods, the Island-wide family planning program, vital rates, and induced abortions. They showed the most liberal attitude toward family planning, including IA. All these probably explain their greater activity in the service involving contraception and IA, besides what may be the main reason, simply that they are specializing in obstetrics and gynecology and women know to go to them when wishing an IA, a fact which was clear from our consumer's study.

c. Care should be directed to detect the characteristics of the general practitioners (GP's) who also perform IA when quality of care to IA is considered. GP are inferior in their knowledge in contraceptive methodology to MW, although superior in their knowledge of vital rates in Taiwan. Knowledge on family planning program and IA is similar between these two professions. MW showed a more liberal attitude toward family planning and induced abortion, and have professed greater effort in education concerning family planning. This is probably also due to the fact that next to OG more of them have received special training in family planning.

d. HD may be ignored as a provider of family planning. However, 3 out of the 39 HD declared that they have performed IA in past 12 months.

e. In questions on vital rates, we have obtained the smallest proportion of correct answers, and the largest proportion of "no answers." The conventional mass communication have not succeeded in reaching these professionals in this aspect.

f. A few comparisons between the providers, excluding HD, and the consumers (from the result of the repeat interview study) showed that the OG as one type of provider does know better and more correctly than the consumer contraceptive methodology and the best time for IA. But as the suppliers and receivers, they do place different emphasis in permissible reasons for IA. The former are more health-oriented, while the latter are more conscious about social acceptance.

g. The providers have, on the average, one less child in fertility ideals, but 0.5 more in actuality. The ever practice rate is similar to that of the consumer. Age and time factor, however, were not taken into consideration.

4. Clinic Studies

Medical students were assigned to ten selected clinics to observe the medical care services provided by the private practitioners, particularly of induced abortion services for a period of about one month. During the study period, a total of 4,160 patient-visits were directly observed by the students, about 5% of which were clinic visits for induced abortions. Major findings from this phase of study include the following:

a. During the study period, 6% of the total patient-visits made in four study clinics were services for induced abortions. Patient-visits numbering 2,016 (48% of total 4,234 patient-visits) including 189 patient-visits for induced abortions (74% of the total 257 induced abortion visits) were directly observed for record analysis. The rate of the induced abortion services was thus 9.4% of the total patient-visits analyzed.

b. Induced abortion services were the fifth most frequent type of services offered by the gynecological and obstetrical clinics, following pregnancy, cervical conditions, menstrual disturbances, and abnormal discharges.

c. The average of the patients receiving induced abortions was 33.2 years, only slightly older than the patients receiving other services. The age distribution of those with induced abortions was, however, much concentrated in its model age group than were other patients. The induced abortion patients have had more unwanted pregnancies which were more likely to be terminated by induced abortions. The majority of the induced abortees were housewives with primary education marrying farmers with similar educational background. The induced abortees often tried intrauterine devices with 13% of failure rate. The unwanted accidental pregnancies were not easily terminated by spontaneous abortions. Nine percent of induced abortion patients were unmarried women.

d. The patients receiving induced abortions usually presented the chief complaints of missed periods and early symptoms of the pregnancy. Suspected pregnancy was confirmed chiefly by pelvic examination. Patients complained of vaginal bleeding were sometimes suspected as inevitable or incomplete abortions. The patients fearing undesirable pregnancies visited the clinics often without any specific complaints. Both medical and social indications for induced abortions prompted the use of local anesthesia to perform dilatation and curettage technique. Twenty minutes were required to complete the procedures. Uterotonics, antibiotics and sulfadrugs were vigorously instituted and the complication rarely occurred.

e. A fee for an average patient receiving one induced abortion service was NT$252 (NT$40 = US$1). However, a higher fee was charged for an unmarried patient demanding desperately for induced abortion.

5. Knowledge of and Attitude Toward Induced Abortion in General

a. From 20% to as high as 40% claimed not to be aware of the possibility of induced abortion prior to discussion with the interviewers.

b. About 50% who knew of induced abortion considered surgery a method; most of the balance claimed to know no specific method.

c. Eighty percent to ninety percent of those aware of surgery as a method said the private doctor's clinic was the place to go for an induced abortion, and a similar proportion that Ob/Gyn doctors are those to see.

d. About one-fourth to one-third who knew of induced abortions did not know the most favorable length of gestation for the operation. About two-thirds of those specifying a time said induced abortions should be done prior to the third month.

e. From 35% to 70% of respondents approved of induced abortions depending on the particular circumstances surrounding the abortion.

f. About 60% claim that they would have another induced abortion if they became pregnant again, 20% said they would not, and 20% were not sure about this question.

II. Dissemination and Utilization of Research Results

Considerable interest has been shown by research workers and administrators in family planning in various parts of the world toward the Taiwan study, and inquiries about its progress and outcome have been received not infrequently. A part of the study, despite its being pilot in nature, has produced some impact in Taiwan and in other areas.

A. Taiwan

Some talks had been going on in Taiwan among some family planning administrators with regard to the desirability of relaxing the existing laws prohibiting induced abortion; the study, no doubt, has promoted further the awareness of the magnitude of the problem and increased the need for such legal reform. During the study period two seminars were organized in Taiwan--one by a group of legislators and another by some religious leaders--to exchange views on such reform.

In view of the changing attitude among the health administrators and political leaders in favor of legal reform concerning abortion, a study into the policy implication of such reform was thought important. The Ford and Rockefeller Foundations have jointly awarded a small grant to enable one of the graduate students in the Department of Population Dynamics of the Johns Hopkins School of Hygiene and Public Health to specifically study the policy implication of such legal reform. The contemplated study will have a different approach, and the data to be collected will be centered largely around the policy aspects of liberalizing induced abortion to help the policy formation of the government; however, there is no doubt that experience gained by the results of this study will be most useful and may be utilized to facilitate the study. Incidentally, the Director-General of the National Health Administration of the Republic of China (Taiwan) has expressed the thought that such a study will be most timely and significant in view of the favorable climate created partly because of this and various other previous studies.

A representative of the Population Council in Taiwan is interested in studying for his doctoral dissertation the behavioral science aspects of induced abortion such as perception of the timing of commencement of human life; he has indicated particular interest in part of the study results and visited this Department twice to exchange ideas and to obtain some preliminary data.

B. General

The principal investigators served as short-term consultants to the World Health Organization for training health statisticians for family planning and participated themselves in a number of WHO scientific meetings. The study design and some preliminary results were frequently brought to the attention of the participants and the WHO staff who demonstrated considerable interest in them. A close contact has since been maintained between the principal investigators and the related technical staff of WHO concerning this study and studies on the problem of pregnancy wastage in general.

Investigators in various related organizations have shown particular interest and attention to the application of the randomized response technique (RRT) to study illegal induced abortions in a developing area. Individuals with whom discussions on this technique were held by the principal investigators included Linda, Kessel, Greenberg, and Horvitz of the Carolina Population Center; Kessler, Rosa, and Hansluwka of the World Health Organization; Potter of Brown University; and Mauldin, Ross, and Tietze of the Population Council. Parker Mauldin of the Population Council invited the investigators to contribute an article on the use of the randomized response technique which will appear in Studies in Family Planning in the near future.

Request for possible collaboration has been received from Kessel of the Carolina Population Institute who is in charge of its AID-supported International Fertility Study, and some preliminary exchange of ideas has been made to this effect. Greenberg indicated his willingness to help analyze part of the data on the RRT, and Horvitz has reviewed some of the theoretical work done on the RRT by the Hopkins group.

An additional and obvious, but important, point is the dissemination and utilization of the research results resulting from contacts with students and colleagues at the Johns Hopkins School of Hygiene and Public Health. The material has been valuable in teaching from both the methodological and the substantive points of view. The School faculty has wide contacts in public health and population circles both within the United States and elsewhere, and frequent discussions with some faculty concerning this study occur. The School has a large fraction of students from outside the United States, and many of these have taken the Department's courses which make use of methods and data of the study or have had other occasions to consult with staff or fellow students from within the Department. To illustrate the geographical spread of Departmental students, during the School year just completed (1971-1972) the following countries were represented: Bangladesh, Canada, India, Indonesia, Iran, Korea, Lebanon, Netherlands, Nigeria, Pakistan, Philippines, Sierra Leone, Taiwan, Togo, and the United States.

III. Implications and Recommendations

Before listing specific points which this study appears to suggest in terms of implications and recommendations, it might be mentioned that a fairly broad study such as this one is expected to have practical (applied) value primarily in two related areas, namely, program planning and general public education. The assistance to program planning results from the "fact-finding" which such a study accomplishes. Occasionally the facts found confirm general impressions, but without the scientific evidence presented by a good study the impressions, though they may be true, cannot form a readily acceptable basis for policy formation or program planning. The second value of such a study, namely, public education, is in some sense an incidental "spin-off" but to the administrator of a program is nonetheless an important one as it may call the public's attention to the existence of some problem, e.g., induced abortion, and simultaneously inform the public of some of the "facts" that have been found.

Without too much imagination one might attach an implication to almost any of the substantive findings. However, there appear one or two major implications of the findings from this study for Taiwan as related to induced abortions.

A. The time is ripe for statutory change in the regulation of induced abortions. Induced abortion, except for narrow medical reasons, is illegal in Taiwan, but the findings of this study suggest that the time has come to liberalize considerably the regulations and legalize induced abortions on a broader range of reasons.

B. There is a continuing need for increased education of the medical and paramedical professions in matters of family planning in general, including induced abortions.

There are very few, if any, of the findings presented in the previous sections which do not directly support the first implication, but some that seem particularly relevant are that the practice of induced abortions appears to be more prevalent based on the data from this study than previous estimates would suggest. In particular, the randomized response technique yielded estimates as high as 28% for the prevalence of women with a history of induced abortion, and the annual incidence based on the interval occurrence of induced abortion among the respondents followed for the year of repeat interviews was also very high. Another supporting datum is that from 35%-70% of married women approve of induced abortions depending on the particular circumstances surrounding the abortion. Further, the professionals who are most active in performing induced abortions are the most highly qualified, namely, the obstetricians-gynecologists. The general practitioners and the nurse midwives, while less active, showed some evidence of inadequate knowledge in the general field of family planning, which finding led to the second implication mentioned above.

In addition to the particular implications just mentioned, the study leads to some recommendations pertaining principally to the conduct of such studies in the future.

A. Because of the fundamental value of such studies, as mentioned in the first paragraph of this section, and because of the insufficiency of data in the area of outcome of pregnancy and especially induced abortion, it is recommended that studies with similar goals be undertaken in geographical areas with identifiably different cultures and conditions. This recommendation is supported by the fact that in Taiwan which is one of the more thoroughly studied areas in the field of population and family planning, certainly in the developing areas, the study has provided significant and new information as mentioned above. Furthermore, the problems associated with certain methodologies used in the Taiwan study are probably importantly variable from one culture to another. For example, in working with the randomized response technique the cooperation obtained in Taiwan from the respondents was less than that obtained in North Carolina. One must expect, then, that special study will be necessary of this new and valuable technique whenever the culture in which it is to be applied

differs from that of previous trials. Another illustration of the same sort is that the trial to obtain information through direct clinic observation using medical students was tailored to meet the conditions found in Taiwan, and the extent to which it could be tried at all or tried with a variation would have to be studied for each new culture.

B. A second specific recommendation is that the data obtained in this study be subjected to further analysis to cover some material not yet touched and to explore all in depth. For this we would hope to involve both graduate students as well as Department staff.

C. We recommend that experimentation with the randomized response technique be carried out more fully and, as mentioned in "A" above, in different cultural settings. Some of the areas for further development of this new technique are discussed in the section on randomized response technique and in Appendices 8 and 9.

D. A fundamental subject that is of special interest to us and our colleagues is the mechanisms by which women fall short of achieving "maximum" fertility in societies where modern contraceptives are not yet readily available. A study such as this on the outcome of pregnancy clearly relates to the broader question and has stimulated our interest in it and, therefore, we recommend that, when possible, the issue relating to maximum fertility be explored, taking advantage of all the methodological techniques studied and tested in this study.

It is our intention to develop specific proposals in line with the four recommendations just mentioned for their implementation.

APPENDIX TO

Report on Study

"Epidemiology of Outcome of Pregnancy in Diverse Cultures and in Selected Countries"

Contract Number: AID/csd-2246

August 1, 1972

Appendix 1

Summary of Taiwan Sampling

1. Taiwan Island is divided into:

   Taiwan Province and Taipei City;
   Province divided into four large cities plus sixteen Hsiens ("counties");
   Each county is divided into non-overlapping cities, townships, and hsiangs. Call all these "towns;"
   Towns are divided into Lis or villages. Call both of these "Lis;"
   Lis are divided into Lins.

2. Taoyuan County selected judgmentally.

3. Fuhsing Hsiang (town), an aboriginal area with about two percent of Taoyuan population, was excluded from further consideration.

4. The remaining twelve towns in Taoyuan County were divided into four strata on the basis of percentage of males fifteen years of age or older and economically active who were classed in the occupational groups of agriculture, forestry, fisheries, husbandry, or hunting.

Strata	Number of Towns
I	2
II	4
III	2
IV	4

5. The desired total sample size was distributed among strata according to proportion of eligible women (married women 15-49 years old) in each stratum.

6. Independently within each stratum one town was selected randomly with probability proportional to size. Size was defined as number of married women aged 15-49 years.

7. Within each selected town one-half of the Lis were selected by random systematic sampling.

8. The selected Lis were divided in the ratio 2:1:1 for samples for one-shot KAP, repeat interview with pregnancy test, and repeat interview without pregnancy test, respectively. This division was done by random systematic sampling.

9. Subsequent sampling differed between sample selected for the one-shot KAP and that for repeat interviews.

10. Sampling within Lis for repeat interviews was done identically but independently for repeat interviews with pregnancy tests and for repeat interviews without pregnancy tests as follows:

    a. Independently in each selected town, pseudo-lins were formed in the selected Lis. The pseudo-lins were of uniform size throughout a given town (the same size for Lis with and without pregnancy test).

b. Enough pseudo-lins were selected to provide the desired sample size for each selected town. The number of pseudo-lins was the same for each selected Li. The selection of pseudo-lins was by random systematic sampling.

c. All eligible women listed in the registration offices for the selected pseudo-lins were included in the sample.

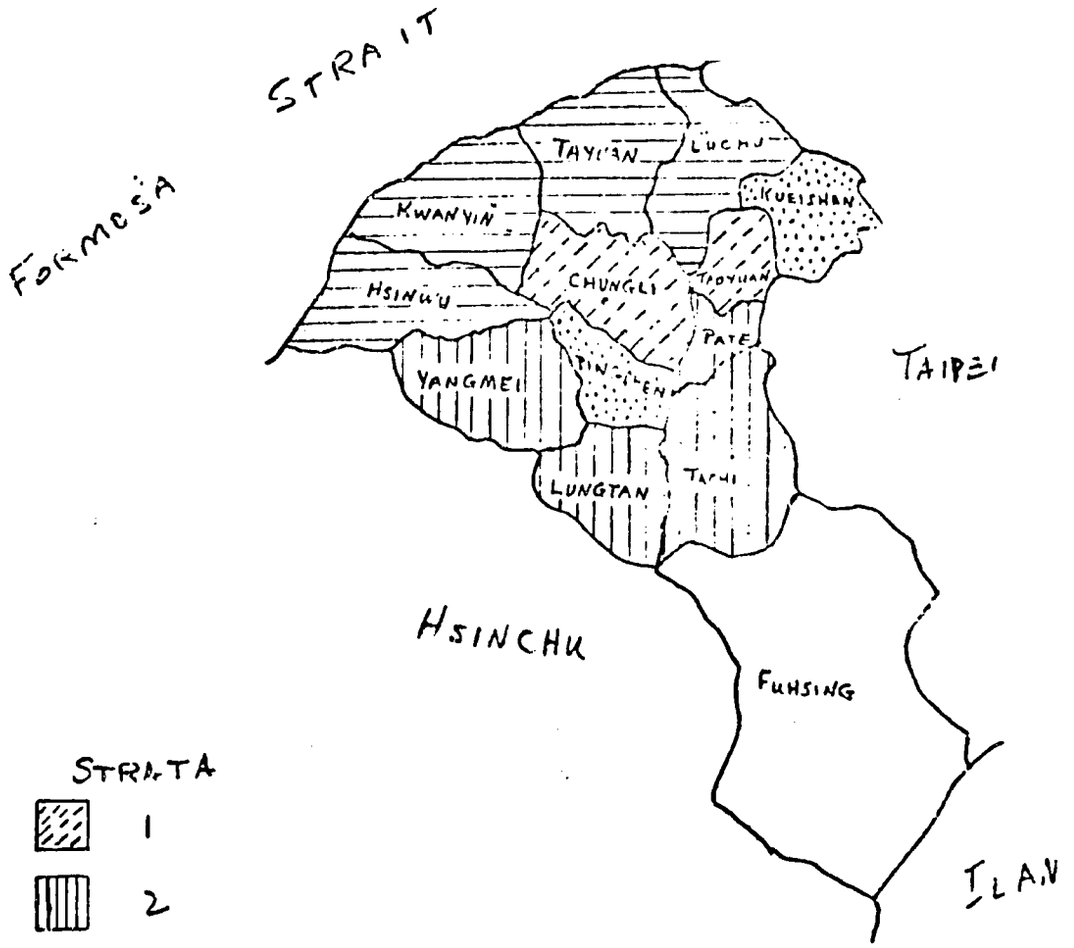
11. Sampling within Lis for one-shot KAP:

a. All Lins in selected Lis were included.

b. Women in the selected Lis were selected by random systematic sampling in sufficient number to provide the desired sample size for each selected town.

c. The selected Lis were divided into two groups equal as to number of Lis, one group for application of randomized response technique, the other for KAP without this technique. This was done separately for each town, taking into consideration the number of eligible women in the selected Lis and aiming at the same time for a systematic sampling of Lis based on their geographical order.

Towns, Strata, and Sample in Taoyuan County, Taiwan



STRATA

1

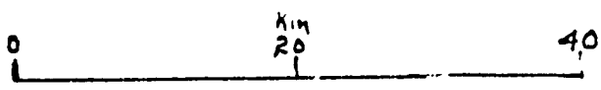
2

3

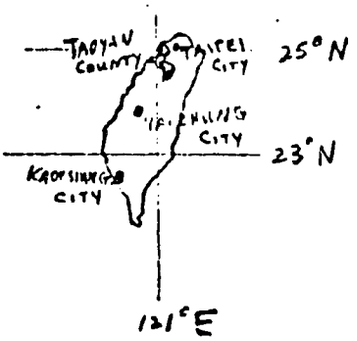
4

Aboriginal town, not sampled

Shaded areas ("towns") were drawn as the sample.



Taiwan



Appendix 2

Maternal Health

"Stillbirth" Study Repeat Interview (First Visit)

Case No.: /_/_/_/_/_/

Names: Case: _____; Husband: _____; Household head: _____

Record of Address:

	Order	Township	Li	Lin	Street	Section	Lane	Sublane	No.
1	Original			A / P					---
2				A / P					---

Record of Visits:

Order	Date Yr.	Mo.	Day	Time Interview Started Hr.	Min.	am/pm	Completed	No Such Address	Not There	Moved	Others	Remarks	Signature of Interviewer
1													
2													
3													

Remarks: _____

Urine Collection: /_/ 0. Not indicated
/_/ 1. Indicated

Result of Urine Collection:

First Collection: /_/ Succeeded: Date Collected: ____Yr. ____Mo. ____Day
Label No. _____
/_/ Failed, Cause _____

Second Collection: /_/ Succeeded: Date Collected: ____Yr. ____Mo. ____Day
Label No. _____
/_/ Failed, Cause _____

Result of Urine Examination: Sugar : /_/No, /_/+, /_/++, /_/+++
Protein: /_/No, /_/+, /_/++, /_/+++, /_/++++

Date of Check: ____Yr. ____Mo. ____Day Result of Check:

Date Interview Completed: ____Yr. ____Mo. ____Day

Signature of Supervisor: _____

Name:

Case No.: /_/_/_/_/_/

A. Nativity and Family Composition

Mrs. _____, I am _____ from the Sino-American Joint Commission on Rural Reconstruction (JCRR). I would like to ask you a few questions about the health of women and those related to pregnancy. Your cooperation would help us to improve the health services for women. It may take about 30 minutes to complete, and I would very much appreciate your cooperation.

A1. Are you an Islander or a Mainlander?

A2. (If an Islander), then, are you a Fukienese or a Hakkanese?

A3. How about your husband? (Put answers of A1-A3 in Table 1)

Table 1. Nativity

Nativity	Respondent	Husband
Fukienese		
Hakkanese		
Mainlander		
Others, specify		

A4. What kind of dialect do you ordinarily speak at home?

/__/ 1. Mandarin
/__/ 2. Fukienese
/__/ 3. Hakkanese
/__/ 4. Others, specify: _____

A5. When were you born? Was this the Western calendar or lunar calendar? (How old are you?)

W.C.: _____Year _____Month _____Day

L.C.: _____Year _____Month _____Day

or _____ years old (equal to animal _____)

A6. How about your husband then?

W.C.: _____Year _____Month _____Day

L.C.: _____Year _____Month _____Day

or _____ years old (equal to animal _____)

A7. When were you and your husband married?

W.C.: _____Year _____Month _____Day

L.C.: _____Year _____Month _____Day

or respondent married at: _____years old

A8. Are you living with him now?

/__/ 0. No

/__/ 1. Yes (Skip to A11)

/__/ 2. Yes, living together; but: _____ (Skip to A11)

A9. Why is that? Are you separated, divorced, or is your husband dead?

/__/ 1. Separated

/__/ 2. Divorced

/__/ 3. Husband dead

/__/ 4. Other, specify: _____

A10. When did this (separation or divorce) happen, or when your husband deceased?

W.C.: _____Year _____Month _____Day

L.C.: _____Year _____Month _____Day

A11. Some women have married more than once. Is this your first marriage?

/__/ 0.

/__/ 1. Yes (Skip to A15)

A12. Then, how many times have you married?

_____times

A13. When were you married before this present marriage, then, and when was this ended?

W.C.: _____Year _____Month _____Day } Started
L.C.: _____Year _____Month _____Day }

W.C.: _____Year _____Month _____Day } Ended
L.C.: _____Year _____Month _____Day }

A14. How about the marriage before that (if any)?

W.C.: _____Year _____Month _____Day } Started
L.C.: _____Year _____Month _____Day }

W.C.: _____Year _____Month _____Day } Ended
L.C.: _____Year _____Month _____Day }

A15. We would like to ask you some questions about your pregnancies. As you know, most pregnancies result in live births, but sometimes they may be spontaneous abortions, stillbirth-B (induced abortion) or dead at birth. What is the outcome of each of your pregnancies?

How about the _____st pregnancy (live birth or stillbirth)?

(a) If it was a livebirth:

(1) Was it male or female?

(2) When was he (she) born? Was this western calendar, or lunar calendar? (or equal to animal, or how old is he/she now?)

(3) Did you give him (her) away? Is he (she) still alive?

(4) (If given away or dead) when was it? (Return to ask the next pregnancy)

(5) Is he (she) living with you now?

(6) (If over 15 and still alive) is he (she) married?

(b) If stillbirth (or other than live birth):

(1) What was the event? (spontaneous abortion, stillbirth A, or stillbirth B?)

(2) When did that happen? Were you pregnant for how many months then? (If this pregnancy ended in stillbirth B, return to ask the next pregnancy)

(3) Do you know how that happened? (Do you know why that could happen?)

Table 2. History of Pregnancies

Preg. Order	Order	Live Birth: Sex M	Sex F	Date of Birth E	Yr.	Mo.	Day	E	Age Full	Age	Animal	Alive M	Alive F	Dead	Adopt.	Death or Adopt. E	Yr.	Mo.	Living Together Yes	No	Marital Status: Married	Not Married	Less Than 15
					---	---	---										---	---					
					---	---	---										---	---					
					---	---	---										---	---					
					---	---	---										---	---					
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					---	---	---										---	---					
					---	---	---										---	---					
					---	---	---										---	---					
Total																							

(Note for Interviewers: (1) If the age to last birthday of the last child is less than $\frac{0}{12}$, ask the exact date of birth and write in the "Remark" column.

(2) If any of the pregnancy interval exceeds 2 years, always probe by asking "The interval between these two pregnancies seems to be quite long. Have you missed any pregnancy in between?")

Table 2. History of Pregnancies (continued)

Non-Live Birth											
Spont. Abort.	Still-birth A	Cause of Spont. Abort. or Stillbirth A	Still-birth B	Date of Termination				Interval from Last Pregnancy			Remarks
				E	Yr.	Mo.	Months of Pregnancy	Order	Yr.	Mo.	
					---	---					
					---	---					
					---	---					
					---	---					
					---	---					
					---	---					
					---	---					
					---	---					
					---	---					

(Note for Interviewers: (1) If the age to last birthday of the last child is less than $\frac{0}{12}$, ask the exact date of birth and write in the "Remark" column.

(2) If any of the pregnancy interval exceeds 2 years, always probe by asking "The interval between these two pregnancies seems to be quite long. Have you missed any pregnancy in between?")

A16. Have you ever adopted any child?

☐ 0. No (Skip to A19)

☐ 1. Yes

A17. How many children have you adopted? Is he (she) or are they included in the children you mentioned earlier?

Total _____ (If mentioned earlier as her own children, interviewer should cross it (them) out from the table)

A18. How old is he (she)?

_____years old (If more than one, list all of them: _____)

A19. Are there any other relatives or family members living with you and eating the meals together? I mean other than you, your husband, children of your own or adopted.

☐ 0. No (Skip to A21)

☐ 1. Yes

A20. How are they? How old are they? Are they married?
(Fill in Table 3)

Table 3. Other Relatives Living Together

Relationship With the Case	Sex		Age	Marital Status		Remarks
	M	F		Married	Not Married	
Total						

A21. Do you intend to move away within a year?

☐ 0. No (Skip to B1)

☐ 1. Possible

☐ 2. Yes

A22. Then to where do you intend to move?

/__/ 0. Not decided yet

/__/ 1. The same township /__/ a. Address uncertain

/__/ b. Address: _____

/__/ 2. Other township but within study area /__/ a. Address uncertain

/__/ b. Address: _____

/__/ 3. Other township outside study area

B. Health Status of Respondent

B1. Have you had any discomfort or illness in the last month or so?

/__/ 0. No (Skip to C1)

/__/ 1. Yes

B2. What was the discomfort?

Explanation: _____

B3. Could you carry on your work as usual, or did you have to stay in bed, or were you admitted to hospital?

/__/ 1. Work as usual

/__/ 2. Stay in bed

/__/ 3. Hospitalized

B4. Did you receive any treatment?

/__/ 0. No (Skip to C1)

/__/ 1. Yes

B5. What kind of therapist was he?

/__/ 1. M.D.

/__/ 2. Herbist

/__/ 3. Nurse or midwife

/__/ 4. Self

/__/ 5. Other specify: _____

C. Menstruation, Breast Feeding and Pregnancy Status

C1. Would you tell me what day was the first day of your last menstruation? How long ago was it?

☐ 1. Remembers the date:

The first day of the last menstruation: W.C.: ____Yr. ____Mo. ____Day

L.C.: ____Yr. ____Mo. ____Day

About _____months _____days ago

☐ 2. None since last pregnancy (Skip to C6)

☐ 3. Forgot or not clear (Skip to C4)

☐ 4. Other (specify): _____

C2. How long did your last menstruation last?

☐ 1. Remember the period: _____days

☐ 2. In the middle of menstruation (Skip to C4)

☐ 3. Forgot or not clear (Skip to C4)

☐ 4. Other (specify): _____

C3. Was it longer, about the same or shorter than your usual period?

☐ 1. Longer

☐ 2. About the same

☐ 3. Shorter

☐ 4. Other (specify): _____

C4. Was it more, about the same or less than usual in volume?

☐ 1. More

☐ 2. About the same

☐ 3. Less

☐ 4. Other (specify): _____

C5. Then, how about the menstruation before your last one? Can you remember what day you started that? How many days ago was it?

☐ 1. Remember the date

The menstruation before the last: W.C.: _____Yr. _____Mo. _____Days

L.C.: _____Yr. _____Mo. _____Days

_____Months _____days ago

☐ 2. Only had once after the last pregnancy

☐ 3. Forgot or not clear

☐ 4. Other (specify): _____

C6. What is the length of your regular menstrual pericd?

1. About _____ days to _____ days
2. Other (specify): _____

C7. Is it periodical?

/_/ 0. No
/_/ 1. Not very periodical
/_/ 2. Periodical
/_/ 3. Other (specify): _____

C8. (*Check the summary sheet and Table 2 to see if any children are under 3.)

/_/ 0. None (Skip to C10)
/_/ 1. Yes

C9. Are you breast-feeding your baby now?

/_/ 0. No
/_/ 1. Yes

C10. (*Check Table 2, the date of birth for the last child and the answers from C1 and D1)

/_/ 1. The last menstruation occurred within 1 month, or smallest child age 0/12 years old (Skip to D1)
/_/ 2. The last menstruation occurred more than 1 month ago or other (forgot and not clear)

C11. There is one more question, that is: Are you pregnant or not now?

/_/ 0. No (Skip to D1)
/_/ 1. Not sure or unknown
/_/ 2. Yes (Skip to C13)

Remarks: _____

C12. Why are you not sure or why don't you know?

Reason, explain: _____ (Skip to D1)

C13. How long do you think you have been pregnant to now?

About _____ months

/_/ Uncertain

C14. How have you been feeling since you got pregnant this time?

/__/ 0. Not well, explain: _____

/__/ 1. Well

C15. Have you had any vaginal bleeding since you were pregnant this time? If so, how much?

/__/ 0. No

/__/ 1. Yes, very little

/__/ 2. Yes, moderate

/__/ 3. Yes, a lot

/__/ 4. Yes, amount uncertain

/__/ 5. Other (explain): _____

C16. How do you feel about this pregnancy? Very happy, neutral or remorse?

/__/ 1. Very happy

/__/ 2. Neutral

/__/ 3. Remorse

/__/ 4. Other (explain): _____

(Skip to E1)

D. Fecundity

D1. Some couples because of an operation or other physiological reasons cannot get pregnant again, how about you? Do you think you will be able to have more children?

/__/ 0. No (Skip to D3)

/__/ 1. Uncertain or unknown

/__/ 2. Yes (Skip to E1)

D2. Why can't you be certain whether you can have more children or not?

Reason: _____

(If any operation is mentioned, ask D4-D7; otherwise skip to E1)

D3. Why don't you think you will be able to have more children?

Reason: _____

D4. Have you or your husband had any operation which made you not able to have more children?

/__/ 0. Neither (Skip to E1)

/__/ 1. Respondent

/__/ 2. Husband

D5. What operation was it?

/__/ 1. Tubal ligation, cost about NT$_____

/__/ 2. Vasectomy

/__/ 3. Other, explain: _____

D6. When was it done?

W.C.: _____Yr. _____Mo. _____Day

L.C.: _____Yr. _____Mo. _____Day

About _____ years _____ months ago

D7. Was it done only because you did not want more children or was it for other reasons?

/__/ 1. Solely for limiting family size

/__/ 2. For limiting family size as well as other reasons, explain _____

/__/ 3. Solely for other reasons, explain _____

E. Socio-economic Background

We would like to ask you some questions about you and your husband:

(Note: If respondent seems to interviewer well educated, E1 can be ignored.)

E1. Can you read or not?

/__/ 0. No (Skip to E4)

/__/ 1. Yes

E2. What was the highest schooling you have received?

E3. How many years have you been in school altogether?

E4. Can your husband read or not?

/__/ 0. No (Skip to E7)

/__/ 1. Yes

E5. What was the highest schooling your husband has received?

E6. How many years has your husband been in school altogether?

(Answers for E2, E3, E5, E6, to be put into Table 4)

Table 4. Education and Years of Schooling

Education	Respondent		Husband	
	Highest School	Years in School	Highest School	Years in School
1. Can read but no formal education				
2. Private tutors or training classes				
3. Primary school				
4. Junior high				
5. High school or vocational school				
6. College and over				
7. Others (specify)				

E7. What is your religion? Do you worship ancestors only, or do you also worship other gods?

(If the answer is Christianity, ask E8, Moslemism skip to E9, others skip to E10)

E8. Are you a Catholic or a Protestant?

E9. Do you go to church every week, or only on special occasions or what?

/__/ 0. Do not go

/__/ 1. Once a week or more frequent

/__/ 2. Frequently, but not quite once weekly

/__/ 3. Seldom, only special occasions

/__/ 4. Others, specify _____

E10. How about your husband?

(Fill the answers to E7-E10 into Table 5)

Table 5. Religion

Religion	Respondent	Husband
0. None		
1. Conventional ancestor worship only		
2. Ancestor worship or Buddhism or Taoism		
3. Protestant Christianity		
4. Catholic Christianity		
5. Moslemism		
6. Others, specify		

(If respondent answered conventional ancestor worship, Buddhism or Taoism, ask E11-E13, otherwise skip to E14)

E11. Are you a vegetarian?

/__/ 0. No (Skip to E13)

/__/ 1. Yes

E12. Do you practice vegetarianism only on special occasions or all year around?

/__/ 1. Several days a year only

/__/ 2. Only in the mornings

/__/ 3. All year around

/__/ 4. Others, specify _____

E13. Do you burn incense every day or only in festivals or only very rarely?

/__/ 0. Never

/__/ 1. Seldom

/__/ 2. Only special occasions

/__/ 3. Every day

/__/ 4. Others (specify): _____

E14. Where did you live longest before marriage? Was any member in your family engaged in farming?

Name of place: _____

/__/ 0. Non-farming

/__/ 1. Farming

E15. Before marriage, did you work at home or outside to augment the family income? If so, where and what?

/__/ 0. No

/__/ 1. Yes, outside, describe nature of work: _____

/__/ 2. Yes, at home, describe nature of work: _____

E16. Where have you lived longest after marriage? Is there any member in your family engaged in farming?

Name of Place: _____ /__/ 0. Non-farming

/__/ 1. Farming

E17. After you married, besides taking care of domestic duties, have you worked at home or outside to augment the family income?

/__/ 0. No (Skip to E19)

/__/ 1. Yes

E18. What is it, and at home or outside? Are you still working now?

In the past: /__/ a. Outside, describe nature of work: _____

/__/ b. At home, describe nature of work: _____

Now : /__/ a. Not working

/__/ b. Outside, describe nature of work: _____

/__/ c. At home, describe nature of work: _____

E19. What is your husband's occupation? What position?

/__/ 0. Unemployed

/__/ 1. Employed: Organization (or nature of work) _____

Position: _____ (Skip to F)

Occupation: (not to be filled by interviewer) _____

/__/ 2. Other (specify): _____

E20. Then, what was the most recent employment of husband?

Organization (or nature of work) _____

Position: _____

Occupation: (not to be filled by interviewer) _____

F. Urine Collection and Result of Urine Test

(only in villages where urine collection is indicated)

Thank you for your cooperation. Now, I want to make some examination concerning your health, will you give me some urine so that I will do some tests. Some of the results can be reported to you right away. The urine will be brought back to our lab. Here is the urine bottle.

Result of Test of the Urine:

G. Interviewer's Report

G1. Time of termination of visit: _____o'clock _____minutes

G2. Dialect used in interview:

/_/ 1. Mandarin
/_/ 2. Fukienese
/_/ 3. Hakkanese

G3. Degree of cooperation:

/_/ 1. Excellent
/_/ 2. Fair
/_/ 3. Poor

G4. Reliability of answers

/_/ 1. Thought to be reliable
/_/ 2. Thought to be doubtful (reasons): _____

G5. Person present during interview other than respondent

/_/ 0. None
/_/ 1. Only children
/_/ 2. Other adult present (explain): _____

G6. Any suggestion

/_/ 0. No
/_/ 1. Yes, explain: _____

G7. Useful hints for locating the case:

/_/ 0. Not necessary
/_/ 1. Necessary, specify: _____

Map, if necessary

"Stillbirth" Study

Study No. SI-2

Repeat Interview (Second Visit)

Case Number /__/__/__/__/__/

Names: Case _____, Husband _____, Household Head _____

Record of Address

Order	Township	Li	Lin	Street	Section	Lane	Sublane	Number
Original 1			A / P					
2			A / P					

Record of Visits

Order	Date Yr.	Mo.	Day	Time Interview Started Hr.	Min.	pm	Completed	No Such Address	Not There	Moved	Others	Remarks	Signature of Interviewer
1													
2													
3													

Remarks: _____

Urine collection: /__/0. No (This should be filled up by supervisors before distributing the questionnaires.)

/__/1. Yes

Result of urine collection:

First Collection: /__/Succeeded; Date Collected: Yr.____Mo.____Day____
Label No. /_____/

/__/Failed; Cause _____

Second Collection: /__/Succeeded; Date Collected: Yr.____Mo.____Day____
Label No. /_____/

/__/Failed; Cause _____

Result of Urine Examination:

Sugar /__/No /__/+ /__/++ /__/+++

Protein: /__/No /__/+ /__/++ /__/+++ /__/++++

Date of Check _____ Result of Check _____

Date of Completion of Questionnaire _____

Signature of Supervisor _____

A. Change in Family Composition

Mrs. _____, I am _____ from the Division of Rural Health, JCRR. You may remember we visited you not too long ago and asked you some questions concerning female hygiene. Now we would like to ask you some more questions.

A1 Could you tell me if there is any change (moving in, moving out, birth, death, etc.) in your family since we visited you last time?

/__/0. No (skip to A8)

/__/1. Yes

A2 What was the change? Who was involved?

/__/1. Birth, respondent's own children (fill in Table 1, continue to ask A3)

/__/2. Birth of respondent's own children and other change (fill in Table 1, continue to ask A3)

/__/3. Other (fill in Table 1, skip to A8)

(*If the answer is "moved in" for A2, ask A2-1.)

A2-1 How is he (she, them) related to you? How old are they? (To those whose marital status cannot be detected, ask "Is he married?")

Relation to Respondent	Sex		Move In			Move Out	Birth	Death	Note
	M	F	Age	Married	Single				

Remarks:

A3 When was he (be) born?

W. C.: _____year_____month_____day

L. C.: _____year_____month_____day

_____months_____days ago

A4 Was he delivered at home or somewhere else?

/__/1. Home

/__/2. Hospital

/__/3. Other, specify _____

A5 What kind of person helped you deliver the baby?

/__/1. Obstetrician

/__/2. Other physician

/__/3. Licensed midwife

/__/4. Granny midwife

/__/5. Relatives, friends, or neighbors (non-medical profession)

/__/6. Self

/__/7. Other, explain _____

A6 How much did you spend for the birth of this baby? (expenses for delivery only)

Approximately NT$_____

A7 Did you have any particular discomfort (fever, bleeding, etc.) a few days before or after the childbirth?

/__/0. No

/__/1. Yes, more than two days before the childbirth; description _____

_____

/__/2. Yes, during the period of two days before delivery till the time of childbirth. Description: _____

/__/3. Yes, within one week after childbirth. Description: _____

/__/4. Yes, other. Description: _____

A8 Could you tell me if your husband has been away from home for business or other reasons since we visited you last time? If so, for how long?

/__/0. No

/__/1. Yes, for _____ days

B. Health Status of the Respondent

(Interviewer should first review the summary sheet of the first visit, and interview should be started from B2 if she learns that the respondent did not have any discomfort during the last visit.)

B1 How is your illness you mentioned last time? Are you all right now?

/__/0. Not yet. Description: _____

/__/1. All right now

B2 Did you have any discomfort or illness in the past month or so after I saw you last time?

/__/0. No (skip to B7)

/__/1. Yes

B3 What was it?

Explanation: _____

B4 During this were you working regularly, or had bed rest, or were hospitalized?

/__/1. Regular daily work

/__/2. Bed rest

/__/3. Hospitalized

B5 Did you receive any treatment?

/__/0. No (skip to B7)

/__/1. Yes

B6 What type of person treated you?

/__/1. Physician

/__/2. Herb doctor

/__/3. Nurse or midwife

/__/4. Self-medication

/__/5. Other, specify _____

B7 Did you receive any operation which will cause sterility after we saw you last?

/__/0. No (skip to B10)

/__/1. Yes

B8 What kind of operation did you receive?

Description: _____

B9 When was the operation performed?

W. C.: _____year_____month_____day

L. C.: _____year_____month_____day

B10 How about your husband? Did he have any discomfort or operation such as sterilization?

/__/0. No (skip to C1)

/__/1. Yes

B11 What was it?

Description: _____

(*If respondent had been performed an operation, then continue to ask B12. Otherwise, skip to Part C.)

B12 What operation was that?

Description: _____

(*If in B12 the respondent answered that her husband had vasectomy, ask B13. If not, skip to Part C.)

B13 When did he receive the operation?

W. C.: _____year_____month_____day

L. C.: _____year_____month_____day

C. Outcome of Pregnancies Since Last Visit

(Interviewer should first look at the summary sheet of last visit, and also check the answer in Table 1 and A3. Then choose one of the following statements.)

/__/0. Respondent answered "no pregnancy" or "others" last time (skip to D1)

/__/1. Respondent reported pregnant last time, and normally delivered at present time (skip to D1)

/__/2. Respondent reported pregnant last time, but did not mention "normal delivery" at present time (continue to ask C1)

/__/3. Respondent reported uncertain for pregnancy last time (skip to C1-1)

C1 How is your pregnancy? Are you continuing pregnancy, or already terminated, or what else?

/__/1. Continuing pregnancy, for _____months ↓

/__/2. The pregnancy has been ended ↓

/__/3. It was wrong information from last interview ↓

C2 How do you feel about your pregnancy during the period from the time of last interview till now?

/__/1. Good

/__/2. Not good
Description: _____

C3 Did you experience vaginal bleeding during the period from the date of last interview till now? Could you tell me the amount?

/__/0. No

/__/1. Yes, little

/__/2. Yes, moderate

/__/3. Yes, massive

/__/4. Yes, not sure

/__/5. Other, description: _____
(skip to E1)

C4 What happened then?

/__/1. Spontaneous abortion (including stillbirth A) (skip to C6)

/__/2. Stillbirth B (skip to C11)

/__/3. Other, description: _____

C5 You said you were pregnant last time, but reported no pregnancy this time. Why was this?

/__/1. The menstruation delayed last time. It was not a real pregnancy (skip to D1)

/__/2. Spontaneous abortion (including stillbirth A)

/__/3. Stillbirth B (skip to C11)

/__/4. Other, description: _____
(skip to D1)

C1 How is your pregnancy? Are you continuing pregnancy, or already terminated, or what else? (Continued)

/__/4. Reported pregnancy last time, but uncertain this time

/__/5. Other

C10 You said you were pregnant last time, but reported uncertain this time. Why was this?

Description: _____

_____

(skip to D1)

Description:

(skip to D1)

C6 What day was this happened?

W. C.: _____year_____month_____day

L. C.: _____year_____month_____day

_____months_____days ago

C7 How many months had you been pregnant when this occurred?

Pregnant _____months

C8 How did this happen?

Description: _____

C9 Did you intend to induce this event, or just an accident?

/__/0. Did not intend (skip to D1, or skip to E1 if the question is led here from D15)

/__/1. Intending to induce, admitted stillbirth B (skip to C11)

/__/2. Intending to induce, but denied stillbirth B (skip to D1, or skip to E1 if the question is led here from D15)

/__/3. Other, description: _____
(skip to D1, or skip to E1 if the question is led here from D15)

C1-1 You reported not sure for whether you have been pregnant or not last time. How is it now?

/__/1. Already definitely pregnant for ____ months	/__/2. Already definitely pregnant but terminated now	/__/3. Already definitely not pregnant	/__/4. Still not sure	/__/5. Other
C2-1 Same as C2 C3-1 Same as C3 (skip to E1)	C4-1 Same as C4	C5-1 Same as C5 (skip to D1)	C10-1 Same as C10 (skip to D1)	Description: (skip to D1)

C6-1 Same as C6

C7-1 Same as C7

C8-1 Same as C8

C9-1 Same as C9

Supplementary Sheet of Second Visit

Case Number /__/__/__/__/__/__/

Date of Interview: _____year_____month_____day

C11 What day did this happen?

W. C.: _____year_____month_____day

L. C.: _____year_____month_____day

_____months_____days ago

(*Interviewer should review the summary sheet of first visit and write down the L. M. P.)

(L. M. P. _____year_____month_____day)

Other description: _____

C12 How many months had you been pregnant when this occurred?

Pregnancy _____months

C13 What type of person who took care of you?

/__/1. Obs/Gyn doctor

/__/2. Other M. D.

/__/3. Midwife

/__/4. Granny midwife

/__/5. Herb doctor

/__/6. Unqualified doctor

/__/7. Herself

/__/8. Others (Description): _____

C14 What kind of method was used?

/__/1. Surgical

/__/2. Drugs

/__/3. Other (Description): _____

/__/4. Unknown (Description): _____

C15 How much money did you spend for it? I mean the expenses used for this treatment (stillbirth B) only.

Approximately NT$_____

C16 Did any particular thing lead you to the decision on this treatment (stillbirth B)?

Description: _____

C17 Did you discuss stillbirth B with somebody before the decision was made?

/__/0. None

/__/1. Husband

/__/2. Friend, neighbor

/__/3. Relatives

/__/4. M. D. or nurse (including midwife)

/__/5. Husband and others; description: _____

/__/6. Others, except husband; description: _____

C18 Did you feel any discomfort after the stillbirth B? (If yes,) What kind of discomfort? How long was this after the treatment?

/__/0. No (skip to C20)

/__/1. Yes, in the first week; description: _____

/__/2. Yes, after the first week; description: _____

C19 Have you ever been treated for the discomfort? (If yes,) How much money did you spend?

/__/0. No

/__/1. Yes, approximately NT$_____

(*Check summary sheet and B8 and B12. If the respondent had performed tubal ligation or hysterectomy, or her husband had performed vasectomy, skip to Part D.)

C20 Suppose you get pregnant again, would you do the same thing? Why?

/__/0. No; reasons: _____

/__/1. Yes; reasons: _____

/__/2. Don't know or not sure; reason: _____

C21 What were the main reasons which led you to practice family planning (stillbirth B)?

1. Want no more children /__/
2. Want more children but keeping a longer spacing /__/
3. For personal health /__/
4. Afraid of deformity child /__/
5. For economic problem /__/
6. Other; description: _____
   (Skip to E1 if the question is led from D15 to C5)

(Note: Interviewers and supervisors should write down the case identification number and signatures here again.)

D. Present Situation: Menstruation, Breast Feeding and Pregnancies

D1 Would you please tell me what day was the first day of your last menstruation? How long ago was it?

/__/1. Remember the date

The first day of the last menstruation?

W. C.: _____year_____month_____day

L. C.: _____year_____month_____day

_____months_____days ago

/__/2. None since last pregnancy (skip to D6)

/__/3. Forget or not clear (skip to D4)

/__/4. Other; description: _____

D2 How long did your last menstruation last?

/__/1. Remember the length: _____days

/__/2. In the middle of menstruation (skip to D4)

/__/3. Forget or not clear (skip to D4)

/__/4. Other; description: _____

D3 Was it longer, about the same or shorter than your usual menstruation period?

/__/1. Longer

/__/2. About the same

/__/3. Shorter

/__/4. Other _____

D4 Was it more, about the same or less than your usual amount of menstruation?

/__/1. More

/__/2. About the same

/__/3. Less

/__/4. Forget or not clear

D5 Then, how about the menstruation before your last one? Can you remember what day did you start it? How many days ago was it?

/__/1. Remember the date

The menstruation before the last

W. C.: _____year_____month_____day

L. C.: _____year_____month_____day

_____months_____days ago

/__/2. Only has once since last pregnancy

/__/3. Forget or not clear

/__/4. Other; description: _____

D6 (*Check the summary sheet of last visit and Table 1 to see if there are any children under 3, and status about breast feeding)

/__/0. None (skip to D8)

/__/1. Yes

D7 Are you breast feeding your baby now?

/__/0. No, both in previous and present visits

/__/1. Yes for previous visit but no for the present visit
(Then ask) When did you stop feeding? _____month_____day

/__/2. Yes, presently feeding

D8 (*Check the date of birth of the last child from A3 and the answers in C1, C1-1, and D1)

/__/0. Had delivered a live baby within last 45 days, or other termination of pregnancy within the past one month (skip to E1)

/__/1. Cases without the above situation and the L. M. P. occurred within past one month in D1 (skip to D15)

/__/2. The remaining cases (including those whose L. M. P. occurred beyond one month period or forget and not clear)

D9 There is one more question, that is, are you pregnant or not now?

/__/0. No (skip to D15)

/__/1. Not sure or unknown

/__/2. Yes (skip to D11)

D10 Why are you not sure or why don't you know?

Explanation: _____(skip to D15)

D11 How long do you think you are pregnant now?

Pregnant about _____ months

/__/Uncertain

D12 How do you feel since you got pregnant this time?

/__/0. Not well; explain: _____

/__/1. Well

D13 Have you had any vaginal bleeding since you were pregnant this time? If so, how much?

/__/0. No

/__/1. Yes, very little

/__/2. Yes, moderate

/__/3. Yes, massive

/__/4. Yes, amount uncertain

/__/5. Other; description: _____

D14 How do you feel about this pregnancy--very happy, neutral, or remorse?

/__/1. Very happy

/__/2. Neutral

/__/3. Remorse

/__/4. Other; explain: _____

D15 (*If respondent who was not sure whether she had been pregnant or not, or who had already been pregnant with unknown months, and can't be detected by appearance, then ask D15; otherwise, skip to E1)

It has been about a month or more since we saw you last. During this period, some women may have had spontaneous abortion or stillbirth B. How about you? Have you had any spontaneous abortion or stillbirth B since I saw you last time? (If the respondent mentioned that she had suffered from spontaneous abortion or stillbirth B during the past month, then ask): Did you have one more experience about the same thing (spontaneous abortion or stillbirth B) happened to you during the period from last interview till now?

/__/0. No

/__/1. Yes (skip back to C4)

E. Knowledge and Attitude Toward Family Planning

E1 In Taiwan some couples want to keep from having too many children or from having children too rapidly and, therefore, use some contraceptive method. Do you know about this?

/__/0. No

/__/1. Yes

/__/2. Other; description: _____

E2 Do you know any of the contraceptive methods commonly used?

/__/0. No (skip to E4)

/__/1. Yes

/__/2. Other; description: _____

E3 What method do you know?

(*Interviewer: For every contraceptive method reported by the respondent check in Table 2. Then probe as in E4 for the remaining methods listed in Table 2. If a positive answer is obtained after probe, check in the column "after probe.")

E4 Here are some methods used by some couples to prevent having too many children or having them too rapidly. Do you know the _____ method?

Table 2. Knowledge of Contraceptive Method

Name of the Contraceptive Method	Know or Don't Know the Method				Knows How to Use		Other; description
	a. Know, Self-Reported	b. Know After Probe		c. Don't Know	Yes	No	
		Without Exp.	After Exp.				
1. Oral Pill							
2. IUD (other than the ota ring)							
3. Condom							
4. Foam tablet							
5. Jelly							
6. Diaphragm							
7. Rhythm							
8. Basal Temperature							
9. Male Sterilization					/	/	
10. Female Sterilization					/	/	
11. Interruption							
12. Injection					/	/	
13. Ota Ring (metal ring)							
14. Others (including herb medicine)							

E5 Among the people you know, for instance, your relatives, friends, and neighbors, do you think any of them use methods to keep from having too many children or having children too rapidly? Would you say they are many, some, very few, or none?

/__/0. None

/__/1. Yes, but don't know how much

/__/2. A very few

/__/3. Some

/__/4. Many

/__/5. Don't Know

/__/6. Other; description: _____

E6 Do you approve or disapprove of some couples' using contraceptive methods to keep from having too many children?

/__/0. Disapprove

/__/1. Approve (skip to E8)

/__/2. Other; description: _____(skip to E8)

E7 Why do you not agree?

Reasons in detail: _____

E8 Do you approve or disapprove of some couples' using certain methods to keep from having children too rapidly?

/__/0. Disapprove

/__/1. Approve (skip to E10)

/__/2. Other; description: _____(skip to E10)

E9 Why do you not agree?

Reasons in detail: _____

E10 Do you want to have more children in the future?

/__/0. No (skip to E12)

/__/1. Yes

/__/2. Other; description: _____

E11 May I ask you, how many additional children do you want to have and, among them, how many boys and how many girls?

1. Want _____ more children, among them a. _____ boys

b. _____ girls

/__/ c. Either boys or girls

2. Other; description: _____

E12 If you were just married and could have the number of children according to your hope, then what do you think is the ideal number of children? Among them, how many boys and how many girls would you like to have?

_____ children as the ideal. Among them a. _____boys

b. _____girls

/__/ c. Either boys or girls

Other; description: _____

E13 In the future when you are older, do you plan to live with your children and grandchildren?

/__/0. No

/__/1. Possibly no (state the condition: _____)

/__/2. Possibly yes (state the condition: _____)

/__/3. Yes

/__/4. Other; description _____

F. Family Economic Status

F1 According to your estimate, how much is spent on your whole family per month?

a. For food, approximately NT$_____

b. For rent (if your own house, suppose you rent a house like the one you live in; now estimate its rent), approximately NT$_____

c. Electric bill _____

d. Others, including clothes, education, medical expenses, transportation, recreation, etc., approximately NT$_____

e. Total NT$_____

F2 This estimate is for how many persons?

Approximately _____ persons

F3 In your family, do you have the following items?

Item	Yes	No
/__/1. Running water		
/__/2. Private toilet		
/__/3. Radio		
/__/4. Electric rice cooker		
/__/6. Refrigerator		
/__/7. T. V. set		
/__/8. Clothes washer		
/__/9. Subscription to newspaper		

Thank you, Mrs. _____, for your cooperation. Now, I want to make some examination concerning your health. Will you please give me some urine so that I will do some tests. Some of the results can be reported to you right away. Some will be after the examination in our lab. Here is the urine bottle.

G. Result of Urine Test

/_____/

H. Other Relevant Records

H1 Time of termination of visit: _____o'clock, _____minutes

H2 Dialect used in interview: _____

H3 Degree of cooperation

/__/1. Excellent

/__/2. Fair

/__/3. Poor

H4 Reliability of answer obtained

/__/1. Thought to be reliable

/__/2. Thought to be doubtful; description: _____

H5 Other persons beside during interview

/__/0. No

/__/1. Only children

/__/2. Other adults present; description: _____

H6 Any suggestion

/__/0. No

/__/1. Yes; explain: _____

H7 Useful hints for locating the cases

/__/0. Not necessary

/__/1. Necessary; specify: _____

Map, if necessary.

"Stillbirth" Study

Study No. SI-3

Repeat Interview (Third Visit)

Supplementary Record

Table 2. Record on Pregnancies

Order of Preg.	Livebirth					Age	Animal*	Alive	Dead	Given Away	Date of Death or Being Adopted			Together	Separated	Marital Status Yes on 15
	Sex		Birth Date													
	M	F	Yr.	Mo.	Day						Yr.	Mo.	Day			
Total																

*The Chinese way of assigning an animal to each year, the person born in that particular year is said to belong to such animal, and from the animal one belongs, one's age can be arrived at.

Changes in Marital Status

/__/1. Divorced, date: _____

/__/2. Separated, date: _____

/__/3. Husband dead, date: _____

/__/4. Other, specify: _____

Changes in Fecundity

/__/1. Respondent sterilized before previous visit, date: _____

/__/2. Other, specify: _____

Table 2. Record on Pregnancies (continued)

Non-Livebirths									
Spontaneous Abortion	Stillbirth A	Cause	Stillbirth B	Date of Termination			Duration of Pregnancy	Duration Separating Each Pregnancy		
				Yr.	Mo.	Day		Order	Years	Month
Total										

E. Circumstances Related to Family Planning Practice

Number of pregnancies before this third visit: _____
(To be filled by supervisors)

Number of pregnancies by the time Part E is asked: _____

/__/0. Currently not pregnant or not sure

/__/1. Currently pregnant

Order of pregnancies and result:

1.	2.	3.	4.	5.	6.	7.
8.	9.	10.	11.	12.	13.	14.

(to be filled by the interviewers)

E1 You remember that we had asked you some questions about the contraceptive methods last time. Now I would like to ask you whether you and your husband have ever used any of these contraceptive methods.

/__/0. No (skip to E17)

/__/1. Yes

/__/2. Other; description: _____

E2 Then, when did you start to use the contraceptive method? For example, was it right after marriage, or after having had several pregnancies, or when?

/__/0. Used before being married, and has never been pregnant (skip to E5)

/__/1. Used right after being married and never been pregnant (skip to E5)

/__/2. Used before being married, but by now has been pregnant

/__/3. Used right after marriage and has since been pregnant

/__/4. Started to use after _____ pregnancies

/__/5. Other

E3-1 Then, you started to use before giving birth to your first children. Is that correct? (If not), then after giving births to how many children?

/__/0. Yes

/__/1. No, it was after the _____th live births

/__/2. Other, specify: _____

E3-2 Then, you started to use before giving birth to the _____th live born child. Is that correct? (If not), then after giving birth to how many children?

/__/0. Yes

/__/1. No, after the _____th live births

/__/2. Other, specify: _____

Specify: _____

E4 When you started to practice contraception for the first time, how many children did you have altogether? I mean, those who were living.

Total _____ living children

_____ boys

_____ girls

(*Put the answers for questions E5-E15 in Table 3)

E5 What kind of contraceptive method(s) was (were) used by you and your husband then? Have you ever used any other method(s)?

(questions for those never been pregnant)

E6-1 Was the reason for your practicing contraception mainly for spacing, or for any other reasons?

E7 Were you satisfied or not satisfied with this method? Why?

E12-1 Are you presently using any contraceptive method now? (If not,) Why? (Then skip to E17)

E13 What was the method?

E14-1 Was that you wanted to space, or for any other reasons?

E15 Were you satisfied or not satisfied with this method?

(questions for those who had been pregnant and those who are presently pregnant)

E6-2 Was the reason for your practicing contraception mainly for limiting, or for spacing, or for any other reasons?

E7 Were you satisfied or not satisfied with this method and why?

E8 (*Only ask those who answered 2 or more methods; if not, skip to E9)
What method have you used last before you had the _____th pregnancy?

E9 Then, for this _____th pregnancy, was it conceived during using this method, or after you stopped to use it?

E10-1 (For those conceived during use and the method was one of the traditional methods) Did you use it every time, frequently or occasionally? (For those using oral pills) Did you take it every day according to the schedule? (If not,) How many times you did not take it during that month?	E10-2 (For those who stopped to use and conceived) Why did you stop to use it?

(Continue to ask for the next birth intervals until the open interval was asked. If there had been use in any birth interval, start to ask E5 again)

(For those who answered no for E11-1. E11-2, and E12-2, but had used in previous birth interval, then ask, why?)

E11 For those whose next birth interval was not the open interval, ask E11-1	For those whose next birth interval was the open interval, ask E11-2
E11-1 Then, have you used any contraceptive methods between the _____th and _____th pregnancies?	E11-2 Then, have you used any contraceptive methods between your last pregnancy until now?

(For those who get pregnancy presently skip to E17)

E12-2 Are you at present using any contraceptive method?
(For those who answered no for E12-2, skip to E17)

E13 What method is that?

E14-2 The reason for your using this method, is it mainly for limiting, or spacing or for any other reasons?

E15 Are you satisfied or not satisfied with this method? Why?

Table 3. Table of Contraceptive Practice

Interval Between Two Pregnancies When Contraception Was Carried Out	Ever Used or Not Ever, Reason Yes	Name of the Methods Used	Purposes of the Use			Satisfied or Not			
			Don't Want More Children	For Spacing	Others, Description	Yes	No	Others	Reason
		1 2 3							
		1 2 3							
		1 2 3							
		1 2 3							
		1 2 3							
		1 2 3							
Open Interval		1 2 3							
Present Use		1 2 3							
Remarks									

Table 3. Table of Contraceptive Practice (continued)

Reasons for Next Pregnancy							
Name of Method	Frequency During Use			Contraception Interrupted	Others	Reasons	Remarks
	Every Time	Frequently	Occasionally				
Remarks							

E16 Do you or do you not intend to continue to use this contraceptive method? (If not, ask:) Why?

/__/0. No; reason: _____

/__/1. Yes

/__/2. Other; description: _____

(*The following questions are limited to those who do not use the contraceptive methods now.)

E17 Do you intend to use contraceptive methods in the future and why?

/__/0. No; reason: _____(skip to F1)

/__/1. Not decided yet; reason: _____(skip to F1)

/__/2. Yes; reason: _____

/__/3. Other; specify: _____

E18 Then, after how many more children you will use contraceptive method?

/__/0. Don't want any more children, intend to use soon

/__/1. After _____ children are born

/__/ _____ boys, _____ girls

/__/ Either boys or girls

/__/2. Other; specify: _____

E19 What method do you intend to use and why?

/__/0. Not decided yet; reason: _____

/__/1. Intend to use

(1)	/__/ or	(2)	/__/ or	(3)
_____	/__/ and _____		/__/ and _____	
Reason:		Reason:		Reason:
/__/Specify:_____		/__/Specify:_____		/__/Specify:_____
/__/Unknown		/__/Unknown		/__/Unknown

TRANSLATION - FOURTH ROUND

Sections A-D and F-G as on previous rounds.

E. Knowledge Toward Stillbirth B

E1 Do you know whether it is possible to interrupt a pregnancy when one desires to do so?

/__/1. Yes

/__/2. No

/__/3. Others, specify: _____

E2 What methods are used to do this? (More than one answer possible. If none of these 1, 2, 3 answers given, skip to E7.)

/__/1. Surgery (D and C, other, not vacuum or saline)

/__/2. Vacuum

/__/3. Saline injection

/__/4. Drugs (western) by mouth

/__/5. Drugs, herbs, other non-western, by mouth

/__/6. Intentioned "accident" or violent exercise

/__/7. Other, specify: _____

/__/9. Unknown

E3 Do you know where one would go to have (surgery) (vacuum) or (saline injection) done?

/__/1. Yes

/__/2. No (skip to E5)

E4 Then, where should one go to get this done? (More than one answer possible.)

/__/1. Hospital (public)

/__/2. Missionary hospital

/__/3. Doctor's clinic (private)

/__/4. Midwife's clinic

/__/5. Other

/__/9. Unknown

E5 What kind of people can do this? (After one or more are mentioned, ask "Anybody else?" until no more kinds are mentioned. Check answers in Table 3.)

E6 Do you know the approximate cost? (For each named, enter in Table 3.)

Table 3.

Type of Person Doing Stillbirth B's and Approximate Cost

Type of Person	Approximate Cost (1) Known	(2) Not Known
/__/1. Ob-Gyn doctor	NT$____to____	/__/
/__/2. Other physician	NT$____to____	/__/
/__/3. Midwife	NT$____to____	/__/
/__/4. Nurse	NT$____to____	/__/
/__/5. Herb doctor	NT$____to____	/__/
/__/6. Unqualified physician	NT$____to____	/__/
/__/7. Other, specify: ____	NT$____to____	/__/

E7 During what month of pregnancy would you think a stillbirth B should be done?

_____month

Other answer, specify: _____

/__/9. Does not know

E8 Some women would ask others to help them do a stillbirth B or have it done by themselves when they find they are pregnant. Their possible reason(s) for doing so is (are) not wanting too many children, not wanting too frequent childbirths and/or other reasons. How many people do you feel, among your friends, relatives, and neighbors have done something like this? Many, some, a very few, or none?

/__/1. Many

/__/2. Some

/__/3. A very few

/__/4. None

/__/5. Other, specify: _____

/__/9. Unknown

E9 How about the married couples in Taiwan. How many do you think have done this? Many, some, a very few, or none?

/__/1. Many

/__/2. Some

/__/3. A very few

/__/4. None

/__/5. Other, specify: _____

/__/9. Unknown

TRANSLATION - FIFTH ROUND

Sections A-D and F-G as on previous rounds.

E. Public Attitude Towards Eugenic Laws

Mrs. _____, we have asked you about your health and menstruation, now I would like to ask you some questions concerning the eugenic methods, what do you think of them.

E1 Suppose a married woman, very poor, can't afford to bring up more children, but now she is pregnant again, she wants to get rid of this child, do you approve or disapprove her doing so?

/__/1. Approve
/__/2. Conditional approve
/__/3. Conditional disapprove
/__/4. Disapprove
/__/5. Refuse to answer, after probing
/__/6. Other, after probing

Explain: _____

Coding notes: _____ /__/

E2 Suppose a married woman who doesn't want more children and doesn't want to use any contraceptive method either, later when she discovers her pregnancy, wants to get rid of the child, do you approve or disapprove her doing so?

/__/1. Approve
/__/2. Conditional approve
/__/3. Conditional disapprove
/__/4. Disapprove
/__/5. Refuse to answer, after probing
/__/6. Other, after probing

Explain: _____

Coding notes: _____ /__/

E3 A married woman who doesn't want more children and has used contraceptive, but the contraceptive failed and she is pregnant again, she wants to get rid of the child, do you approve or disapprove her doing so?

/__/1. Approve
/__/2. Conditional approve
/__/3. Conditional disapprove
/__/4. Disapprove
/__/5. Refuse to answer, after probing
/__/6. Other, after probing

Explain: _____

Coding notes: _____ /./

E4 Suppose a married woman who still wants more children but when she got pregnant, she discovered the pregnancy may affect her own health, therefore she wants to get rid of the child, do you approve or disapprove her doing so?

/__/1. Approve
/__/2. Conditional approve
/__/3. Conditional disapprove
/__/4. Disapprove
/__/5. Refuse to answer, after probing
/__/6. Other, after probing

Explain: _____

Coding notes: _____ /__/

E5 A married woman who was perfectly well until she got pregnant, when she feels emotionally disturbed and troubled. Therefore she wants to get rid of the child, do you approve or disapprove her doing so?

/__/1. Approve
/__/2. Conditional approve
/__/3. Conditional disapprove
/__/4. Disapprove
/__/5. Refuse to answer, after probing
/__/6. Other, after probing

Explain: _____

Coding notes: _____

E6 A married woman who still wants more children, but during her pregnancy, because of diseases or drugs, her child may be deformed, so she wants to get rid of the child, do you approve or disapprove her doing so?

/__/1. Approve
/__/2. Conditional approve
/__/3. Conditional disapprove
/__/4. Disapprove
/__/5. Refuse to answer, after probing
/__/6. Other, after probing

Explain: _____

Coding notes: _____ /__/

E7 A certain married woman whose daughter got pregnant before marriage so they want to get rid of the child, do you approve or disapprove their doing so?

/__/1. Approve
/__/2. Conditional approve
/__/3. Conditional disapprove
/__/4. Disapprove
/__/5. Refuse to answer, after probing
/__/6. Other, after probing

Explain: _____

Coding notes: _____ /__/

E8 Suppose a woman was raped and pregnant, so she wants to get rid of the child, do you approve or disapprove her doing so?

/__/1. Approve
/__/2. Conditional approve
/__/3. Conditional disapprove
/__/4. Disapprove
/__/5. Refuse to answer, after probing
/__/6. Other, after probing

Explain: _____

Coding notes: _____ /__/

E9-1 (For respondents who answered one or more approve or conditional approve to the above questions.)

Besides the reasons mentioned, do you feel there is any other reason(s) one may get rid of a child?

/__/0. No or don't know
/__/1. Yes: _____
/__/2. Refuse to answer, after probing
/__/3. Other, after probing

Explain: _____

Coding notes: _____ /__/

E9-2 (For respondents who disapproved all the conditions above.)

Then, under what condition do you feel one may get rid of a child?

/__/0. Under no condition
/__/1. Under the following condition
/__/2. Unknown
/__/3. Refuse to answer, after probing
/__/4. Other, after probing

Explain: _____

Coding notes: _____ /__/

TRANSLATION - SIXTH ROUND

Sections A-D and F-G as on previous rounds.

E. Perception Toward Value of Life and Traditional Thinking

Mrs. _____, we have already asked some questions concerning your recent health status and menstruation pattern. Now, we want to ask a few hypothetical questions and hope that you can tell us what is your opinion.

E1 There are quite a few different opinions concerning the question when a human being's life starts. For example, some think that life starts when fetus is still in mother's abdomen, some think life starts at birth, and some feel that life really does not begin until some time after birth. Then what do you think when does a human being's life start?

/__/1. At conception
/__/2. At some point between pregnancy and "quickening"
/__/3. At "quickening"
/__/4. At birth
/__/5. Some time after birth
/__/6. Refusal after probe
/__/7. Others after probe

Specify: _____

/__/Code after checking: _____

E2 Suppose there is a badly deformed baby and now his life is in danger. Although the doctor might be able to save his life, but cannot cure his deformity. Would you approve or not approve if this doctor would not save this baby's life?

/__/1. Approve
/__/2. Approve, but
/__/3. Disapprove, but
/__/4. Disapprove
/__/5. Refusal after probe
/__/6. Others after probe

Specify: _____

/__/Code after checking: _____

E3 Suppose a father killed a man who had raped his daughter, and the court freed the father. Would you approve or not approve the court's decision?

/__/1. Approve
/__/2. Approve, but
/__/3. Disapprove, but
/__/4. Disapprove
/__/5. Refusal after probe
/__/6. Others after probe

Specify: _____

/__/Code after checking: _____

E4 Suppose a man killed somebody in defense of his own life, would you approve or not approve of what he had done?

/__/1. Approve
/__/2. Approve, but
/__/3. Disapprove, but
/__/4. Disapprove
/__/5. Refusal after probe
/__/6. Others after probe

Specify: _____

/__/Code after checking: _____

E5 Then, would you approve or not approve of a man taking his own life?

/__/1. Approve
/__/2. Approve, but
/__/3. Disapprove, but
/__/4. Disapprove
/__/5. Refusal after probe
/__/6. Others after probe

Specify: _____

/__/Code after checking: _____

E6 In the following, I would like to ask you a few questions concerning "the guardian of conception." Some women believe that there is such a guardian who, if offended in some way, may cause a miscarriage or deformity of the fetus, things like that. Have you ever heard of "this guardian of conception"?

/__/0. No
/__/1. Yes
/__/2. Refusal after probe
/__/3. Others after probe

Specify: _____

/__/Code after checking: _____

E7 Then, do you believe or not in this goddess?

/__/0. No
/__/1. Believed in the past, but not now
/__/2. Half believe only
/__/3. Yes
/__/4. Refusal after probe
/__/5. Others after probe

Specify: _____

/__/Code after checking: _____

E8-1 (For those who had been pregnant) Then, did you try to avoid offending her when pregnant?

/__/0. No
/__/1. Yes
/__/2. Refusal after probe
/__/3. Others after probe

Specify: _____

/__/Code after checking: _____

E8-2 (For those who had never been pregnant) Then, would you try to avoid offending her when pregnant?

/__/0. No
/__/1. Yes
/__/2. Refusal after probe
/__/3. Others after probe

Specify: _____

/__/Code after checking: _____

E9 Then, do you know or not what actions offend the goddess? And what actions please her?

/__/0. No
/__/1. Yes
/__/2. Refusal after probe
/__/3. Others after probe

Specify: _____

/__/Code after checking: _____

E10 Some women when they are pregnant but have had all the children they want, will deliberately offend the goddess, hoping by doing this, this pregnancy could be terminated. Do you think there are many of these women, or some, or only a few, or none who do this?

/__/0. None
/__/1. Only a few
/__/2. Some
/__/3. Many
/__/4. Refusal after probe
/__/5. Others after probe

Specify: _____

/__/Code after checking: _____

E11 Then, do you know anything more about the goddess that you can tell us?

/__/0. No
/__/1. Yes
/__/2. Refusal after probe
/__/3. Others after probe

Specify: _____

_____

_____

_____

/__/Code after checking: _____

_____

TRANSLATION - SEVENTH ROUND

Sections A-D and F-G as on previous rounds.

(For pretest, subject to further modification)

E1 Do you think a girl nowadays should or should not go to school for education? (If should), Should she be educated until elementary school, junior high, senior high, or college?

/__/0. Should not go to school
/__/1. Should be self-educated
/__/2. Elementary school
/__/3. Junior high or junior vocational
/__/4. Senior high or senior vocational
/__/5. College
/__/6. Graduate study or go abroad for advanced study
/__/7. As much as she can, depends on circumstances
/__/8. Others, specify: _____
/__/9. Refuse to answer or don't know, specify: _____

E2 In your opinion, what is the best age at marriage for a girl nowadays?

_____ years old
/__/ Others, specify: _____
/__/ Refuse to answer or don't know, specify: _____

E3 In your opinion, should or should not a girl work outside her home before marriage? Why?

/__/0. Should not, reasons: _____
/__/1. Should, reasons: _____
/__/2. Others, specify: _____
/__/9. Refuse to answer or don't know, specify: _____

E4 Then, how about after marriage? Why?

/__/0. Should not, reasons: _____
/__/1. Should, reasons: _____
/__/2. Others, specify: _____
/__/9. Refuse to answer, or don't know, specify: _____

E5 Do you think it is more preferable to work in a place which is run by your family, or relatives, or is it more preferable to work in a place run by others, such as a governmental organization?

/__/1. Place run by family or relatives
/__/2. Other places
/__/3. Others, specify: _____
/__/9. Refuse to answer or don't know, specify: _____

E6 In your opinion, which kind of family is happier, the family with more children, or the family with less children?

/__/1. Families with less children

/__/2. No difference

/__/3. Families with more children

/__/4. Others, specify: _____

/__/9. Refuse to answer or don't know, specify: _____

E7 Do you think that nowadays in Taiwan, once a child is born, he is more likely or not to survive than before?

/__/0. More unlikely

/__/1. Not much difference

/__/2. More likely

/__/3. Others, specify: _____

/__/9. Refuse to answer or don't know, specify: _____

E8 Do you think that everything is up to God to decide or that it can be changed by your own endeavor?

/__/1. Up to God to decide

/__/2. Can be changed by endeavor

/__/3. Others, specify: _____

/__/9. Refuse to answer or don't know, specify: _____

E9 When you are faced by a problem, do you think that you should discuss with your husband first before taking action?

/__/0. Not necessary

/__/1. Depend on circumstances

/__/2. Should

/__/3. Others, specify: _____

/__/9. Refuse to answer or don't know, specify: _____

E10 By the way, do you read newspapers? (If yes,) Do you read every day, once in a few days, or occasionally?

/__/0. Does not read

/__/1. Only occasionally

/__/2. Once in a few days

/__/3. Every day

/__/4. Others, specify: _____

/__/9. Refuse to answer or don't know, specify: _____

Definition of Terms for Part E, Round 7
(Before Pretest)

The purpose for these questions in Part E is to detect whether the cases in our study are conscious and influenced by the recent industrialization on this Island. Whether their attitude and concept is still traditional or modernized, and whether their thinking is fatalistic or striving. It is self-apparent that all these feelings and concepts are indirectly related to family planning, including Stillbirth B (induced abortion).

E1 The educational attainment includes both those who have studied and those who are graduated from the reported school.

E3,4 "Outside job" signifies those who work outside their homes and receive financial reward from their work, excluding those who work at home, even though they do receive financial reward.

E5 The first type of places signify those shops, factories, and organizations which are kinship-tied, while the latter type of places denotes those organizations not kinship-tied, either private or public.

E7 The purpose of this question is to detect whether the cases have noticed the infant mortality rate has been declining for years.

Other questions are mostly self-explanatory. More definition of terms will be added after the pretest when the interviewers bring back more practical problems.

TRANSLATION - EIGHTH ROUND

Sections A-D and F-G as on previous rounds.

E. Practice of Stillbirth B

Mrs. _____, now I want to ask you a few questions concerning your pregnancy and delivery history. I will ask you first from now until the time at your marriage.

(Interviewer: Based on the information given by your supervisor in Table III and what you have obtained from this interview on Table I and Parts C and D, check one of the following boxes.)

/__/1. Have had live births
- /__/1-1 Presently not pregnant (Ask E1-1 or E1-3)
- /__/1-2 Presently pregnant (Ask E1-2 or E1-3)

/__/2. Never had live births
- /__/2-1 Presently not pregnant (Ask E1-4)
- /__/2-2 Presently pregnant (Ask E1-4)

E1-1	E1-2	E1-3	E1-4
(For open birth interval)	(For those presently pregnant and have had live birth)	(For non-open interval)	(For those never had live births)

There are quite a few women who, after getting pregnant, have abortion either spontaneously or induced (Stillbirth B) or the baby was unfortunately dead at birth. Have you encountered anything like these?

From the time you gave birth to your last child until now	From the time you gave birth to your last child until this pregnancy	Between you gave birth to your ___th and ___th children	From the time you married until now

Please think of it carefully and tell me in detail.

(Write into the column for open birth interval. If answer is no, skip to E1-3.)	(Write into the column for non-open interval. If answer is no, skip to E1-3.)	(If the answer is no, continue to ask the next birth interval.)	(Write into the column for never had live birth. If answer is no, skip to Part F.)

E2 During this period, altogether how many times like these happened?

E3 (For those who have had more than one non-live birth, start to ask the most recent one until E7 is asked, then ask the next recent one until all non-live births are asked.) About the event(s) (non-live births) you mentioned, what was it? Was it a spontaneous abortion, stillbirth B, or the baby was born dead? (If Stillbirth B, skip to E6.)

E4 Did you intentionally make it happen, or did it just happen spontaneously? (If intentional, skip to E6.)

E5 Do you know how this happened? (Do you know what was the cause of this?)

E6 When did this happen? Can you remember what year and what month it happened? Is this the Western or Lunar Calendar? (If Lunar Calendar,) Did this happen in the first, middle, or latter part of the month? (If exact year and month cannot be recalled,) Then this happened how long after you gave birth to the ____th child?

E7 How long had you been pregnant when this happened?

E8-1 (For those reporting no Stillbirth B) Then, from the time you married until now, you did not have even one Stillbirth B? Please think it over again.

/__/0. No (Skip to F)

/__/1. Yes

E8-2 (For those reporting have had ____th Stillbirth B) Then, from the time you married until now, beside the Stillbirth B you mentioned before, have you had more Stillbirth B? Please think it over.

/__/0. No (Skip to E11)

/__/1. Yes

E9 Then, how many times did you have (further)?

_____ times

E10 Between which and which live birth did this (these) happen?

(Return to ask E4-E7 until all the reported Stillbirths B are asked)

Table 3.

Records on Non-Live Births

(Supervisors be responsible to fill up:)

History of pregnancies until the seventh interview:

Total pregnancies _______ times

Results: ( ) _____, ( ) _____, ( ) _____, ( ) _____, ( ) _____

( ) _____, ( ) _____, ( ) _____, ( ) _____, ( ) _____.

Filled by Interviewers	Sequence of Pregnancies																				
	Result of Pregnancies																				
	Sequence of Live Birth																				
	Sequence of Live Birth Intervals			Never have live birth						Open birth interval (___)						--					
Non-Live Births	No																				
	Yes (times)			☐ (___times)						☐ (___times)						☐ (___times)					
	Stillbirth B																				
	Spontaneous Abortions or Stillbirth A	Intentional																			
		Spontaneous																			
		Cause	Unknown																		
			Specify																		

Table 3.

Records on Non-Live Births (continued)

	Date of Termination	Estimate																				
		Western C	Year																			
			Month																			
		Lunar C	Year																			
			Month																			
	Length of Pregnancy		Days																			
			Months																			
New Sequence of Pregnancies																						
New Sequence of Stillbirth B																						
Remarks																						

Table 4.

Records on Stillbirth B

(*Check one of the following two boxes based on information obtained from Table 3.)

/__/0. Never had Stillbirth B (Skip to F)

/__/1. Have had Stillbirth B (Continue to ask E11)

Totally _____ times

(*Start to ask the most recent Stillbirth B, proceed from E11 to E26 as a loop, until all the reported Stillbirths B were asked)	Answers Provided	The _____th Stillbirth B The _____th Pregnancy	The _____th Stillbirth B The _____th Pregnancy	The _____th Stillbirth B The _____th Pregnancy	The _____th Stillbirth B The _____th Pregnancy
E11 About the ___th Stillbirth B you received (i.e., the ___th pregnancy), was this performed by others, or by yourself? (Skip to E14 if performed by the case herself)	1. By case herself				
	2. By others				
	3. By both the case and others				
	4. Other, specify				
E12 Then, what type of person performed this for you? (If by a physician, then ask) What kind of physician?	1. Ob-Gyn				
	2. Other doctor				
	3. Midwife				
	4. Nurse				
	5. Herb doctor				
	6. Unqualified doctor				
	7. Other, specify				

Table 4.

Records on Stillbirth B (continued)

(*Start to ask the most recent Stillbirth B, proceed from E11 to E26 as a loop, until all the reported Stillbirths B were asked)	Answers Provided	The _____th Stillbirth B The _____th Pregnancy	The _____th Stillbirth B The _____th Pregnancy	The _____th Stillbirth B The _____th Pregnancy	The _____th Stillbirth B The _____th Pregnancy
E13 Was this performed at hospital or at your home? Or was this performed somewhere else?	1. Hospital				
	2. Home				
	3. Other places				
	4. Other, specify				
E14 (To those who answered "by the case herself" or by "both the case and others") What methoddid you use? Can you tell me in more detail?	Specify				
E15 How much did you spend on Stillbirth B itself? (Not including expenses for complications, etc.)	Approximately NT$				
E16 Would you tell me why you have had this Stillbirth B?	Specify				
E17 Who decided for this Stillbirth B? Was this decided by yourself, by your husband, or both decided together? (If not decided by case herself) Skip to E20	1. By case herself				
	2. By husband				
	3. By both the case and her husband				
	4. Other, specify				

Table 4.

Records on Stillbirth B (continued)

(*Start to ask the most recent Stillbirth B, proceed from E11 to E26 as a loop, until all the reported Stillbirths B were asked)	Answers Provided	The _____th Stillbirth B The _____th Pregnancy	The _____th Stillbirth B The _____th Pregnancy	The _____th Stillbirth B The _____th Pregnancy	The _____th Stillbirth B The _____th Pregnancy
E18 About this Stillbirth B, did your husband know that you were going to have a Stillbirth B beforehand? (If no, Skip to E20)	0. Did not know				
	1. Yes				
	2. Other, specify				
E19 Did your husband agree or not of you doing so?	0. Did not agree				
	1. Agreed				
	2. Other, specify				
E20 Did the seniors of your family, such as your husband's parents, or your own parents, know that you were going to have a Stillbirth B beforehand? (If did not know, or no seniors in the family, Skip to E22)	0. Did not know				
	1. Yes				
	2. No seniors				
	3. Other, specify				
E21 Did they agree or not to your doing so?	0. Did not know				
	1. Agreed				
	2. Other, specify				

Table 4.

Records on Stillbirth B (continued)

(*Start to ask the most recent Stillbirth B, proceed from E11 to E26 as a loop, until all the reported Stillbirths B were asked)	Answers Provided	The _____th Stillbirth B The _____th Pregnancy	The _____th Stillbirth B The _____th Pregnancy	The _____th Stillbirth B The _____th Pregnancy	The _____th Stillbirth B The _____th Pregnancy
E22 After you have had this Stillbirth B, did you have any discomfort? (If yes, ask) When did this discomfort occur, in a week, a month, or after one month? (If not, Skip to E24. If yes, ask) What kind of discomfort, then?	0. No				
	1. Yes, within a week, specify				
	2. Yes, within a month, specify				
	3. Yes, after a month, specify				
	4. Other, specify				
E23 Did you get the discomfort treated or take drugs? (If yes,) How much did you spend on this?	0. No				
	1. Yes, approximate expenses, NT$ _____				
E24 Had you and your husband used any contraceptive method between this stillbirth B and the previous pregnancy?	0. No				
	1. Yes				
	2. Other, specify				

Table 4.

Records on Stillbirth B (continued)

(*Start to ask the most recent Stillbirth B, proceed from E11 to E26 as a loop, until all the reported Stillbirths B were asked)	Answers Provided	The _____th Stillbirth B The _____th Pregnancy	The _____th Stillbirth B The _____th Pregnancy	The _____th Stillbirth B The _____th Pregnancy	The _____th Stillbirth B The _____th Pregnancy
E25 (For those Stillbirths B which were the last pregnancy) Ever since you had this Stillbirth B until now, have you and your husband used any contraceptive method? (For those Stillbirths B which were not the last pregnancy) After you had this Stillbirth B and before the next pregnancy, did you and your husband use any contraceptive method?	0. No				
	1. Yes				
	2. Other, specify				
E26 (Only ask on those cases who answered yes for both E24 and E25) Do you think you became more or less careful in using contraceptive method after this Stillbirth B as compared with that before this Stillbirth B?	0. Less careful				
	1. About the same				
	2. More careful				
	3. Other, specify				

E27 (If you become pregnant again,) Do you think you would or would not have a Stillbirth B?

/__/0. No

/__/1. Yes

/__/2. Not decided yet

/__/3. Other, specify: _____

TRANSLATION - NINTH ROUND

Sections A-D and F-G as on previous rounds.

E. Changes in Co-residents and in Respondents in Past Year

Mrs. _____, before I leave I want to ask you a few questions concerning you and your family.

E1 Almost a year has elapsed since the time we first visited you. During this period, have there been any other ever married women who lived with you?

/__/0. No (Skip to E3)

/__/1. Yes

E2 (*Put the answers to the following questions in Table 3.)

a. Who are they (who is she)? How are they (is she) related with you?

b. Has she been interviewed by one of our interviewers? (If yes, skip to E3)

c. Was she living here when we first came to visit you?

d. 1. For those answered "yes," in question c:

At that time, did she share the same household registration record with you? (If not,) Then did her household registration record share the same "address" with you?

Was she married at that time? (If yes,) Then was she separated, divorced, or widowed at that time?

2. For those answered "no," in question c:

Why did she move in and live with you?

e. When was she born? (May I see your household registration record, please?)

Table 3.

Co-Resident Ever-Married Women

Relation With Respondent	Whether Our Study Case		Whether Lived With Respondent at First Interview?									Date of Birth	Age in Years	Remarks
			Yes, At That Time								No. Reason for Moved in			
			Household Registration			Marital Status								
				Different Household			Married							
	Yes	No	Same Household	Same Address	Different Address	Not Married	In Marriage	Separated	Divorced	Widowed				

E3 Are you presently living with your husband? (If not,) Why is that?

/__/0. No; reason, specify: _____
(If separated, divorced, or widowed, skip to E5.)

/__/1. Yes

E4 What is your husband's occupation? (What kind of work is he doing? What is his position?)

/__/0. Not working

/__/1. Working; organization and nature of his work: _____
Position: _____
Classification by industry (not for interviewers to fill): _____

E5 Beside housekeeping, are you doing some work either outside or inside your home to increase your family income?

/__/0. No (Skip to E7)

/__/1. Yes

E6 Then, are you working inside or outside your home? What kind of work is that?

/__/Outside; specify: _____

/__/Inside; specify: _____

(*Check the summary sheet and Parts A-D of this questionnaire. For those respondents who are presently pregnant, who was sterilized or her husband was sterilized, or separated, divorced or widowed, skip to E11.)

E7 If you and your husband want to have more children, do you think that you can have more children?

/__/0. No

/__/1. Not sure or don't know (Skip to E9)

/__/2. Yes (Skip to E10)

E8 Why do you think that you and your household cannot bear more children?

Reason: _____
(Skip to E11)

E9 Why are you not sure (or why don't you know) whether you and your husband can bear more children?

Reason: _____

E10 Are you presently using any contraceptive method? (If yes,) What are they?

/__/0. No

/__/1. Yes; name of methods: 1. _____
2. _____
3. _____

E11 As compared with one year ago, do you feel that your family's living is better off or worse?

/__/1. Better

/__/2. Same

/__/3. Worse

/__/4. Other, specify: _____

/__/5. Refused to answer after probe

E12 Then, would you think that your family's living would be better or worse in the future as compared with now?

/__/1. Will be better; specify: _____

/__/2. About the same; specify: _____

/__/3. Will be worse; specify: _____

/__/4. Can't predict for future; specify: _____

/__/5. Other, specify: _____

/__/6. Refused to answer after probe; specify: _____

E13 Mrs. _____, for the last year we have visited you for about nine times. Suppose we would continue to visit you for another nine times. Do you think you would still like to cooperate with us?

/__/0. No; specify: _____

/__/1. Yes; specify: _____

/__/2. Other, specify: _____

/__/9. Refused after probe; specify: _____

Definition of Terms and Method of Recording
for the Ninth Round of Repeat Interview

A. At the beginning of this interview, the interviewer should explain to the respondent (by using the words in the beginning of Part A) that this is the last interview for her and thank her for her hitherto cooperation.

B. For Parts A-D and the Supplementary Record Sheet, interviewers should follow the definitions for the previous rounds.

C. For Part E:

1. The main purpose of the 13 questions contained in Part E is to find out the changes which occurred concerning the respondent and her family during the last year since our repeat interview started in marital status, occupation, fecundity, practice of contraception and socio-economic condition. At the end of this part, we want to find out the reaction of the respondents toward the repeat interview.

2. Interviewer should notice that some of the 13 questions were asked in the first, second, or third rounds. We tried to make the wording as identical as possible to the correspondent previous questions. Interviewers should carefully review the definitions we made for the first, second, and third rounds on related questions.

E1-E2 (1) The main purposes are:

a. To detect the co-residents of the respondents who were eligible but were not selected as our respondents.

b. To detect the eligible women who moved in the study Pseudo-Lin during the past year.

(2) If the respondents showed their suspicion when these questions are asked, the interviewer should explain to them as above.

E1 The definition for <u>co-resident ever married women</u> is entirely based on the opinion of the respondent. If she feels that they are living in the same family including those who live in the same address but with different household registration, hence different household heads, they can be either blood-related or not related.

E2 a. Denotes the relationship with the respondents. If blood-related, the way of recording should follow the rules made for the first round of interview. If not blood-related, record as the respondent reported.

b. If the co-resident ever-married woman is also one of our study cases, then skip to E3.

c. If the co-resident ever-married woman shares the same household record with the respondent, ask for that record and copy down the birth date of the co-resident ever-married woman. If not, follow the way of asking and recording we decided for the first round.

Note: For those cases who have moved to a new address which is not our study Pseudo-Lin during the study period, E1-E2 will not be asked.

E3 The purpose of this question is to find out whether there have been any changes in the marital status for which we could not find out in previous rounds.

E4 To ask the present occupation and nature of work of her husband. Interviewers should follow the rules made for E19 and E20 of the first round of interview. If not working in an organization, such as peddler, carpenter, etc., write down the nature of work, and don't fill the position part.

E5-E6 To ask whether the respondent has a gainful job beside her regular housekeeping work at home. Interviewers should review the rules for E15-E18 of Round 1.

E7-E9 (1) Be careful of those respondents who are presently using contraception. They may report as not fecund. If interviewers find out this in E8, record down the reason, and correct the answer of "not fecund" (cannot bear more children) to "fecund" (can bear more children) in E7.

(2) Sterilization of either husband or wife is considered as not fecund.

(3) This question is to ask the perception of the respondent concerning the fecundity.

E10 Using the definition made in Round 3 concerning method of contraception.

E13 If the respondent asks whether we will really come back to visit her again, the interviewer should answer, "If we will come back, would you or not .....," and not make a definite answer.

Appendix 3

The Third Interview Training Schedule

Date/Day of 1970 Week	Time	Content	Remarks
July 7	a.m.	1. Dr. Rider, talk	
		2. Introduction of general interviewing work in Taiwan	Dr. Chi
		3. Female health	Dr. Sun
	p.m.	4. Review	
		a. Working situation and interviewers quality	Dr. Chi
		b. Questionnaire from Sections A-D	Supervisors
		c. Review of recording, summary sheets	Supervisors
July 8	a.m.	1. Interpretation of definitions of terms in third round questionnaire	
		a. General terms, emphasizing definitions	
		b. Emphasizing important points from Sections A to D	
	p.m.	2. Interpretation, etc.	
		a. Meaning of birth interval	Dr. Chi
		b. Section E	
		c. Interrelation among the three rounds	Dr. Sun
July 9	a.m.	1. Lecture about summary sheet	Questions by interviewers
		2. Discussion	
		3. Listening to Mandarin recording of illustrative interview	
	p.m.	4. Listening to recording in the two local dialects	
	eve.	5. Supervisor reviews completed questionnaires based on "3" and "4"	
July 10	a.m.	1. Listening to recording of illustrative interview in Hakkinese	Supervisor checks questionnaires based on recordings
	p.m.	2. Discussion	
		3. Role playing	Groups
	eve.	4. Supervisor checks questionnaires from role playing	
July 11	a.m.	1. Role playing	
	p.m.	2. Discussion (mainly about problems discovered in role playing)	
Sat.			

Date/Day of 1970 Week	Time	Content	Remarks
July 13 Mon.	a.m.	Pretest	Supervisors and interviewers (include mobile interviewers and supervisor in main office)
July 14	a.m. p.m.	1. Supervisors and interviewers edit questionnaires from pretest (discussion in small groups) 2. Discussion (problems discovered in pretest)	1. Editing of summary sheet 2. Noting problems 3. Supervisors' questionnaire to be checked by main office 4. Editing of pretest log book
July 15	a.m. p.m.	1. Discussion 2. Preparation for second pretest 3. Concerning punch cards	
July 16	a.m. p.m.	As July 13	
July 17	a.m. p.m.	As July 14	Preparation of questions for exam
July 18	a.m.	1. Exam 2. Discussion (Supervisors will give answers) 3. Conclusion (lecture)	 Dr. Chi

Appendix 4

Maternal Health
Outcome of Pregnancy One-Shot Interview

Study No: S-III

Case No. ☐☐☐☐☐

Name: Case _____ Husband _____ Household head _____

Record of Address:

Order	Township	Li	Lin	Street	Section	Land	Sublane	No.
Original 1								
2								

Record of Visit

No.	Time(Started Interviewed)	Completed	No such Address	Not there	Moved	Refu-sal	Others	Inter-viewer
1.	Yr. m. d. hr.							
2.								
3.								

Remarks: _____

Randomized Response: ☐ 0. No ☐ 1. Yes (This should be filled up by supervisors before distributing the questionnaires)

Result of Randomized Response Interview:

☐ 0. Non Randomized Response Case

☐ 1. Randomized Response Case and Cooperative

☐ 2. Randomized Response Case but not cooperative

☐ 3. Randomized Response Case but switched to None Randomized Response Case. Reason: _____

Date of Check: ___Yr.___M.___D. Result of Check: _____

Date of Completion of questionnaire: ___Yr.___M.___D. Signature of Supervisor: _____

A. Nativity, Dates of Birth and Marriage, and Composition of Family

Mrs._____, my name is _____, an interviewer from the study group of JCRR and the Taoyuan Health Bureau. Now, I want to ask you a few questions concerning maternal health. The information we obtained, will be studied by a group of specialist, and used as a guideline for future improvement of maternal health (The whole interview will take about 30 minutes) hope that you would give the cooperation

(Put answers of A1-A3 in Table 1)

A1. Are you an Islander or a Mainlander?

A2. (If Islander) Are you a Fukieness or a Hakkanese?

A3. How about your husband?

Table 1. Nativity

Nativity	Respondent	Husband
Fukienese		
Hakkanese		
Mainlander		
Chaonese		
Others, specify		

A4. What kind of dialect do you ordinarily speak at home?

- ☐ 1. Mandarin
- ☐ 2. Fukienese
- ☐ 3. Hakkanese
- ☐ 4. Others, specify: _____

A5. When were you born? Was this the western calendar or lunar calendar? (or How many years old are you?)

W.C.:_____ year _____ month _____ day
L.C.:_____ year _____month _____ day

or _____ years old (equal to animal _____)

A6. How about your husband then?

W.C.: _____year _____month _____day
L.C.: _____year _____month _____day

or _____years old (equal to animal _____)

A7. When were you and your husband married?

W.C.: _____year _____month _____day
L.C.: _____year _____month _____day

or Respondent Married at _____years old

A8. Are you and your husband living together now?

☐ 0. No
☐ 1. Yes (Skip to A11)
☐ 2. Yes, living together, but _____(Skip to A11)

A9. Then, what is the situation? Are you separated, divorced, or your husband is dead?

☐ 1. Separated
☐ 2. Divorced
☐ 3. Husband dead
☐ 4. Others, specify: _____

A10. When were you separated, divorced, or when did your husband die?

W.C.: _____year _____month _____day
L.C.: _____year _____month _____day

A11. Some women have married more than once, is this your first marriage ?

☐ 0. No
☐ 1. Yes (Skip to A15)

A12. Then, how many times have you married?

_____times

A13. When were you married before this present marriage, then? And when was this ended?

(Start) W.C.: _____year _____month _____day
L.C.: _____year _____month _____day

(Ended) W.C.: _____year _____month _____day
L.C.: _____year _____month _____day

A14. (Only ask the respond married over three times) How about the marriage before that?

(Start) W.C.: _____year _____month _____day
L.C.: _____year _____month _____day

(Ended) W.C.: _____year _____month _____day
L.C.: _____year _____month _____day

A15. Among the adults and children (including you) actually living in your family, how many eat together?

In total _____ persons

A16. Are your father-in-law and mother-in-law still alive?

☐ 0. Both are dead (Skip to A18)
☐ 1. Only father-in-law is alive
☐ 2. Only mother-in-law is alive
☐ 3. Both are alive
☐ 4. Others, specify: _____

A17. Are they living with you? Do they usually eat with you?

☐ 1. Not living together:
  ☐ 0. Not eating together
  ☐ 1. Eating together
☐ 2. Living together:
  ☐ 0. Not eating together
  ☐ 1. Eating together

A18. Are your own father and mother still alive?

☐ 0. Both are dead (Skip to A20)
☐ 1. Only father is alive
☐ 2. Only mother is alive
☐ 3. Both are alive
☐ 4. Others, specify: _____

A19. Are they living with you? Do they eat with you?

☐ 1. Not living together:
  ☐ 0. Not eating together
  ☐ 1. Eating together
☐ 2. Living together
  ☐ 0. Not eating together
  ☐ 1. Eating together

A20. Is any of your husband's married sibling living with you? Does he usually eat with you?

- ☐ o. Husband has no married siblings
- ☐ 1. Not living together:
  - ☐ 0. Not eating together
  - ☐ 1. Eating together
- ☐ 2. Living together:
  - ☐ 0. Not eating together
  - ☐ 1. Eating together

A21. Is any of your own married sibling living with you? Does he usually eat with you? (Same as A20)

- ☐ 0. Husband has no married siblings
- ☐ 1. Not living together:
  - ☐ o. Not eating together
  - ☐ 1. Eating together
- ☐ 2. Living together:
  - ☐ 0. Not eating together
  - ☐ 1. Eating together

B. Knowledge and Attitude Toward Family Planning

B1. In Taiwan, some couples want to keep from having too many children, or from having children too rapidly, therefore, they use some contraceptive method. Do you know anything about this?

- ☐ 0. No
- ☐ 1. Yes
- ☐ 2. Others, specify: _____

B2. Do you know any of the contraceptive method commonly used?

- ☐ 0. No (Skip to B5)
- ☐ 1. Yes
- ☐ 2. Others, specify: _____

B3. What method do you know? Any method else?

(Interviewer: Please check every contraceptive method reported by the respondent into Table 2)

B4. (Only ask for the methods reported by the respondent) Do you know how to use the _____ method?

Table 2. Knowledge of Contraceptive Method

Name of the Contraceptive Method	Know self-reported	Know how to use		Others, specify
		Yes	No	
1. Oral pill				
2. IUD (other than the ota ring)				
3. Condom				
4. Foam tablet				
5. Jelly				
6. Diaphragm				
7. Rhythm				
8. Basal Temperature				
9. Male sterilization		/	/	
10. Female sterilization		/	/	
11. Interruption				
12. Injection		/	/	
13. Ota Ring (metal ring)				
14. Others (including herb medicine)				

B5. Among the people you know, for instance, your relatives, friends, and neighbors, do you think any of them use methods to keep from having children too rapidly or having too many children? Would you say they are many, some, a few or none?

☐ 0. None

☐ 1. Yes, but don't know how much

☐ 2. A few (including below a half)

B5. (Continued)

- ☐ 3. Some (including not many and not few)
- ☐ 4. Many (including over a half)
- ☐ 5. Others, specify: _____
- ☐ 9. Unknown

B6. Do you agree or not agree of some couples' using contraceptive methods to keep from having too many children?

- ☐ 0. Don't agree
- ☐ 1. Agree (Skip to B8)
- ☐ 2. Others, specify: _____

B7. Why don't you agree?

Reasons in detail: _____

B8. Do you agree or not agree of some couples' using certain methods to keep from having children too rapidly?

- ☐ 0. Don't agree
- ☐ 1. Agree (Skip to B10)
- ☐ 2. Others, specify: _____

B9. Why don't you agree?

Reasons in detail: _____

B10. Do you want to have more children in the future? (ask the respondent who is pregnant now and her answer is No) Then, do you mean that you don't want to have more children after giving birth to this baby?

- ☐ 0. No (Skip to B12)
- ☐ 1. Yes
- ☐ 2. Others, specify: _____

B11. May I ask you how many children do you want to have? And among them how many boys and how many girls?

☐ 1. Want ___more children, among them a. ___boys
b. ___girls

☐ c. Either boys or girls

☐ 2. Others, specify: _____

B12. If you were just married and could have the number of children according to your hope, then what do you think is the ideal number of children? Among them, how many boys and how many girls would you like to have?

☐ 1. ___children as the ideal, among them
a. ___boys
b. ___girls

☐ c. Either boys or girls

☐ 2. Others, specify: _____

B13. Do you think that nowaday in Taiwan, once a child is born, he is more likely or less likely to survive than before?

☐ 0. More unlikely

☐ 1. No much difference

☐ 2. More likely

☐ 3. Others, specify: _____

B14. In the future when you are old, do you or do you not plan to live with your children and grandchildren?

☐ 0. No

☐ 1. No, but if. (State the condition:_____)

☐ 2. Yes, but if. (State the condition:_____)

☐ 3. Yes

☐ 4. Not decided yet, specify:_____

☐ 5. Others, specify:_____

C. Knowledge Toward Induced Abortion

C1. Now I want to talk something about Induced Abortion with you. Do you know or do not know that whether it is possible to interrupt a pregnancy when one desires to do so? (If no) Have you ever heard about it?

☐ 0. No (Skip to D)
☐ 1. Yes
☐ 2. Others, specify: _____

C2. Then, do you know what methods used to interrupt a pregnancy? Any other method?

☐ 0. Don't know .....☐
☐ 1. Surgery.....☐
☐ 2. Vacuum .....☐
☐ 3. Saline injection.....☐
☐ 4. Drugs (western) by mouth.....☐
☐ 5. Drugs, herb or other non-western, by mouth.....☐
☐ 6. Intentional "accident" or over-exercise.....☐
☐ 7. Others, specify: _____.....☐

(If none of these 1, 2, & 3 answers given, skip to C7)

C3. Do you or don't you know where one would go to have this done?

☐ 0. No (Skip to C5)
☐ 1. Yes
☐ 2. Others, specify: _____

C4. Then, where should one go to get this done?

☐ 0. Don't know
☐ 1. Public hospital.....☐
☐ 2. Missionary hospital.....☐
☐ 3. Private clinic.....☐
☐ 4. Midwife's clinic.....☐
☐ 5. Others, specify: _____.....☐

(Put answers of C5 &C6 in Table 3)

C5. What kind of people can do this? Anybody else? (If answer is No, skip to C7)

C6. Do you know the approximate cost? The cost here does not include those paid for afterward treatment expenses.

Table 3. Type of person doing Induced Abortion and Approximate cost

Type of Person	Approximate cost: 1. Don't know	2. Know
☐ 1. Obs/gyn doctor..... ☐	☐	NT$____ to ____
☐ 2. Other physician..... ☐	☐	NT$____ to ____
☐ 3. Midwife..... ☐	☐	NT$____ to ____
☐ 4. Nurse..... ☐	☐	NT$____ to ____
☐ 5. Herb doctor..... ☐	☐	NT$____ to ____
☐ 6. Unqualified physician. ☐	☐	NT$____ to ____
☐ 7. Others, specify:_____. ☐	☐	NT$____ to ____
☐ 0. Don't know		

C7. During what time of pregnancy would you think a Induced Abortion should be done?

☐ 0. Don't know
☐ 1. About ____months (or ____days)
☐ 2. Others, specify:_____

C8. Some women would have an induced abortion when they find they are pregnant. Their possible reason for doing so is not wanting too many children, or not wanting too frequent childbirth or other reasons. How many people do you feel, among your friends, relatives and neighbors, have done something like this? Many, some, a few or none?

☐ 0. None
☐ 1. Yes, but don't know how many
☐ 2. A few (including below a half)
☐ 3. Some (including not many nor few)
☐ 4. Many (including over a half)
☐ 5. Others, specify: _____
☐ 9. Unknown

C9. Then, how about the married couples in general in Taiwan? How many do you think have done this--many, some, a few, or none?

- ☐ 0. None
- ☐ 1. Yes, but don't know how many
- ☐ 2. A few (including below a half)
- ☐ 3. Some (including not many nor few)
- ☐ 4. Many (including over a half)
- ☐ 5. Others, specify: _____
- ☐ 9. Unknown

D. Attitude Toward Induced Abortion

Mrs. _____, we have asked you some questions about your family and marriage, now I would like to ask you some hypothetical questions and would like to know what you think of them.

D1. Suppose a married woman, very poor, can't afford to bring up more children, but now she is pregnant again, she wants to get rid of this child, do you approve or disapprove her doing so?

- ☐ 1. Approve
- ☐ 2. Conditional approve
- ☐ 3. Conditional disapprove
- ☐ 4. Disapprove
- ☐ 5. Refuse to answer or don't know after proving
- ☐ 6. Others after probing

Explain: _____

Coding notes: ☐

D2. Suppose a married woman who doesn't want more children and doesn't want to use any contraceptive method either, later when she discovers her pregnancy, she wants to get rid of the child, do you approve or disapprove her doing so?

- ☐ 1. Approve
- ☐ 2. Conditional approve
- ☐ 3. Conditional disapprove
- ☐ 4. Disapprove
- ☐ 5. Refuse to answer or don't know after probing
- ☐ 6. Others after probing

Explain: _____

D3. A married woman who doesn't want more children and has used contraceptive, but the contraceptive failed and she is pregnant again; she wants to get rid of the child, do you approve or disapprove her doing so?

- ☐ 1. Approve
- ☐ 2. Conditional approve
- ☐ 3. Conditional disapprove
- ☐ 4. Disapprove
- ☐ 5. Refuse to answer or don't know after probing
- ☐ 6. Others after probing

Explain: _____

D4. A married woman who still wants more children but when she got pregnant, she discovered that the pregnancy may affect her own health, therefore she wants to get rid of the child, do you approve or disapprove her doing so?

- ☐ 1. Approve
- ☐ 2. Conditional approve
- ☐ 3. Conditional disapprove
- ☐ 4. Disapprove
- ☐ 5. Refuse to answer or don't know after probing
- ☐ 6. Others after probing

Explain: _____

D5. A married woman who was perfectly well until she got pregnant, when she feels emotionally disturbed and troubled. Therefore she wants to get rid of the child, do you approve or disapprove her doing so?

- ☐ 1. Approve — Explain:_____
- ☐ 2. Conditional approve _____
- ☐ 3. Conditional disapprove _____
- ☐ 4. Disapprove _____
- ☐ 5. Refuse to answer or don't know after probing _____
- ☐ 6. Others after probing _____

D6. A married woman who still wants more children, but durine her pregnancy, because of diseases or drugs, her child may be deformed, so she wants to get rid of the child, so you approve or disapprove her doing so?

- ☐ 1. Approve — Explain:_____
- ☐ 2. Conditional approve _____
- ☐ 3. Conditional disapprove _____
- ☐ 4. Disapprove _____
- ☐ 5. Refuse to answer or don't know after probing _____
- ☐ 6. Others after probing _____

D7. A married woman whose daughter got pregnant before marriage, so they went to get rid of the child, do you approve or disapprove their doing so?

- ☐ 1. Approve — Explain: _____
- ☐ 2. Conditional approve _____
- ☐ 3. Conditional disapprove _____
- ☐ 4. Disapprove _____
- ☐ 5. Refuse to answer or don't know after probing _____
- ☐ 6. Others after probing _____

D8. Suppose a woman was raped and pregnant, so she wants to get rid of the child, do you approve or disapprove her doing so?

- ☐ 1. Approve — Explain:_____
- ☐ 2. Conditional approve _____
- ☐ 3. Conditional disapprove _____
- ☐ 4. Disapprove _____
- ☐ 5. Refuse to answer or don't know after probing _____
- ☐ 6. Others after probing _____

D9-1. (For respondents who answered one or more approval or conditional approval or conditional disapproval to the above questions)
Besides the reasons mentioned, do you feel there are any other reasons one may get rid or a child?

- ☐ 0. No or don't know — Explain:_____
- ☐ 1. Yes _____
- ☐ 2. Refuse to answer after p probing _____
- ☐ 3. Others after probing _____

Coding notes: ☐

D9-2. (For respondents who disapproved all the conditions above) Then, under what condition do you feel one may get rid or a child?

- ☐ 0. Under no condition — Explain:_____
- ☐ 1. Under the following condition _____
- ☐ 2. Refuse to answer after probing _____
- ☐ 3. Others, after probing _____
- ☐ 9. Don't know _____

Coding Notes: ☐

D10. There is quite a few different opinion concerning the question when a human beign's life starts. For example, somebody thinks that life starts when still in mother's abdomen, somebody thinks life starts at birth, and also somebody feels that life really begins until sometime after birth. Then what do you think when does a human being's life start?

☐ 1. At conception — Explain:_____
☐ 2. At some point between pregnancy and "quickening" _____
☐ 3. At "quickening" _____
☐ 4. At birth _____
☐ 5. Sometime after birth _____
☐ 6. Others _____
☐ 7. Refuse to answer or don't know after probing _____
☐ 8. Give an inappropriate answer after probing _____

Coding notes: ☐

E. Menstruation, Breast Feeding and Whether Presently Pregnancy

E1. May I ask you when was the first day of your last menstruation? How many days ago from now?

☐ 1. Can remember date: W.C.:___year___month___day
L.C.:___year___month___day
Duration:_____months_____days ago
☐ 2. None since last pregnancy
☐ 3. Forgot or unknown
☐ 4. Others, specify:_____

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E2. How old is your youngest children? (If under three years old) How many years and months old is he? (When was he born?)

☐ 0. No children under age of three (Skip to E4)

☐ 1. Have children age under three, now age:
_____years _____months old

E3. Are you breast-feeding now?

☐ 0. No

☐ 1. Yes

E4. (Interviewer: check with E1 and E2)

☐ 1. Last menstruation within a month or the youngest child aged less than one month or reported the pregnancy terminated within one month (Skip to F1)

☐ 2. None of all conditions above

E5. By the way, are you pregnant now?

☐ 0. No (Skip to F1)

☐ 1. Not sure or don't know

☐ 2. Yes (Skip to E7)

E6. Why are you not sure or why don't you know?

Reasons explained:_____

E7. How many months have you been pregnant?

About _____months

☐ Unknown

E8. How did you feel since you get pregnant this time?

☐ 0. Not well, specify:_____

☐ 1. Well

E9. How do you feel about this pregnancy? Very happy? Neutral? Or remorse?

☐ 1. Very happy ☐ 2. Neutral ☐ 3. Remorse
(Skip to F8)

☐ 4. Others, specify: _____

F. Fecundity

F1. Some couple because of operation or other physiological reasons cannot get pregnant again, how about you? Do you think you will be able to have more children?

☐ 0. No (Skip to F3)
☐ 1. Not sure or don't know
☐ 2. Yes (Skip to F8)

F2. ~~Why~~ are you not sure or why don't you know whether you can have more children?

Reasons explained: _____(Skip to F4)

F3. Why don't you think you will be able to have more children?

Reasons explained:_____

F4. Have you or your husband had any operation which made you not able to have more children?

☐ 0. Neither (Skip to F8)
☐ 1. Respondent
☐ 2. Husband

F5. What operation was it? (If tubal ligation) How much did you spend for it?

☐ 1. Tubal ligation, cost about NT$_____
☐ 2. Vasectomy
☐ 3. Others, specify: _____

F6. When was it done?

W.C.: ____year ____month _____day
L.C.: ____year ____month _____day

Or about ____years _____months ago

F7. Was it done only because you did not want more children or was it for other reasons?

☐ 1. Solely for limiting family size
☐ 2. For limiting family size as well as other reasons, explain: _____
☐ 3. Solely for other reasons, explain:_____

F8. (Interviewer: Basing on the information on the cover page filled up by supervisors. If the respondent is a randomized response case but has reported about her experience of induced abortion, by now change into non-randomized response)

☐ 0. Originally being a non-randomized response case (Skip to H1)

☐ 1. Originally being a randomized response case, and stays as a randomized response (Ask G1)

☐ 2. Originally a randomized response case, but now changed into a non-randomized response case, reason:

☐ 1. Reported having experience of induced abortion

☐ 2. Others, specify:_____

(Skip to H1)

G. Questions for Ransomized Response Cases Concerning Live Birth History, Practice of Family planning and Ransomized Response

Mrs. ___, now I want to ask you some questions about the livebirths you have had.

G1. How many livebirths have you had? I mean children which were alive at the time of delivery?

☐ 0. Never have had livebirth (Skip to G3)

☐ 1. Have had ____ livebirths

G2. May I ask your ____th livebirth: (Put in Table 4)

(1) was it a male or a female?
(2) When was he (she) born?
(3) Is he (she) living with you now? (If yes, skip to (6))
(4) Why is he (she) not living with you? Did you give him (her) away? Or for another reason?(If not adopted out or dead return to ask the next livebirth)
(5) (If adopted out or dead) When was it? (Return to ask the next livebirth)
(6) (If alive over 15) Is he (she) married?

Table 4. Live Birth Records

Order	Sex		Birth Date				E	Full Year	Age	Equate to animal	
	M	F	E	Yr.	M.	D.					
Total											

(Continue)

Living together or not							Date of Death or Being Adopted				Marriage Status			Remarks
Yes		No												
M	F	Alive M.	Alive F	Unknown	Dead	Giving away	E	Yr	M	D	Yes	No	Under 15 yrs old	

G3. Have you adopted any child?

☐ 0. No (Skip to G6)

☐ 1. Yes

G4. How many children have you adpoted? Is he (she) included in the children you mentioned earlier?

Total____(If mentioned earlier as her own children, interviewer should cross it out from the Table 4)

G5. How old is he(she)? Is he (she) a boy or a girl?

(1) How ___years old, ☐ boy, ☐ girl,

(2) How ___years old, ☐ boy, ☐ girl,

(3) How ___years old, ☐ boy, ☐ girl,

(4) How ___years old, ☐ boy, ☐ girl,

G6. In the above, I have asked you about the contraceptive methods you know, not I want to ask you whether you and your husband ever used any of these methods?

☐ 0. Never (Skip to G12)

☐ 1. Yes

☐ 2. Others, specify: _____

G7. When you first started to use contraceptive method, how many living children did you have? How many boys, and how many girls?

Totally: ___living children: ___boys, ___girls

G8. (For those presently pregnant skip to G12, and for those sterilized skip to G13) Then, are you and your husband using any contraceptive method now? (If yes) What are they? Any other methods?

☐ 0. No (Skip to G12)

☐ 1. Yes, name of methods:(1)_____(2)_____(3)_____

G9. Are you satisfied or not with these methods? Why?

☐ 0. Not satisfied, reason:_____

☐ 1. Satisfied, reason:_____

☐ 2. Others, specify:_____

G10. Do you intend to continue to use these methods? (If not) Why?

☐ 0. No, reason:_____

☐ 1. Yes

☐ 2. Others, specify:_____

G11. What is the reason for you to use this method? For family-limiting, or for spacing or for any other reason?

☐ 1. For limiting.....☐
☐ 2. For spacing.....☐ } (Skip to G13)
☐ 3. Others, specify:_____..☐

G12. Then, are you going to use contraceptive method in the future? Why?

☐ 0. No, reason:_____

☐ 1. Not decided yet, reason:_____

☐ 2. Yes, reason:_____

☐ 3. Others, specify:_____

G13. Mrs._____, I have asked you many questions by using the method that I asked and your answered. Now, I want to use a kind of game to ask you some questions. This is a new method. Only a few countries have used it. The purpose of using this method is that we want to test how good this method is. So, we hope you can cooperate with us.

Now, let me explain how to play this game: Here is a bag, in it, there are two-colored-beads, black and white. Please take one bead out, and see what color is it, black or white. But don't let me know what color it is. If you take a black one, answer the question: "Have you had received any induced abortion?" If you take a white one, answer the question"Were you born in a year of horse?" Let me repeat once more, the black one represents the question: "Have you had received any induced abortion?" The white one represents the question: "Were you born in a year of horse?" Can you remember it? Now, would you mind repeating once more to me? What does the black one represent?..... And the white one? .....(If respondent can remember it) Then, when you answer the question later, just

3.k.b

answer "yes" or "no" according to your actual condition to answer the question you take. You don't need to say any o other words, Just answer "yes" or "no". So, we cannot know what the question you had or what the question you answered. But when we add all the answers we got, we can know what is percentage of women received induced abortion and what is the percentate of being born in a year of horse. But we cannot know which is the question one answered.

Well, please take one bead out from the bag. (After she take one bead) Is your answer "yes" or "no"?

- ☐ 0, No at ____th time
- ☐ 1. Yes
- ☐ 2. Did not cooperate and didn't report [illegible] induced abortion. .....
- ☐ 3. Did Not cooperate, but spontaneously reported having not had induced abortion..... (Skip to G17)
- ☐ 4. Did not cooperate, but spontaneously reported having had induced abortion..
- ☐ 5. Did not understand the explanation....
- ☐ 6. Others, specify:_____....

G14. Do you think other women like yourself, your friends and acquaintance, will think there is a trick to this and that we can really figure out which question was answered?

- ☐ 0. No
- ☐ 1. Yes, some will and some won't
- ☐ 2. Yes.
- ☐ 3. Others, specify:_____
- ☐ 9. Don't know

G15. When you took part (play the game), did you think that we could know which question you have answered?

- ☐ 0. No
- ☐ 1. Yes
- ☐ 2. Others, specify:_____
- ☐ 9. Don't know

G16. How many women among your friends and acquaintances do you think would answer truthfully to a direct question about whether they have an induced abortion?

- ☐ 0. None.....
- ☐ 1. Yes, but don't know how many.....
- ☐ 2. Yes, but very few (including under a half).....(Skip
- ☐ 3. Yes, some (including not many, not few)..... to I18)
- ☐ 4. Yes, many (including over a half)....
- ☐ 5. Others, specify:_____.....
- ☐ 9. Unknown.....

G17. Mrs. _____, now I want to ask you a few more questions concerning your pregnancy and delivery history. I will first ask you your present situation and trace back until the time of your marriage. (*Interviewer: Base on the information given by E4, E5 & G1, to check one of the following boxes)

- ☐ 1. Have had live birth
  - ☐ 1-1 Presently not pregnant (ask G17-1 or G17-2)
  - ☐ 1-2 Presently pregnant
- ☐ 2. Never had live birth
  - ☐ 2-1 Presently not pregnant (ask G17-4)
  - ☐ 2-2 Presently pregnant

G17-1 (For open birth interval)	G17-2. (For those presently pregnant & have no open interval)	G17-3. (For Non-open interval)	G17-4. (For those never had live births)

There are quite a few women who, after getting pregnant, have abortions either spontaneously or induced or the baby was unfortunately dead at birth. Have you had encountered anything like these:

from the time you gave birth to your last child until now	from the time you give birth to your last child until this pregnancy	from the time between you gave birth to your ___th and ___th children	from the time you married until now

G17-1	G17-2	G17-3	G17-4

(Continued)

Please think of it carefully and tell me in detail.

(Write into the column for open birth interval. If answer is no, skip to G17-3)	(Write into the column for non-open interval. If answer is no, skip to G17-3)	(If the answer is no, contiune to ask the next birth interval)	(Write into the column for never had live birth. If answer is no, skip to I17)

G18. During this period, althgether how many times like these happened?

G19. (For those who have had more than one non-live births, start to ask the most recent one until G23 is asked, then ask the next recent one until all non-live births are asked) About the event you mentioned, what was it? Was it a spontaneous abortion induced abortion, or the baby was born dead? (If induced abortion, skip to G22)

G20. Did you intentionally make it happen, or it just happened spontaneously? (If intentional, skip to G22)

G21. Do you know how this happened? (Do you know what was the cause of this?)

G22. When did this happen? Can you remember it happened at what year and what month? Is this the western or lunar calendar? (If lunar calendar) What day was it? Or (Did this happen in the first, middle or latter part of the month?) (If exact year and month cannot be recalled) then this happened how long after you gave birth to the ___th child?

G23. How long have you been pregnant when this happened?

G24-1 (For those reporting no induced abortion) Then, from the time you married until now, you did not have even one induced abortion? Please think it over again.	G24-2 (For those reporting have had ___th induced abortion) Then, from the time you married until now, beside the induced abortion you mentioned before have you had more induced abortion? Please think it over again?
☐ 0. No (skip to I17)	☐ 0. No (Skip to G27)
☐ 1. Yes (Skip to G25)	☐ 1. Yes

G25. Then, how many times did you have (further)?
Totally _____times else.

G26. Between which and which live births did this happen?
(Return to ask G22 & G23 until all the reported induced abortions are asked)

G27. During the past year, i.e. from ___month of last year to now, have you had received any induced abortion?
(If yes) How many times have you had?

☐ 0. None

☐ 1. Yes, Totally _____times (Skip to Table 7)

☐ 2. Others, specify:_____

Table 5. Records on Non-live Birth

Be filled by interview	Sequence of livebirth			
	Sequence of livebirth intervals	Never have had live birth	Open birth interval (-)	-
Non-live births	No			
	Yes (times)	☐(times)	☐(times)	☐(times)
	Induced abortion			
	Intentional			
	Spontaneous			
	*1 Unknown			
	*2 Specify			
	Date of term. E			
	M. Yr.			
	C. Mon.			
	L. Yr.			
	C. Mon.			
	Length of Preg. Days			
	Mons.			
New sequence of pregnancies				
Sequence of induced abortions				
Remarks				

*1: Spontaneous abortion or stillbirth

*2: Cause

H. Questions for Non-randomized Response Cases Concerning Pregnancy History and Practice of Family Planning

Now,,I want to ask you some questions about your pregnancy history. You know, that most pregnancies were terminated by livebirths. But sometimes after getting pregnant, have abortion either spontaneously of induced, or the baby was unfortunately dead at birth. How about every pregnancy of yours?

H1. May I ask you how many pregnancies have you had?

Totally _____times

H2. How about your _____th pregnancy? (Was this a livebirth or a non-live birth?)

(Put the answers of following questions in Table 6)

(A) If livebirth:	(B) If non-live birth:
(1) Was it male or female?	(1) What was it? Was it a spontaneous abortion, induced abortion, or the baby was born dead? (If induced abortion, skip to (4))
(2) When was he (she) born?	
(3) Is he (she) living with you now?	
(4) Why is he (she) not living with you? Did you give him (her) away? Or for another reasons? (If not adopted out or dead, return to (3) ask the next pregnancy)	(2) Did you intentionally make it happened, or it just happened spontaneously? (If intentional, skip to (4))
	Do you know how this happened? (Do you know what was the cause of this?)
(5) (If adopted out or dead) When was it? (Return to(4) ask the next pregnancy)	When did this happen? Can you remember it happened at what year and what month? Is this the western or lunar calendar? (If lunar calendar) What date was it? Did this happen in the first, middle or latter part of the month (If exact year and month cannot be recalled) Then, this happened how long after you gave birth to the __th child?
(6) (If alive and children over 15) Is he (she) married?	(5) How long have you been pregnant when this happened?

(C)-1.
(For those reporting no induced abortion) Then, from the time you married until now, you did not have even one induced abortion, oh? Please think it over again.

☐ 0. No (Skip to H3)
☐ 1. Yes

(C)-2
(For those reporting having ___th induced abortions) Then, from the time you married until now, beside the induced abortions you mentioned before, have you had more induced abortions? Please think it over again?

☐ 0. No (Skip to (C)-5)
☐ 1. Yes

(C)-3. How many times did you have (further)?

Totally _____times

(C)-4. Between which and which pregnancies did this (those) happen?
(Put in Table 6, correct the order of pregnancy, and return to ask (B)-3 & (B)-4)

(C)-5. Then, during the past year, from ____month of last year to now, have you received my induced abortion? (If yes) How many times have you had?

☐ 0. None
☐ 1. Yes, Totally _____times
☐ 2. Others, specify:_____

H3. Have you adopted any child?
☐ 0. No (Skip to H5)
☐ 1. Yes

H4. How many children have you adopted? Is he (she) included in the children you mentioned earlier?

Total _____ (If mentioned earlier as her own children, interviewer should cross it out from the Table 6)

H5. How old is he (she)? Is he (she) a boy or a girl?

(1) Now ____years old, ☐ boy, ☐ girl.
(2) Now ____years old, ☐ boy, ☐ girl.
(3) Now ____years old, ☐ boy, ☐ girl.
(4) Now ____years old, ☐ boy, ☐ girl.

(*Check the boxes below base on information obtained from E4 & E5)

☐ 0. Currently not pregnant or not sure

☐ 1. Currently pregnant

Table 6. Record on Pregnancy History

Seq. of Preg.	Live Birth														
	Order	Sex		Birth Date			Full Year	Age	Animal Year	Living together or not					
										Yes	No				
											Alive		Unknown	Dead	Giving Away
		M	F	E	Yr.M.D.	E					M	F			
Total															

Live Birth							Non-live Birth					
Date of Death or Adoption				Marrital Status			Seq. of I.A.	Induced Abortion (I. A)	Spontaneous & Still Birth			
				Yes	No	Below age 15			Intentional but Denied I. A.	Spontaneous	Cause	
E	Yr.	M.	D.								Unknown	Description

Non-live Birth					Interval between two pregnancies			Remarks
Date of Term.				Length of Gestation (Months)				
E	Yr.	M.	D.		Seq.	No. of years	No. of months	

H5. In the
G6.

H6. In the above, I have asked you about the contraceptive methods you know, now I want to ask you whether you and your husband ever used any of these method?

☐ 0. Never (Skip to H12)
☐ 1. Yes
☐ 2. Others, specify:_____

H7. When you first started to use contraceptive method, how many living children did you have? How many girls?

Totally:_____living children: _____boys, _____girls.

H8. (For those presently pregnant skip to H12, and for those sterilized,skip to Table 7)
Then, are you and your husband using any contraceptive method now? (If yes) What are they? Any other methods?

☐ c. No (Skip to H12)
☐ 1. Yes, name of methods:(1)_____ (2)_____ (3)_____
☐ 2. Other, specify: _____

H9. Are you satisfied or not with these methods? Why?

☐ 0. Not satisfied, reason:_____
☐ 1. Satisfied, reason:_____
☐ 2. Others, specify:_____

H10. Do you intend to continue to use these methods? (If not) Why?

☐ 0. No, reason:_____
☐ 1. Yes
☐ 2. Others, specify:_____

H11. What is the reason for you to use this method? For family limiting, or for spacing or for any other reason?

☐ 1. For limiting.....☐
☐ 2. For spacing.....☐ } (Skip to Table 7)
☐ 3. Others, specify:_____....☐

H12. Then, are you going to use contraceptive method in the future? Why?

☐ 0. No, reason: _____ ☐ 1. Not decided yet, reason:___
☐ 2. Yes, reason:_____ ☐ 3. Others, specify:_____

I. Practice of Induced Abortion

Table 7. Records on Stillbirth B

[* Check one of the following two boxes based on information obtained from Table 5 or Table 6]

☐ 0. Never had Induced Abortion (Skip to I17)

☐ 1. Have had Induced Abortion (Continue to ask 11)
Totally _____ times

[*Start to ask the most recent induced abortion, proceed from I1 to I16 as a loop, until all the reported induced abortions were asked]	Answers Provided	The _th induced abortion The _th pregnancy	The _th induced abortion The _th pregnancy	The _th induced abortion The _th pregnancy	The _th induced abortion The _th pregnancy
I1. About the _th induced abortion you received, (i.e. the _th pregnancy), was this performed by others, or by yourself? (Skip to I4 if performed by the case herself)	1. by case herself				
	2. by others				
	3. by both the case & others				
	4. others, specify				
I2. Then, what type of person performed this for you? (If by a physician, then ask) what kind of physician?	1. Obs/gyn				
	2. other doctor				
	3. midwife				
	4. Nurse				
	5. Herb doctor				
	6. Unqualified doctor				
	7. Others specify				

/* Start to ask the most recent induced abortion until all the reported induced abortion were asked/	Answers Provided	The _th induced abortion The _th pregnancy	The _th induced abortion The _th pregnancy	The _th induced abortion The _th pregnancy	The _th induced abortion The _th pregnancy
I3. Was this performed at hospital or at your home? or was this performed somewhere else?	1.Hospital				
	2.Home				
	3.Other places				
	4.Other specify				
I4. /To those who answered "by the case herself" or by "both the case and others/ What method did you use? Can you tell me in more detail?	Specify				
I5. How much did you spend on induced abortion itself? (not including expenses o for complications etc)	Approximately NT$				
I6. Would you tell me why you have had this induced abortion?	Specify				
I7. Who decided for this induced abortion? Was this decided by yourself, by your husband, or both decided together? (If not decided by case herself) skip to I10	1.by case herself				
	2.by husband				
	3.by both the case and her husband				
	4.Other specify				

/* Start to ask the most recent induced abortion until all the reported induced abortion were asked/	Answers Provided	The _th induced abortion The _th pregnancy	The _th induced abortion The _th pregnancy	The _th induced abortion The _th pregnancy	The _th induced abortion The _th pregnancy
I8. About this induced abortion, did your husband know that you were going to have an induced abortion before hand? (If no, skip to I10)	0.Did not know				
	1.Yes				
	2.Other specify				
I9. Did your husband agree or not of your doing so?	0.Did not agree				
	1.Agreed				
	2.Other specify				
I10. Did the senior of your family, such as your husband's parents, know that you were going to have induced abortion beforehand? (If didn't know, or no seniors in the family, skip to I12)	0.Did not know				
	1.Yes				
	2.No seniors				
	3.Other specify				
I11. Did they agree or not of your doing so?	0.Did not know				
	1.Agreed				
	2.Other specify				
I12. After you have had this induced abortion, did you have any discomfort? (If yes, ask) whan did this discomfort occour, in a week, a month, or after one month (If not, skip to I14, If yes, ask) what kind of discomfort, than?	0.No				
	1.Yes, within a week, specify				
	3.Yes, after a month specify				
	2.Yes, within a month, specify				
	4.Other specify				

/* Start to ask the most recent induced abortion until all the reported induced abortion were asked/	Answers Provided	The _th induced abortion The _th pregnancy	The _th induced abortion The _th pregnancy	The _th induced abortion The _th pregnancy	The _th induced abortion The _th pregnancy
I13. Did you get the discomfort treated? (If yes) How much did you spend on this	0.No				
	1.Yes,				
	Approximate expenses, NT$				
I14. Had you and your husband used any contraceptive method between this induced abortion and the previous pregnancy?	0.No				
	1.Yes				
	2.Others specify				
I15. (For those induced abortion which were the last pregnancy) Ever since you had this induced abortion, until now, have you and your husband used any contraceptive methods?	0.No				
	1.Yes				
	2.Others specify				
	(For those induced abortion which were not the last pregnancy) After you had this induced abortion and before the next pregnancy, did you hnd your husband used any contraceptive method?				
I16. (Only ask on those cases who answered yes for both I14 and I15) Do you think you became more or less careful in using contraceptive method after this induced abortion as compared with that before this induced abortion?	0.Less careful				
	1.About the same				
	2.More careful				
	3.Others specify				

I17. (Only ask those who did not have any operation which will cause sterility) So you think you would or would not have another induced abortion? Why?

if get pregnant again

375

I17. (Continued)

☐ 0. No, reason:_____

☐ 1. Yes, reason:_____

☐ 2. Not decided yet, reason:_____

☐ 3. Others, specify;_____

I18. Do you think that whether induced abortion would do any harms, either physically or psychologically to a woman? (If yes) What are they?

☐ 0. No

☐ 1. Yes, specify:_____

☐ 2. Others, specify:_____

I19. To your knowledge, is induced abortion legal or illegal in Taiwan?

☐ 0. Legal (Skip to J1)

☐ 1. Illegal

☐ 2. Other, specify:_____

☐ 9. Don't know

I20. Some countries, such as Japan, their government has loosened the limitation of induced abortion legally. Do you approve or disapprove if our government does the same thing?

☐ 0. Disapprove

☐ 1. Approve

☐ 2. Others, specify:_____

J. Socio-economic Background of the Respondents and Their Husbands

Now, I want to ask you some questions concerning you and your huaband:

J1. Can you read or not?

☐ 0. No (Skip to J4)

☐ 1. Yes

J2. What was highest schooling received?

J3. How many years have you been in school altogether?

J4. Can your husband read or not?

☐ 0. No (Skip to J7)

☐ 1. Yes

J5. What was the highest schooling your husband received?

J6. How many years has your husband been in school altogether?

(Answers of J2, J3, J5, & J6 put in Table 8)

Table 8. Level and years of Education

Level of Education	Respondent's		Husband's	
	Highest School Attended	Total Years in School	Highest School Attended	Total Years in School
1.Can read but never went to school				
2.Private tutor or Adult classes				
3.Elementary school				
4.Junior high school				
5.Senior high school				
6.College and over				
7.Others, specify				

J7. What is your religion? Is it ancestor worship alone, or Buddhist or Taoist? Or any other religion? (If Moslem, skip to J9, Others skip to J10)

J8. Are you a Catholic or a Protestant?

J9. Do you go to church at least once a week, or only on some important occasions, or how ofter?

- ☐ 0. Never
- ☐ 1. Only on important occasions
- ☐ 2. Less than once a week, but frequently
- ☐ 3. At least once a week
- ☐ 4. Others, specify:_____

J10. How about your husband?

(Put J7-J10 in Table 9)

Table 9. Religion

Religion	Respondent	Husband
0. None		
1. Conventional ancestor worship only		
2. Buddhism or Taoism		
3. Protestant Christian		
4. Catholic Christian		
5. Moslem		
6. Others, specify		

(If the religion of respondent is Conventional ancestor worship only or Buddhism or Taosim, ask J11-J13, or skip to J14)

J11. Are you a vegetarian?

- ☐ o. No (Skip to J13)
- ☐ 1. Yes

J12. Do you eat only vegetables all year around, or in the morning only, or just for a few days in a year?

- ☐ 1. Just for a few days in a year
- ☐ 2. In the morning only
- ☐ 3. All year around
- ☐ 4. Others, specify:_____

J13. Do you burn incense every day or only in festivals or only very rarely?

- ☐ 0. No
- ☐ 1. Very rarely
- ☐ 2. Only in festivals
- ☐ 3. Every day
- ☐ 4. Others, specify:_____

J14. Before marriage, where did you live longest?

- ☐ 1. ___ Hsian (City) _____ Township, in Taiwan
- ☐ 2. Other place: _____
- ☐ 3. Others, specify:_____

J15. During that time, did anybody in your home work on farming?

- ☐ 0. No
- ☐ 1. Yes

J16. Before marriage, did you work to augment the family income? (If yes) outside or at home? What is that work?

- ☐ 0. No
- ☐ 1. Outside, specify:_____
- ☐ 2. At home, specify:_____

J17. After marriage, where did you live longest?

- ☐ 1. ____Hsian(City) ____Township, in Taiwan
- ☐ 2. Other place:_____
- ☐ 3. Others, specify:_____

J18. During that time, did anybody in your home work on farming?

- ☐ 0. No
- ☐ 1. Yes

J19. After marriage, did you work to augment the family income?

- ☐ 0. No (Skip to J21)
- ☐ 1. Yes

J20. Is it outside, or at home? What is it? Are you working now?

☐ 1. Past work:
  ☐ a. Outside home, specify:_____
  ☐ b. In home, specify:_____
☐ 2. Now:
  ☐ a. Outside home, specify:_____
  ☐ b. In home, specify:_____

J21. What is your husband's occupation? What position does he hold?

☐ 0. No work
☐ 1. Has occupation, specify nature:_____, Position:_____
☐ 2. Others, specify:_____ (Skip to J23)

J22. Then what was your husband's occupation before? What position did he hold?

☐ 1. Specdify nature:_____, Position:_____
☐ 2. Others, specify:_____

J23. According to your estimate, how much is spent on your whole family per month?

a. For food: About NT$_____
b. For rent (If own house, suppose you rent a house like the one you live in now estimate its rent.) About NT$_____
c. Electricity bill: About NT$_____
d. Others, including clothes, education, medical expenses, transportation, recreation etc. About NT$_____
e. Total: About NT$_____

J24. This estimate is for how many persons?

About _____ persons

J25. In your family, do you have the following items? (Put in Table 10)

Table 10

Item	Yes	No	Remarks
1. Running water			
2. Private toilet			
3. Radio			
4. Electric rice cooker			
5. Sewing machine			
6. Refrigerator			
7. T.V. set			
8. Clothes washer			
9. Subscription to newspaper			

K. Other Relevent Records

K1. Time of termination of visit: _____O'clock, _____minutes

K2. Dialect used in interview: _____

K3. Degree of cooperation:

☐ 1. Excellent ☐ 2. Fair ☐ 3. Poor

K4. Reliability of answer obtained:

☐ 1. Thought to be reliable

☐ 2. Thought to be doubtful, description:_____

K5. Other persons beside during interview:

☐ 0. No

☐ 1. Only childran

☐ 2. Other adults present, description:_____

K6. Any suggestion:

☐ 0. No

☐ 1. Yes, explain:_____

Study No. S/II - ☐☐☐
February - March 1971

Questionnaire for KAP on Medical Practitioners (including Practicing Midwives) in Taoyuan

Introduction:

Family planning program has started in Taiwan for already seven years. Its excellent achievement has not only decreased the population pressure on this island and elevated the living standard of the people, but also is being looked upon by other developing countries as a model to follow. In order to improve further the efficiency of our program, the opinion and comments from the practicing physicians, and other paramedical workers such as practicing midwives (both are in the leading position of our community) are very much needed. This questionnaire is designed to ask your knowledge, attitude and practice in family planning. The information obtained, will be analyzed as a guideline for the future work in family planning on this island. The questionnaire is anonymous, and will be kept as confidential. Thank you very much for your kind cooperation.

Method of Recording:

1. Most of the questions in this questionnaire have the several possible answers provided, please check one in the box which you think is correct for each question.
2. The time needed for filling up this questionnaire is 10-15 minutes.

Date: _____

A. General Background Information:

A 1 Specialty:

- ☐ 1. Ob-Gyn doctor
- ☐ 2. Other doctor
- ☐ 3. Chinese Medicine doctor
- ☐ 4. Midwives
- ☐ 5. Other, Specify: _____ _____

A 2 Length in that Specialty:

_____ years

A 5 Marital Status:

- ☐ 1. Not married
- ☐ 2. Married
- ☐ 3. Divorced
- ☐ 4. Widow or Spinster

A 3 Age in Years

- ☐ 1. 19 or under
- ☐ 2. 20 - 24
- ☐ 3. 25 - 29
- ☐ 4. 30 - 39
- ☐ 5. 40 - 49
- ☐ 6. 50 - 59
- ☐ 7. 60 or over

A 4 Sex

- ☐ 1. Male
- ☐ 2. Female

A 6 Years of Marriage (Those not married don't fill)

Totally _____ years

A 7 Highest School attended: _____

A 8 Medical School granduated: _____
(Only physicians fill this)

B. Knowledge of Family Planning

B 1. The one method of contraception which the Island-wide family planning program has chiefly fostered has been:

- ☐ 1. The "oral pill"
- ☐ 2. The condom
- ☐ 3. The IUD
- ☐ 4. The rhythm method
- ☐ 9. Don't know

B 2. Under the direction of the Surgeon General's Headquarters the Army regularly conducts family planning training in all centers training new recruits.

- ☐ 0. False
- ☐ 1. True
- ☐ 9. Don't know

B 3. The women showing the greatest decline in fertility following the first few years of the Island-wide family planning program were:

- ☐ 1. Those below age 20
- ☐ 2. Those between 20 and 30
- ☐ 3. Those above age 30
- ☐ 4. All ages equally
- ☐ 9. Don't know

B 4. The long-range goal of the family planning program has been:

- ☐ 1. To reduce the natural increase rate from 3% to 2% in 10 years
- ☐ 2. To reduce the birth rate by 10%
- ☐ 3. To have 600,000 married women aged 20-44 using the "oral pill" within 5 years from 1964
- ☐ 4. None of the above
- ☐ 9. Don't know

B 5. The doctor's fee for inserting an IUD as part of the family planning program is:

- ☐ 0. There is no fee, the doctor is to donate this service to the program
- ☐ 1. NT$30 -3 -6
- ☐ 2. NT$60
- ☐ 3. NT$100 with half coming from the women and half from the public find
- ☐ 9. Don't know

B 6. a. List as many methods to prevent pregnancy as you know, b. Opposite each method explain briefly how it acts, and c. Enter in the column of Effectiveness by 1, 2, 3 ...., the most effective as 1, and second effective as 2, as so on.

a Method	b Mode of Action	c Effectiveness

B 7. At what time in the menstrual cycle does ovulation usually occur?

- ☐ 1. During menstrual bleeding
- ☐ 2. Just before menstrual bleeding
- ☐ 3. About midway between menses
- ☐ 4. Just after menstrual bleeding
- ☐ 9. Don't know

B 8. What hormones are used in oral contraception?

1. _____ 2. _____
3. _____ 4. _____ or
☐ 9. Don't know

B 9. What methods do you know for interrupting a pregnancy?

1. _____ 2. _____
3. _____ 4. _____
☐ 9. Don't know

B10. What is the best time for interrupting a pregnancy?

- ☐ 1. In 1st half of 1st trimester
- ☐ 2. In 2nd half of 1st
- ☐ 3. In 2nd trimester
- ☐ 4. In 3rd trimester
- ☐ 5. All times equally safe
- ☐ 9. Don't know

B11. Are there any medical conditions in which contraception should be recommended?

☐ 0. None

☐ 1. Yes, then please list conditions below

Condition(s)	State whether this is a permanent or temporary indication for contraception	
	Temporary	Permanent
a. _____	☐	☐
b. _____	☐	☐
c. _____	☐	☐
d. _____	☐	☐

B12. Are there any non-medical situations in which contraception should be recommended?

☐ 1. None

☐ 2. Yes, then please list the situations below

Situation(s)

a. _____

b. _____

c. _____

d. _____

C. Attitude Toward Family Planning

C 1. Contraception is practiced either (a) to limit family size or (b) to keep from having too short an interval between pregnancies. Do you approve or not approve of,

a. Some couples using contraception to limit family size?

☐ 1. Approve

☐ 2. Do not approve. If do not approve, please give reasons: _____

_____

_____

b. Some couples using contraception to keep from having too short an interval between two pregnancies?

☐ 1. Approve

☐ 2. Do not approve. If do not approve, please give reasons: _____

_____

_____

C 2. Who do you think should practice family planning in Taiwan? Check one answer in each of the 4 categories.

Category A

- ☐ 1. Male
- ☐ 2. Female
- ☐ 3. Both
- ☐ 4. Neither

Category B

- ☐ 1. Wealthy people
- ☐ 2. Middle-class people
- ☐ 3. Poor people
- ☐ 4. Everybody
- ☐ 5. Nobody

Category C

- ☐ 1. Urban
- ☐ 2. Village people
- ☐ 3. Both
- ☐ 4. Neither

Category D

- ☐ 1. People with 1-3 children
- ☐ 2. People with 4-6 children
- ☐ 3. People with more than 6 children
- ☐ 4. Everybody
- ☐ 5. Nobody

C 3. When a patient comes to you whom you think could be helped by practicing contraception, which of the following actions do you feel that it is your responsibility to undertake.

☐ 1. Advise the patient and personally assist the patient by providing contraception when agreed upon, but only if the patient raises the question.

☐ 2. Advise the patient and personally assist the patient by providing contraception when agreed upon, even when the patient does not raise the question herself.

☐ 3. Only advise the patient and do this only when the patient raises the question.

☐ 4. Only advise the patient, but do this even when the patient does not raise the question.

C 4. The following list contains a number of arguments which may be heard in favor of family planning in Taiwan.

If you personally feel that any of these are valid, then write the number 1 in front of the argument you feel is most important, the number 2 in front of the second most important, etc., write a 0 in front of those arguments which you feel are not valid.

_____ Family Planning promotes the health of the mother.

_____ Family Planning promotes economic development.

_____ A few healthy, well educated children are better support in old age than many uneducated children.

_____ Family Planning is in agreement with your Religion.

_____ In modern warfare the quality of soldiers is more important than the quantity.

_____ More machines, not more men, are needed to develop agriculture.

_____ Family Planning will reduce the number of induced abortions.

_____ God gave man intelligence to solve his problems. Family Planning is a produce of Man's Intelligence.

_____ Fewer children mean a more peaceful home

_____ What other arguments would you suggest which you consider valid - (Specify)

_____

_____

C 5. The following list contains a number of arguments which may be heard against family planning in Taiwan.

If you personally feel that any of these are valid, then write the number 1 in front of the argument you feel is most important, the number 2 in front of the second most important, etc., write 0 in front of those arguments which you feel are not valid.

_____ Family Planning is killing life.

_____ Family Planning is against your Religion.

_____ Taiwan needs more men for the army.

_____ Family Planning weakens the nation's economy.

_____ Taiwan needs more labor force to develop new areas for agriculture.

_____ Many children are needed to support parents in old age.

_____ Family Planning is dangerous to the health.

_____ Family Planning is interfering with God's will.

_____ Family Planning encourages immorality.

_____ What other arguments would you suggest which you consider valid - (specify)

_____

_____

C 6. Some women have their pregnancies interrupted when they do not want a birth for some reason. Do you approve or disapprove of such an action in the each of the following situations?

	Approve	Disapprove	Undecided
a. For health of mother	1. ☐	2. ☐	3. ☐
b. Because baby may be deformed	1. ☐	2. ☐	3. ☐
c. Rape	1. ☐	2. ☐	3. ☐
d. To limit family size for economic reasons	1. ☐	2. ☐	3. ☐

Alternative to above "4", or in addition:

C 7. When a woman comes to you as a patient and requests an induced abortion; what are the indications for an abortion in your opinion?

_____

_____

_____

_____

C 8. What do you think is the ratio of induced abortions to live births in Taiwan?

☐ 1. Less than 5% (that is less than 1 induced abortion for every 20 live births)

☐ 2. 5 to 15%

☐ 3. 15 to 25%

☐ 4. Over 25% (that is more than 1 induced abortion for every 4 live births)

☐ 9. Don't know

D. Practice of Family Planning

D 1. Have you ever received instruction concerning inserting an intrauterine device?

- ☐ 0. No
- ☐ 1. Yes, If "Yes," indicate where instruction was given.
  - ☐ 1. Medical school while you were a student, intern or resident.
  - ☐ 2. Medical school after completing your Regular training
  - ☐ 3. Public health clinic on training class
  - ☐ 4. Elsewhere, specify: _____

D 2. Have you ever advised a patient to practice family planning in last 12 months?

- ☐ 0. Never
- ☐ 1. Less than 5 times
- ☐ 2. 5 - 9 times
- ☐ 3. 10 - 19 "
- ☐ 4. 20 - 49 "
- ☐ 5. 50 or more times

D 3. Have you ever explained to a patient how to use a contraceptive in last 12 months?

- ☐ 0. Never
- ☐ 1. Less than 5 times
- ☐ 2. 5 - 9 times
- ☐ 3. 10 - 19 "
- ☐ 4. 20 - 49 "
- ☐ 5. 50 or more times

D 4. Have you ever fitted a woman with a diaphragm in last 12 months?

- ☐ 0. Never
- ☐ 1. Less than 5 times
- ☐ 2. 5 - 9 times
- ☐ 3. 10 - 19 "
- ☐ 4. 20 - 49 "
- ☐ 5. 50 or more times

D 5. Have you ever inserted an intrauterme device(8ta ring, loop, or other) in last 12 months?

- ☐ 0. Never
- ☐ 1. Less than 5 times
- ☐ 2. 5 - 9 times
- ☐ 3. 10 - 19 "
- ☐ 4. 20 - 49 "
- ☐ 5. 50 or more times

D 6. Have you ever instructed a patient in the use of oral pills in last 12 months?

- ☐ 0. Never
- ☐ 1. Less than 5 times
- ☐ 2. 5 - 9 times
- ☐ 3. 10 - 19 "
- ☐ 4. 20 - 49 "
- ☐ 5. 50 or more times

D 7. Have you ever performed a tubal ligation in last 12 months?

- ☐ 0. Never
- ☐ 1. Less than 5 times
- ☐ 2. 5 - 9 times
- ☐ 3. 10 - 19 "
- ☐ 4. 20 - 49 "
- ☐ 5. 50 or more times

D 8. Have you ever performed a vasectomy in last 12 months?

- ☐ 0. Never
- ☐ 1. Less than 5 times
- ☐ 2. 5 - 9 times
- ☐ 3. 10 - 19 "
- ☐ 4. 20 - 49 "
- ☐ 5. 50 or more times

D 9. Have you ever performed an D & C or other procedure to complete an incomplete abortion in last 12 months?

- ☐ 0. Never
- ☐ 1. Less than 5 times
- ☐ 2. 5 - 9 times
- ☐ 3. 10 - 19 "
- ☐ 4. 20 - 49 "
- ☐ 5. 50 or more times

D10. Have you ever performed an induced abortion in last 12 months?

- ☐ 0. Never
- ☐ 1. Less than 5 times
- ☐ 2. 5 - 9 times
- ☐ 3. 10 - 19 "
- ☐ 4. 20 - 49 "
- ☐ 5. 50 or more times

Main methods used:

1. _____
2. _____
3. _____

D11. How many children do you think is the ideal number for a Taiwan family?

	Wealthy Family	Middle Class Family	Poor Class Family
Boys			
Girls			
Total			

D12. How many living children do you have?

- ☐ 1. Not married yet
- ☐ 2. Married, but no living children yet
- ☐ 3. Boys _____
  Girls _____
  Total _____

D13. Have you and your spouse used any means to limit your family size or to postpone conception (including Sterilization) ?

- ☐ 1. Not married yet
- ☐ 2. Never used any method
- ☐ 3. Have used, but for purpose other than for family planning
- ☐ 4. Have used, Method a. _____
  b. _____
  c. _____
  d. _____

E. Re Demographic Situation in Taiwan

E 1. The Crude Birth Rate is:

- ☐ 1. The number of births in a year.
- ☐ 2. The number of births in a year per 100 square kilometers.
- ☐ 3. The number of births in a year divided by the number of mothers (expressed per 1,000 mothers)
- ☐ 4. The number of births in a year divided by the population (expressed per 1,000 population)
- ☐ 5. None of the above.
- ☐ 9. Don't know

E 2. The Rate of Natural Increase is:

☐ 1. The number of births in a year expressed as a percentage of the total population.

☐ 2. The number of births in a year minus the number of deaths in the year expressed as a percentage of the total population.

☐ 3. The number of births plus in-migrants minus number of deaths plus out-migrants expressed as a percentage of the total population.

☐ 9. Don't know

E 3. Taiwan's Crude Birth Rate is approximately:

☐ 1. 10 to 15 per 1,000

☐ 2. 15 to 20 per 1,000

☐ 3. 20 to 25 per 1,000

☐ 4. 25 to 30 per 1,000

☐ 5. 30 to 35 per 1,000

☐ 9. Don't know

E 4. Taiwan's Crude Death Rate is approximately:

☐ 1. Under 10 per 1,000

☐ 2. 10 to 15 per 1,000

☐ 3. 15 to 20 per 1,000

☐ 4. 20 to 25 per 1,000

☐ 5. 25 to 30 per 1,000

☐ 9. Don't know

E 5. Taiwan's Population is approximately:

☐ 1. 9,000,000

☐ 2. 12,000,000

☐ 3. 15,000,000

☐ 4. 18,000,000

☐ 9. Don't know

E 6. In approximately how many years will the population of Taiwan double at its present rate of increase?

- ☐ 1. 15 years
- ☐ 2. 30 years
- ☐ 3. 45 years
- ☐ 4. 60 years
- ☐ 5. 75 years
- ☐ 9. Don't know

E 7. Does a country with a high birth rate and a low death rate have a high or a low dependency ratio*?
*Note: Dependency ratio refers to the percentage of the population supported by the working age groups, usually the percent of total population that is under 15 and over 65 years of age.

- ☐ 1. High
- ☐ 2. The same
- ☐ 3. Low
- ☐ 9. Don't know

E 8. A National Population Policy for the Republic of China was formally announced in:

- ☐ 1. 1954
- ☐ 2. 1959
- ☐ 3. 1963
- ☐ 4. 1966
- ☐ 5. 1969
- ☐ 6. The Central Government has not yet announced a formal Population Policy
- ☐ 9. Don't know

Appendix 6

Patient Care Form

Clinic_____ Doctor_____ Students_____ Date_____

Patient Code Number_____ Name_____ Age_____ Occupation_____

Education_____ Address_____

Husband's Occupation_____ Husband's Education _____

Source of Referral_____

Time: Arriving_____ Seen by Doctor: Begin_____ End_____

Out Clinic_____

1. Chief Complaint:

2. A. New_____

   B. Returned_____

   C. New Illness_____

3. _____Instruction

   A. General Systemic History_____

   B. Unmarried_____ Divorced_____ Married_____ Years_____

   C. Mens.: (1) Regular_____ Irregular_____

   (2) Cycle _____Days

   (3) Amount: Over 1 week_____ 3-7 Days_____ Within 3 Days_____

   (4) Pain_____ No Pain_____

   (5) L. M. P. _____

D. _____

Pregnancy	1	2	3	4	5
(a) Livebirth					
(b) Induced Abortion					
(c) Spontaneous Abortion					
(d) Stillbirth					

E. _____

Contraception	Methods
(a) Ever Used	
(b) Current Use	
(c) Prior to Present Pregnancy	

4. Physical Examination

A. Systemic _____

B. Local

(1) Uterus: Size _____

Position _____

(2) Cervix: Erosion _____

Laceration _____

(3) Discharge _____

(4) Vagina _____

(5) Genitalia _____

(6) Smear _____

(7) Pregnancy _____ Months

5. Laboratory	Order	By Whom	Time

6. Working Diagnosis _____

7. Indication _____

Procedures	By Whom	Time
A. Anesthetics		
B. Dilatation		
C. Currettage		

8. Other Operation

	By Whom	Time

9. Advice

Contents	By Whom	Time
A. Return Visit		
B. Referral		
C. Health Teachings		
D. Admissions		

10. Fees Collected: NT$_____

11. Medications

Drug Name	Dosage	Route of Administration	Duration

12. Complications — Management

13. Patient's Comments

Patient Activity Sheet

(As explained in the text, the Patient Activity Sheet was derived from the Patient Care Form with minor alterations. A copy of this form is not available.)

Doctor's Activity Time Log

Staff_____ Date_____ Interviewer_____

Time	Activity	Outputs
7- 8 a.m.		
8- 9 a.m.		
9-10 a.m.		
10-11 a.m.		
11-12 a.m.		
12- 1 p.m.		
1- 2 p.m.		
2- 3 p.m.		
3- 4 p.m.		
4- 5 p.m.		
5- 6 p.m.		
6- 7 p.m.		
7- 8 p.m.		
8- 9 p.m.		

Staff and Facilities Record

Clinic_____

Departments_____

1. Personnel (List all)

Position				
Age				
Sex				
Education				
Profession				
Functions				

2. Operation Rooms

Facility	Number	Average Frequency of Use/Period

3. Delivery Rooms

Facility	Number

4. Laboratory

Examinations	Facility Available or Sent Out for Test	No. Examinations Day

5. Supportive Care Facilities

Facility	Number
Dining rooms	
Kitchens	
Toilets	
Bathrooms	
Refuse disposal	
Water supply	
Treatment of patient wastes	

Daily Patient List

Clinic_____

Date_____ Medical Students_____

Case Number	Hours of Day	Diagnoses	Management	Fees Collected

Appendix Tables I - XXVIII

RRT Cooperative, RRT Uncooperative, and NRRT Cases by Various Characteristics of the Respondents

	RRT Cases							
	Cooperative		Uncooperative		Subtotal of Original		NRRT Cases	
I By Township	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Chungli	249	35.98	106	25.24	355	31.92	356	32.28
Tachi	183	26.44	127	30.24	310	27.88	300	27.20
Pingchen	100	14.45	45	10.71	145	13.04	157	14.23
Hainwu	160	23.12	142	33.81	302	27.16	290	26.29
II By Interviewers								
By Supervisors	13	1.88	16	3.81	29	2.61	17	1.54
A	55	7.95	47	11.19	102	9.17	100	9.07
B	78	11.27	33	7.86	111	9.98	104	9.43
C	56	8.09	29	6.91	85	7.64	86	7.80
D	88	12.72	31	7.38	119	10.70	104	9.07
E	34	4.91	11	2.62	45	4.05	24	2.18
F	49	7.08	32	7.62	81	7.28	82	7.43
G	40	5.78	32	7.62	72	6.47	85	7.71
H	61	3.81	31	7.38	92	8.27	106	9.61
I	49	7.08	15	3.57	64	5.76	114	10.34
J	69	9.97	51	12.14	120	10.79	95	8.61
K	47	6.79	48	11.43	95	8.54	89	8.07
L	35	5.05	32	7.62	67	6.03	72	6.53
M	18	2.60	12	2.86	30	2.70	25	2.27
III By Ancestry of Cases								
Fukinese	228	32.95	136	32.38	364	32.73	436	39.53
Hakkanese	363	52.45	222	52.86	585	52.61	621	56.30
Mainlander	94	13.58	56	13.33	150	13.49	38	3.45
Others	7	1.01	6	1.43	13	1.17	8	.73
IV By Ancestry of Husband								
Fukinese	110	15.89	93	22.14	203	18.25	403	36.54
Hakkanese	325	49.96	209	49.76	534	48.02	549	47.77
Mainlander	256	39.99	117	27.86	373	33.54	148	13.42
Others	1	.15	1	.24	2	.18	3	.27

V By Number of Livebirths								
0	34	4.91	13	3.10	47	4.23	36	3.26
1	84	12.14	29	6.91	113	10.16	99	8.98
2	125	18.06	36	8.57	161	14.48	118	10.70
3	150	21.68	63	15.00	213	19.15	183	16.57
4	96	13.87	77	18.33	173	15.56	193	17.50
5	85	12.28	71	16.90	156	14.03	157	14.23
6	49	7.08	48	11.43	97	8.72	129	11.70
7	34	4.91	31	7.38	65	5.85	69	6.26
8	21	3.03	29	6.91	50	4.50	53	4.81
9	4	.58	11	2.62	15	1.35	37	3.35
10	6	.87	8	1.91	14	1.26	15	1.36
11	2	.30	4	.95	6	.54	12	1.09
12	2	.30	--	--	2	.18	2	.18
VI By Education of Cases								
Not Educated	204	29.48	232	55.24	436	39.21	549	49.77
Primary	353	51.01	158	37.62	511	45.95	450	40.80
Junior High	71	10.26	12	2.86	83	7.46	59	5.35
Senior High	53	7.66	15	3.57	68	6.11	37	3.35
College and over	7	1.01	1	.24	8	.72	5	.45
Other	4	.58	2	.48	6	.54	3	.27
VII By Dialect Used								
Mandarin	237	34.25	83	19.76	320	28.78	144	13.06
Fukinese	95	13.73	104	24.76	199	17.90	368	33.36
Hakkanese	212	30.63	181	43.09	393	35.34	424	38.44
Mandarin and Fukinese	89	12.86	23	5.48	112	10.07	70	6.35
Mandarin and Hakkanese	57	8.24	26	6.19	83	7.46	88	7.98
Others	2	.30	3	.71	5	.45	9	.82

VIII By Age Group

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
19 or less	21	3.04	0	0	21	2.06
20-24	109	15.77	31	9.48	140	13.75
25-29	174	25.18	48	14.68	222	21.81
30-34	126	18.23	72	22.02	198	19.45
35-39	105	15.20	68	20.80	173	16.99
40-44	86	12.44	66	20.18	152	14.93
45 or more	70	10.13	42	12.84	112	11.00
Unknown	1	-	2	-	3	-
	692	99.99	329	100.00	1021	99.99

IX By Length of Marriage

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
0 - 4	178	25.72	45	13.68	223	21.84
5 - 9	161	23.27	57	17.33	218	21.35
10 - 14	121	17.49	57	17.33	178	17.43
15 - 19	81	11.71	64	19.45	145	14.20
20 - 24	86	12.43	55	16.72	141	13.81
25 - 29	53	7.66	42	12.77	95	9.30
30 - 34	11	1.59	9	2.73	20	1.96
35 - 39	0	0	0	0	0	0
40 +	1	0.14	0	0	1	0.10
Unknown	0	0	0	0	0	0
	692	100.01	329	100.01	1021	99.99

X Number of Additional Children Respondent Wants

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
None	462	66.76	238	72.34	700	68.56
One	106	15.32	38	11.55	144	14.10
Two	76	10.98	22	6.69	98	9.60
Three	30	4.34	10	3.04	40	3.92
Four	3	0.43	4	1.22	7	0.69
Five	3	0.43	0	0	3	0.29
Others	10	1.45	16	4.86	26	2.55
Unknown	2	0.29	1	0.30	3	0.29
	692	100.00	329	100.00	1021	100.00

XI Ideal Number of Children

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
None	0	0	0	0	0	0
One	2	0.29	1	0.30	3	0.29
Two	72	10.40	26	7.90	98	9.60
Three	240	34.68	67	20.36	307	30.07
Four	277	40.03	121	36.78	398	38.98
Five	75	10.84	65	19.76	140	13.71
Six	9	1.30	13	3.95	22	2.15
Seven +	4	0.58	4	1.22	8	0.78
Others	10	1.45	23	6.99	33	3.23
Unknown	3	0.43	9	2.74	12	1.18
	692	100.00	329	100.00	1021	99.99

XII Respondent's Approval of Using Contraception for Limiting Family Size

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
Disapprove	14	2.02	17	5.17	31	3.04
Approve	646	93.35	272	82.67	918	89.91
No opinion	3	0.43	5	1.52	8	0.78
Others	17	2.46	14	4.26	31	3.04
Unknown	12	1.73	21	6.38	33	3.23
	692	99.99	329	100.00	1021	100.00

XIII Respondent's Approval of Using Contraceptives for Spacing Pregnancies

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
Disapprove	36	5.20	20	6.08	56	5.48
Approve	628	90.75	261	79.33	889	87.07
No opinion	3	0.43	6	1.82	9	0.88
Others	12	1.73	15	4.56	27	2.64
Unknown	13	1.88	27	8.21	40	3.92
	692	99.99	329	100.00	1021	99.99

XIV Respondent's Knowledge As to the Possibility of Having an Induced Abortion

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
Did not know	99	14.31	101	30.70	200	19.59
Knows	593	85.69	228	69.30	821	80.41
	692	100.00	329	100.00	1021	100.00

XV Respondent's Perception of the Number of Others Using Contraceptives

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
None	18	2.60	14	4.26	32	3.13
Yes, but does not know no.	26	3.76	25	7.60	51	5.00
Yes, very few	45	6.50	27	8.21	72	7.05
Yes, some	45	6.50	16	4.86	61	5.97
Yes, many	417	60.26	142	43.16	559	54.75
Others	2	0.29	2	0.61	4	0.39
Unknown	139	20.09	103	31.31	242	23.70
	692	100.00	329	100.01	1021	99.99

XVI Knowledge Whether Induced Abortion is Illegal or Not in Taiwan

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
Legal	241	34.83	99	30.09	340	33.30
Illegal	311	44.94	80	24.32	391	38.30
Others	19	2.74	10	3.04	29	2.84
Unknown	121	17.49	140	42.55	261	25.56
	692	100.00	329	100.00	1021	100.00

XVII Opinion About the Legalization of Induced Abortions

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
Disapprove	140	20.23	38	11.55	178	17.43
Approve	212	30.63	62	18.84	274	26.84
No opinion	14	2.02	14	4.25	28	2.74
Others	266	38.44	117	35.56	383	37.51
Unknown	60	8.67	98	29.79	158	15.48
	692	99.99	329	99.99	1021	100.00

XVIII Whether the respondent approves of a married woman having an induced abortion if the woman is very poor and cannot afford any more children.

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
Approve	485	70.08	184	55.92	669	65.53
Disapprove	166	23.99	79	24.01	245	24.00
Either	0	0	2	0.61	2	0.20
Other	7	1.01	11	3.34	18	1.76
Refuse to answer	34	4.91	53	16.11	87	8.52
Unknown	0	0	0	0	0	0
	692	99.99	329	99.99	1021	100.01

XIX Whether respondent approves of a married woman receiving an induced abortion if she does not want more children and does not use contraceptives.

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
Approve	305	44.08	118	35.87	423	41.43
Disapprove	319	46.10	120	36.47	439	43.00
Either	0	0	0	0	0	0
Other	11	1.59	9	2.74	20	1.96
Refuse to answer	57	8.24	82	24.92	139	13.61
Unknown	0	0	0	0	0	0
	692	100.01	329	100.00	692	100.00

XX Whether respondent approves of a married woman receiving an induced abortion if she does not want more children and has failed in using contraceptives.

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
Approve	444	64.16	161	48.94	605	59.25
Disapprove	195	28.18	79	24.01	274	26.84
Either	0	0	0	0	0	0
Other	5	0.72	6	1.82	11	1.08
Refuses to answer	48	6.94	83	25.23	131	12.83
Unknown	0	0	0	0	0	0
	692	100.00	329	100.00	1021	100.00

XXI Whether the respondent approves of a married woman receiving an induced abortion if she wants more children but discovers that pregnancy may affect her own health.

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
Approve	358	51.01	124	37.69	477	46.72
Disapprove	267	38.58	106	32.21	373	36.53
Either	0	0	1	0.30	1	0.10
Others	18	2.60	11	3.34	29	2.84
Refuses to answer	54	7.80	87	26.44	141	13.81
Unknown	0	0	0	0	0	0
	692	99.99	329	99.98	1021	100.00

XXII Whether the respondent approves of a married woman receiving an induced abortion if she feels emotionally disturbed and troubled during her pregnancy.

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
Approve	262	37.86	112	34.04	374	36.63
Disapprove	364	52.60	121	36.77	482	47.50
Either	0	0	0	0	0	0
Others	10	1.45	9	2.74	19	1.86
Refuses to answer	56	8.09	87	26.44	143	14.01
Unknown	0	0	0	0	0	0
	692	100.00	329	99.99	1021	100.00

XXIII Whether the respondent approves of a married woman receiving an induced abortion if she wants more children but her child may be deformed during her pregnancy.

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
Approve	459	65.61	163	49.54	617	60.43
Disapprove	171	24.71	79	24.01	250	24.49
Either	0	0	0	0	0	0
Others	20	2.89	14	4.26	34	3.33
Refuse to answer	47	6.79	73	22.19	120	11.75
Unknown	0	0	0	0	0	0
	692	100.00	329	100.00	1021	100.00

XXIV Whether the respondent approves of a married woman receiving an induced abortion, if the woman got pregnant before marriage.

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
Approve	411	59.39	142	43.17	553	54.17
Disapprove	210	30.35	89	27.05	299	29.28
Either	1	0.14	0	0	1	0.10
Others	13	1.88	13	3.95	26	2.55
Refuse to answer	57	8.24	85	25.84	142	13.91
Unknown	0	0	0	0	0	0
	692	100.00	329	100.01	1021	100.01

XXV Whether the respondent approves of a married woman receiving an induced abortion if she was raped and became pregnant.

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
Approve	530	76.59	185	56.23	715	70.03
Disapprove	81	11.70	29	8.81	110	10.77
Either	1	0.14	1	0.30	2	0.20
Others	12	1.73	11	3.34	23	2.25
Refuse to answer	68	9.83	103	31.31	171	16.75
Unknown	0	0	0	0	0	0
	692	99.99	329	99.99	1021	100.00

XXVI The time a human life starts

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
At conception	236	34.10	55	16.72	291	28.50
Between concep.-quick.	19	2.75	4	1.22	23	2.25
At quickening	81	11.71	17	5.17	98	9.60
At birth	194	28.03	73	22.19	267	26.15
Some time after birth	26	3.76	15	4.56	41	4.02
Others	15	2.17	6	1.82	21	2.06
Refuse to answer	116	16.76	154	46.81	270	26.44
Others	5	0.72	5	1.52	10	0.98
Unknown	0	0	0	0	0	0
	692	100.00	329	100.01	1021	100.00

XXVII Whether the respondent is breast feeding her baby

	Cooperative		Un-cooperative		Total	
	f	%	f	%	f	%
Yes	237	34.25	96	29.18	333	32.62
No	117	16.91	51	15.50	168	16.45
Inapplicable (no child under 3)	330	47.69	181	55.02	511	50.05
Unknown	8	1.16	1	0.30	9	0.88
	692	100.01	329	100.00	1021	100.00

XXVIII Pregnancy status of respondent

	Cooperative		Non-cooperative		Total	
	f	%	f	%	f	%
Not pregnant	609	88.01	292	88.75	901	88.25
Not sure	7	1.01	3	0.91	10	0.98
Yes, less than 3 months	11	1.59	0	0	11	1.08
Yes, 3-5 mos.	29	4.19	10	3.04	39	3.82
Yes, 6 mos. or or more	33	4.77	23	6.99	56	5.48
Yes, but no. of mos. unknown	3	0.43	1	0.30	4	0.39
Unknown	0	0	0	0	0	0
	692	100.00	329	99.99	1021	100.00

Appendix 8

Use of the Randomized Response Technique with a New Randomizing Device for Obtaining Quantitative and Qualitative Data

1. Introduction:

Since the original work of Warner on the Randomized Response Technique (RRT) in 1965, some field trials and considerable theoretical works have been done to test and to increase the feasibility of the method in dealing with difficult or threatening questions in a social survey. Most of these works have hitherto been done by Greenberg and his associates.

Recently, Liu and Chow developed a method to administer a set of two related questions more than once (twice, or three times), and they proved statistically that the efficiency of estimate can be improved by such multiple trials without increase in sample size.

Greenberg, et al, have developed further the RRT to be used to assess quantitative data, which is a significant contribution. For example, to estimate the number of induced abortions experienced by a respondent, the method is to administer the following two questions according to the usual randomized response technique procedures:

Statement I: "How many abortions have you had during your life time?"

Statement II: "If a woman has to work full-time to make a living, how many children do you think she should have?"

This method, which otherwise is an excellent idea, seems to have one shortcoming: the respondents may feel that it is possible for the investigators to guess which question they are answering. This fear is particularly

warranted in a developing society where incidence of induced abortion is lower and where family size norm is higher. If the answer of a woman is "0", then it is almost certain that she is responding to the first statement.

It should be possible to change the second statement to overcome this weakness, but formulation of the innocuous question is a more difficult task than it appears to be. The authors, therefore, have developed a new randomizing device, which seems to be more satisfactory in obtaining quantitative data for a sensitive question. The usefulness of RRT would certainly increase as better randomizing devices are invented. The present article describes briefly the design of the device and the statistical background of the method.

2. Randomizing device and procedures:

The new randomizing device proposed by the authors looks like a flask with a "body" and long "neck", as shown in Figure 1.

The device contains 15 balls which will be marked as A, B, C, and D, and will have four different colors. For example, 1 ball is marked A (white), 2 balls are marked B (black), 4 balls are marked C (red), and 8 balls are marked D (green). The proportion of number of balls with different letters (and colors) is an important factor in this method.

Suppose a population can be classified into four mutually exclusive groups, A, B, C, and D, denoting the women who have had zero, one, two, and three or more induced abortions, respectively.

The respondent is asked to shake the device thoroughly and turn it upside down. All the balls will move into the "neck". The neck has 15 "locations" and will be marked accordingly (Figure 1). The respondent will be asked to tell the location in which the first ball that identified her attribute falls: if she belongs to the group A (zero abortions), she is to tell in which location

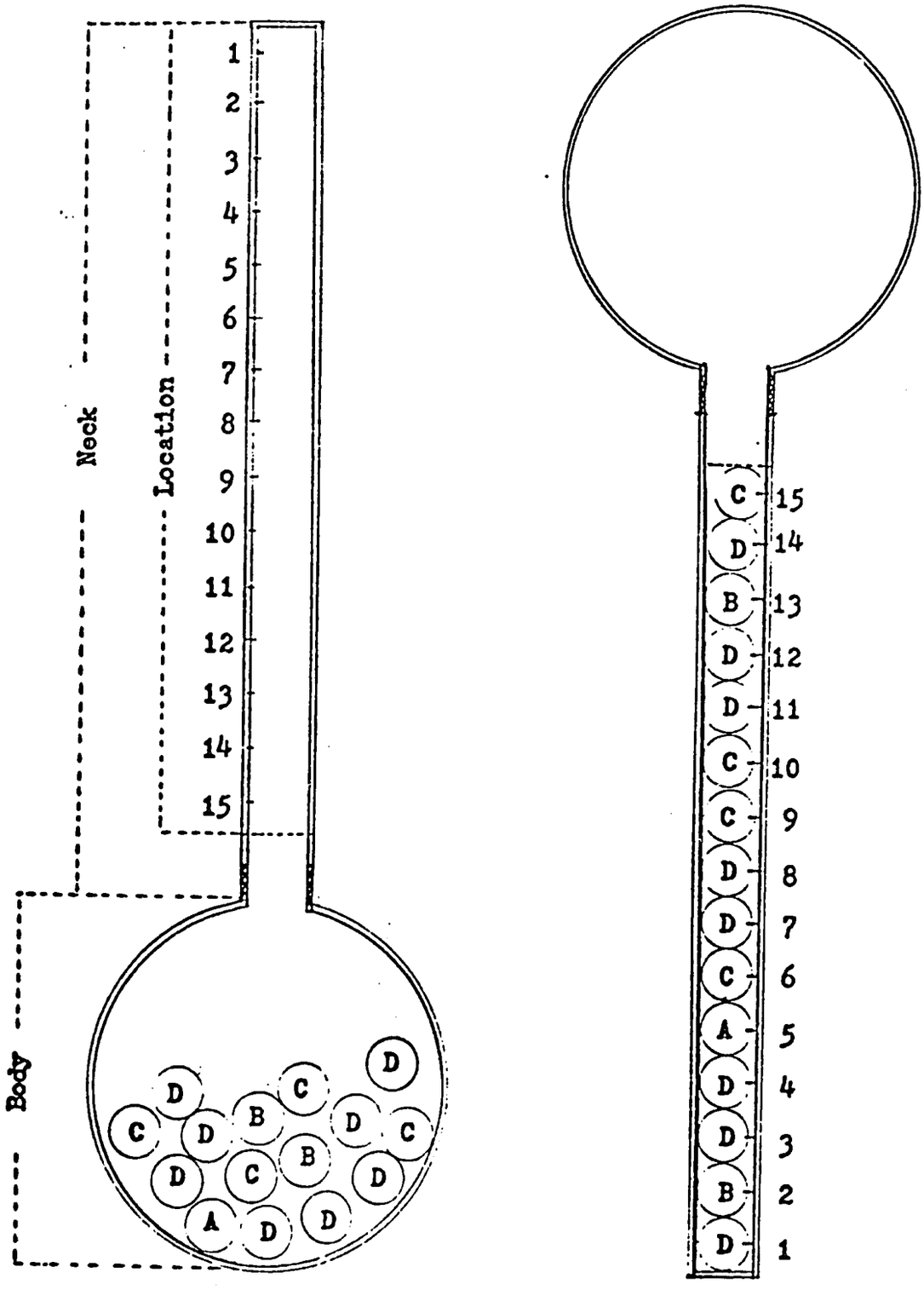

Figure 1. The Hopkins' Randomizing Device -- Model I

Note: There may be some advantages in marking the balls 0, 1, 2, and 3+ (instead of A, B, C and D), and the locations A, B, C ... (instead of 1, 2, 3, ...).

the ball marked A falls (location 5, in Figure 1). If a respondent belongs to group B, then she is to tell in which location the first ball marked B falls, (location 2 in Figure 1), and so on.

The interviewer stands at some distance away from the respondent and, of course, should not attempt to observe the result.

3. The prior probability density function:

Let a_i denote that the A-ball appears in the i-th location, and $\overline{a_i}$ denote that the A-ball does not appear in the i-th location.

Let A_i represent the probability for the first A-ball to appear in the i-th location, then the probability for the first A-ball to appear in the first location, A_1, is

$$A_1 = \text{Prob.}(a_1) = 1/15 = 0.0667$$

The probability for the first A-ball to appear in the second location, A_2, is equivalent to the probability of A-ball to appear in the second location given the A-ball does not appear in the first location.

$$A_2 = \text{Prob.}\ (a_2 \mid \overline{a_1}\ ) = (14/15)\ (1/14) = 0.0667$$

Similarly,

$$A_3 = \text{Prob.}\ (a_3 \mid \overline{a}_1, \overline{a}_2) = (14/15)\ (13/14)\ (1/13) = 0.0667$$

$$A_4 = \text{Prob.}\ (a_4 \mid \overline{a}_1, \overline{a}_2, \overline{a}_3) = (14/15)\ (13/14)\ (12/13)\ (1/12) = 0.0667$$

In general,

$$A_i = \text{Prob.}\ (a_i \mid \overline{a}_1, \overline{a}_2, \ldots \overline{a}_{i-1}) \qquad \text{for } i = 1, 2, 3, \ldots 15.$$

Let B_i represent the probability for the first B-ball to appear in the i-th location, in like manner,

$$B_1 = \text{Prob.}\ (b_1) = (2/15) = 0.1333$$

B_2 = Prob. $(b_2 \mid \bar{b}_1)$ = (13/15) (2/14) = 0.1238

B_3 = Prob. $(b_3 \mid \bar{b}_1, \bar{b}_2)$ = (13/15) (12/14) (2/13) = 0.1143

....

and B_i = Prob. $(b_i \mid \bar{b}_1, \bar{b}_2, \ldots \bar{b}_{i-1})$ for i = 1, 2, 3, ... 15

The probability density function of the first color ball appearing at a specified location is shown in Table 1.

Table 1. Expected Distribution of Responses

Location number	A		B		C		D	
	p.d.f.*	c.d.f.**	p.d.f.	c.d.f.	p.d.f.	c.d.f.	p.d.f.	c.d.f.
1	0.0667	0.0667	0.1333	0.1333	0.2667	0.2667	0.5333	0.5333
2	0.0667	0.1333	0.1238	0.2571	0.2095	0.4762	0.2667	0.8000
3	0.0667	0.2000	0.1143	0.3714	0.1612	0.6374	0.1231	0.9231
4	0.0667	0.2667	0.1048	0.4762	0.1209	0.7583	0.0513	0.9744
5	0.0667	0.3333	0.0952	0.5714	0.0879	0.8462	0.0187	0.9931
6	0.0667	0.4000	0.0857	0.6571	0.0615	0.9077	0.0056	0.9987
7	0.0667	0.4667	0.0762	0.7333	0.0410	0.9487	0.0012	0.9999
8	0.0667	0.5333	0.0667	0.8000	0.0256	0.9743	0.0002	1.0000
9	0.0667	0.6000	0.0571	0.8571	0.0147	0.9890	0	1.0000
10	0.0667	0.6667	0.0476	0.9047	0.0073	0.9963	0	1.0000
11	0.0667	0.7333	0.0381	0.9428	0.0029	0.9992	0	1.0000
12	0.0667	0.8000	0.0286	0.9714	0.0007	1.0000	0	1.0000
13	0.0667	0.8667	0.0190	0.9904	0	1.0000	0	1.0000
14	0.0667	0.9333	0.0095	1.0000	0	1.0000	0	1.0000
15	0.0667	1.0000	0	1.0000	0	1.0000	0	1.0000

*p.d.f. = probability density function

**c.d.f. = cumulative density function

In other words, if a woman belongs to group A, the probability of answering "1" is 0.0667, of answering "2" is 0.0667 and of answering "3" is 0.0667,etc. Similarly, if a woman belongs to group B, the probability of her answering "1", "2", or "3", ... is 0.1333, 0.1238, 0.1143, ..., respectively. Obviously, A_i is a uniform distribution, and B_i, C_i, and D_i are monotone decreasing functions.

4. Estimation of parameters:

Suppose a random sample of size n is taken, let n_i denote the number of respondents answering "i", and y_i denote the proportion of respondents answering "i"; that is $y_i = n_i/n$, for i = 1, 2, 3, ... 15.

Let r_A be the true proportion of group A in the population, r_B be the true proportion of group B in the population, etc. (where $r_A + r_B + r_C + r_D = 1$). Then the expected proportion of respondents answering "i" is

$$E(y_i) = r_A A_i + r_B B_i + r_C C_i + r_D D_i = P_i, \text{ for } i = 1, 2, 3, \ldots, 15$$

A simple linear model can be written as

$$y_i = r_A A_i + r_B B_i + r_C C_i + r_D D_i + e_i \qquad \text{----------(1)}$$

where $E(e_i) = 0$

$$\text{Var}(e_i) = P_i(1-P_i)/n$$

and $$\text{Cov}(e_i, e_j) = -P_i P_j/n$$

Substituting $r_D = 1 - r_A - r_B - r_C$ into Equation 1, it becomes

$$Y_i = r_A A_i + r_B B_i + r_C C_i + (1 - r_A - r_B - r_C) D_i + e_i$$

That is,

$$Y_i - D_i = r_A (A_i - D_i) + r_B (B_i - D_i) + r_C (C_i - D_i) + e_i \qquad \text{------(2)}$$

Writing Equation 4 in the matrix form,

$$\underline{Z} = \underline{X}\,\underline{B} + \underline{e}$$

where

$$\underline{Z} = \begin{bmatrix} y_1 - D_1 \\ y_2 - D_2 \\ \vdots \\ y_{15} - D_{15} \end{bmatrix} \qquad \underline{X} = \begin{bmatrix} A_1 - D_1 & B_1 - D_1 & C_1 - D_1 \\ A_2 - D_2 & B_2 - D_2 & C_2 - D_2 \\ \vdots & \vdots & \vdots \\ A_{15} - D_{15} & B_{15} - D_{15} & C_{15} - D_{15} \end{bmatrix}$$

$\underline{15 \times 1}$ $\qquad$ $\underline{15 \times 3}$

$$\underline{B} = \begin{bmatrix} r_A \\ r_B \\ r_C \end{bmatrix} \qquad \text{and} \qquad \underline{e} = \begin{bmatrix} e_1 \\ e_2 \\ \vdots \\ e_{15} \end{bmatrix}$$

$\underline{3 \times 1}$ $\qquad$ $\underline{15 \times 1}$

The variance-covariance matrix of the vector $\underline{e}$ is $\underline{v}$

$$\underline{V} = \begin{bmatrix} v_{1,1} & v_{1,2} & \cdots & v_{1,15} \\ v_{2,1} & v_{2,1} & \cdots & v_{2,15} \\ \vdots & \vdots & & \vdots \\ v_{15,1} & v_{15,2} & \cdots & v_{15,3} \end{bmatrix}$$

where $v_{i,i} = P_i\,(1 - P_i)/n$ and $v_{i,j} = P_i P_j/n$

Fortunately, the variance-covariance matrix of the vector $\underline{e}$ can be estimated by

$$v_{ii} = Y_i\ (1- Y_i)/n \qquad \text{and} \qquad v_{ij} = -Y_iY_j/n$$

Following the wrighted least square method, the vector $\underline{\beta}$ is given by

$$\hat{\underline{\beta}} = (\underline{X}^1\underline{V}^{-1}\underline{X})\quad \underline{X}^1\underline{V}^{-1}\underline{Z}$$

and the estimation of r_D

$$\hat{r}_D = 1 - \hat{r}_A - \hat{r}_B - \hat{r}_C$$

Let $\underline{C} = (X^1V^{-1}X)^{-1}$, and c_{ij} is the element in the i-th row and j-th column of matrix $\underline{C}$, then the variance-covariance matrix of the vector $\underline{\beta}$ is

$$\text{Cov}\ (\underline{\beta}\ ) = \underline{C}$$

and $\text{Var}\ (r_D) = \text{Var}\ (1 - \hat{r}_A - \hat{r}_B - \hat{r}_C)$

$$= c_{11} + c_{22b} + c_{33} + 2c_{12} + 2c_{13} + 2c_{23}$$

5. General model:

Suppose a population can be classified into k mutually exclusive groups, say A, B, C, D, E, ...; the object is to estimate the proportion of each group in the population.

We design a randomizing device which contains m balls; m_A balls marked A, m_B balls marked B, and m_C balls marked C, and so on (where $m_A + m_B + m_C + \ldots = m$, and $m_A \neq m_B \neq m_C \neq \ldots$).

Using the same notation as discussed in Section 2 and 3, the probability of the first A ball's falling in the first location is

$$A_1 = \text{Prob.}\ (a_1) = m_A / m$$

Similarly, the probability for the first A ball to fall in the second location is $A_2 = \text{Prob.}\ (a_2 \mid \bar{a}_1) = \left(\frac{m - m_A}{m}\right) \left(\frac{m_A}{m - 1}\right)$

.....

In general, the probability for the first A ball to fall in the i-th location is

$$A_i = \text{Prob.}\ (a_i \mid \bar{a}_1, \bar{a}_2, \ldots \bar{a}_{i-1})$$

$$= \left(\frac{m - m_A}{m}\right) \left(\frac{m - m_A - 1}{m - 1}\right) \ldots \left(\frac{m - m_A - i - 1}{m - i + 2}\right) \left(\frac{m_A}{m - i + 1}\right)$$

for $i = 1, 2, 3, \ldots m$.

Similarly, we can derive the probability density function of random variables B, C, D, E, ..., which are constructed by the discrete conditional probabilities.

We follow the weighted least squares method: deriving a simple linear model, constructing the normal equation, and finally estimating the unknown parameters.

6. Qualitative use of the device:

It is obvious that this device can also be used for qualitative purposes by corrupting the classifications into two categories: A and B, each representing a mutually exclusive characteristic as in the original models of Warner for obtaining qualitative data. The respondent will be asked to look at the ball at location one and will be asked if that ball represents her characteristic. She is simply to answer "Yes", or "No" as she would normally respond to the usual RRT questions.

7. Discussion:

Application of the Randomized Response Technique for obtaining quantitative data is a significant contribution made by Warner, Greenberg, Horvitz and their associates to the survey methodology. This technique is particularly useful for family planning surveys in estimating the number of experiences with such problems as induced abortion, pre-marital sexual experience, extra-marital sexual behaviors, etc, for which direct answers are difficult to obtain because of the sensitivity of the questions.

A major consideration in the RRT should enable the respondents to feel comfortable in responding honestly to a sensitive question. There should be no way for the investigators to guess which question the respondents are answering, and in this context the method proposed by the current article is a further improvement in the application of the RRT. As can be understood from the procedures, it is difficult for the interviewers to correctly guess the question without actually witnessing the result.

Another consideration in RRT is the simplicity of the procedure. This is especially critical when the technique is to be administered to a population of low literacy rate. The proposed method, unfortunately, seems to

have the weakness of being rather difficult to understand because of the complexity of the procedures. In this connection, Mauldin suggested an idea of training respondents by administering a few sets of less sensitive questions before the really sensitive set. The suggestion should be useful also in providing a means for an independent estimate of the degree of the respondents' understanding of the procedures.

It is known that increase of sample size will improve the precision of estimation. In RRT, an earlier work of Liu and Chow has demonstrated that the efficiency of estimate can be improved by multiple trials of a set of two related questions, or unrelated questions without increasing the sample size. A similar idea should also be applicable to the current method. Further studies are, therefore, being undertaken along this direction.

Optimum ratios of different types (marks and color) of balls are also an important consideration for which further studies are necessary. In this article the ratio of m_A, m_B, m_C, and m_D is

$$m_A : m_B : m_C : m_D = 1 : 2 : 4 : 8$$

which is a geometric series. The question is, with a fixed number of balls, what would be the optimum ratios of different types in order to minimize the variance of estimate (or maximize efficiency of estimate). The number of balls to be placed in the device may be another consideration, although it is obvious that it cannot be too large, otherwise, the method will become too complicated.

Sound statistical reasoning is essential for the RRT, but equally important is the cooperation of the respondents. If they have some suspi-

cion about the technique, they might feel it safer not to respond to the sensitive question honestly, or not cooperate with it at all. The method proposed by this article should give more assurance to the respondent of the confidentiality of information, hence theoretically should be able to obtain better cooperation. This assumption, however, needs verification through actual field trials. Such a field experiment is being contemplated in various types of communities with diversified cultural settings.

8. Summary

A new randomizing device has been developed which amy be used for obtaining quantitative as well as qualitative data on sensitive problems such as illegal induced abortion and other social problems of contemporary concern. The current article describes the design of the device and the mathematical procedures used in estimating related parameters. A few considerations concerning the use of the RRT were also briefly discussed.

It is stressed that although the proposed method is theoretically sound, its feasibility should be tested under clinical and field conditions in different cultural settings and to populations of different literacy levels.

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Appendix 9 April 1972
Revised

Study on the Efficiency of Randomized Response Technique with Multiple Trials per Respondent

1. Introduction:

A serious problem in the study of abortion is the difficulty of measuring accurately its incidence or prevalence. Since induced abortion (hereafter referred to as abortion) is still illegal in most parts of the developing world, and because of some emotional resistance and social stigmas that still exist, interview surveys conducted with conventional questionnaire schedules usually considerably under-estimate its real incidence. The Randomized Response Technique (RRT), which had been developed to obtain better cooperation of the respondent on such sensitive questions, was first tried in North Carolina for estimating the incidence of abortion, with favourable result. (Horvitz, et al, 1967)

Randomized Response Technique was also tried in the Epidemiological Study on the Outcome of Pregnancy in Taiwan. The study was undertaken by The Department of Population Dynamics of Johns Hopkins University School of Hygiene and Public Health, with AID support. Some interesting findings have been obtained by the trial, results of which will be reported separately.

In analysing the related data, an idea occurred that if a respondent were asked a set of two 'related questions' more than once, the efficiency of estimate of RRT might increase without increase in sample size. Some theoretical work has been done, which seems to have confirmed this hypothesis. The purpose of the current article is to describe the procedures of the multiple trials of RRT questions and to present the statistical reasonings for the attempt.

2. Review of Literature:

Since the original report by Warner in 1965 on the use of randomized response technique to estimate the proportion of population having a sensitive characteristic, considerable theoretical work and some field experiments have been done, mainly by Greenberg, Abul-Ela, Jorbitz, Simmons, Daniel, Gould, Shah, Abernathy, and others.

The technique, which was used originally for qualitative purpose, is now being developed to apply also to quantitative data.

With respect to the qualitative use of RRT, following the initial report of Warner of using two 'related' questions, Abul-Ela, et al, extended its use to estimate the proportions of three related but mutually exclusive characteristics of a population. Later, following a suggestion of Simmons, Abul-Ela developed a modified method which is known as the 'unrelated' question model.

Horvitz, et al, have tried this unrelated question model for the estimation of incidence of abortion in North Carolina,and Greenberg et al have studied the theoretical aspect of this model, results of which favoured the unrelated question model to the original one in terms of statistical efficiency. It has also been shown that if the probability (or proportion) of population having the unrelated and non-sensitive characteristic is known in advance, or can be estimated with a reasonable precision, the efficiency of estimate will increase. A priori knowledge of this proportion, however, is not mandatory.

Gould and his co-workers administered a set of unrelated questions to a group of respondents and repeated the set of questions (i.e., asked twice), rather than the usual method of asking only once. Their purpose, however, was to study and develop models of respondent behavior. They applied these

models to survey results on illegitimate births, in which survey randomized response was used.

The quantitative use of the RRT is a rather recent development and still needs to be greatly improved. Efforts are being made mainly by Greenberg and his co-workers to develop a method by which the RRT questions may be used in a survey with self-administered questionnaires. Other related theoretical works are being continued, mainly by the North Carolina group. Field studies to test the feasibility of RRT under different cultural background in different countries have been started under the auspice of the World Health Organization. As far as it is known by the authors, neither theoretical nor field study has ever been attempted to use the RRT for multiple trials per respondent for the purpose of increasing the efficiency of estimate.

3. Estimation of Parameter:

Suppose a population can be classified into two mutually exclusive groups, A and $\bar{A}$, denoting those who have had an abortion and those who have never had an abortion, respectively. The objective is to estimate the proportion of group A in the total population.

Let r be the true proportion of group A in the population, p be the probability that the statement A is selected by the respondent, and k be the number of trials per respondent.

When k = 1, then

$$\text{Prob. (yes)} = rp + (1-r)(1-p)$$

$$\text{Prob. (no)} = r(1-p) + (1-r)p$$

Warner showed that the maximum likelihood estimate is unbiased, and its value is

$$\hat{r} = \frac{1}{2p-1}\left[(p-1) + \frac{n_1}{n}\right], \text{ for } p \neq \frac{1}{2}$$

where: n is the sample size,

n_1 is number of respondents who answered 'yes',

and the variance of the estimate, as given by Warner, is

$$\hat{Var}(\hat{r}) = \frac{1}{n}\left[\frac{1}{16(p-0.5)^2} - (r-0.5)^2\right]$$

In general, when the number of trials per respondent is m times, (i.e., k = m), then the probability of answering 'i-yes' in m trials is

$$\text{Prob (i-yes)} = \binom{m}{i}\left[rp^i(1-p)^{m-i} + (1-r)p^{m-i}(1-p)^i\right]$$

$$= w_i$$

$$i = 0, 1, 2, 3, \ldots, m \quad : \quad \sum_{i=0}^{m} w_i = 1$$

Clearly, these m+1 mutually exclusive classes are defined as function of a single parameter r.

If a sample of size n is drawn, and n_i is the number of respondents answering 'i-yes' $\left(\sum_{i=0}^{m} n_i = n\right)$, then the likelihood function is

$$L = \prod_{i=0}^{m} w_i^{n_i}$$

The log likelihood becomes

$$\log L = \sum_{i=0}^{m} n_i \log w_i$$

When k is large, then estimating the value of r directly from the likelihood function is difficult, therefore the method of scoring system is introduced.

The quantity $\frac{\partial \log L}{\partial r}$ is defined as the efficient score for r. The maximum likelihood estimate is the value of r for which the efficient score vanishes.

Let r_0 be the initial trial value of r, then using Taylor's series expansion and retaining only the first power of $\delta r = r - r_0$ yields

$$\frac{d \log L}{d r} = \frac{d \log L}{d r_0} + \delta r \frac{d^2 \log L}{d r_0^2}$$

$$= \frac{d \log L}{d r_0} - \delta r \, I(r_0)$$

where $I(r_0)$, the information at the value $r = r_0$, is the expected value of $\frac{-d^2 \log L}{d r^2}$. In large samples the difference between $-I(r_0)$ and $-\frac{d^2 \log L}{d r_0}$ will be $0\left(\frac{1}{n}\right)$, so that the above approximation holds to the first order of small quantities. The correction δr is obtained from the equation

$$\delta r = \frac{d \log L}{I(r_0) \, dr_0}$$

The first approximation is $(r_0 + \delta r)$, and the foregoing process can be repeated with this as the new trial value. This process can be carried on to give as accurate a value for r as may be desired.

The asymptotic variance of the estimate is the reciprocal of the information, which is given as

$$\hat{Var}(\hat{r}) = \frac{1}{I(\hat{r})}$$

In spite of the initial trial value r_0 can be any arbitrary value between 0 and 1, however it has been suggested to use the weighted mean of inefficiency estimate which is derived from the maximum likelihood estimate, that is

$$\hat{w}_i = \frac{n_i}{n} \quad i = 0, 1, 2, \ldots, m$$

and we may write

$$r_{(i)} = \left[\frac{\left(\frac{n_i}{n}\right)}{\binom{m}{i}} - p^{m-i} (1-p)^i \right] \Big/ \left[p^i (1-p)^{m-i} - p^{m-i} (1-p)^i \right]$$

Hence, the weighted mean is

$$r_0 = \frac{n_i \, r_{(i)}}{\Sigma \, n_i}$$

3.1 If k = 2

If the number of trials per respondent k = 2, then

$$\text{Prob. (2-yes)} = rp^2 + (1-r)(1-p)^2 = r(2p-1) + (1-p)^2 = w_2$$

$$\text{Prob. (1-yes)} = 2[rp(1-p) + (1-r)(1-p)p] = 2p(1-p) = w_1$$

$$\text{Prob. (0-yes)} = r(1-p)^2 + (1-r)p^2 = r(1-2p) + p^2 = w_0$$

If the observed frequencies are n_2, n_1, n_0 ($\sum_{i=0}^{2} n_i = n$), the likelihood function is

$$L = w_2^{n_2} w_1^{n_1} w_0^{n_0}$$

The log likelihood then becomes

$$\log L = n_2 \log w_2 + n_1 \log w_1 + n_0 \log w_0$$

The efficient score at r_0 is

$$S(r_0) = \frac{d \log L}{d r_0} = \frac{n_2}{w_2}\frac{d w_2}{d r_0} + \frac{n_0}{w_0}\frac{d w_0}{d r_0}$$

$$= \frac{n_2 (2p-1)}{r_0 (2p-1) + (1-p)^2} + \frac{n_0 (1-2p)}{r_0 (1-2p) + p^2}$$

and the information of r_0

$$I(r_0) = n \sum_{i=0}^{2} \frac{d w_i}{d r_0}\left(\frac{1}{w_i}\frac{d w_i}{d r_0}\right)$$

$$= n\left[\frac{(2p-1)^2}{r_0 (2p-1) + (1-p)^2} + \frac{(1-2p)^2}{r_0 (1-2p) + p^2}\right]$$

Therefore, the correction term is

$$C(r_0) = \frac{S(r_0)}{I(r_0)}$$

and the first approximation

$$r_1 = r_0 + C(r_0)$$

The process may be repeated j times until the correction term C (r_j) approaches zero or r_j is stabilized.

The asymptotic variance of the estimate is

$$\hat{Var}\ (\hat{r}) = \frac{1}{I\ (\hat{r})}$$

$$= \frac{1}{n\left[\frac{(2p-1)^2}{\hat{r}(2p-1)+(1-p)^2} + \frac{(1-2p)^2}{\hat{r}(1-2p)+p^2}\right]}$$

3.2 If $k \geq 3$

Using the same procedures as described above for two trials (k=2), the efficient score and information on three trials (k=3) are summarized and presented in Table 1.

The quantities $\frac{1}{w_i}\frac{d\ w_i}{d\ r}$ and $\frac{1}{w_i}\left(\frac{d\ w_i}{d\ r}\right)^2$ may be called the score and information supplied by i-th class. The sum of all classes of score multiple observed frequency is called efficient score. The sum of information in all classes is called the information per observation. The information of parameter is the information of per observation multiple the sample size n.

There is no difficulty in estimating r when the number of trials per respondent is greater than 3; the general formula is discussed before and we can construct the table of scoring and information for k=m, and $m \geq 3$ for each value of m as Table 1.

Table 1. The Score and Information of r in Three Trials Estimate

Class	Probability	Score $(\frac{1}{w_i}\frac{dw_i}{dr})$	Information $\frac{1}{w_i}(\frac{dw_i}{dr})^2$	Observed frequency
3-yes, 0-no	$r[p^3-(1-p)^3] + (1-p)^3$	$\frac{p^3-(1-p)^3}{r[p^3-(1-p)^3] + (1-p)^3}$	$\frac{[p^3-(1-p)^3]^2}{r[p^3-(1-p)^3]+ (1-p)^3}$	n_3
2-yes, 1-no	$3p(1-p)[r(2p-1)+(1-p)]$	$\frac{(2p-1)}{r(2p-1) + (1-p)}$	$\frac{3p\ (1-p)\ (2p-1)^2}{r\ (2p-1) + (1-p)}$	n_2
1-yes, 2-no	$3p(1-p)\ [r(1-2p) + p]$	$\frac{(1-2p)}{r\ (1-2p) + p}$	$\frac{3p\ (1-p)\ (1-2p)^2}{r\ (1-2p) + p}$	n_1
0-yes, 3-no	$r\ [(1-p)^3 - p^3] + p^3$	$\frac{(1-p)^3 - p^3}{r\ [(1-p)^3 - p^3] + p^3}$	$\frac{[(1-p)^3 - p^3]^2}{r\ [(1-p)^3 - p^3] + p^3}$	n_0

$$\text{Efficient score } S(r) = \frac{n_3[p^3-(1-p)^3]}{r[p^3-(1-p)^3] + (1-p)^3} + \frac{n_2\ (2p-1)}{r(2p-1)+(1-p)} + \frac{n_1(1-2p)}{r(1-2p)+p} + \frac{n_0[(1-p)^3-p^3]}{r[(1-p)^3-p^3]+p^3}$$

$$\text{Information } I(r) = n\left[\ \frac{[p^3-(1-p)^3]^2}{r[p^3-(1-p)^3] + (1-p)^3} + \frac{3p(1-p)(2p-1)^2}{r(2p-1)+(1-p)} + \frac{3p(1-p)(1-2p)^2}{r(1-2p)+p} + \frac{[(1-p)^3-p^3]^2}{r[(1-p)^3-p^3]+p^3}\ \right]$$

3.3 Numerical example

Suppose the probability that the abortion question is selected is p=0.7. Of a total of 100 respondents interviewed, 40 respondents reported '2-yes', 40 respondents reported '1-yes, 1-no' and 20 respondents reported '2-no'. What is the proportion of abortion? What is the variance of this proportion?

Estimation of r based on inefficiency information

$$r_{(2)} = \left[\frac{n_2}{n} - (1-p)^2 \right] / (2p-1) = 0.775$$

$$r_{(0)} = \left[\frac{n_0}{n} - p^2 \right] / (1-2p) = 0.725$$

and the initial trial value, r_0, is

$$r_0 = \frac{n_2 \, r_{(2)}}{n_2 + n_0} + \frac{n_0 \, r_{(0)}}{n_2 + n_0}$$

$$= \frac{40}{60} 0.775 + \frac{20}{60} 0.725$$

$$= 0.758$$

The efficient score at r_0 is

$$S(r_0) = \frac{n_2 (2p-1)}{r_0 (2p-1) + (1-p)^2} + \frac{n_0 (1-2p)}{r_0 (1-2p) + p^2}$$

$$= -2.1348$$

and the information of r_0 is

$$I(r_0) = n \left[\frac{(2p-1)^2}{r_0 (2p-1) + (1-p)^2} + \frac{(1-2p)^2}{r_0 (1-2p) + p^2} \right]$$

$$= 126.3449$$

Hence, the correction term $C(r_0)$ is

$$C(r_0) = \frac{S(r_0)}{I(r_0)} = -0.0169$$

and the first approximation of r, r_1, is

$$r_1 = r_0 + C(r_0) = 0.7411$$

Repeating these procedures, the efficient score at r_1 is

$$S(r_1) = 0.0727$$

and

$$I(r_1) = 124.0652$$

$$C(r_1) = \frac{S(r_1)}{I(r_1)} = 0.0006$$

The second approximation of r, r_2, is

$$r_2 = r_1 + C(r_1) = 0.7417$$

Since the correction term $C(r_2)$ is small, the process may not be repeated. The asymptotic variance for determining the precision of the estimate is given by

$$\hat{Var}(\hat{r}) = \frac{1}{I(r_2)} = 0.00806$$

As described before, the probability of answering '1-yes, 1-no' is 2p(1-p), which does not contain any information about r. Since the probability that the statement A is to be selected, p, is known in advance, the number of respondents answering '1-yes, 1-no' can be predicted. For instance, if n=100 and p=0.7, then about 42 respondents may answer '1-yes, 1-no' and at 95% confidence level, the range will be from 39 to 45 respondents. In a survey, if observed values substantially diverge from this value, it may be taken as indication of error. This procedure should be an indicator of the quality of a survey.

4. Relative Efficiency of Estimate

The relative efficiency of two estimates can be expressed by the ratio of their variance, which is affected by the following two factors: the probability that the statement A is selected (p), and the proportion of abortion (r).

The efficiency of two trials to one trial estimate is

$$R.E._{[k=2,\ k=1]} = \frac{\hat{Var}_{[k=1]}(\hat{r})}{\hat{Var}_{[k=2]}(\hat{r})}$$

$$= \left[\frac{1}{16(p-0.5)^2} - (r-0.5)^2 \right] \left[\frac{(2p-1)^2}{r(2p-1) + (1-p)^2} + \frac{(1-2p)^2}{r(1-2p)+p^2} \right]$$

The relative efficiency of two trials to one trial at different levels of p and r is shown in Table 2.

Table 2. Relative Efficiency of Two Trials Estimate to One Trial Estimate (One Trial Estimate as 100 Percent)

r \ p	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9
0.1	184	225	223	207	207	223	225	184
0.2	143	178	196	200	200	196	178	143
0.3	129	158	182	196	196	182	158	129
0.4	123	149	175	193	193	175	149	123
0.5	122	147	173	192	192	173	147	122
0.6	123	149	175	193	193	175	149	123
0.7	129	158	182	196	196	182	158	129
0.8	143	178	196	200	200	196	178	143
0.9	184	225	223	207	207	223	225	184

Note: If p = 0.5, estimate fails

The efficiency of three trials to one trial estimate is shown in Table 3.

Table 3. Relative Efficiency of Three Trials Estimate to One Trial Estimate (One Trial Estimate as 100 Percent)

r \ p	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9
0.1	211	310	347	320	320	347	310	211
0.2	163	226	279	299	299	279	226	163
0.3	148	198	249	287	287	249	198	148
0.4	142	187	236	280	280	236	187	142
0.5	140	184	232	278	278	232	184	140
0.6	142	187	236	280	280	236	187	142
0.7	148	198	249	287	287	249	198	148
0.8	163	226	279	299	299	279	226	163
0.9	211	310	347	320	320	347	310	211

Note: If p = 0.5, estimate fails

5. Discussion:

Two types of sampling errors exist in a survey utilizing the randomized response technique: (a) error in sampling the respondents from the universe, and (b) error in selecting a question by the respondents. Increase of sample size will minimize both types of errors, but increase in the number of trials per respondent, as proposed in this article, will only be able to minimize the second type of error.

The latter type of error exists because, in spite of the fact that the probability for each respondent to select the Statement A (p) is pre-determined, (e.g., p=0.7), the observed proportion of the respondents actually selecting Statement A is subjected to a sampling error and will not exactly equal p. This error, however, will become smaller, when sample size is fixed, if the number of trials per respondent increases. In other words, the actual proportion of selections of Statement A will be asymptotically approaching p if the number of trials per respondent increases.

We, however, are not only concerned with the sampling errors, but also with the non-sampling errors of estimate. In a social survey, particularly in dealing with sensitive questions, the latter type of error often is more serious.

In multiple trials of RRT per respondent, there are also problems of willingness and knowledge of the respondents to respond to the questions honestly (reliability) and accurately (validity).

The RRT is developed on the assumption that when anonymity is ensured, the respondents will be more willing to respond honestly. This assumption seems to be a logical one but more field studies are necessary to determine the behavior of respondents under various circumstances in different cultural settings.

Whether respondents will be more cooperative with multiple trials of RRT than with a single trial, therefore, is a critical problem. Our guess is that their cooperation will be better by multiple trial, if the number of trials (k) is not too large, say less than 3, because they may have the feeling that the anonymity to the sensitive question is further ensured by increased chance of answering to the sensitive question.

This can be argued to the contrary: the respondents might become even more suspicious than in the case of single trial. This certainly is true if a respondent is answering all yes (or all no) under 2, 3 or 4 trials, in which p is substantially larger than 0.5 (e.g., p = 0.7 or larger). If p = 0.7, then the probability of answering the sensitive question twice is much larger (0.7 x 0.7 = 0.49) than that of answering the innocuous question twice (0.3 x 0.3 = 0.09)*. One can guess which question the respondent is answering under this circumstance.

With respect to the knowledge about the questions being asked, since abortion is a significant event in the reproductive history of a woman, she probably will have the knowledge of it, if she has ever had one. There nevertheless is a possibility that the pregnancy she was said to have had

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* If the probability for the sensitive question to be selected is 0.7 (p=0.7), by Bayes' theorem, the conditional probability for a respondent to have come from the group with sensitive characteristic, given answering "1-yes" in single trial per respondent is Prob (A | 1-yes) = 0.7, and given answering "2-yes" in two trials per respondent is Prob (A | 2-yes) = 0.84.

aborted might not have been a real pregnancy, but was simply a delay of menstruation, and the abortion was done either because of the misjudgement of the doctor or deliberate 'over-surgery' of the doctor. In such case, she does not have a precise knowledge to respond to the question precisely, but such error presumably will be small.

The experience or event which is to be surveyed by the RRT must be a significant and distinct one which the respondents will have no difficulty defining and remembering. For example, asking such questions as experience of drunken driving, or cheating on examination will not be good questions for RRT, because respondents will have trouble in defining the extent of drunkenness or cheating to "qualify" for the conducts. Likewise, the innocuous question under/unrelated question model will have to be constructed carefully so that it can be answered correctly, without causing suspicion on the part of respondents. In this regard the innocuous question used by the recent Taiwan study of "Were you born in the year of the horse?" is not an ideal one, because the date of birth is usually asked at the beginning of interviews. A sophisticated respondent may soon become suspicious that since the year of birth had already been asked, it should be possible for the surveyors to find out if she were born in the year of horse, hence to identify the question to which she responded. RRT does not permit interpretation of individual responses, and should not be designed for that purpose. Formulating an innocuous question in unrelated question model, therefore, is as difficult a task as designing the sensitive one.

In view of the importance of non-sampling errors discussed above, it is essential to test, under suitable field conditions and preferably under

different socio-economic and cultural settings, the feasibility of the multiple trials model to determine the reaction and cooperation of respondents.

Theoretical works are also in progress with respect to multiple trials of a set of two 'unrelated' questions for a similar purpose. Preliminary results hitherto obtained have revealed rather interesting findings, which will be reported separately.

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