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Some Aspects of WFS Data Quality: A Preliminary Assessment

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The World Fertility Survey (WFS) is an international research programme whose purpose is to assess the current state of human fertility throughout the world. This is being done principally through promoting and supporting nationally representative, internationally comparable, and scientifically designed and conducted sample surveys of fertility behaviour in as many countries as possible.
The WFS is being undertaken, with the collaboration of the United Nations, by the International Statistical Institute in cooperation with the International Union for the Scientific Study of Population. Financial support is provided principally by the United Nations Fund for Population Activities and the United States Agency for International Development. Substantial support is also provided by the U.K. Overseas Development Administration.
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ERRATA

COMPARATIVE STUDIES NO. 16
Some Aspects of WFS Data Quality: A Preliminary Assessment

p. 3, Section 5, should read:
"ASSESSMENT OF THE QUALITY OF FERTILITY DATA COLLECTED IN WFS INDIVIDUAL SURVEYS"

p. 23, Table 13, heading should read:
"Mean Age at First Birth, by Birth Cohort"

p. 26, Section 5.6.3., end of first para., footnote no. should read "2". It refers to the footnote at the bottom of p. 27, R.H. Column.

p. 32, Figure 1, sub-heading should read:
"Mexico - All women 20-49".

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Foreword

The major objective of the WFS programme is to generate substantive results rather than to engage in methodological experimentation. However every stage of the operation, from planning to analysis, has a strong methodological component, the assessment of which would eventually contribute towards the improvement of survey methodology in general. The need to assess the WFS experience and methodology in this context has been recognised from the very beginning of the operation. The present report is the first outcome in this regard, and has the limited objective of summarising some of the main results that are emerging from the evaluation of the data sets for the first countries with particular emphasis on fertility data. In view of the large volume of work still to be done, this account should be regarded as an interim one and it is hoped to widen the coverage and scope of the evaluation work as more data sets become available over the coming years.

An earlier version of this document was presented at the meeting of the Population Association of American held in Denver, April 1980. We wish to express our thanks to the WFS staff and to the participants of the PAA meeting for their comments and suggestions.

Authors

1 Introduction

The World Fertility Survey (WFS) is an international population research programme designed to assist a large number of countries in carrying out nationally representative and internationally comparable surveys of human fertility behaviour. The WFS was set up in 1972 and field work started in 1974. By the end of 1979 a total of 42 developing countries and 22 developed countries had participated in the programme. Among the developing countries, 36 have already completed the field work.

From the outset the WFS has attempted to reduce to a minimum the delay between field work and dissemination of results by encouraging countries to issue preliminary and largely descriptive Country Reports, based on a detailed, standardized set of cross-tabulations. By the end of 1979, 18 such reports had been published. The completion of Country Reports marks the beginning of the analysis phase, in which detailed investigation of particular topics is carried out, using more refined demographic and statistical techniques than attempted in the first reports. An important component of further analysis is a critical evaluation of data quality. The analysis and evaluation phase of the WFS programme is still at a relatively early stage of development. Though well over one hundred pieces of research are underway, only a small number have been finalized and published.

In this paper, we attempt to summarize some of the main results that are emerging from evaluations of data sets, with particular emphasis on fertility data. In view of the volume of work still to be done, this account should be regarded as an interim one, to be supplemented later as the evidence accumulates.

It should be stressed that the major objective of the WFS has been to generate substantive results rather than engage in methodological experimentation. It will be fair to summarise WFS methodological development as consisting of (a) collation of pre-WFS experience in the conduct of fertility surveys, (b) design of a core methodology in close consultation with international expertise, both individual and institutional, (c) piloting the methodology in a full scale national survey in Fiji, (d) elaboration and operationalisation of this methodology in a series of detailed basic documents covering all aspects of the survey, and then (e) implementation – through centralised technical support of national fertility surveys – of this methodology, with country adaptation as necessary. This core methodology and the key variations between countries are described in Sections 2 and 3.

Methodological experimentation is by and large excluded by the very nature of the whole operation. The primary objective has been to assist countries in obtaining the best possible data from a single operation, which necessarily requires the choice of a study design thought a priori to be the most suitable. As an example, almost all countries have used maternity histories (whether "separate" or "integrated") in which the sequence of questions is from the earliest to the most recent periods: to reverse this sequence in, say, one half of a national sample, though potentially of great methodological interest, will in practice be a very difficult task. Even where present, the effects of methodological differences between surveys cannot be separated out from all other confounding differences between countries which affect the survey results.

The relative lack of methodological experimentation makes it difficult to answer such questions as "Is field technique A better than technique B?", except in a few instances where WFS data can be compared to other surveys employing a different methodology but conducted in the same country and within a few years of each other. In countries where a household demographic survey has been conducted independently of the intensive individual survey there is also scope for comparison of the two different methodologies. We turn to such a comparison in Section 4.

Questions concerning the quality of a given data set are in principle more readily answerable than the basic methodological questions referred to above. In Section 5 we will attempt a general assessment of quality of birth history data collected in individual interviews through comparison with external sources where available, and by examining their internal consistency. In Section 6 additional evidence from post-enumeration surveys conducted in a few of the WFS countries will be considered briefly.

2 Key Elements of WFS Methodology

In co-ordinating the series of surveys whose primary objective is to provide high quality data at the national level, the WFS attempts to achieve a degree of standardisation in the collection and reporting of data relating to fertility by different countries. This is achieved through standardisation of concepts, questionnaires, supporting documentation and procedures for training, field work and reporting of survey results. (Developed countries participating in the WFS programme use a less standardised methodology.) In this section we briefly outline the key and unchanging elements of WFS methodology.

First, in each country proposing to participate in the programme, an elaborate work plan is drawn up which specifies in some detail the coverage, content, logistics, timetable, budget and methodology of the survey. The need for technical assistance at various stages of the operation is also worked out.

In each participating country the study consists of a single round survey based on a probability sample of households. Though the sample is designed individually to suit each country's situation, similar problems often lead to similar solutions, as discussed elsewhere (WFS 1975, Verma 1977). The primary objective of the WFS has been an investigation of the trends and differentials in fertility, and its correlates including socio-economic background characteristics of individual women, nuptiality patterns, knowledge and use of contraception and attitudes affecting fertility and family size. For this purpose a detailed *individual questionnaire* is used, respondents for which are women in the childbearing ages residing in households. A central instrument of standardisation across countries is the close adherence in concepts and content, often also in form, of the country questionnaire to the WFS "core", with necessary country adaptation of course (see WFS 1974). Addition to the core of items of particular interest to a country is frequently done on the basis of a number of "modules" developed at the WFS covering areas such as fertility regulation and family planning, abortion and factors other than contraception affecting fertility (see WFS 1977).

All country questionnaires, following the WFS core, are highly structured with elaborate skips and filters to allow appropriate sequence and wording of questions for each individual respondent; further, most of the questions are precoded, allowing a strict control on the interviewers' recording of responses.

In addition to the individual questionnaire, the surveys also include a *household schedule* of the kind widely used in surveys and census in developing countries. An objective of the schedule common to all countries is to provide a listing of persons (household members) along with basic demographic data such as sex, age and marital status, on the basis of which women eligible for the individual interview can be identified; the schedule also supplies the base data about the population needed for computation of demographic rates. In some countries, an additional objective of the household schedule is to yield large sample but less elaborate data on fertility and possibly also on mortality (see Section 3).

With a few exceptions, country questionnaires are prepared initially in one of the international languages and then, where appropriate, are translated into indigenous languages, back-translated and double-checked to ensure that the original meaning and intention of the questions is retained. In multi-lingual countries, a great deal of effort has been spent in ensuring that as far as possible respondents are interviewed in their mother-tongue. Ideally, a written questionnaire is prepared in each major language, but oral versions may have to be used for less prevalent languages and dialects. This problem has been most serious in Africa. For example, in the Cameroon the WFS commissioned a detailed linguistic survey, and the survey questionnaire was prepared in 14 languages (Ware 1977); similarly in Ghana and Kenya, the questionnaire was prepared in 10 different languages. In about two in five of the countries participating in the WFS, more than one language was used for interviewing. We may also note that in all cases the questionnaires are field-tested before the main survey.

The nature of the intensive individual interview makes it highly desirable that eligible women be interviewed by female interviewers (this has been the case in WFS surveys with only two exceptions). This requirement has had an important consequence for the mode of organisation of the surveys. Country agencies (usually national statistical offices) conducting the survey often do not have a sufficient number of trained female workers on their permanent staff. Hence usually interviewers have to be specially recruited. The WFS regards training as the key to quality data. The high standards set for the survey require training to be thorough, comparatively long in duration (3-4 weeks), and, if possible, centralised to ensure uniformity of standards within the country. Across countries, an attempt is made to ensure uniformity by following standard procedures described in detail in the WFS Manual on Training and instructions for interviewers and supervisors. Countries develop their own instruction manuals following closely the standard WFS documents.

In the field, interviewers work in teams, a team usually consisting of 4-6 interviewers, and 2 supervisors responsible for organisational supervision and timely scrutiny of interviewers' work. Prior to field work, the supervisors are usually trained for two weeks, followed by their full participation in the interviewers' training programme.

The WFS also specifies uniform procedures for editing of questionnaires which in all cases is done at three stages – in the field soon after interviewers return their day's completed work, then manual editing in the office and finally computer editing. In the field of data processing very detailed instructions and package programs have been developed for cleaning, transforming (recoding) and tabulating the survey data. Similarly, guidelines for the preparation of a descriptive but detailed report of survey results have been prepared and are generally adhered to by participating countries.

In short, most of the WFS surveys not only have a common content, but also follow a core methodology and common arrangements for the collection, processing, analysis and reporting of survey data, while keeping the flexibility to adapt the instruments to meet individual country needs and conditions.

3 Main Variants in Methodology Between Countries

In view of differences between country needs, preferences and circumstances, there have nevertheless been important substantive and organisational differences among individual surveys. Important inter-country differences relating to study design are summarised below on the basis of 36 surveys in developing countries which had reached or passed the field work stage by the end of 1979. The main features are presented by country in Table 1.

Questionnaire Variation

Notwithstanding a common core, there are important variations in country questionnaires. The WFS core questionnaire consists of seven sections in the following order: respondent's back-ground, maternity history, knowledge and ever-use of contraception; marriage history, fertility regulation, woman's work history and, finally, husband's background. The maternity history consists of two separate parts: a sequence of live births, followed by a listing of other pregnancies which did not result in live births. Many countries felt it desirable to alter the arrangement of sections in the questionnaire, modify the birth history roster, or add additional items to the questionnaire. Around one-half (20 out of 36) have used an integrated form of pregnancy history in which data on live births and non-live births are obtained in a single temporal sequence. In 13 cases the marriage history precedes the section on contraceptive methods, and in another nine it precedes that section as well as the maternity history. (In other words, only two-fifths of the countries have retained the original ordering of sections). Around one-half of the countries included additional questions on family planning, and a similar proportion on induced abortion and fertility regulation; two in five have added questions on factors other than contraception affecting fertility and one in six on economic variables.

Eligibility Criteria

Countries also differ in the criteria for eligibility for the individual interview. While in a majority of the cases (24 out of 36) age limits for eligibility are 15-49 (or simply "under 50"), women aged 50 have been included in six surveys, while those aged 15-19 are excluded (or included only with some restriction) in five others, and those aged 45-49 excluded in one. In 21 countries (mainly in Asia and the Middle East) the detailed interview is confined to ever-married women; while in the remaining 15 (in Latin America, Caribbean and Africa) all women irrespective of marital status are eligible. Concerning residence, a majority (25) have used a de facto coverage definition, and a third (11) have used a de jure coverage definition (see Table 1, Col. 4).

Expanded Household Survey

In a majority of the countries the main data collection operation is confined to the intensive individual interview of women in the child-bearing ages. However, in a third (12 out of 36) of the cases, an additional important objective of the survey has been to measure with greater sampling precision the levels of current fertility and possibly also of mortality. These are generally (but not always) countries with defective or non-existent vital registration and with no recent census or survey from which reliable estimates can be derived. In these countries, WFS surveys have used an "expanded" household schedule incorporating questions on children ever-born (by sex, survivorship and residence) applied to a sample usually 3-5 times larger than the individual interview sample. (In other countries, by contrast, the household schedule is used primarily for the purpose of identifying eligible women and for defining the base population necessary for computing various demographic rates.)

The introduction of the expanded household schedule can very substantially increase the amount of work involved in conducting the survey. The logistic arrangement for the household and individual interviews varies between countries as shown in Table 1. In some surveys, the household data come from a recent completely independent demographic survey (e.g. Kenya, Indonesia, Thailand). Where the household interview is conducted as a part of the WFS survey itself, it may form a separate operation from the individual interview, requiring a separate visit to the sample areas; or the interviews may be separated only by a short interval (say one or two days); and in either case the two interviews may be conducted by the same interviewer teams or by different sets of teams. Finally, in some countries the operations are entirely combined, the two interviews being conducted during a single visit to the household.

Supplementary Operations

Around one in three surveys involve some supplementary data collection operation: a post enumeration survey or, less frequently, a husband's survey over a subsample of the main survey sample. These operations are frequently conducted soon after the main field work, and frequently employ the same field work staff.

Sample Size and Design

Standardisation across countries does not of course extend – at least in principle – to sampling, and countries differ greatly in sample design characteristics and parameters. Though self-weighting samples with a single effective area stage predominate, 10 out of the 36 samples depart more or less seriously from self-weighting, and 14 samples involve multiple area stages at least in some of the sub-national domains. The amount of work involved in the creation of the sampling frame and selection of the sample has varied greatly. In seven countries the WFS survey formed a subsample of a recent larger household survey and no mapping or household listing operations were involved, and in another five a recent survey provided the frame for selecting sample area units (but not households) for the WFS. At the other extreme, in many countries mapping and segmentation in the field was necessary before an adequate area sampling frame could be constructed.

Some countries have used relatively heavily clustered samples, while others, with less difficult travel conditions, have used very dispersed sample designs. In around one-half of the surveys, 15-30 eligible women per ultimate sample cluster were selected, with one-quarter of the cases falling on either side of this range. As two extreme examples, in Costa Rica only five women per sample cluster were interviewed, while in Nepal compact clusters

with an average of around 60 interviews per cluster were used. Hence, even for a given sample size, the sampling variability varies by country as well as by the nature of the variable being estimated from the survey[1].

Though typically the individual interview sample size is around 5000 women, in 10 of the 36 countries, the achieved sample size falls below 4000 and in 9 it is over 6000.

Training and Field Work

While interviewers for the individual interview have in most cases been female, there has been great variation between countries in the background and characteristics of the interviewers used. In some countries the interviewers have been housewives, in others health workers or students. The interviewers' required level of education was mere primary schooling in some countries; others insisted on high school or even university graduates. Similarly there have been variations by age and marital status of interviewers.

The number of interviewers trained has varied from around 20 to over 100. Many countries used a single centralised training course; others conducted separate training courses in regions.

In approximately one-half of the surveys, the main field work was completed within 3-5 months; one in four took less than three months while in a few cases (Cameroon, Ghana, Kenya, Pakistan, Mexico, Peru) the duration of field work was extended to more than six months.

It is not possible here to describe in detail the very significant procedural variations in the actual organisation and conduction of individual surveys, variations which result from and are confounded with, variations in country circumstances and practices. While the WFS programme is guided by a fairly well defined philosophy and a core methodology, it by no means amounts to a series of uniform surveys.

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[1] For a discussion of WFS sample characteristics and an analysis of sampling errors see: Verma, Scott and O'Muircheartaigh (1980).

Table 1 Selected Characteristics of WFS Surveys in Developing Countries

	(1) Hh Interview		(2)	(3)	(4) Eligibility			(5) Sample			(6)	(7)	(8) Order of Sections		
	Visits	Inter-viewers	Supplementary Operation	No. Women Interviewed	Age	Marital Status	Cover-age	Self wt.? Hh	I	from Another Survey?	Field Work Duration (Months)	Integrated Birth History?	B	C	M
AFRICA															
Cameroon	Sep Hh	same		8,100	15-54	All	F	No	No	--	7	Yes	1	2	3
Ghana	--	--	--	6,000	15-49	All	F	--	Yes	--	13[f]	Yes	1	3	2
Kenya	Ext	diff	--	8,100	15-50	All	F	No	No	All[e]	8	Yes	1	3	2
Lesotho	Sep Ar	diff	PES	3,600	15-49	EM	F	No	Yes	--	3	Yes	1	3	2
Senegal	Sep Hh	diff	--	4,000	15-49	All	F	No	Yes	--	6	No	2	3	1
Sudan (North)	Comb	diff[a]	PES	3,100	-49	EM	J	Yes	Yes	--	4	No	2	3	1
Tunisia	--	--	--	4,100	15-49	EM	J	--	Yes	Area	4	No	1	3	2
ASIA & PACIFIC															
Bangladesh	--	--	PES	6,500	-49	EM	F	--	No	--	4	Yes	2	3	1
Fiji	--	--	PES	4,900	15-49	EM	F	--	Yes	--	2	No	1	2	3
Indonesia	Ext	diff	PES	9,300	-49	EM	J	No	No	All	3	Yes	2	3	1
Iran	--	--	HS	4,900	15-50	EM	F	--	Yes	--	3	No	1	2	3
Korea, Republic of	Sep Hh	same	--	5,400	-50	EM	F	Yes	Yes	--	3	Yes	1	3	2
Malaysia	--	--	--	6,300	-49	EM	F	--	Yes	All	3	Yes	2	3	1
Nepal	--	--	--	5,900	15-49	EM	F	--	Yes	--	3	Yes	1	2	3
Pakistan	--	--	PES	5,000	-50	EM	F	--	No	--	7	No	2	3	1
Philippines	--	--	PES	9,300	15-49	EM	J	--	No	--	4	Yes	1	3	2
Sri Lanka	--	--	--	6,800	-49	EM	F	--	No	--	3	No	1	2	3
Thailand	Ext	diff	HS	3,800	-49	EM	F	No	Yes	All	2	No	1	2	3
CARIBBEAN															
Guyana	--	--	--	4,600	15-49[c]	All	J	--	Yes	--	3	Yes	1	3	2
Haiti	--	--	--	3,400	15-49[c]	All	F	--	Yes	Area[e]	5	Yes	1g	2	3
Jamaica	--	--	--	3,100	15-49	All	J	--	Yes	--	3	Yes	1	3	2
Trinidad & Tobago	--	--	--	4,400	15-49[c]	All	F	--	Yes	All	3	Yes	1	3	2
EUROPE															
Portugal	--	--	--	6,500[b]	15-49	EM	F	--	Yes	--	5	Yes	1	2	3
LATIN AMERICA															
Colombia	Sep Hh	same	--	5,400	15-49	All	F	No	Yes	Area	3	No	1	2	3
Costa Rica	--	--	--	3,900	20-49	All	J	--	Yes	--	5	No	1	3	2
Dominican Republic	Sep Hh	same	--	3,100	15-49	All	F	Yes	Yes	--	3	Yes	1	2	3
Ecuador	--	--	--	7,000	15-49	All	J	--	No	--	5	No	1	3	2
Mexico	Comb	same	--	7,300	20-49[d]	All	J	Yes	Yes	All	7	Yes	1	2	3
Panama	--	--	--	3,700	20-49	All	F	--	Yes	--	3	No	1	3	2
Paraguay	--	--	--	4,600	15-49	All	F	--	Yes	--	2	Yes	1	2	3
Peru	--	--	PES	5,600	15-49	EM	F	--	No	All	12[f]	No	1	2	3
Venezuela	Comb	same		4,400	15-44	All	J	Yes	Yes	Area	5	No	1	2	3
MIDDLE EAST															
Jordan	Sep Ar	diff	--	3,600	15-49	EM	F	No	No	--	3	No	2	3	1
Syria	Comb	same	--	4,500	-49	EM	F	Yes	Yes	--	2	Yes	2	3	1
Turkey	Ext	diff	PES	4,400	-49	EM	J	Yes	Yes	All	2	Yes	1	3	2
Yemen (A.R.)	Comb	diff[a]	--	3,700	-50	EM	F	Yes	Yes	--	3	No	2	3	1

Notes on Table 1

Col. (1) Whether household schedule used over larger sample for substantive data and organisation of field operation in relation to individual interview.

Visits:
- Ext: household data from independent external recent survey
- Sep Ar: household and individual interview during separate visits to sample area
- Sep Hh: the two interviews during separate visits to household, but same visit to area
- Comb: the two interviews combined to same visit to household
- —: no expanded household survey

Interviewers:
- Same: same teams used for both surveys
- Diff: different teams used (normally male interviewers for household survey)

Col. (2) Supplementary operations.
- PES: post-enumeration survey
- HS: husbands' survey

Col. (3) Number of women successfully interviewed (to nearest 100).

Col. (4) Eligibility for individual interview.
- All: all women sample
- EM: sample confined to ever-married women
- F: *de facto* coverage definition
- J: *de jure* coverage definition

Co. (5) Whether the household (Hh) and the individual (I) sample self-weighting, and whether the sample based on another recent survey.
- All: area units household/dwelling lists obtained from a recent survey
- Area: area units (but not household lists) from another survey

Col. (6) Duration from the beginning to the end of main field work in months.

Col. (7) Whether births recorded in the form of an integrated sequence of live births and other non-live birth pregnancies.

Col. (8) Relative order of the birth history (B), contraceptive knowledge and use (C), and marriage history (M) sections in the questionnaire. The standard order is B, C, M.

a Additional households in the expanded household schedule sample conducted by different teams of interviewers (usually male).

b Provisional figure.

c Never-married women aged 15-19 excluded if they were full-time students.

d Never-married women aged 15-19 included if they had had a live birth.

e Sampling frame available from another survey only for a part of the country.

f Field work interrupted for several months.

g Sequence of questioning reversed (from most recent to earliest birth).

4 Comparison of Household and Individual Interview Data

4.1 INTRODUCTION

For those countries using an enlarged household sample with a schedule including questions on fertility, the WFS affords a rare opportunity for data relating to women enumerated in the household survey to be compared to those obtained from the sub-sample of individual interview respondents. The comparison may be made at the aggregate or individual level. The latter approach permits a detailed analysis of consistency of response on the two occasions and also overcomes any problem of selective non-response of women sampled for the intensive interview: but it has the disadvantage that it requires merging and matching of individual data from two different files, a process that is never straightforward and sometimes not feasible. In this section, comparisons at both aggregate and individual level will be presented.

The purpose of the comparison is to assess two different methodologies in terms of the apparent quality of data that they yield. Two inter-related factors – the degree of independence of the two data sets and the use of the same or different interviewing teams – have a crucial bearing on the interpretation of results. Obviously cross-checking of household and individual data and subsequent amendment in the field or at the editing stage thwarts the whole purpose of the exercise. The possibility of such contamination is always present when the two surveys are conducted in parallel by the same interviewers. In these instances, we have had to use our judgement, based on detailed knowledge of training and field work procedures, concerning the likelihood of its occurrence. The implication of the second factor is as follows: in countries where the same team was used for both surveys, differences between the two data sets can be attributed to differences in the techniques of eliciting the information, but in countries where two separate field forces were employed, differences may also be caused by an uneven quality or contrasting characteristics of staff in the two surveys, and thus are less easy to interpret.

These considerations have led us to divide the comparison of household and individual data into two parts. We shall first discuss evidence from those countries who conducted an expanded household survey but used the same interviewers as for the individual survey. Countries in this category, whose data are available, are Colombia, Dominican Republic, Venezuela, Mexico, and the Republic of Korea, though, for present purposes, Korea is omitted because of lack of independence between household and individual data. We shall then consider countries where the two surveys were conducted independently by different interviewers. Jordan is so far the only country with data available to have used the independent approach and where both surveys were conducted under the auspices of the WFS. However an additional three countries, Indonesia, Kenya and Thailand can be included with Jordan because the frame for the WFS sample was a larger independent demographic household enquiry.

4.2 COMPARISON FOR COUNTRIES USING SAME INTERVIEWS FOR BOTH SURVEYS

Colombia

The Colombian Fertility Survey was conducted in 1976 by the Regional Population Centre Corporation and the National Administrative Statistics Department. The achieved sample sizes were 9793 households and 5378 intensive interviews with women aged 15 to 49, representing response rates of 96 and 95 per cent, respectively. Typically, selection of women for the individual interview was done by supervisors in the evening from lists of women who had been enumerated on the household schedule earlier in the day. Individual interviews with selected women would normally take place on the following day and risk of contamination is minor. However in some inaccessible areas, interviewers were allowed to do their own sub-sampling (according to a fixed formula) and the individual interview may have followed immediately after the completion of the household schedule. In such instances, independence of the two data sources is uncertain, even though interviewers were instructed not to cross-check or amend household and individual data. On balance, we consider that any loss of independence was minor and unlikely to vitiate the purpose of the comparison.

Colombia is one of the few WFS countries where detailed comparisons of the two data sets have been made by matching of records. Flórez and Goldman (1980) have analysed age and marital status and Hobcraft (1980), fertility. What follows is a brief summary of their relevant findings.

In the household schedule, current age was reported directly while in the individual questionnaire, month and year of birth was asked and current age calculated. (Only three per cent were unable to provide their date of birth). This difference in mode of obtaining age data undoubtedly accounts for the apparently low consistency of reporting – in only 61 per cent of cases was the age identical and in only 89 per cent did the two answers fall in the same quinquennial age group. Flórez and Goldman note a tendency for reported age to be lower in the schedule than in the questionnaire, particularly for women aged 35 or more, a finding of considerable methodological importance.

Whereas the questionnaire was always administered to the individual women, wherever possible in privacy[1], the household schedule questions could be asked of any adult member of the household. As expected, the extent of inconsistency is related to whether or not the individual respondent was also the household respondent. Nevertheless the figures in Table 2 show that substantial differences in age between schedule and questionnaire persist even when the intensive interview respondent was also the respondent for the schedule.

In view of the apparently straightforward nature of the subject matter, a somewhat low level of consistency is also apparent in the recording of current marital status. Even disregarding the distinction between legal and consensual unions, current status was recorded differently in six per cent of cases. As shown in the cross-classification below the major sources of inconsistency are: (1) women classified as single on the schedule but as formerly or currently married at interview, and (2) women classified as currently married on the schedule but formerly married at interview. The net result is that individual interview data show a much higher proportion of women who are widowed,

[1] In over 80 per cent of interviews, no one was present during the marriage history section, apart from respondent and interviewer.

Table 2 Percentage of Respondents Whose Age was Reported in Same Five Year Group in Colombian Household and Individual Surveys (Matched Sample)

Household Survey	Current Age (Individual Survey)							
	All	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Self-Reported	90	95	92	89	87	90	84	90
Not Self-Reported	88	96	87	81	73	80	69	75

Source: Flórez and Goldman, Table 4

divorced or separated (8.8 compared to 4.9 per cent) and a lower proportion never married (38.5 compared to 42.2 per cent) than household data.

As with age, the level of consistency of response is related to the identity of the household respondent but it is clear that this is not the major determinant. For instance, of women classified separated or divorced at interview, the proportion who were similarly classified in the household schedule rises from 35 per cent in cases where the woman was not the household respondent to only 41 per cent where she was.

A partial explanation of the difference in response lies in a key difference in the nature of the questions. In the interview, women who replied to an initial question on current marital status by affirming that they were single were asked a probe question to check whether they had ever been married: this probe resulted in the re-classification of 78 women as formerly married. In the household schedule, no similar check question was administered. However this discrepancy in the questions can account for less than half of inconsistent replies and we are left with the possibility that enhanced rapport and privacy of the interview situation, coupled with the fact that the questions on nuptiality followed the potentially more self-revealing section on contraceptive use, are also partially responsible for the shift in the pattern of response.

Consistency of fertility data is rather higher than in the case of age or marital status. Hobcraft has shown that, for the self-reported group, the percentage giving identical parities on both occasions drops slightly below 90 per cent only for women aged 40 or more. For non-self reporters, consistency, as expected, is lower and falls to 71 per cent in the oldest age group, with evidence of a slight bias towards lower fertility in the household survey. However, as may be seen in Table 4, these individual differences do not affect the mean parities for age groups and thus the surprising and important conclusion is reached that the overall completeness of recall of births in the household survey is not appreciably lower than in the individual survey.

Table 3 Cross-Classification of Current Marital Status Recorded in Colombian Household and Individual Surveys (Matched Sample)

Household Survey	Individual Survey				
	Single	Married (Legal or Consensual)	Widowed	Divorced/ Separated	Total
Single	2047	54	9	154	2264
Married (Legal or Consensual)	16	2755	4	60	2835
Widowed	0	3	84	12	99
Divorced/ Separated	5	11	4	145	165
Total	2068	2823	101	371	5363

Source: Flórez and Goldman, Table 5

Table 4 Mean Parity Reported in Colombian Household and Individual Surveys (Matched Sample)

	Survey	Current Age (Individual Survey)						
		15-19	20-24	25-29	30-34	35-39	40-44	45-49
Self-reported in household survey	Household	.40	1.52	2.90	4.27	5.46	6.42	6.89
	Individual	.37	1.52	2.89	4.36	5.29	6.40	6.79
Not self-reported in household schedule	Household	.07	.61	1.44	2.95	4.00	5.68	6.37
	Individual	.07	.56	1.44	2.85	4.09	5.23	6.58

Source: Hobcraft, Table 2.4

This consistency is achieved despite differences in methods of eliciting the data. The household schedule contained a simple set of census-like questions to measure the components of parity, by sex, survival and residence. In the questionnaire, a similar set of questions was followed by a complete live-birth and pregnancy history and the two sources of information were reconciled where necessary. The evidence from the Colombian survey suggests that few, if any, additional live-births were detected by means of the birth and pregnancy histories, a point to which we shall return in Section 5.

Reports of current fertility are also consistent, with total fertility rates of 4.54 and 4.47, again despite contrasts in questioning technique. Age specific fertility rates for the year preceding the survey were derived from the household schedule from answers to a single question on the date of last birth, while from the questionnaire the same rates were derived from the birth history in which dates of all births (starting with the first born) were recorded.

Dominican Republic

The Dominican Republic Fertility Survey was conducted in 1975 by the National Council on Population and Family. As in Colombia, an expanded household sample was followed by sub-sampling in the field of women aged 15 to 49 for the individual survey. The achieved sample sizes were 10921 households and 3115 individual interviews, with response rates of 94 and 97 per cent. Though contamination of the two sets of data was possible, it is less likely to have occurred than in Colombia because selection was always done by supervisors and individual interviews rarely followed immediately after the household enumeration.

Consistency of household and intensive interview responses has been examined by Guzman in the course of his general evaluation of the quality of the data. For the 3056 women for whom matching of household and individual data was possible, the level of consistency in age recording was very similar to that described above for Colombia.

In only 65 per cent of cases were the ages identical and in only 88 per cent did they fall into the same five year group. As may be seen in Table 5, consistency falls with increasing age, with younger ages recorded on the schedule than those derived from the questionnaire, a pattern that parallels the Colombian findings. The fact that about 84 per cent of individual respondents were able to provide a full calendar date of birth, from which age was computed, no doubt accounts for much of the discrepancy between the two data sets.

Current marital status is recorded with a higher level of consistency than in the Colombian survey. Ignoring the distinction between legal and consensual unions, status is recorded identically in 96 per cent of cases.

The probable reason for this difference between the two countries is that in the Dominican Republic household schedule the question on current marital status was preceded by a question on ever-married status (as recommended in WFS core documentation), whereas the Colombian schedule employed only one question on current status, thereby increasing the likelihood in Colombia for formerly married women to be described as single.

Turning lastly to fertility, differences between schedule and interview in the recorded number of children ever born are minimal. At younger ages, fractionally higher parities are recorded on the household schedule but the total difference at ages 15 to 29 only amounts to 20 births, and clerical or punching errors could account for the slight discrepancy. Above age 30, a modest difference in the opposite direction may be observed.

Individual interview estimates of age-specific fertility rates for the last year are a little higher than corresponding rates from the schedule, the total fertility rates being 5.02 and 4.72. The age pattern also differs with a higher mean age at childbearing from the interview (28.8) than from the schedule (27.9). However these figures, unlike previous ones, are not confined to the matched sample and it is possible that selectivity in non-response for the individual survey can account for at least some of this difference.

Table 5 Comparison of Age Reporting in Dominican Republic Household and Individual Surveys (Matched Sample)

Household Survey Age Compared to Individual Survey Age	Current Age (Individual Survey)							
	All	15-19	20-24	25-29	30-34	35-39	40-44	45-49
	Per Cent							
In Younger Age Group	8	0	7	10	10	13	20	18
In Same Age Group	88	97	89	85	85	83	74	82
In Older Age Group	4	3	4	5	5	4	6	

Source: Guzman, Table 1

Table 6 Mean Parity Reported in Dominican Republic Household and Individual Surveys (Matched Sample)

Survey	Current Age (Individual Survey)						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Household	.22	1.36	3.10	4.63	6.37	6.28	6.39
Individual	.21	1.36	3.07	4.63	6.45	6.40	6.53

Source: Guzman Table 15

Venezuela and Mexico

Unlike Colombia and the Dominican Republic, the results of matching household and individual data are not available for Venezuela[1] and Mexico. More importantly, selection of women for the individual survey was done in the field by interviewers themselves in both countries and thus the degree of independence between the two data sets is uncertain. The discussion will therefore be brief.

In Venezuela the individual sample was confined to women aged 15 to 44, regardless of marital status and in Mexico to women aged 20 to 49, also regardless of marital status, plus fertile or ever-married women aged 15 to 19. In Figure 1, the single-year age distributions of women, derived from household and individual surveys, are compared. In both cases, there is less heaping in the individual data, the improvement being marginal for Venezuela and moderate for Mexico. In contrast to the pattern of differences in Colombia and the Dominican Republic, no tendency can be discerned for the ages of older women to be under-reported in the household relative to the individual survey.

Household data on current fertility are not yet available for either country and questions on number of children ever-born were not included in Mexico. Thus the only fertility comparison that can be made is for reported parity in Venezuela and this is shown below. Only minor discrepancies are apparent, which might well be explained by shifts in age reporting between the two surveys or selective non-response in the individual survey.

4.3 COMPARISON FOR COUNTRIES USING DIFFERENT INTERVIEWERS FOR THE TWO SURVEYS

The second group of countries comprise those where the sample for the individual survey was drawn from an independently conducted household survey. Problems of the independence of data do not arise but problems of interpretation are more severe. The scope of the analysis is limited by the fact that systematic comparison has been attempted for none of the four countries, though matching of files is underway in the case of Kenya and Indonesia.

Jordan

Though both household and individual surveys in Jordan formed part of the WFS programme, they were conducted in two separate phases. The first phase, the household survey, based on a sample of 15000 households, was carried out by a predominantly male field force, who had been specifically trained for two weeks. For the second phase, a sub-sample of households was drawn at survey headquarters and ever-married women aged 15 to 49 resident in selected households were interviewed by female interviewers, most of whom had not participated in the household survey. These interviewers received three weeks' training. A total of 3610 women were successfully interviewed in the second phase.

The Jordan survey represents one of the most severe cases of age heaping so far encountered in the WFS programme. The household and individual age distributions for ever-married women shown in Figure 2 indicate an appreciable reduction in heaping in the individual survey at younger ages compared to the household survey, an improvement which no doubt is related to the fact that 30 per cent of women were able to report month and year of birth, from which age was calculated.

Comparison of fertility data is shown in Table 8. At younger ages, there is no difference between household and individual surveys in the recorded parity of ever-married women. For the two oldest age groups, parity is slightly higher in the individual survey, suggesting marginally better recall on this occasion than in the household survey. The level and age pattern of current fertility implied by the two surveys is similar, with total fertility rates for the 12 months preceding the survey of 7.5 and 7.3.

[1] Matching has been done for 3669 of the 4361 Venezuelan sample and comparisons of age and marital status made. This preliminary work indicates higher levels of consistency than Colombia or the Dominican Republic. Ages were recorded identically in 88 per cent of cases and came in the same five year group for 97 per cent. Marital status was the same for 97 per cent of respondents.

Table 7 Mean Parity Reported in Venezuela Household and Individual Surveys

	Current Age					
Survey	15-19	20-24	25-29	30-34	35-39	40-44
Household	0.2	1.1	2.4	3.8	5.1	5.8
Individual	0.2	1.1	2.5	3.9	5.0	6.1

Table 8 Mean Parity for Ever-Married Women and Fertility Rates, Reported in Jordan Household and Individual Surveys

	Current Age						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Mean Parity							
Household	1.0	2.5	4.1	6.0	7.5	8.3	8.6
Individual	0.9	2.4	4.2	5.9	7.3	8.6	8.8
Age Specific Fertility Rate for-Last 12 Months							
Household	.071	.300	.367	.332	.240	.112	.047
Individual	.063	.312	.401	.331	.260	.103	.039

Indonesia

The Indonesia Fertility Survey formed the last phase of the Intercensal Population Survey (SUPAS) and was conducted on a sub-sample of the second phase (SUPAS II), a large scale enquiry covering about 60000 households. In addition to questions on household membership and other characteristics which were directed to the head of the household, or other responsible members, all adults enumerated in SUPAS II were asked in turn about their economic activities and women about their fertility and related matters. More specifically, questions were asked of all ever-married women about their total number of marriages, date of first marriage, number of children born and surviving and details of their last birth, while currently married women under 50 years of age were asked in addition whether they wanted another child, and about knowledge, ever-use and current use of contraceptive methods. SUPAS II, then, combines elements both of a typical household survey and of an individual survey.

The fertility survey (SUPAS III) was based on a subsample of about 10000 households enumerated in SUPAS II and resulted in 9136 completed interviews with ever-married women under 50 years of age. Female interviewers were specially recruited and trained for three weeks, in contrast to SUPAS II interviewers who were male staff members of branch offices of the Central Bureau of Statistics, or recruited from outside, and who received 5½ days' training.

It is clear from this brief description that the Indonesian Intercensal Population Survey represents a particularly interesting opportunity for comparing a range of data from two different survey approaches. Unfortunately this potentially rich field for methodological analysis cannot be started on the basis of published results because of a major difference in the sample universes for SUPAS II and III. Whereas the former survey had nearly national coverage, the latter was confined to Java and Bali, which account for about two-thirds of the total population. The only published data on fertility and related topics from SUPAS II, of which we are aware (Indonesia Central Bureau of Statistics 1977), include rural/urban but not regional breakdowns and thus the incompatibility of coverage cannot be overcome at present.

However, one topic, contraception, is perhaps worth mentioning at this stage. In SUPAS II, 18 per cent of currently married women were reported as current users of contraception, compared to 26 per cent in SUPAS III. At least part of this difference can be attributed to higher use in Java and Bali than in other parts of the country and it is thus possible that SUPAS II estimates of prevalence are only marginally lower than SUPAS III estimates. Moreover, the composition of users by method type (modern, traditional, folk) are similar. In view of the substantial differences in interviewer characteristics, in the overall interview setting and in the nature of the questions asked, this would be a remarkable finding, with important methodological implications.

Kenya

In Kenya, problems of incompatibility of sample universes do not arise and a preliminary comparison can be made from published data. The frame for the fertility survey was provided by Round 1 of the National Demographic Survey (NDS) conducted early in 1977 by male enumerators, most of whom were permanent employees of the Central Bureau of Statistics and who received two days' training for the NDS. The schedule conformed to the conventional model with questions on the number of children ever-born and details of the most recent birth for all women aged 10 or more. For the fertility survey, an average of one in three households selected in the office was re-enumerated and women aged 15 to 50 were interviewed by specially recruited and trained female interviewers. The achieved sample size was 8100 women.

Because of the well known difficulties of ascertaining age in many parts of Africa and because eligibility for the detailed interview was defined solely in terms of age, fertility survey interviewers were told to probe female ages fully at the household screening stage, using a predetermined hierarchy of probes. Where date of birth was known, this was recorded on the schedule in addition to current age. In all, 44 per cent of women were able to provide a month and year of birth.

These considerable efforts to obtain good age data yielded disappointing results. Comparison of the single year distribution of females enumerated in households with that for the NDS (Figure 3) shows a similar degree of heaping at ages ending in 0 and 5. Figure 3 also reveals that the eligibility criteria in the fertility survey affected the reported age structure. Relative to the NDS, there is a pronounced surplus of women aged 10 to 14 and 51 to 55 with corresponding deficits at ages 15-19 and 46 to 50. The absence of the expected heaping at age 50 in the fertility survey is particularly striking. Thus it appears likely that interviewers, consciously or sub-consciously, minimized their work load by shifting women across the age boundaries that determined eligibility for the detailed interview. Similar tendencies can be observed for a few other WFS surveys (e.g. Fiji, Indonesia and Nepal) but it is by no means a universal phenomenon.

Table 9 Comparison of Data from the Kenyan National Demographic Survey and the Fertility Survey

		Current Age						
	Survey	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Proportion Ever Married	NDS	.29	.78	.94	.97	.98	.99	.99
	Fertility Survey	.28	.79	.96	.99	.99	.99	1.00
Mean Parity	NDS	.33	1.83	3.72	5.55	6.67	7.25	7.46
	Fertility Survey	.35	1.84	3.76	5.55	6.82	7.59	7.88
Proportion of Children Dead	NDS	.115	.109	.125	.158	.177	.209	.247
	Fertility Survey	.101	.130	.144	.157	.174	.189	.236
Age Specific Fertility Rates for Last 12 Months	NDS	.135	.365	.361	.316	.231	.133	.056
	Fertility Survey	.147	.358	.371	.293	.238	.141	.077

Other comparisons between the NDS and the fertility survey are presented in Table 9. Proportions ever-married are closely similar, even for the age group 15 to 19, which implies that downward displacement of women in the fertility survey has not been selective in terms of marital status. The mean numbers of children ever-born are also almost identical up to the age group 30 to 34. Thereafter, parities are higher in the fertility survey with a difference of almost half a birth for the oldest age group. Thus for the first time, we have evidence of better recall of births in an intensive than in a household survey, though the third row of the table proves that omission of births by older women in the NDS is not selective of those who have died.

These differences in reported parity are particularly interesting because they run counter to previous methodological research in Kenya (Kenya Central Bureau of Statistics 1977) which suggested that no improvement in the completeness of birth reporting would accrue from the use of birth and pregnancy histories, in addition to the direct standard questions on children ever-born, by sex, survival and residence. Probably the apparent slight superiority of the fertility survey reflects the use of thoroughly trained female interviewers and carefully translated questions, rather than differences in the content of the questions asked in the two surveys.

The two surveys show similar levels of current fertility, the total fertility rates for the 12 months preceding the surveys being 7.98 for the NDS and 8.12 for the fertility survey. The age pattern differs slightly with higher fertility at older ages in the fertility survey than in the NDS.

Thailand

The WFS survey in Thailand was based on a sub-sample of households enumerated in Round 5 of the multi-round Survey of Population Change (SPC). The SPC was conducted by specially recruited and trained male interviewers and covered about 40000 households. Its main purpose was to estimate fertility and mortality levels by matching events with those recorded in the civil registration system but, in this paper, we are concerned with the unadjusted estimates of the SPC Round 5 enumeration. The comparison of some results of the two surveys is shown in Table 10. Proportions of women ever-married are slightly higher at all ages in the SPC than in the fertility survey. Mean parities correspond very closely up to age 40 but thereafter the fertility survey estimates are higher, a pattern that implies slightly greater omission in the SPC. A substantial discrepancy in the level of current fertility and differences in the age structure of fertility are apparent. The unadjusted total fertility rates derived from the fertility survey and the SPC are 4.79 and 3.87, respectively. As the former figure is close to a series of other indirect estimates we are able to conclude that the SPC suffers from much greater reference period error than the fertility survey.

4.4 CONCLUSIONS

Despite the partial and fragmentary evidence that has been presented it is possible to make some tentative generalisations, pending more detailed work. The most important of these is the finding that household surveys can achieve as complete a coverage of children ever-born as individual surveys. This was broadly true even in Jordan where the level of literacy is low and male interviewers conducted the household survey; more remarkably, completeness of reporting in Colombia was little lower in households where the information was provided by someone other than the mother herself.

Thoroughness of training, quality of field staff and standards of field work are undoubtedly crucial considerations. It is worth noting that relative under-reporting in the household survey was non-existent for the three countries where both surveys were conducted by the same field staff but slight differences emerged in Jordan, Thailand and Kenya where the household survey field force was different from the individual survey one and was trained less intensively. This point is made more forcibly in the next section where WFS estimates of parity are compared to estimates from censuses and other surveys.

The consistency between household and individual surveys in the reported level of current fertility is another important finding. Four out of five countries for which the comparison was possible show closely similar total fertility rates, though the age pattern varied more, perhaps in response to shifts in reporting of current age. In view of the facts that household survey rates were based on a single item, date of last birth, while individual rates were taken from maternity histories where all births were dated, starting with the first born, it is rather surprising that reference period error was absent, or constant, in both data sets for most of the countries examined.

The third tentative conclusion concerns age reporting. In all countries, except for Kenya and Venezuela, considerably less heaping of ages was observed in the individual survey than in the household survey; and in two countries, there appeared to be a systematic tendency for older women to understate their age in the household survey. Determination of age thus appears to present a more serious problem of measurement than parity, but the evidence from the WFS suggests that considerable improvement in precision of household survey data on age could be made if date of birth was asked instead of, or in addition to, a direct question.

The fact that carefully conducted household surveys can give estimates of life-time and current fertility that are only marginally inferior to those derived from intensive surveys of individual women of course does not invalidate the latter approach, which is designed to gather a much broader range of data. Particularly in countries where fertility levels and

Table 10 Comparison of Data from Round 5 of the Thai Survey of Population Change (SPC) and the Fertility Survey

		Current Age						
		15-19	20-24	25-29	30-34	35-39	40-44	45-49
Proportion Ever Married	SPC	.21	.64	.84	.92	.95	.97	.98
	Fertility Survey	.15	.58	.81	.90	.94	.96	.96
Mean Parity	SPC	0.6	1.3	2.5	3.8	4.9	5.8	6.4
	Fertility Survey	0.7	1.5	2.6	3.9	5.0	6.1	6.8
Age Specific Fertility Rates for Last 12 Months	SPC	.029	.156	.199	.164	.127	.075	.023
	Fertility Survey	.073	.208	.246	.171	.148	.092	.019

patterns are changing, the collection of complete birth histories represents a major advantage over the summary data elicited in typical household surveys.

The methodology of SUPAS II in Indonesia represents a more realistic alternative to the intensive interview approach than an ordinary household survey, though it remains to be seen how favourably SUPAS II data compare to those from the fertility survey. It is also worth pointing out that the addition of a complete birth history to the SUPAS II schedules would create an end-product not dissimilar from a shortened version of WFS core questionnaire. In the final resort, a choice always has to be made between collection of a lot of information for a relatively small sample or limited information for a large sample.

5 Assessment of the Quality of Fertility Data Collected in WFS Individual Surveys

5.1 INTRODUCTION

The most important component of the individual interview is the detailed birth history which provides the basic information on the main dependent variable, fertility. It is through this history that we obtain information on the details of all children ever born to the woman. Fertility surveys carried out in the past have used two main methods to gather this information:

(1) An integrated pregnancy history where the details of all pregnancies experienced by the women are collected in chronological order:

(2) Separate live birth and pregnancy histories where the details of live births are first obtained and this step is followed by questions on other pregnancies terminating as non-live births, with detailed probes to locate these pregnancies within inter-live birth intervals.

In both methods it is also possible to use two types of approach:

(a) The "forward approach" where the interviewers start from the first birth and proceed up to the last birth or pregnancy.

(b) The "backward approach" which starts with the most recent birth and then works backwards to the first birth.

In its core questionnaire the WFS recommends the combination 2(a) above, where the live birth history is first obtained using the forward approach. However because of the WFS policy of allowing flexibility to meet the needs of the individual country, some have deviated from this recommendation. Of the 36 countries, 20 have used integrated pregnancy histories with further variations among the countries (see Table 1).

In all countries, the birth history is preceded by a set of five questions on number of sons and daughters living with the respondent and living away from home and the number of children who have died, in order to obtain the total number of children ever born. Any discrepancy between the numbers thus given and those listed in the birth history is reconciled by further probing.

The primary purpose of questions on other pregnancies is to identify any live births that might have been missed or forgotten by the respondent, particularly in instances where the child lived only for a few hours. A subsidiary aim is to obtain some indication of the incidence of foetal loss.

The information from the birth history, together with the age of the woman, her marital status and her age at first marriage, constitute the ingredients for calculating various measures of fertility used in the study of levels, trends and differentials. Past experience indicates that these data obtained through a retrospective survey of the WFS type are often subject to errors of various forms. The high standards set by WFS, described briefly in Section 2, are expected to result in better quality data than typically obtained in the past, but this expectation in no way obviates the need for a detailed assessment of the quality of the data. Such an evaluation will not only alert analysts by identifying any defects in the data, but also may throw light on the shortcomings of the WFS approach which can be rectified in the design of future fertility surveys. Recognising these needs, the WFS has initiated a continuous programme for evaluating the data from each country survey as soon as possible after the publication of the Country Report. To assist the countries in this work, WFS has sought to develop new methodologies and refine old ones, by commissioning work from outside experts and through work by its own staff.

In order to expedite the work in other countries and to train the national staff in the relevant techniques, the WFS has also launched a programme of workshops. Participants from four or five countries are invited to London for a period of three months to evaluate data from their respective countries. The participants work in close collaboration with, and receive formal training from, WFS staff and consultants. The first such workshop, held in 1979, covered the Dominican Republic, Mexico, Peru and Venezuela and the second one, with participants from Guyana, Indonesia, Jordan, Malaysia and the Philippines, was completed in May 1980.

5.2 COVERAGE OF LIVE BIRTHS

One crucial criterion of data quality is the extent to which the survey has succeeded in recording all the births which occurred to each respondent in her life time. Previous experience tells us that coverage of events is rarely complete in developing country surveys. Moreover, it is generally believed that the probability of omission is related to characteristics of the respondent, for instance age and educational background and to characteristics of births, such as date of birth, survival and residence status, and sex. The occurrence of such selective omissions of births may distort fertility differentials, the period trends in fertility and even may bias the level of fertility estimated for the most recent period.

Unfortunately, there seems to be no easy method of estimating the level of such omissions, unless fertility can be assumed to have remained unchanged for the last 30 years or there is complete vital registration by which the birth history data can be verified. In other circumstances, diagnosis is difficult, though comparison with other sources, examination of internal consistencies in the data, and the application of indirect methods of estimation may lead to reasonably confident conclusions regarding the existence and extent of any omissions.

Substantial omissions of births in WFS surveys may be detected by simple inspection of the increments in mean parity across age groups or by comparison of WFS data with independent national estimates derived from censuses and surveys. As shown in Table 11, WFS data stand up well to these admittedly crude criteria. In most of the countries, WFS surveys have achieved a major improvement in coverage of births, giving consistently higher means for older age groups than other sources[1]. In many cases, the increase is

[1] An implicit assumption is that women tend to under-report but not over-report births. The possibility of a woman reporting stillbirths as live births or adopted children or children of her husband by another wife as her own children is recognised, but the incidence of such occurrences is not considered high enough to make a significant difference to the means.

about one third of a child per woman aged 40 to 44, while in Nepal it is as high as 1.5 births. Even in Latin America where demographic data are generally of higher quality than in Asia and even in countries where the independent source is an individual fertility survey (Jordan, Philippines) rather than a census or household enquiry, WFS surveys have recorded more births for older women.

In the absence of evidence of a genuine cohort increase in fertility, the recording of lower parity for the 45 to 49 age group than for the 40 to 44 group constitutes prima facie evidence of omission in the oldest cohort[1]. Table 11 indicates that in only three of 19 countries is the life time fertility of women aged 45 to 49 lower than that for the 40 to 44 group (Bangladesh, Indonesia, and Pakistan). A more systematic assessment of the extent of under-reporting in the oldest cohort *relative* to the next quinquennial group is presented in Table 12 which compares the cumulative fertility of the two groups when they were of the same age for nine countries where these data were available. At younger ages, the comparison is affected by displacement of births, but at older ages, particularly at age 42.5, the results suggest severe relative omission in Bangladesh and minor omission in Pakistan and in one ethnic group in Fiji. In Jamaica, a genuine increase in fertility may have caused a slight difference in cumulative fertility. In Colombia and Sri Lanka, fertility is higher for the 45 to 49 than for the 40 to 44 group, a finding which probably reflects fertility declines in these two countries.

In a comparative analysis of the mean age at first birth, Casterline and Trussell (1980) have also arrived at similar conclusions. Table 13 gives the mean age at first birth for different age cohorts. The increases in mean ages for older women again indicate the possibility of errors due to omission and/or misplacement of first births among the older cohorts, particularly among those aged 45-49 in Bangladesh, Indonesia, Malaysia, Costa Rica, and the Dominican Republic[2].

Turning now to evidence from the detailed country evaluations, we have to draw heavily on work which is not yet published. Apart from evaluations of Nepal (Goldman et al 1979) and Fiji (Potter 1977), the following studies were in draft form at the time of writing this report: Bangladesh (Brass), Colombia (Hobcraft), Dominican Republic (Guzman), Pakistan (Booth and Alam), Sri Lanka (Alam), and Jamaica (Singh). Some conclusions on the extent and nature of omissions are presented below.

Analyses of the extent of omission of births by cohort have revealed: considerable omission by the oldest cohorts (40-44 and 45-49) in Nepal, omission which seems to be much higher for those women who do not know their ages, and for women living in the Terai region; omission by the oldest cohort (45-49) in Pakistan and in Bangladesh, and possibly by the next oldest cohort in Bangladesh; omission by the oldest cohort of Fijians (but not Indians) in Fiji; omission by the oldest and perhaps next oldest cohort in the Dominican Republic, but an over-reporting of births by the cohort aged 35-39 (probably due to age mis-statement); possible omission by the oldest cohort in Jamaica; and no evidence of significant omission of births for Colombia or Sri Lanka.

Analyses of sex ratios at birth and infant and child mortality rates have indicated that, in general, omission of births has not been selective of female births nor of children who died in the first few years of life. Thus, for example, even in Nepal where there is strong evidence of some omission of births by the older women, the sex ratios at birth are fairly constant across periods (indicating no selective omission of female births), the proportion dead of children ever born increases with increasing age, and the infant and child mortality rates are progressively higher for periods further in the past (the latter two tests indicating no selective omission of infants who died). In fact, as discussed in the next section, the Dominican Republic is the only one of these detailed studies which shows lower proportions dead for 45-49 year olds than for 40-44 year olds or which shows lower infant mortality rates ($_1q_0$) for the more remote past (1950's) than for more recent years (1960's). However, there are some indications that female births have been more frequently omitted in the birth histories than male births in Pakistan and Bangladesh, and possibly to a slight extent in the Dominican Republic and Jamaica. There is no evidence of selective omission of female births in Fiji, Nepal, Colombia, or Sri Lanka. Analyses in Pakistan and Colombia yield no evidence of higher omission rates of children not living at home.

In summary, the detailed country evaluations have indicated that most of the maternity histories in the individual survey have been characterised by some omission of births, but for the majority of countries, the level of omission is not high, usually less than 10 per cent for any single cohort, and seems to occur for only the oldest cohorts. In most countries the quality of data permit investigation of socio-economic and other differentials in lifetime fertility, without serious risk of spurious results.

5.3 INFANT AND CHILD DEATHS

Infant and child mortality has been studied not only in the course of the general evaluations mentioned above but also as a topic of substantative interest in the case of Sri Lanka (Meegama 1980), Colombia (Somoza 1980), and Kenya (Mott, forthcoming). The data have stood up well to a variety of critical tests of internal consistency and plausibility.

With the exception of the Dominican Republic where there is clear evidence of omission of infant deaths before 1960, levels of mortality show a decline over time (See Table 14). The expected sex differential (male mortality rates higher than female rates) has been observed though there is slight evidence of differential under-reporting of female deaths in Jamaica. Socio-economic differentials in mortality, and the relationship between birth order, age of mother, and mortality have conformed to plausible patterns for data sets where these aspects have been analyzed. Lastly, the age pattern of mortality for ages 1 to 10 in Colombia and ages 1 to 5 in Nepal are consistent with patterns in other comparable life tables.

The conclusion emerging from this work is that WFS surveys provide an unexpectedly reliable and rich source of information on mortality that will considerably increase our understanding of this subject.

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[1] Any interpretation based on absolute differences without taking into account sampling errors is hazardous, but limitations of space do not permit detailed discussion of this point. However we can report that the standard error of the means for the 45 to 49 cohort varies between 0.12 and 0.22.

[2] This conclusion necessarily assumes that the pattern of age at first marriage was the same for the two cohorts 40-44 and 45-49. In the case of younger cohorts such an assumption is not valid in many countries.

Table 11 Comparison of WFS and Other Estimates of Mean Number of Children Ever Born by Ever-Married Women

Country	Source/Year	Age 15-19	20-24	25-29	30-34	35-39	40-44	45-49
Bangladesh	WFS 75	0.8	2.4	4.2	5.7	6.7	7.1	6.7
	Survey 74	0.6	1.9	3.5	4.9	5.9	6.2	6.1
Fiji	WFS 74	0.1	1.0	2.5	4.1	5.1	6.1	6.5
	Census 76	0.1	0.9	2.2	3.5	4.6	5.4	6.1
Indonesia	WFS 76	0.6	1.7	2.8	4.1	4.8	5.3	5.2
Jordan	WFS 76	0.9	2.4	4.3	5.9	7.3	8.6	8.8
	Survey 72	0.8	2.4	4.4	6.1	7.5	8.3	8.2
Korea, Republic of	WFS 74	0.5	1.0	2.0	3.4	4.4	5.1	5.8
	Census 70	0.5	1.0	2.1	3.5	4.5	5.3	5.6
Malaysia	WFS 74	0.8	1.7	2.8	4.2	5.5	6.1	6.2
	Census 70	0.7	1.8	3.2	4.5	5.5	5.8	5.6
Nepal	WFS 76	0.3	1.4	2.9	4.1	5.1	5.5	5.7
	Census 71	0.3	1.1	2.2	3.1	3.7	4.0	4.0
Pakistan[1]	WFS 75	0.2	1.4	3.0	4.6	6.1	6.8	6.9
	Survey 71	0.2	1.3	2.8	4.4	5.5	6.0	6.5
Philippines	WFS 78	0.9	1.9	3.0	4.3	5.7	6.7	7.0
	Survey 73	0.9	1.9	3.1	4.5	5.7	6.5	6.4
Sri Lanka	WFS 75	0.8	1.6	2.6	3.9	4.9	5.5	5.9
Thailand	WFS 75	0.7	1.5	2.6	3.9	5.0	6.1	6.8
	Survey 75	0.6	1.3	2.5	3.8	4.9	5.8	6.4
Colombia[1]	WFS 76	0.2	1.1	2.4	4.1	5.0	6.1	6.7
	Census 73	0.1	1.0	2.4	3.9	5.0	5.8	6.0
Costa Rica	WFS 76	–	1.0	2.0	3.5	4.8	6.1	6.7
	Census 73	–	1.1	2.5	4.1	5.5	6.2	6.3
Dominican Republic[1]	WFS 75	0.2	1.4	3.1	4.6	6.4	6.4	6.6
	Census 70	0.2	1.6	3.3	4.6	5.6	5.8	6.0
Guyana	WFS 75	0.8	1.8	3.0	4.9	5.9	6.4	6.6
Jamaica	WFS 75	0.9	1.8	2.9	4.1	5.2	5.4	5.6
Mexico	WFS 76	1.0	2.0	3.4	5.0	6.3	7.0	7.1
	Census 70	1.0	2.2	3.7	5.0	6.2	6.7	6.8
Panama	WFS 75	–	1.2	2.6	3.8	4.9	5.6	5.8
	Survey 74	–	1.4	2.6	3.9	4.9	5.3	5.4
Peru[2]	WFS 77	1.0	2.0	3.3	4.6	6.0	6.8	7.2
	Survey 76	1.0	1.9	3.4	4.7	5.9	6.8	7.8

[1] All women

[2] Currently married women

Table 12 Comparison of Cumulative Fertility Up to Specified Age (Approximate Only) for Two Age Cohorts, 40-44 and 45-49

		Cumulative Fertility Up to Age						
Country	Cohort	17.5	22.5	27.5	32.5	37.5	42.5	47.5
Colombia	45-49	0.24	1.23	2.79	4.42	5.78	6.55	6.74
	40-44	0.27	1.34	2.98	4.54	5.59	6.08	–
Bangladesh	45-49	0.63	1.87	3.24	4.45	5.56	6.29	6.47
	40-44	0.83	2.37	3.89	5.41	6.61	7.15	–
Fiji (Fijian component only)	45-49	0.13	0.86	2.11	3.45	4.65	5.33	5.49
	40-44	0.21	1.20	2.67	4.14	5.19	5.68	–
Nepal	45-49	0.15	0.99	2.31	3.59	4.69	5.44	5.70
	40-44	0.16	1.07	2.42	3.75	4.86	5.51	–
Pakistan	45-49	0.36	1.66	3.16	4.67	5.86	6.61	6.80
	40-44	0.54	1.80	3.32	4.87	6.18	6.89	–
Sri Lanka	45-49	0.28	1.30	2.67	4.04	5.11	5.63	5.77
	40-44	0.33	1.35	2.67	3.94	4.83	5.21	–
Jamaica	45-49	0.61	1.74	3.14	4.36	5.22	5.52	5.58
	40-44	0.70	1.92	3.35	4.57	5.25	5.61	–
Dominican Republic	45-49	0.35	1.50	2.98	4.42	5.69	6.40	6.55
	40-44	0.46	1.69	3.24	4.72	5.84	6.38	–
Peru	45-49	0.26	1.23	2.85	4.40	5.69	6.46	6.71
	40-44	0.24	1.40	2.97	4.44	5.59	6.25	–

Table 13 Mean Age at Birth, by Birth Cohort

	Cohort					
Country	20-24	25-29	30-34	35-39	40-44	45-49
Bangladesh	17.58	17.18	17.08	17.46	17.72	18.32
Fiji	24.57	22.44	20.73	20.50	20.38	20.72
Indonesia	22.78	20.52	19.82	19.61	20.12	20.71
Jordan	20.11	20.58	20.08	20.24	20.08	19.76
Korea, Republic of	27.14	26.26	24.30	22.68	21.82	20.69
Malaysia	24.33	23.94	22.79	22.81	24.02	22.22
Nepal	23.27	20.69	20.82	20.50	21.72	21.92
Pakistan	19.47	19.84	19.38	19.34	18.59	18.97
Philippines	22.88	22.91	23.01	22.55	22.42	22.95
Sri Lanka	24.71	25.26	22.68	22.63	21.63	21.56
Thailand	22.70	22.77	22.22	22.67	22.39	22.38
Colombia	24.04	22.38	21.59	21.70	22.02	22.51
Costa Rica	22.77	22.85	21.92	21.72	21.85	22.81
Dominican Republic	20.86	20.31	20.69	20.19	20.31	21.32
Guyana	21.28	21.10	20.39	20.42	20.14	20.70
Jamaica	19.52	20.36	19.77	20.31	21.44	21.67
Mexico	22.42	21.71	21.26	21.18	21.07	21.45
Panama	22..	22.06	21.20	21.18	21.06	21.22
Peru	23.31	21.59	21.62	21.36	21.48	21.83

Source: Casterline and Trussell

Table 14 Infant Mortality Rates Per 1000 Live Births by Approximate Time Period

Country	Time Period				
Indonesia	1971-1975 93	1966-1970 99	1956-1965 120	<1955 172	
Kenya	1968-1976 92	1958-1967 109	<1958 159		
Nepal	1965-1969 166	1960-1964 183	1955-1959 181	1950-1954 203	
Pakistan	1971-1975 136	1966-1970 137	1961-1965 138	1956-1960 161	1951-1955 188
Sri Lanka	1971-1974 56	1965-1970 59	1959-1964 60	1953-1958 66	1948-1952 70
Colombia	1971-1975 66	1966-1970 68	1960-1965 78	1956-1960 99	
Dominican Republic	1970-1974 79	1965-1969 95	1960-1964 100	1955-1959 84	1950-1954 78
Jamaica	1970-1975 38	1965-1969 42	1960-1964 50	1955-1959 77	1950-1954 103
Peru	1974-1977 95	1969-1973 107	1964-1968 114	1959-1963 122	1954-1958 146

5.4 COVERAGE OF NON-LIVE BIRTHS

In all the surveys, the respondents were exposed to fairly detailed questioning on the non-live births they had experienced. Table 15 presents information for 19 countries on (a) percentages of women who did not report any non-live birth, (b) mean number of non-live births per woman, and, (c) number of non-live births per 1000 total pregnancies. The message is clear. Except in Guyana, Jordan, Korea and the Philippines three-quarters or more of the women did not report any abortions, miscarriages or stillbirths. In most cases the non-live births accounted for only one-tenth or less of the total pregnancies. The percentage is as low as four in Nepal. These figures indicate significant under-reporting of the non-live births in almost all the surveys.

Reporting of non-live births seems to be relatively good in Jordan, Guyana, Jamaica, Costa Rica and the Dominican Republic and is by far the highest in Korea. There is not enough evidence to attribute the better coverage in these five countries to differences in the type of birth history used. The extent to which inter-country variations may reflect real differences in the incidence of wasted pregnancies is also uncertain.

The primary objective of detailed question on non-live births in the WFS context was to detect extra live births which otherwise would have been omitted by the respondent. This aim was not fulfilled. The number of "extra" live births detected was insignificantly small (e.g. 28 in Jordan, 16 in Nepal, 7 in Costa Rica, 12 in Indonesia, and 9 in Korea). Of course, it is possible that interviewers could have transferred such live births detected into the main live birth history during the interview itself but we do not think this happened often.

The general conclusion is that while a carefully designed and implemented live birth history of the WFS core type can be expected to net a fairly complete coverage of live births occurring to women up to the age of 45 years, the additional questions on other pregnancies failed to identify more than a trivial number of extra live births, and the WFS approach has not succeeded as regards the coverage of non-live births. These findings have an important bearing on the content of future fertility surveys.

5.5 REPORTING OF CURRENT PREGNANCY

In the individual interview, the respondent was asked whether she was currently pregnant and, if so, the expected date of termination of pregnancy (or the duration of pregnancy). Goldman and Westoff (1980) have analysed the data and explored the feasibility of estimating current fertility, using WFS data from 15 countries. In virtually all countries, the total fertility rates based on the birth history were higher, by about 13 per cent on average, than the rates estimated from data on current pregnancies of duration 5, 6 and 7 months, without any adjustments for fetal losses or multiple births. The obvious lesson to be learned is that single round surveys of the WFS type tend to under-estimate the percentage of currently pregnant women in the population even when attention is confined to the later trimesters.

5.6 REPORTING OF DATES AND AGES

5.6.1 Introduction

The accuracy of trends and levels of fertility and mortality and cohort patterns of family building derived from the birth history depends not only on the coverage of the events – births and deaths – but also on the reporting of the time of occurrence of the events. In the individual interview the respondents were asked to report the dates

Table 15 Selected Statistics on Non-Live Births[1]

Country	Percentage of Women Who Did Not Report any Non-Live Births	Mean Number of Non-Live Births Per Woman	Number of Non-Live Births Per 1000 Pregnancies
Bangladesh	79	0.29	69
Fiji	84	0.22	54
Indonesia	85	0.19	57
Jordan	57	0.85	138
Korea, Republic of	59	0.82	187
Malaysia	79	0.30	67
Nepal	91	0.13	39
Pakistan	77	0.35	76
Philippines	72	0.41	83
Sri Lanka	82	0.26	62
Thailand	78	0.33	79
Colombia	85	0.25	85
Costa Rica	75	0.45	118
Dominican Republic	77	0.38	103
Guyana	73	0.55	153
Jamaica	80	0.32	91
Mexico	76	0.41	97
Panama	77	0.33	90
Peru	78	0.34	71

[1] The term "non-live births" refers to all pregnancies which did not terminate as live births.

of births (and deaths if a child died) through the repetition of the following questions: "In what month and year did your (first, second, . . .) birth occur?" If don't know, "How many years ago?"

It is well known from past experience that, in many of the developing countries, women – particularly rural, illiterate women – are not sure of the dates of births and hence the interviewers were given intensive training in the use of probes, local calendars, historical events, and birth charts in order to obtain the most accurate information possible. We now examine the extent to which these intensive efforts have achieved their objectives.

5.6.2 Problems of Date Reporting and Imputation

One useful preliminary step is to look at the proportion of events for which actual month and year of occurrence were reported. Table 16 gives the information both for all live births reported and for most recent births[1]. In Latin America[2], exact month and year were reported for 90 per cent or more of the births, whereas in Asia the percentages are much lower. The worst case is Bangladesh where month and year were reported for only 12 per cent of births, the year of birth alone for another two per cent, while for the remaining 86 per cent of cases the date of the birth was given in terms of "years ago". Completeness of reporting date of last birth is much higher than for all births, the percentage with at least the calendar year of birth being above 90, except in Bangladesh and Indonesia.

The strikingly complete reporting of month and year of birth in Nepal deserves comment as it may be the result of the particular variant of birth history used. In the Nepal survey the forms for recording births consisted of rows representing all possible calendar years prior to the survey in chronological order (and the equivalent number of years ago) so that even when the date of birth is reported as "years ago", the interviewer records the details of the birth in the row for the corresponding calendar year. This information on calendar year was then transferred at the time of coding. However the most interesting feature is that the month of birth also seems to have been reported in all cases. By contrast most other surveys made no provision to record the month of birth in instances where the respondent was unable to state calendar year but stated the number of "years ago"; hence the interviewer had to discard that

[1] Interviewers were instructed to probe and estimate dates of births rather than accept a respondent's initial inability to provide the information. In most countries, only a few dozen, or less, births had no recorded estimate of date of occurrence, and these were imputed clerically. The extent of estimation or imputation by interviewers in the field is of course unknown.

[2] Data are not included in Table 17 for these countries because unimputed tapes are not available at WFS headquarters. Another reason for their exclusion is the fact that in some countries "years ago" responses were converted clerically into calendar years.

Table 16 Reporting of the Date of Occurrence for (a) All Live Births and (b) Last Live Birth

Country	Per Cent Reporting Date of Last Live Birth as			Per Cent Reporting Date of All Live Births as		
	Month and Year	Year Only	Years Ago	Month and Year	Year Only	Years Ago
Bangladesh	33	4	63	12	3	85
Fiji	96	4	0	86	14	0
Indonesia	56	8	36	46	11	43
Jordan	84	6	10	67	11	22
Korea, Republic of	100	0	0	100	0	0
Malaysia	95	5	0	86	14	0
Nepal	100	0	0	100	–	0
Pakistan	90	10	0	80	20	0
Sri Lanka	83	12	5	73	18	9
Thailand	90	8	2	84	13	3
Guyana	93	3	4	91	4	5
Jamaica	93	–	7	91	–	9

Note: "–" less than one per cent

information even if it was reported by the respondent.

This brings us to the general question of imputation. At the time of recoding and tabulation, all data in the "years ago" form were imputed into calendar month and year, using a WFS imputation program[1]. Since the extent of such computer imputation is known exactly, it is interesting to examine the effect, if any, of the mode of imputation on the fertility trends obtained thus.

In a recent study Chidambaram and Pullum (1980) have examined this problem in detail with special reference to Bangladesh where the calendar month and year had to be imputed in the office for about 85 per cent of births, with the percentage requiring imputation rising steeply from recent to more distant past. The authors point out that the term "years ago", which is synonymous to the age of a living child at the time of the survey as far as the woman is concerned, could be reckoned in the following different ways: age at last birthday (completed years): age at the nearer birthday (rounded years): age at next birthday (projected years).

The WFS uniformly recommended the concept of completed years for reporting age, but it is possible that in some societies, such as Bangladesh, this approach is rather an alien idea. In Bangladesh, and indeed throughout the Indian Sub-continent, therefore, the ages could have been reported in rounded years (e.g. 4.5 to 5.5 rounded as 5). In order to assess the sensitivity of period fertility estimates to different imputational assumptions, all information on "years ago" was assigned to a calendar month and year using the WFS imputation program, first under the assumption that reporting was in conventional completed year format and then using the rounded year assumption. Figure 4 shows the total number of births estimated for each calendar year using "completed" and "rounded" year assumptions.

It is interesting to note that the "rounded" year assumption gives a higher number of births in the most recent periods and hence does not show as steep a decline in fertility as the "completed" year approach. At this stage it is not possible to say which set of estimates represents the truth in the case of Bangladesh, but the more important finding is that the method of month imputation, itself, whether done in the field or in the office, can bias the estimated trends and levels in fertility, in situations where the percentage of births to be imputed is high and increases as one goes back in time.

5.6.3 Displacement of Live Births

Completeness of date reporting is no guarantee of accuracy, because of the unknown amount of interviewer estimation and the possibility of digit preferences and more systematic respondent errors in the dating of events. Indeed there are grounds for believing that maternity histories frequently suffer from event displacement, particularly in the form of a concentration of births in the period 5 to 14 years prior to the survey, at the expense of births in earlier periods and perhaps even from the most recent five year period prior to the survey. The presence of such errors may create an entirely artificial impression of rising fertility levels, followed by a decline in the last five years. In cases of genuine fertility decline, recent trends may be severely exaggerated[1].

In Tables 12 and 13 above, evidence of birth displacement for the oldest cohort has already been noted. In

[1] The details of this program are available on request from WFS, London.

Table 17 Age Specific Fertility Rates Cumulated Up to Age 35 for Periods 0-4, 5-9, 10-14 and 15-19 Years Prior to the Survey

Country	Years Prior to the Survey			
	0-4	5-9	10-14	15-19
Bangladesh	5.13	6.84	6.56	5.72
Fiji	3.52	4.26	5.30	5.53
Indonesia	4.17	4.75	4.91	4.92
Jordan	5.83	6.49	6.95	6.73
Kenya	5.94	6.29	6.62	5.97
Korea, Republic of	3.03	3.48	4.26	4.40
Malaysia	3.75	4.31	4.88	5.23
Nepal	4.79	4.82	4.67	4.65
Pakistan	5.14	5.68	5.54	5.52
Sri Lanka	2.89	3.65	4.23	4.50
Thailand	3.59	4.43	4.82	5.12
Colombia	3.69	4.65	5.29	5.34
Dominican Republic	3.94	4.79	5.19	4.70
Jamaica	3.91	4.74	5.22	4.93
Peru	3.49	4.12	4.23	4.42

Table 17 displacement is examined by means of age specific fertility rates cumulated up to age 35 for the periods 0-4, 5-9, 10-14, and 15-19 years prior to the survey for 15 countries. Countries can be classified into two groups. For seven of them, the fertility rate falls monotonically over the 20 year period (Fiji, Indonesia, Malaysia, Sri Lanka, Thailand, Colombia, Peru). As we have corroborative evidence of decline, we may conclude that displacement, if it has occurred at all, has not been sufficiently severe to reverse the monotonic nature of the decline. In all other countries, the fertility rate peaks at duration 5 to 14 years prior to the survey: in the countries of the Indian Subcontinent, fertility is highest in the period 5 to 9 years ago, while for the others (Jordan, Kenya, Dominican Republic, Jamaica) this is so in the period 10 to 14 years ago. Of course, the possibility of a secular rise and then fall in fertility cannot be entirely discounted and it is likely that omission in the earliest period has contributed to the fertility hump in certain countries. Nevertheless misreporting of dates of births is the most plausible explanation for the phenomenon. Furthermore, a study currently in progress at WFS headquarters suggests that the observed peaks are largely caused by misplacement of events from earlier time periods rather than from the most recent period. If this is so, reporting of births during the past five years can be used with reasonable confidence for estimating the current level of fertility.

The detailed country analyses confirm that displacement of dates of birth is more prevalent (or detectable) than omission of births. In general, older women have tended to displace the date of their early births towards the survey date. This type of displacement error is most pronounced in Nepal and Bangladesh; in Nepal, fertility rates for several of the older cohorts seem to have been affected by displacement, whereas in Bangladesh mainly rates for the oldest cohort have been affected. Evidence of displacement of dates of early births towards the survey date for women in their 40's has also been presented for Pakistan, the Dominican Republic, Jamaica, and for Fijians (not Indians) in Fiji. There is evidence of only very slight displacement of dates of early births for the oldest cohorts in Colombia and Sri Lanka. Surprisingly, the data for Sri Lanka suggest the possibility of a pushing backwards of dates of early births. This is the only evidence of event displacement away from the survey date.

5.7 CONCLUSIONS

Though it has proved difficult to disentangle the effects of omission and displacement of births, the tentative conclusion is that the latter is the more serious problem. Though under-reporting of births has occurred in a number of surveys, it is usually of modest dimensions and confined to women who are reaching the end of their reproductive life. Surprisingly, omission is not inevitably selective in terms of survivorship or sex of births. In only one country is there firm evidence of differential omission of dead children and, in only a couple is there an apparent propensity to forget girls rather than boys. As a consequence, data on infant and child suvivorship are unexpectedly good, and permit more ambitious substantive analysis than hitherto attempted using retrospective information.

Displacement of births, particularly in the form of a shift by older women of distant events towards the date of the survey, is a more common defect of WFS data sets. As a consequence, estimation of fertility trends should never be made without a critical assessment of the data. Current levels of fertility are less prone to distortion but, even here, caution should be exercised.

[1] Retherford (1979) presents evidence that errors in reporting of respondent's age may lead to similar distortions in fertility trends.

6 Response Reliability

.Assessment of the quality of survey data is an essential step in their analysis and utilisation. In addition to comparison with external sources and examination of the internal consistency of the data, a post-enumeration survey (PES) provides another basis for assessment of data quality. Though a PES is not an essential component of all WFS surveys, a subsample of the main survey respondents has been reinterviewed in an attempt to study response variability in a number of countries (see Table 1, Col. 2). Basic features of these studies are: the conduct of a reinterview soon after the main survey under similar "essential survey conditions" using the same or similar questionnaire and interviewing and field procedures; and the matching of individual respondents in the two interviews. More recently, our PES studies have involved a third – reconciliation – interview, the objective of which is to establish more clearly "true" answers in cases where discrepancies between the first two interviews arise, and to assess the source of these discrepancies.

The interview-reinterview comparison provides measures of response variability pertinent to the essential conditions under which the survey is conducted. Response variance can influence the results derived from the survey, since the introduction of "random" noise due to response instability attenuates correlation between survey variables and increases the variance of survey estimates.

Insofar as the two interviews are conducted under similar conditions, their comparison can throw no light on the effect of those conditions themselves, i.e. on the magnitude of response *bias* common to both. The third reconciliation interview, has a certain potential in meeting this objective, and one can also hope to identify the sources of error on the basis of which survey procedures – questionnaire design, recruitment and training methods, field work organisation and supervision – can be evaluated and improved.

In this preliminary assessment of the WFS data, we summarise below the main conclusions to emerge from response reliability studies in Fiji, Indonesia and Peru, more detailed results for which are published elsewhere (Srikantan 1979; MacDonald, Simpson and Whitfield 1978; O'Muircheartaigh, Marckwardt and Verma 1979). Unfortunately results are not available for the other PES studies at present.

The magnitude of response variability depends upon the nature of the survey variable in a pronounced way. Generally (and not unexpectedly), factual data are more reliable than attitudinal data, and data for current and recent periods are more reliable than those relating to the more remote past. However, the detailed pattern is more complex, and sometimes surprising. For example, in Indonesia where women were asked to classify their childhood place of residence as urban and rural, over one in four gave a different answer during the reinterview; the level of discrepancy was not much smaller even among women who had never moved from the place of their birth.

Univariate distributions by individual characteristics are generally very close between the two interviews. In other words, for many variables the "net" discrepancy at the aggregate level is negligible due to the cancelling out of individual level discrepancies in opposite directions. This is particularly true of factual data such as the number of children ever born. However, for certain groups of variables discrepancy even at the aggregate level can be pronounced. For example the PES in Peru yields an appreciably different distribution for the first birth interval – a variable which depends upon two independently obtained dates (date of first marriage and of first birth), both referring to the relatively distant past and highly prone to memory lapse. A similar observation has been made for variables concerning fertility preferences in Fiji.

Large net differences are found also in variables concerning knowledge and use of contraception, (though these differences may reflect the failure to maintain the essential survey conditions identical in the two interviews): for example in the Fiji PES women indicate a substantially improved knowledge of non-supply contraceptive methods such as breast-feeding; in Peru, where the reinterview did not involve a method by method probe, substantially lower levels of contraceptive use are reported. As an illustration Table 18 compares the means computed for the matched sample for the two interviews in Peru[1].

Turning to individual level of gross discrepancies, even for presumably "hard" variables such as the respondents' level of education and work status, 10-20 per cent give different answers in the two interviews. The level of discrepancy is naturally much higher for attitudinal and knowledge variables. For example, over one-half of the respondents in Peru give a different answer to the question on the total number of children desired, and among older

[1] Temporal data are adjusted for the time elapsed between the two interviews.

Table 18 Comparison of Means for Matched Sample from Original Interview and Reinterview in Peru

Variable	Original Interview	Reinterview
Mean number of marriages	1.10	1.11
Children ever born	4.65	4.67
Total number of children desired	3.78	3.57
Percentage ever used contraception	53.2	41.3
Age at first marriage	19.8	20.0
Calendar year of first birth	1963.6	1963.4
First birth interval (months)	13.4	9.1
Last closed interval (months)	38.4	38.6
Births in past 5 years	1.11	1.05

Table 19 Percentage of Respondents Who Give Different Answers During the Two Interviews

Variable	Peru	Indonesia	Fiji
Level of Education	16.3	10.1	–
Status of First Marriage	9.1	–	7.0
Children Ever Born	12.4	9.6	12.9
Ever-Use of Contraception	18.9	–	18.1
Number of Children Desired	59.8	46.0	49.6
Current Age (Single Years)	34.1	56.7	–
Current Age (5 Year Group)	14.0	22.5	12.9
Age at Marriage (Single Years)	54.2	62.5	–
Age at Marriage (5 Year Group)	24.5	21.8	19.4
Year of First Birth	29.1	20.5	–
First Birth Interval (Months)	72.2	–	63.3
Last Closed Interval (Months)	53.9	–	–
Births in Past 5 Years	15.9	–	12.9

rural women with no education this is true of over three-quarters of the women.

Differences between countries are particularly pronounced in the extent to which answers concerning dates of distant events in retrospective birth and marriage histories are reported consistently, just as countries differ in the extent to which women are able to provide complete information (calendar month and year) on these dates. The dating of events in the marriage history is particularly unreliable. The date of first marriage, for example, is frequently reported less consistently than the date of woman's own birth and particularly less consistently than the date of her first live birth. The fact that some women completely omit an earlier marriage in one of the other interview is an additional source of large discrepancies. Table 19 shows individual level discrepancies for a number of variables for the three countries. Unfortunately not all the figures are available in the published reports referred to earlier.

Though to an appreciable extent, individual level discrepancies tend to cancel out on the average, response errors can nevertheless seriously distort or obscure relationships between variables. Apart from response bias, the introduction of random or haphazard noise in the measurements attenuates (i.e. biases downwards) correlations between variables. The magnitude of this attenuation for a pair of variables depends upon the interview-reinterview correlation between responses for each of the variables. As an example, the correlation between responses concerning the total number of children desired is only 0.42 for Peru and 0.46 for Indonesia (but somewhat higher, 0.62 in Fiji), which implies that the correlation of this variable with any other survey variable is reduced by around a third due to response variability in the former alone.

For the improvement of survey procedures it is important to separate the sampling from the non-sampling component in the total variance of a survey estimate. For the relatively stable variables, such as current parity, we have frequently found non-sampling variability to be negligibly small compared to sampling variability. On the other hand, for variables concerning fertility preferences and knowledge and use of contraception, 10-20 per cent of the total variance is due to non-sampling sources in Fiji; in Peru this proportion is 58 per cent for the mean total number of children desired and as high as 85 per cent for the mean first birth interval length. Further, this proportion varies from one sample category to another and depends upon the sample size in a complex way. It may not always be possible to reduce the total variance through augmentation of sample size in the same way as it is to reduce the sampling component alone.

In conclusion, WFS response variability studies – though small in number and at present only partially analysed – point to important differences in response errors between different types of survey variables. Since attitudinal variables and variables relating to retrospective dating tend to be substantially more prone to response instability, it is necessary to rely on carefully conducted intensive individual interviews to obtain data relating to those. The simpler household interview is unlikely to be a substitute for the intensive individual interview, even though the former may provide, as argued in a previous section, equally good data on recent and factual matters at a much lower cost.

7 Concluding Remarks

The practical infeasibility of experimentation while conducting a series of comparable national surveys through an intensive international programme such as the WFS, limits the extent to which certain methodologically pertinent questions can be answered. Given a core methodology, it is nevertheless possible to go a long way towards evaluation of the quality of the data obtained. This paper is a preliminary and broad attempt in this direction, and the tentative nature of many of our conclusions should be stressed. We have been fortunate to have access to data from nearly 20 developing country surveys, and to a large volume of unpublished work by scholars in the field.

The central theme of WFS surveys has been the measurement of fertility. We believe that in most cases the coverage of vital events in the individual survey has been good and WFS data on infant and child mortality appear particularly sound (the coverage of fetal losses is, however, poor). On the other hand we have demonstrated that carefully conducted *household* surveys *can* achieve a fairly complete coverage of cumulative fertility and similar estimates of current fertility. Of course the main value of the detailed birth history in the individual questionnaire is its potential for analysis of trends and patterns of fertility. The quality of WFS data in this context varies considerably between countries. In around one-half of the countries considered here the data appear to be of sufficient quality to permit detailed analysis, by period and cohort for example. In other countries the scope of analysis may be more limited by errors in the dating of births.

Another advantage of an individual interview as opposed to a general household interview is the greater potential in the former to obtain elaborate data on factors associated with fertility such as marriage history, knowledge and the pattern and timing of contraceptive use, fertility preferences and other attitudinal items. We have made no attempt in this paper to evaluate this wealth of additional information available in all WFS surveys. However, the limited evidence from reinterview studies suggest that attitudinal measures as well as data relating to the more distant past are specially prone to response variability. Such data are thus more sensitive to the conditions under which they are obtained and it is difficult to imagine a substitute for intensive personal interviews conducted under strict field supervision, if these variables are to be obtained with acceptable precision.

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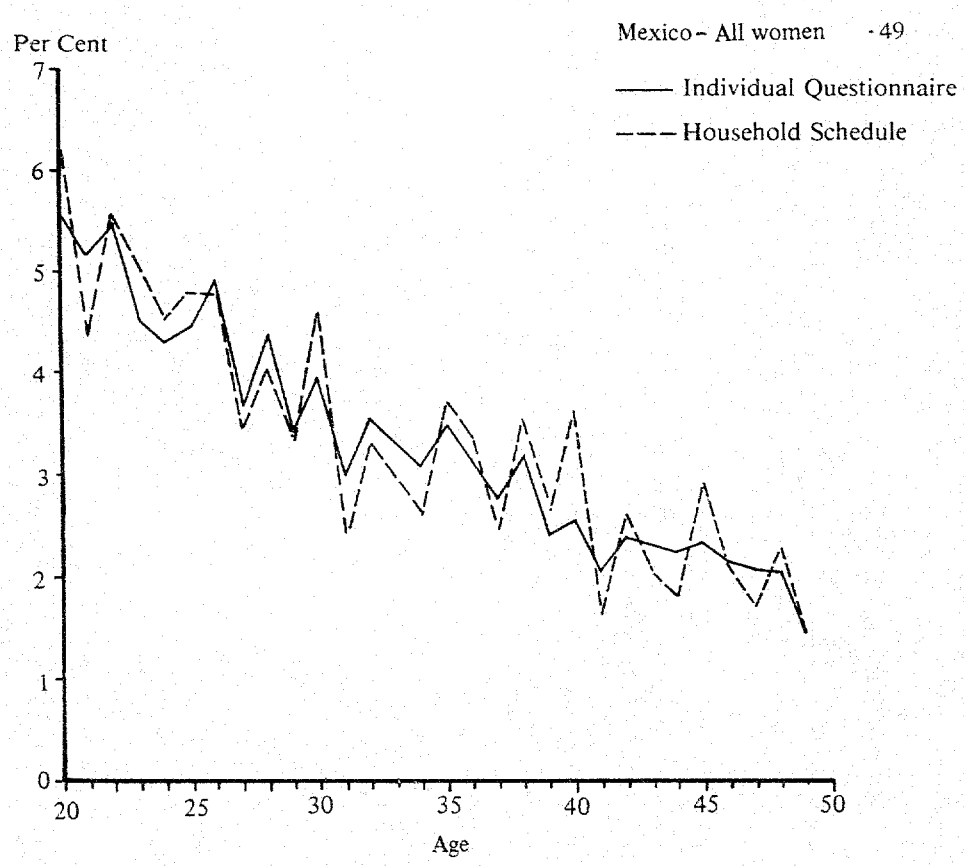
Figure 1 Per Cent Distribution of Women, by Single Years of Age: Mexico and Venezuela



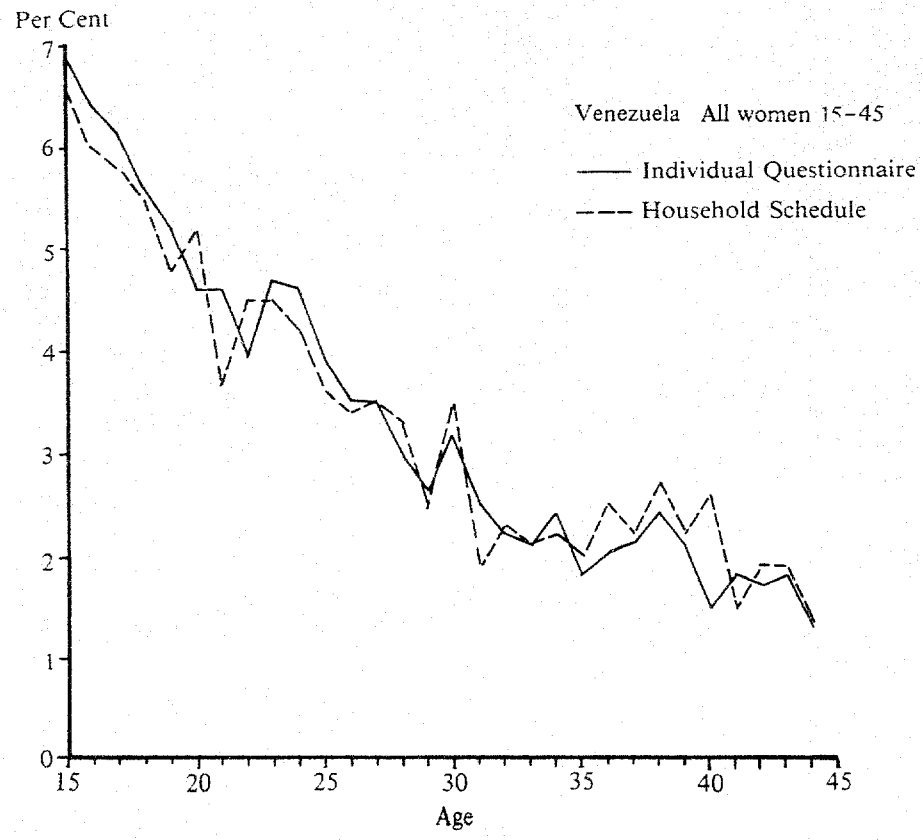


Figure 2 Per Cent Distribution of Women, by Single Years of Age: Jordan

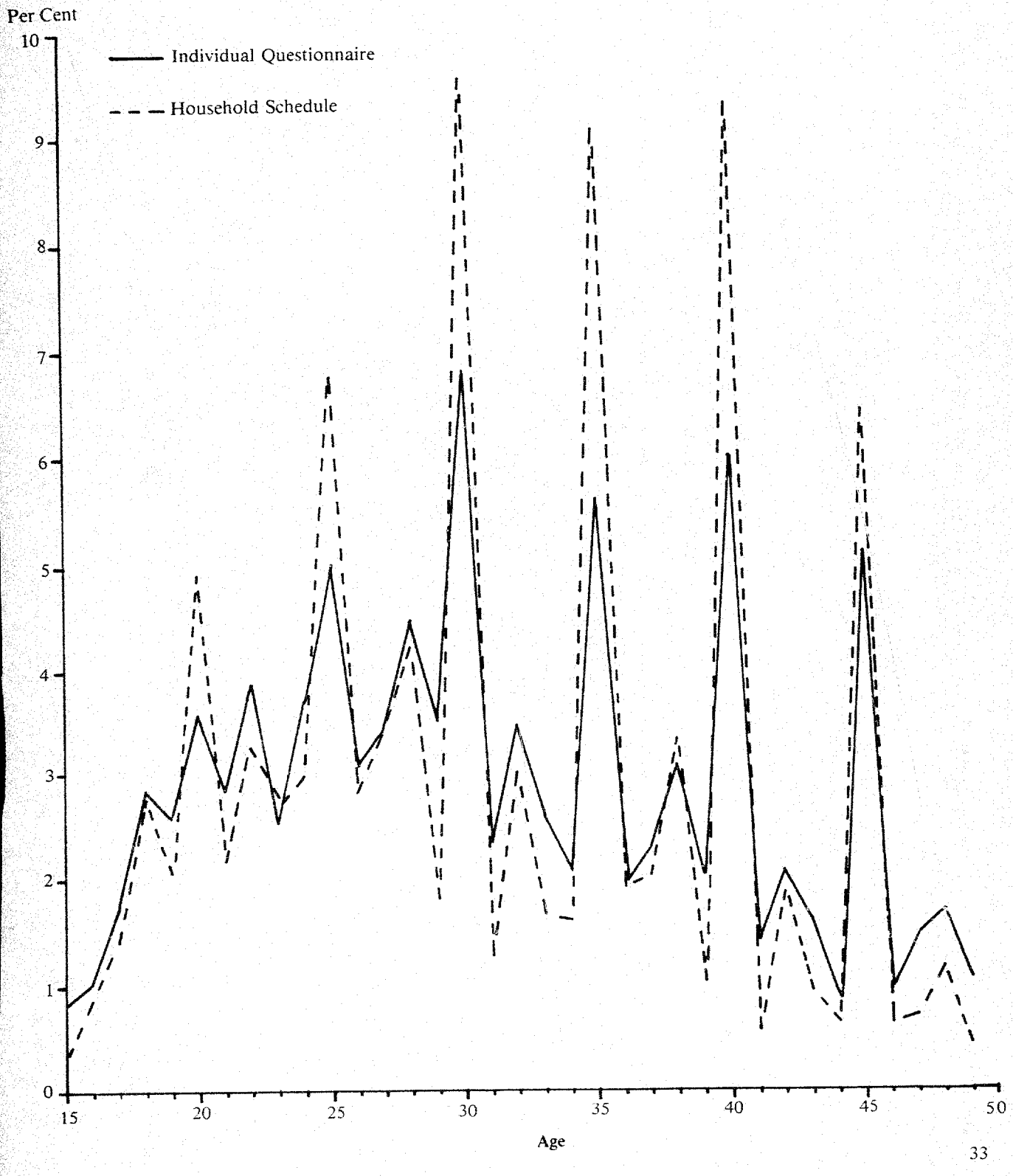


Figure 3 Per Cent Distribution of De Facto Female Population Enumerated in the Kenyan National Demographic Survey (NDS) and the Fertility Survey (KFS)

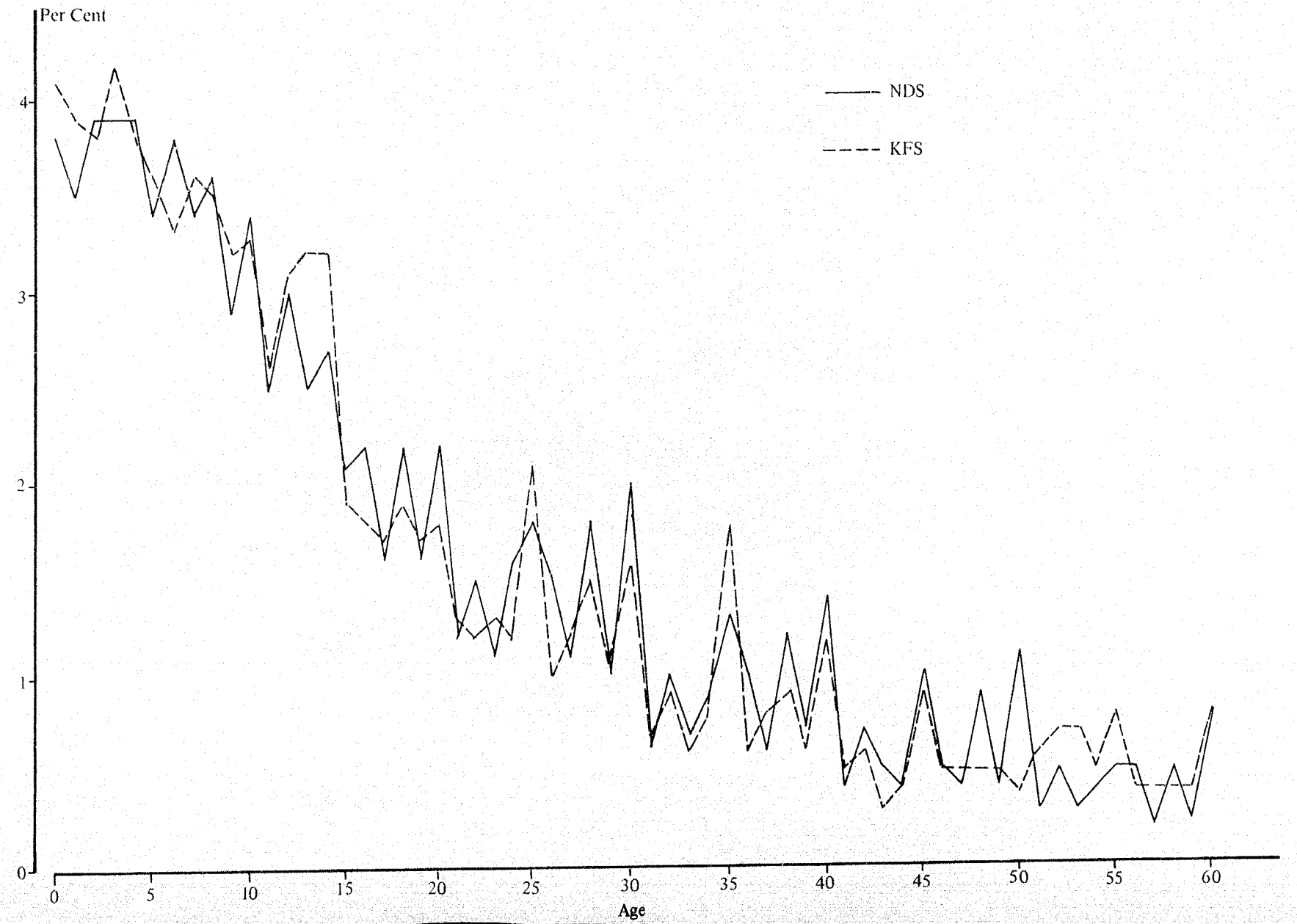


Figure 4 Comparison of Annual Number of Births Estimated using two assumptions for imputation, Bangladesh Fertility Survey, 1962-75