

CONTRACEPTIVE PREVALENCE SURVEYS FURTHER ANALYSIS REPORT

AN EVALUATION OF THE AGE-SPECIFIC
FERTILITY RATES FROM MEXICO'S
1979 CONTRACEPTIVE PREVALENCE SURVEY

BY

JOSEPH E. POTTER

FEBRUARY 1984



WESTINGHOUSE HEALTH SYSTEMS
P.O. BOX 866
COLUMBIA, MARYLAND 21044 U.S.A.

An Evaluation of the Age-Specific Fertility Rates from

Mexico's 1979 Contraceptive Prevalence Survey

by

Joseph E. Potter

Introduction

The 1979 Contraceptive Prevalence Survey provided the first convincing evidence of a major decline in Mexican fertility following the vigorous implementation, starting in 1976, of the national family planning program. A survey of contraceptive prevalence conducted in 1978 had provided indications of fertility change, but the results were not taken seriously as the sample consisted of only a small number of women, and the questionnaire was lacking in demographic sophistication. It was perhaps to avoid a similar reaction that a very considerable amount of thought and resources were devoted to the Encuesta Nacional de Prevalencia en el Uso de Metodos Anticonceptivos con Modulo Fecundidad/Mortalidad. The survey actually consisted of two sub-surveys carried out at the same time. The first and largest was the Prevalence survey with a sample that eventually included 13,854 households and 15,279 women of reproductive age. The second and smaller survey was of Maternal and Child Health with a sample of 4,642 households and 5,202 women of reproductive age. Common to both surveys was a household questionnaire that included a complete enumeration of members of the household and made possible an analysis of fertility based on the own-children method. The individual questionnaires for both surveys also included a common module on the socio-economic characteristics of the interviewee, and her reproductive antecedents.

The purpose of the report which follows is to provide an evaluation of the age-specific fertility rates provided by the

1979 survey. At this point, the findings of the survey are not in much doubt since the survey has already been analyzed in considerable detail(eg. Martinez Manatou, 1982), and the own-children results give considerable credence to the general consistency of this survey with the earlier Mexican Fertility Survey(Mendoza and Nunez, 1980). But although the main finding of a considerable decline in fertility is not in question, there are still questions about the magnitude of the decline, and about the intermediate fertility variables which served to bring it about. These are the questions on which we hope to shed additional light.

In the analysis, the bulk of our attention will be devoted to the Prevalence sub-survey since it is this survey which collected the information on contraceptive use. Hereafter, this sub-survey will be referred to as the Contraceptive Prevalence Survey or CPS. The topics to be considered are the influence that non-response to the individual survey may have had on the composition of the sample by age and marital status, and the degree to which change in several of the proximate determinants of fertility account for the decline in the observed Total Fertility Rate since the 1976 Mexican Fertilty Survey.

The Influence of Non-Response to the Individual Survey

Garcia Castro and Garcia Nunez (1982) have made a preliminary analysis of the incidence and influence of non-response in the 1979 Contraceptive Prevalence Survey. They examine the phenomenon at two levels: non-response to the household questionnaire and thus to the entire survey, and non-

response to the individual questionnaire of women age 15 to 49 enumerated in the household questionnaire. The former admits of a geographical analysis, but few conclusions can be drawn since no information is recorded regarding the households in which it proved impossible to administer the questionnaire.

Non-response to the individual survey may be analysed in greater depth as a certain amount of information concerning the missing individuals is recorded on the household questionnaire. Garcia Castro and Garcia Nunez compared the distribution by age of the women reproductive age enumerated in the household survey with that of women who responded to the individual questionnaire. They found that the women who were successfully interviewed in the individual survey were significantly older than those who were not successfully interviewed (p.736). The mean age of women who responded was 28.8 while the non-responding women had a mean age of 25.9.

These authors note that it is altogether likely that non-response will be selective of certain kinds of women, particularly of economically active women in urban areas. But the bias they identify is not, of itself, particularly important to an evaluation of age-specific fertility in that, at least within the limits of five year groups, the age distribution is factored out of the analysis. Much more disturbing are the child-woman ratios they calculate for respondents and non-respondents. The mean number of own-children recorded on the household survey for women who were eventually interviewed was 2.0, while this number was

only 0.6 in the case of non-respondents. The difference of 1.4 children is clearly larger than what would be expected on the basis of the relatively slight difference in age between the two groups. It suggests that non-response was selective with respect to motherhood and probably marital status as well.

To explore the possibility that the distribution of women by age and marital status in the Prevalence Survey may have been affected by non-response bias, it was decided to further investigate differences between all the women of reproductive age enumerated in the household survey and those of them who were eventually included in the individual survey. Since marital status was not included in the household questionnaire, we directed our attention to the information on the woman's relationship to head of household and also to the "own-children" questions that sought to identify the mother of any children under 15 enumerated in the household questionnaire.

In this analysis were included the 16,905 women with stated ages from 15 to 49 enumerated in the Prevalence household survey. Of them, 15,190 were eventually interviewed for the individual survey. Since the total number of women in the Prevalence individual survey was slightly larger (15,279) apparently some of the women with age unstated or unknown were also selected for the individual survey, perhaps on the basis of information provided about their year of birth. The exclusion of these 89 individuals from our analysis should not constitute a problem, however, since they only account for 0.6 percent of the

total sample.

For our purposes, it was sufficient to collapse the various categories of relationship to head of household into three: head, spouse of head, and other. Of these, it seemed likely that the second or spouse category would consist mainly of currently married women. Although it would be perfectly plausible to find currently married women in either of the other two, they would be less likely to constitute a large majority of the women in the category. The numbers of women to be found in each of the three categories by five year age group in both the household and the individual survey are shown in Tables 1 and 2. These results are unweighted and thus do not necessarily reflect the distribution of non-response in the weighted sample. Table 3 shows the non-respondents to the individual survey in each age and relationship category, calculated as the difference between the numbers found in Tables 1 and 2.

The marked difference in relationship to the head of the household between the respondents and non-respondents to the individual survey is evident in Table 4, that shows the percent of women in the three relationship categories for each age group. The discrepancy is such that, in any age group, the proportion of spouses is much smaller among non-respondents than among respondents. In turn, non-respondents are much more likely than respondents to be classified as the head of the household or in the "other" category. The net bias introduced by the selectiveness of non-response is evident in the comparison between

Table 1. The Distribution of Women Enumerated in the Household Survey According to Relationship to the Household Head, by Age Group, Contraceptive Prevalence Survey.

<u>Age Group</u>	<u>Head</u>	<u>Spouse of Head</u>	<u>Other</u>
15-19	66	489	3593
20-24	169	1508	1703
25-29	197	1840	675
30-34	186	1557	304
35-39	211	1442	219
40-44	195	1116	186
45-49	180	871	198

Table 2. The Distribution of Respondents to the Individual Questionnaire According to their Relationship to the Household Head, by Age Group, Contraceptive Prevalence Survey.

<u>Age Group</u>	<u>Head</u>	<u>Spouse of Head</u>	<u>Other</u>
15-19	54	473	2977
20-24	143	1457	1365
25-29	165	1794	530
30-34	166	1517	242
35-39	189	1383	180
40-44	171	1055	158
45-49	160	797	168

Table 3. The Distribution of Non-Respondents to the Individual Questionnaire According to their Relationship to the Household Head, by Age Group, Contraceptive Prevalence Survey.

<u>Age-Group</u>	<u>Head</u>	<u>Spouse of Head</u>	<u>Other</u>
15-19	12	16	616
20-24	26	51	338
25-29	32	46	145
30-34	20	40	62
35-39	22	59	39
40-44	24	61	28
45-49	20	74	30

Table 4. The Percent Distribution of Women by Relationship to the Household Head, by Age Group, for Respondents and Non-Respondents to the Individual Questionnaire, Contraceptive Prevalence Survey (Unweighted Data)

Age Group	Head			Spouse			Other		
	Respondents	Non-Respondents	Total	Respondents	Non-Respondents	Total	Respondents	Non-Respondents	Total
15-19	1.5	1.9	1.6	13.5	2.5	11.8	85.0	95.7	86.6
20-24	4.8	6.3	5.0	49.1	12.3	44.6	46.0	81.4	50.4
25-29	6.6	14.3	7.3	72.1	20.6	67.8	21.3	65.0	24.9
30-34	8.6	16.4	9.1	78.8	32.8	76.1	12.6	50.8	14.9
35-39	10.8	18.3	11.3	78.9	49.2	77.0	10.3	32.5	11.7
40-44	12.4	21.2	13.0	76.2	54.0	74.5	11.4	24.8	12.4
45-49	14.2	16.1	14.4	70.8	59.7	69.7	14.9	24.2	15.9

the percentage distribution of respondents by relationship with that of all women enumerated in household survey. The bias is greatest in the youngest age groups where the non-response is most heavily concentrated.

The figures presented so far were derived from unweighted tabulations. To see the influence of non-response on the published results of the Prevalence Survey, tabulations of weighted cases were made. Table 5 shows the percentage distribution of women by relationship to the head of the household in each age group for both respondents to the individual questionnaire and all women enumerated in the household questionnaire according to the weighted data. These numbers differ only slightly from those in the previous table, and the direction and magnitude of the net bias is clearly the same.

The file containing the individual questionnaire "matched" with the corresponding household questionnaire can be analysed to see just how closely the relationship to household head approximates marital status. Table 6 shows the percent in each age group of women reported to be currently married ("casadas" and "conviventes") in the individual survey who are not reported in the household survey as the spouse of the household head. Except in the first two age groups, about 90 percent of the currently married respondents were enumerated as being the spouse of the household head. On the other hand, only a minute fraction of spouses did not report themselves to be currently married.

These relations can be used to estimate the proportion of

Table 5. The Percentage Distribution of Women by Relationship to Household Head, by Age Group, among Respondents to the Individual Questionnaire and among all Women Enumerated in the Household Survey, Contraceptive Prevalence Survey (Weighted Data).

<u>Respondents to the Individual Questionnaire</u>			
<u>Age Group</u>	<u>Head</u>	<u>Spouse of Head</u>	<u>Other</u>
15-19	1.4	14.2	84.4
20-24	4.7	49.3	46.0
25-29	6.6	71.3	22.1
30-34	8.5	78.7	12.8
35-39	10.6	78.8	10.5
40-44	14.9	74.0	11.0
45-49	13.5	72.7	13.8
<u>All Women Enumerated in the Household Survey</u>			
<u>Age Group</u>	<u>Head</u>	<u>Spouse of Head</u>	<u>Other</u>
15-19	1.2	12.4	86.1
20-24	4.8	45.2	50.0
25-29	7.3	67.4	25.2
30-34	8.7	76.0	15.3
35-39	10.9	77.0	12.1
40-44	15.1	72.8	12.0
45-49	13.2	72.1	14.7

Table 6. Percent of Currently Married Respondents to the Individual Questionnaire Not Reported as the Spouse of the Household Head, by Age Group, Contraceptive Prevalence Survey (Weighted Data).

<u>Age Group</u>	<u>Percent</u>
15-19	31.7
20-24	20.9
25-29	10.7
30-34	8.8
35-39	7.8
40-44	8.7
45-49	11.1

Table 7. Estimated Percent Currently Married, by Age Group, Contraceptive Prevalence Survey.

<u>Age Group</u>	<u>Percent</u>
15-19	18.1
20-24	56.9
25-29	75.3
30-34	83.0
35-39	83.3
40-44	79.6
45-49	81.1

currently married women in each age group in the household survey providing that we are willing to assume that the proportion of currently married women listed as spouses is unaffected by non-response. For example, in the age group 15-19 in the individual survey there are 1.457 currently married women for each woman listed as the spouse of a household head. If we suppose that this same relation holds in the household survey, we can then multiply the total number of women 15-19 enumerated as spouses in that survey by 1.457 to obtain an estimate of the number of currently married women in the age group.

Another way to think of this procedure is in terms of the row percents and column percents shown in Figure 1. For the household survey, the only available information consists of the marginal total for the "spouse" and "not spouse" columns. To fill out the remaining cells, we first distribute the 512 spouses by marital status according to the (first) column percents shown in the top panel of Figure 1. The next step is to utilize the (first) row percents from the individual survey to determine the number of women age 15-19 in the household survey who are currently married but who are not spouse of the household head.

The procedure will be unbiased as long as non-response is confined to women who are neither currently married or spouses, or whenever it is neutral with respect to the row and column percents used in the procedure. Applying the procedure to all seven of the five year age groups yielded the estimated percents currently married shown in Table 7.

Figure 1. Schematic Representation of the Procedure of Estimating the Number of Currently Married Women Age 15-19 in the Household Survey

Individual Survey

	Spouse	Not Spouse
Currently Married	row % = 68.3 489.7 col % = 99.5	row % = 31.7 227.8
Not Currently Married	2.6 col % = 0.5	2,757.8

Household Survey

	Spouse	Not Spouse
Currently Married		
Not Currently Married		
Total	512	3,607

The "own-children" data collected by the household questionnaire provide another point of reference with which to gauge the selectiveness of non-response. Whenever a child less than age 15 was listed in the enumeration of members of the household, the respondent was asked to identify the mother of the child. Thus, by considering all members of the household, it is possible to classify women of reproductive age according to whether or not they were named as the mother of a child also residing in the household. Being named as a mother is, though, an imperfect indicator of motherhood since children who have died or who are not living in the household will not be taken into account.

Table 8 shows the percent of women in each five year age group named as mothers among respondents to the individual survey and among all women enumerated in the household survey. Once again, a noticeable discrepancy has been produced by non-response which in this case appears to be selective of women who have children living in the household in all but the first age group.

The cross-tabulation of the matched file of respondents to the individual questionnaire shows that a generally small but variable proportion of currently married women were not reported as mothers, and that an even smaller but still variable proportion of named mothers were not currently married. These results are shown in Tables 9 and 10.

On the basis of these proportions, we can again estimate the number of currently married women in each five year age group

Table 8. The Percent of Mothers, by Age Group, among Respondents to the Individual Questionnaire and among all Women Enumerated in the Household Survey, Contraceptive Prevalence Survey (Weighted Data).

<u>Age Group</u>	<u>Individual Questionnaire</u>	<u>Household Survey</u>
15-19	13.6	13.7
20-24	57.5	53.7
25-29	80.2	76.9
30-34	88.2	85.8
35-39	88.8	86.4
40-44	79.8	78.2
45-49	68.8	66.8

Table 9. Percent of Currently Married Women not Named as a Mother, by Age Group, Respondents to the Individual Questionnaire, Contraceptive Prevalence Survey (Weighted Data)

<u>Age Group</u>	<u>Percent</u>
15-19	43.1
20-24	15.1
25-29	7.0
30-34	5.0
35-39	5.8
40-44	13.2
45-49	25.9

Table 10. Percent of Named Mothers not Currently Married, by Age Group, Respondents to the Individual Questionnaire, Contraceptive Prevalence Survey (Weighted Data)

<u>Age Group</u>	<u>Percent</u>
15-19	14.0
20-24	8.4
25-29	7.7
30-34	7.3
35-39	9.5
40-44	12.0
45-49	11.9

in the household survey. The assumption is that, in the individual survey, non-response does not influence either the proportion of currently married women listed as mothers, or the proportion of women listed as mothers who are currently married. In each age group, these proportions from the individual survey are used to, first, distribute the women listed as mothers in the household survey according to marital status, and then to determine the number of currently married women who were not listed as mothers. The percent currently married, by age group, estimated on this basis is shown in Table 11.

Before comparing the two sets of estimated percents currently married with those observed directly in the individual survey, let us review what we are about. Our suspicion is that the women of a particular age who were enumerated in the household survey and who responded to the individual survey were more likely to have been currently married than the enumerated women who did not appear in the individual survey. Since information on marital status was only collected in the individual survey, there is no direct way to determine the marital status of non-respondents. To get around this problem, we have focused on two surrogate variables from the household survey that should be closely related to marital status, namely relationship to the household head and motherhood. By comparing the respondents to the individual survey with the totality of women enumerated in the household survey, we demonstrated that non-response biased the sample of women included in the individual survey with respect to these two

TABLE 11

Estimated Percent Currently Married by Age Group,
Contraceptive Prevalence Survey

Age Group	Percent
15-19	0.182
20-24	0.569
25-29	0.753
30-34	0.830
35-39	0.833
40-44	0.796
45-49	0.811

characteristics. That is to say that the latter includes, in each age group, too great a proportion of mothers and too many women who are the spouse of the household head. These results strongly suggest that response to the individual survey was also selective of currently married women, but we would like to be able to quantify the amount by which the individual survey might mislead us in this regard.

To proceed further, we examined the relationship between marital status and the surrogate variables among respondents to the individual survey. We looked at both the proportions of currently married women who were not spouses (mothers) in different age groups, and the proportions of spouses (mothers) who were not currently married. This analysis indicated a strong association in most age groups between marital status and the surrogate variables. The last step was to extrapolate back to the household survey in an attempt to estimate the proportion of enumerated women in each age group who may have been currently married.

Table 12 shows the percent currently married in each age group that was observed in the individual survey together with the two estimates of the percents currently married in the household survey. The estimates are both lower in every age group (with one exception) than the proportions currently married observed in the individual survey. The estimates also differ from each other. The motherhood estimates are higher than the spouse estimates in the first four age groups while the reverse holds

TABLE 12

Estimates of the Percent Currently Married by Age Group,
Contraceptive Prevalence Survey (Weighted Data)

Age Group	Observed in the Individual Survey	Spouse Estimate Household Survey	Motherhood Estimate Household Survey	Mean Estimate Household Survey
15-19	20.6	18.2	20.6	19.4
20-24	62.1	56.9	57.9	57.4
25-29	79.7	75.3	76.4	75.9
30-34	86.0	83.0	83.6	83.3
35-39	85.3	83.3	83.0	83.2
40-44	80.9	79.6	79.3	79.5
45-49	81.8	81.1	79.5	80.3

true in the last three age groups. This pattern may have its origin in the differential selectiveness of non-response according to these two variables. Table 5 showed that in the older age groups the proportion of spouses in the individual survey was only slightly larger in than in the household survey. Such narrowing of differences with increasing age is less evident in Table 8 showing the percent of mothers in the two samples. With respect to the difference in the estimates in the younger age groups, a likely explanation might involve the selectiveness of non-response to the individual survey of young mothers according to marital status. If young unmarried mothers were less reluctant to participate in the individual survey than married mothers of the same age, then the assumptions on which the estimate is constructed would be violated in a way that would tend to bias the estimate in an upwards direction. This is not to deny that there might be an offsetting bias deriving from differential non-response among young married women according to motherhood. The point is rather that in the case of the motherhood estimates there is the possibility of two conflicting biases, while there is only scope for one type of bias in the spouse estimates.

In any case, in the absence of a firm basis for deciding between one or the other of the two sets of estimates, a reasonable conclusion might be to accept an average of the both of them such as appears in the last column of Table 12.

The Credibility of the Fertility Rates

The individual questionnaire of the Prevalence Survey included a battery of questions designed to obtain reliable information on the fertility of respondents in the one to two year period preceding the interview. After a series of questions on the number of children ever born, the woman was asked to give the date of birth of her last live born child. Then, following a series of questions on the sex of the child, its breastfeeding history and mortality status, there were probes for any pregnancies that may have followed the afore-mentioned birth and for multiple births. Finally, if the last live birth occurred after August 1978, a respondent was asked for the date of her next to last live birth.

Age-specific fertility rates could be calculated in a number of ways on the basis of the available information. The procedure adopted here was to take into account the last twelve months of experience prior to the month of interview. Since the interviews were conducted from September 1979 to December 1979, the fertility rates do not refer to a single calendar year (e.g. 1978) that is exactly the same for each respondent. We chose to work with complete months of exposure and exclude the month in which the interview took place so as not to depend on the information supplied regarding the day of birth, but only on the month and the year. With this small exception, the information we are working with is as close as possible to the date of interview.

In evaluating the Prevalence Survey, our principal point of reference is necessarily the Mexican Fertility Survey -- the

Mexican round of the World Fertility Survey -- that was conducted about three years earlier (October 1976 - February 1977). The Mexican Fertility Survey was based on a national sample only 60 percent as large as that of the Prevalence Survey, but included full pregnancy histories in its individual questionnaire. It has been subjected to a number of consistency checks (Ordorica and Potter, 1980) and prior to the prevalence Survey constituted the principal source of data on recent Mexican Fertility. Age-specific fertility rates from the two surveys are presented in Table 13. Notice that because of the smaller sample, the MFS rates are based on the 24 months of experience preceding the survey interview. For convenience, the reference periods in the table are simply labeled 1979 and 1975-1976 although this is not exactly the case.

The main question before us is whether the large decline in fertility evident in Table 13 -- 17 percent in about 3 1/2 years -- actually took place. Given the absence of reliable vital registration or census data that could be used as external benchmarks, our strategy must necessarily depend on information collected in the two surveys. The procedure we propose is to compare the observed change in fertility with the change that one would expect on the basis of the changes in the three proximate determinants of fertility which were measured in both of the two surveys.

The three proximate determinants (or intermediate variables) at our disposal are the proportions of women in a

TABLE 13

Age-Specific Fertility Rates (Per Thousand) from the
Mexican Fertility Survey and the
Contraceptive Prevalence Survey

<u>Age Group</u>	<u>MFS</u> <u>(1975-1976)</u>	<u>CPS</u> <u>(1979)</u>
15-19	115	118
20-24	285	243
25-29	265	224
30-34	230	184
35-39	165	131
40-44	73	44
45-49	14	11
Total Fertility Rate	5.74	4.78

sexual union, contraceptive use and efficacy, and the duration of postpartum infecundability as indicated by the length of breastfeeding. In recent work, Bongaarts (1978, 1982, and 1983) has developed indices to measure the fertility-inhibiting effect of these variables, and has shown that they, together with induced abortion, account for a large proportion of the variance in age-specific fertility rates observed among national populations.

Before proceeding, it is worthwhile to review the strengths and weaknesses of this approach. The greatest weakness, of course, is that only a sub-set of the various intermediate fertility variables will be taken into account. In particular, no data is available from the surveys on changes in induced abortion, fecundability, spontaneous intrauterine mortality, or the prevalence of permanent sterility. Not taking these variables into account is tantamount to assuming either that their impact on fertility did not change over the period, or that plausible shifts in the variables in such a short time span would have had a negligible effect on fertility. Such an assumption is clearly least justifiable in the case of induced abortion.

A further difficulty is that the information that the surveys do provide does not always correspond well in its reference period with the age-specific fertility rates we are trying to evaluate. The information we have on marital status and contraceptive use refer to the time of the interview and will affect the level of fertility that will be observed nine months

after the interview, yet the fertility we are evaluating occurred in a defined time period preceding the interview.

Despite these limitations, the proposed methodology is clearly superior to the obvious alternative of applying a series of consistency checks relying on the information on children ever born collected in the two surveys. The problem with such checks is that any inconsistencies they reveal are more likely to reflect on the quality of the parity data in the respective surveys than on the reliability of recent age-specific fertility. Much the same could be said about checks on the consistency of overlapping estimates of past fertility based on applying the own-children method to the household questionnaires of the Prevalence Survey (see, for example, Mendoza and Nunez, 1980). In spite of the reluctance of some demographers to accept the fact (e.g. Hill, 1980), intermediate fertility variables are usually the only legitimate basis for an evaluation of this type.

In the following pages, we will first explore changes in the proportions of women in union and in the duration of breastfeeding, since they can be dealt with in relatively short order, before turning to the more time consuming analysis of changes in contraceptive use and effectiveness. Table 14 shows the proportions of respondents in marital unions by age group in the Mexican Fertility Survey along with the proportions from the CPS individual survey and those estimated for the CPS household survey in the previous section. The direction of change between 1976 and 1977 in the proportion of women in union in the different

TABLE 14

Percent of Respondents in Marital Unions by Age Group,
in the Mexican Fertility Survey and the
Contraceptive Prevalence Survey

Age Group	MFS (1976)	CPS Individual Survey (1979)	CPS Household Survey (1979)
15-19	19.4	22.1	19.4
20-24	60.5	61.9	57.4
25-29	80.1	79.6	75.9
30-34	84.0	85.9	83.3
35-39	83.8	85.4	83.2
40-44	81.2	80.7	79.5
45-49	77.3	81.9	80.3

age groups greatly depends on which proportions from the CPS one compares with the MFS proportions: the comparison with the CPS individual survey indicates a general increase in the proportion of women in union, while the comparison with the household survey estimates indicate that a smaller proportion of women were in marital unions in all age groups except 15 - 19, where there is no change.

The fertility-inhibiting impact of a given set of age-specific proportions of women currently married is, in populations where the vast majority of fertility takes place within marriage, conveniently summarized by the Bongaarts model (1982) index, C_m . To calculate the index, one needs only the proportions of women in union and the corresponding age-specific fertility rates. Using the fertility rates from Table 13, the value of C_m for the Mexican Fertility Survey was 0.66, while it was 0.68 for the CPS individual survey and 0.64 for the CPS household survey.

Before trying to reach any conclusions on the basis of these conflicting indicators, one must also consider the non-response bias that might be present in the Mexican Fertility Survey data which itself is derived from an individual questionnaire. This possibility was explored, although not in depth, by Ordorica and Potter (1980). A tabulation of women enumerated in the MFS household survey according to age, marital status, and whether or not the person was included in the individual survey showed higher proportions of women in union in the individual as compared to the household survey (p.12). Non-

response to the individual questionnaire was less prevalent in the MFS than in the CPS -- 4.7% as against 9.3% (SPP, 1979, p. 196) -- but only about 60% of all eligible women were selected for the individual survey.

Taking the numerous uncertainties account, it seems likely that the results from both individual surveys concerning the distribution of women by age and marital status were affected by selective non-response, but that the bias was greatest in the case of the CPS.

All told, these data do not permit a sure inference as to whether the fertility-inhibiting effect of "non-marriage" was greater in 1979 or 1976. We can be sure, though, that whatever the direction of the effect, it was fairly small.

In the absence of information on the mean length of the post-partum infecundable period, investigators usually resort to estimating this parameter from an estimate of the mean duration of breastfeeding in the population since "it is now well established that breastfeeding is the principal determinant of amenorrhea" (Bongaarts and Potter, 1983, p.24). To determine whether or not there was a change in breastfeeding practices between the 1976 Mexican Fertility Survey and the 1977 Contraceptive Prevalence Survey, we can rely on the careful study undertaken by Keller (SSA, 1981). Analyzing the Prevalence and the MCH modules from the 1979 Survey together, he noticed that a slightly smaller percent of last births -- 77.6 versus 80.3 -- were "ever breastfed" in the CPS as compared to the MFS. On the other hand,

on the basis of the information presented in Table 15 on the proportion of children still being breastfed at the time of the survey, he concluded that the duration of breastfeeding might have increased slightly between the two surveys.

Once again, comparing the two surveys does not provide evidence of a change, and the most that can be said is that if a change did take place, it was of a relatively small magnitude.

While there was no firm evidence of change in the first two intermediate fertility variables on which the surveys provide information, the third variable, contraceptive use and effectiveness, clearly increased between 1976 and 1979. The proportion of currently married women of child bearing age using a contraceptive method at the time of the interview rose from 29 percent in the Mexican Fertility Survey to 38 percent in the Contraceptive Prevalence Survey. Table 16 shows the change that occurred in the various five year age groups.

In addition to the change in the prevalence of contraceptive use, there was also an important shift in the composition of this use by contraceptive method. Table 17 shows the distribution of use by method in each of the two surveys. The most notable change evident in the table is an increase in sterilization at the expense of "other" methods such as withdrawal, rhythm, and barrier methods.

In Bongaarts' model, the index measuring the fertility-inhibiting effect of contraception is constructed on the basis of two parameters: the prevalence of current contraceptive use among

TABLE 15

Percent of Children Still Breast Feeding by Age

Mexican Fertility Survey and

Contraceptive Prevalence Survey

Age (in Months)	MFS (1976)	CPS (1979)
1	72.7	76.8
2	68.0	70.5
3	61.5	62.1
4	57.3	55.3
5	51.4	52.2
6	50.4	52.4
9	44.6	46.0
12	37.5	35.6
15	27.1	29.0
18	20.0	20.3
21	13.9	9.5
24	5.9	6.2

SOURCE: SSA, 1981, Table 6.

NOTE: Includes last and next to last children irrespective of their ever having been breastfed or of their surviving to the date of the interview.

TABLE 16

The Percent of Currently Married Women Using a Contraceptive Method
at the Time of the Interview by Age Group, Mexican Fertility Survey
and Contraceptive Prevalence Survey

<u>Age Group</u>	<u>M.F.S.</u> <u>(1976)</u>	<u>C.P.S.</u> <u>(1979)</u>
15-19	14	19
20-24	27	37
25-29	39	45
30-34	38	50
35-39	38	43
40-44	25	33
45-49	11	16
15-49	29	38

TABLE 17

The Percentage Distribution of Current Use of Contraception by
Methods and Average Use-Effectiveness (Percent),
Mexican Fertility Survey and Contraceptive Prevalence Survey

<u>Methods</u>	<u>M.F.S.</u> <u>(1976)</u>	<u>C.P.S.</u> <u>(1979)</u>
Pills	37	33
IUD or Injectables	25	22
Sterilization	7	24
Other	31	21
Average Use-Effectiveness	86	89

married women 15-49, and the average use-effectiveness of contraception. The latter may be obtained by assigning standard values -- 1.0 for sterilization, 0.95 for IUDs and injectables, 0.90 for pills, and 0.70 for other methods -- to the method categories used in Table 16 (Bongaarts, 1982, p.187). Following this procedure, we arrive at indices of 0.73 for the Mexican Fertility Survey and 0.63 for the Contraceptive Prevalence Survey. Taking the ratio of the two indices, one arrives at the inference that the change in contraceptive use indicated by the two surveys should, of its own account, produced a 13 percent decline in the Total Fertility Rate. The actual change in the TFR shown in Table 13 was of the order of 17 percent.

While it would appear that the increase in contraception was able to account for about three quarters of the observed decline in fertility, there are several considerations that might alter this conclusion. The first is that the level of fertility at a point in time is determined by contraceptive use nine months earlier. In the calculations just performed, we have been associating fertility in a defined time period with contraceptive use occurring, in the case of the MFS, 12 months after the mid-point of the period, and in the case of the Prevalence Survey, six months after the mid-point of the period. In other words, the contraceptive use we are observing in the Prevalence Survey is occurring, on average, 15 months after the fact, and in Mexican Fertility Survey, 21 months after the fact. Not only are we off by a considerable margin in terms of the temporal matching

contraception with fertility, but the time elapsed between the two measures of contraceptive prevalence is shorter than the time elapsed between the mid-points of the two intervals.

One way to ensure that time elapsed between the measurements is the same for both fertility and contraception is to estimate fertility in the year (rather than the two years) preceding the Mexican Fertility Survey. The Total Fertility Rate obtained from the MFS individual survey for the 12 months preceding interview was 5.5 (Ordorica and Potter, 1980, p.23). The ratio of this TFR to the 4.78 obtained from the Prevalence Survey turns out to be very close to the ratio of the two indices of the impact of contraception. Thus, in this comparison, the change in contraception appears to account for all of the change in fertility observed between the surveys.

The last consideration is of the unobservable trend in contraceptive prevalence prior to the 1976 survey. Although the increase in prevalence between 1976 and 1979 documented by the surveys was large by almost any standard, it is at least plausible that the increase in the two years prior to the Mexican Fertility Survey may have been as fast or even faster. These years witnessed the legalization of contraception in Mexico and the initiation of a contraceptive delivery system within the urban public health infrastructure (Martinez Manatou, 1982).

The conclusion of this analysis is simply that the change in the three intermediate fertility variables on which the Mexican Fertility Survey and the Contraceptive Prevalence Survey collected

information does not call into question the decline in the Total Fertility Rate observed between the two surveys. The surveys do not provide a basis for believing that changes in either nuptiality or breastfeeding practices had much if anything to do with the decline, but they do show an increase in contraceptive use and effectiveness between 1976 and 1979 that is indicative of a trend steep enough to have accounted for virtually all of the observed decline in fertility.

Even with this satisfactory answer concerning the consistency of the results of the two surveys, there remains the possibility that the Total Fertility Rate observed in the Contraceptive Prevalence Survey may not be representative of the level of Mexican fertility in 1979. On the one hand, there is the likelihood that the selective non-response to the CPS individual survey analyzed in the first section of this report introduced a sample bias in the direction of higher fertility. On the other hand, the the CPS individual questionnaire may not have resulted in an entirely accurate and complete enumeration of the births that actually did occur within the sample population. On balance, it seems reasonable to suppose that these two sources of bias would be opposite in direction, and that the TFR of about 4.8 provides a satisfactory estimate of Mexican Fertility in the year preceding the CPS interviews.

References

Bongaarts, J. 1978. A framework for analyzing the proximate determinants of fertility. *Population and Development Review* 4(1): 105-132.

Bongaarts, J. 1982. The fertility inhibiting effects of the intermediate fertility variables. *Studies in Family Planning* 13(6/7): 179-189.

Bongaarts, J. and Potter, R. 1983. *Fertility, Biology, and Behavior: An Analysis of the Proximate Determinants*. New York: Academic Press.

Garcia Castro, A. and Garcia Nunez, J. 1982. Algunos errores no muestrales en la Encuesta Nacional de Prevalencia en el Uso de Metodos Anticonceptivos con Módulo Fecundidad/Mortalidad, 1979. En *Memorias de la Segunda Reunion Nacional sobre la Investigacion Demografica en Mexico*. Mexico, D. F.: CONACYT.

Hill, K. H. 1980. Methods for estimating fertility trends using WFS and other data. *World Fertility Survey Conference, London, Vol. 3*.

Martínez Manatou, J. ed. 1982. *La Revolucion Demografica en Mexico, 1970-1980*. Mexico, D. F.: IMSS.

Mendoza, D. and Nunez, L. 1980. Mexico: Estimacion de la fecundidad por el metodo de los hijos propios. mimeograph.

Ordorica, M. and Potter, J. E. 1981. Evaluation of the Mexican Fertility Survey 1976-1977. Scientific Report No. 21 of the World Fertility Survey.

SSA(Secretaria de Salubridad y Asistencia). 1981. *Lactancia materna: Tendencias recientes en la experiencia Mexicana*. Mexico, D. F.

SPP(Secretaria de Programacion y Presupuesto). 1978. *Encuesta Mexicana de Fecundidad, Informe Metodologico*. Mexico, D. F.