The Pakistan Development Review
33:4 Part II (Winter 1994) pp. 727–742

Proximate Determinants of Fertility in Pakistan

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INTRODUCTION

The fertility level is the phenomenon which is the major determinant of population growth. Various studies conducted since early seventies and to date reveal that total fertility rate in Pakistan ranged between 6 to 5.4 and crude birth rate between 42 to 34 [Population Planning Council of Pakistan (1976); Population Welfare Division of Pakistan (1986); Pakistan Demographic and Health Survey (1990) and Population and Fertility Indicators (1993). The levels and trends in fertility are influenced by various physiological, cultural, social, economic, behavioural, demographic and ecological factors. But on the bases of empirical evidences Bongaarts argues that most of the variation in fertility levels is attributed to the differential impact of four factors; namely marriage, contraceptive use, lactational infecundability, and induced abortion [Bongaarts (1978)].

Using the Bongaarts model and data obtained in the Pakistan Fertility Survey (1974-75), Pakistan Contraceptive Prevalence Survey (1984-85), Pakistan Demographic and Health Survey (1990-91) and Population and Family Planning Indicators Survey (1993) attempt is made to decompose the total fertility rates.

FERTILITY LEVELS AND TRENDS

Crude birth rates (CBRs) and age-specific fertility rates obtained from the selected four surveys are presented in Table 1 and Table 2.

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Author's Note: I am grateful to Dr A. K. Ubaid-ur-Rob, Associate in Population Council Islamabad for encouraging to write this paper. Thanks are due to Dr Rafique Shah, Consultant to UNFPA, Islamabad for providing comments on an earlier draft of this paper. Special thanks are also due to Dr Sultan S. Hashmi, Resident Advisor to NIPS, who provided technical assistance to complete this paper.

Table 1

Crude Birth Rates according to Selected Surveys 1974-1993, Pakistan

Year	Crude Birth Rate
PFS 1974-75	40.5
PCPS 1984-85	36.6
PDHS 1990-91	35.0
PFPI 1993	34.0

Note: Based on data for six years prior to the interview for PDHS and one year prior to the interview for the PFS, PCPS and PFPI.

Crude birth rates are shown in Table 1 to show the progressive decrease which is consistent with the small decline in the Total Fertility Rates.

The Table 1 indicates a crude birth rate for Pakistan of 40.5, 36.6, 35.0 and 34.0 births per 1000 in 1974-75, 1984-85, 1990-91 and 1993 respectively. Comparing the CBRs of various surveys, it is observed that there is a decline of four percent in CBR between two surveys of 1974-75 (PFS) and 1984-85 (PCPS) and 2.6 percent between 1984-85 and 1993.

The estimated age-specific fertility rates shown in Table 2, produce a TFR of 6.3, 6.0, 5.4 and 5.38 births per women in 1974-75, 1984-85, 1990-91 and 1993 respectively. The estimates of age-specific fertility rates (Table 2) indicate that the prime childbearing reported in PFPI (1993) is 5.38 children per women which is considerably lower than fertility estimates reported in the PFS (1974-75) and PCPS

Table 2

Age-specific Fertility Rates for Women Age 15–49 Years in 1974-75 PFS, 1984-85 PCPS, 1990-91 PDHS and 1993 PFPI

Age Group	1974-75	1984-85	1990-1991	1993
15–19	104	64	84	36
20–24	266	223	230	189
25–29	314	263	268	276
30–34	264	234	229	230
35–39	204	209	147	174
40–44	93	127	73	89
45–49	8	71	40	82
TFR	6.3	6.0	5.4	5.38

Source: PFS Table 37, PCPS Table V.2, PDHS Table 4.3, PFPI Table 5.4.

(1984-85) which were 6.3 and 6.0 respectively. The downward trend in fertility observed in selected surveys may be in response to an increasing age at marriage and increasing use of contraception. However, these rates are higher than in many less developed countries.

MARRIAGE PATTERNS

Marriage is one of the principal proximate determinants of fertility. In Pakistan marriage is a social obligation and all births occur within wedlock. The length of time, women are exposed to the risk of child bearing affects the number of children women potentially can bear. Thus increase in marriage age can play a vital role in reducing fertility levels, as it reduces the period of exposure to child bearing. Comparative results of previous surveys show that according to the PFS (1974-75) 98 percent of women were married by the time they reached age 35–39. Proportion of women married aged 30 reported in PCPS (1984-85), PDHS (1990-91) and PFPI (1993) were 97.4 percent and 98 percent respectively. Average age at first marriage observed in the selected surveys is presented in Table 3.

Table 3

Mean Age at First Marriage of Currently Married Women by Current Age in 1974-75 PFS, 1984-85 PCPS, 1990-91 PDHS and 1993 PFPI

Age Group	1974-75	1984-85	1990-91	1993
15–19	N.A.	15.6	N.A.	15.9
20–24	N.A.	17.1	N.A.	17.9
25–29	17.0	17.6	18.9	18.9
30–34	16.6	17.8	18.2	19.4
35–39	16.2	17.6	18.6	19.5
40–44	15.7	17.8	18.5	19.9
45–49	16.2	17.4	18.8	20
15–49	16.4	17.4	18.9	19.04

Source: PFS Table 3.6, PCPS Table IV. 3 PDHS Table 7.3, PFPI Table 4.2.

It is seen that the average age at first marriage for women aged 15–49 was 16.4 years in PFS (1974-75), 17.4 years in PCPS (1984-85), 18.9 years in PDHS (1990-91) and 19.04 in PFPI (1993). The age at first marriage shows a rising trend during last 19 years.

Ahmed (1987) pointed out that though age at marriage shows an upward trend by itself it is not a crucial factor in determining fertility levels. It is related to fertility by virtue of its association with education and urban residence [Ahmed (1987)].

Analysing the differentials in age at marriage, Zeba Sathar writes that differentials in the median age at marriage for different groups of women is higher in urban areas (19.1 years) than in rural areas (18.4 years). She further explains that there was positive association between median age at marriage for women and educational attainment. Women with no education marry four years earlier, on average, than women with secondary or higher education [Sathar (1984)]. Many other studies reported that rising trend in age at marriage does affect fertility but in close association with other socio-economic factors, e.g. education, urban residences, women's decision and marriage outside blood relation.

It therefore seems that in Pakistani society, with minor exceptions, educated women are more likely to be employed, less likely to enter consanguineous unions, more likely to reside in major cities or urban areas, more likely to marry late and have reduced period of exposure of risk of pregnancy and thus more likely to have reduced fertility.

LEVEL OF CONTRACEPTIVE PREVALENCE

Information regarding the important fertility determinants–contraceptive prevalence rate is available for all selected surveys. Table 4 indicates that over the past four decades Ministry of Population Welfare has provided all methods of birth control to the users. The level of contraceptive use by method mixed reported in the PFPI (1993) indicates a considerable increase from that reported in PFS (1974-75), PCPS (1984-85) and PDHS (1990-91).

Overall modern methods were used by 20.7 percent of currently married non-pregnant women and traditional methods by 4.7 percent of currently married non-pregnant women as reported in recent Population and Family Planning Indicators Survey (1993).

Among modern methods, female sterilisation was used most frequently (6.29 percent), followed by the condom (5.2 percent), IUD (4.08 percent), pills (3.1 percent) vaginal method (1.39 percent) and injections (0.58 percent). The government's policy towards users is that of voluntary acceptor, therefore, the continuity of use is rather left to the users but also supported by strong campaign through the use of interpersonal communication and all types of media to create demand for contraception. The four-fold increase in contraceptive use rate over 19

Table 4

Percentage of Currently Married Non-pregnant Women who are Currently Using Contraception by Specific Method in 1974-75 PFS, 1984-85 PCPS, 1990-91 PDHS and 1993 PFPI

Method	1974-75	1984-85	1990-91	1993
Any Method	5.2	9.1	14.0	25.4
Any Scientific Method	3.9	7.6	10.7	20.7
Pill	1.0	1.4	0.8	03.1
Condom	1.0	2.1	3.2	05.2
Vaginal Methods	0.2	0.1	–	01.4
Injection	N.A.	0.6	0.9	00.6
I.U.D	0.7	0.8	1.5	04.1
Female Sterilisation	1.0	2.6	4.2	06.3
Any Traditional Method	1.3	1.5	3.3	04.7
Rhythm/Abstinence	0.1	0.1	1.5	00.7
Withdrawal	0.1	0.9	1.4	03.5
Other Methods	1.1	0.5	0.4	00.5
No. of Women	4441	–	5375	7295

Source: PFS Table 4.4.1, PCPS Table VIII.9, PDHS Table 5.6, PFPI Table 9.5.

years, from 5.2 percent in 1974-75 to 25.4 percent in 1993 is an evidence of various factors mainly the IEC component.

Table 5 indicates the level o contraceptive use with respect to the ages of women. It is seen from the table that contraceptive use rate varies with the ages of women, e.g. in PFS (1974-75) there was an increase from 3 percent for currently married non-pregnant women age 20–24 to a high of 25 percent for women 35–39, in PCPS (1984-85), it was 22 percent for women age 35–39, and in PDHS (1990-91), it ranged from 15 percent for women age 20–24 to a high of 22 percent for women age 25–29.

STATUS OF BREASTFEEDING

Breastfeeding is another important factor in the study of fertility reduction and regulation. Prolonged breastfeeding is known to extend the inter-birth interval. After each birth, a woman experiences an interval of postpartum amenorrhea, during which ovulation does not occur. This interval is usually extended by

Table 5

Percentage of Currently Married Non-pregnant Women who are Currently Using Contraception by Current Age in 1974-75 PFS, 1984-85 PCPS and 1990-91 PDHS

Age Group	1974-75	1984-85	1990-91	1993
15–19	0.0	0.1	0.8	1.0
20–24	0.2	0.8	2.1	3.6
25–29	1.2	1.6	3.1	5.5
30–34	1.3	1.8	2.4	4.8
35–39	1.5	2.0	2.2	4.7
40–44	1.1	1.6	1.9	3.4
45–49	0.7	1.2	1.5	2.5
No. of Women	6.0	9.1	14.0	25.5
	3900*	–	5375	7295

Source: PFS Table 4.4.2, PCPS Table VIII.10, PDHS Table Data tape, PFPI Table 9.7.
*541 Fecundity impairment women are excluded.

breastfeeding because suckling suppresses ovulation. The average duration of postpartum amenorrhea averages about two months if a women does not breastfed at all and as long as two years if breastfeeding is prolonged.

Data on breastfeeding are available from PFS (1974-75), PCPS (1984-85), PDHS (1990-91) and PFPI (1993) and presented in Table 6 and Table 7.

Table 6

Mean Duration (in Months) of the Open Interval of Currently Breastfeeding Last Child in PFS 1974-75, PCPS 1984-85, and PDHS 1990-91

	PFS 1974-75	PCPS 1984-85	PDHS 1990-91
Mean Duration	16.5	18.5	19.5

Source: PFS Table 4.1.2, PCPS Table X1.3, PDHS Data tape.
Note: Data from PFS 1974-75 show mean duration of breastfeeding of closed interval.

As can be seen from Table 6, data collected from selected surveys reveal that on average, Pakistani mothers breastfed their children for 16.5 months, 18.5 months, 19.5 months in PFS (1974-75), PCPS (1984-85) and PDHS (1990-91). Mean duration

of breastfeeding for 1993 is considered the same as in 1990-91. As the both surveys were undertaken near to each other.

The proportion of women who breastfed their children for a specified number of months is revealed from Table 7. Comparative analysis of data from selected surveys shows in Table 7 indicates that proportion of women breastfeeding is getting lower with increasing age of children. For example in PFS (1974-75) 38 percent women breastfed their child for 12–17 months which is reduced to only 23.2 percent women who breastfed for the same period in PDHS (1990-91). For 18–23 months of children the proportion of women who breastfed was 31 percent in PFS (1974-75) which reduced to 11.6 percent in PDHS (1990-91). Variation in the average duration and decline in the level of breastfeeding may be attributed to the increase in educational level, urbanisation, modernisation which ultimately effect on socio-economic status of mothers.

Table 7

Percentage of Women who Breastfed for Specified Number of Months in the Open Interval in PFS 1974-75, PCPS 1984-85 and PDHS 1990-91

Months Breastfed	PFS 1974-75	PCPS 1984-85	PDHS 1990-91
00–00	5.9	5.0	3.4
01–02	3.6	10.6	12.3
03–04	4.6	9.7	10.4
05–06	5.4	8.7	9.3
07–08	4.1	7.3	9.3
09–11	7.3	9.3	9.4
12–17	38.1	25.6	23.2
18–23	31.0	7.6	11.6
24–29	N.A.	13.9	6.0
30–36	N.A.	2.3	5.3
Total	100	100	100
No. of Women	2287	4898852	2309

Source: PFS Table 4.1.3, PCPS Table XI.3, PDHS Data Tape.

Note: Data from PFS 1974-75 show number of months of breastfeeding of closed interval.

ESTIMATION TECHNIQUES USED AND IMPACT OF PROXIMATE DETERMINANTS ON FERTILITY

Fertility differentials among human populations have long been studied by the social scientists and biologists [Davis and Blake (1956)] and developed theoreti-

cal models to explain the variations in the levels of fertility among different societies and among the various segments of the same society. The most important and widely known conceptual model to account for fertility differential is that provided by Davis and Blake (1956). They formulised certain social, demographic and physiological variables through which any socio-cultural factors influence the level of fertility in every society. They listed eleven such variables, called "intermediate variables" and classified them in three groups: factors affecting exposure to intercourse, factors affecting exposure to conception, and factors affecting gestation and successful child birth.

Lactation was absent from these groups. But it is now recognised as one of the principal source of societal variation in fertility, and a model developed by John Bongaarts incorporates this factor. Moreover, he adduces evidence that most of the variation in fertility among national populations is due to just four intermediate, or "proximate", determinants–namely, marriage, contraception use, abortion and postpartum infecundability.

Each of these four variables have a direct effect on fertility together or they determine the level of fertility. The proportion of women married measures the extent to which women are exposed to regular intercourse. Contraceptive use and induced abortion are the measures of deliberate marital fertility control, and lactational infecundability, is the determinant of natural fertility. According to Bongaarts, differentials in fertility are due to differential impact of four intermediate variables, because observed fertility is lower than its maximum value as a result of delayed marriage, the use of contraception, induced abortion and postpartum infecundability induced by breastfeeding.

The distinguishing feature of a proximate determinant is its direct influence on fertility. If a proximate determinant such as contraception use changes, then fertility necessarily changes (assuming the other proximate determinants remain constant) while this is not necessarily true for an indirect determinant, such as income or education. Consequently, fertility differentials and trends in fertility over time can always be traced to variation in one or more of the proximate determinants.

In this paper, utilising a model developed by Bongaarts, we can assess the effect of four most significant proximate determinants of fertility in Pakistan for the period 1974 to 1993.

The fertility-inhibiting effects of the four most important intermediate variables are measured by four indices. The indices can take values between 0 and 1. When there is no fertility-inhibiting effect of a given intermediate variable, the corresponding index equals one; if the fertility-inhibition is complete, the index

equals zero. The farther the value of the proximate determinant is from 1.0, the greater is the factors' fertility-inhabiting effect.

The indices are defined as follows:

Cm = Index of proportion married (equals 1 if all women of reproductive age are married and 0 in the absence of marriage).

Cc = Index of non-contraception (equals 1 in the absence of contraception and 0 if all fecund women use 100 percent effective contraception).

Ci = Index of postpartum infecundability (equals 1 in the absence of lactation and postpartum abstinence and 0 if the duration of infecundability is infinite).

Ca = Index of induced abortion (equals 1 in the absence of induced abortion and 0 if all pregnancies are aborted).

The indices can be calculated by the following formulas.

$Cm = TFR/TM$

Where TFR = Total fertility rate
TM = Total marital fertility rate

$Cc = (1-1.08\,Ue)$

Where U = Contraception prevalence rate
e = The average use-effectiveness

$Ci = 20/(18.5 + i)$

where i is the mean duration of breastfeeding (in months).

The index of induced abortion is considered 1 because rates are not available for Pakistan. The following equation is derived from the above Bongaarts formula:

$TFR = Cm.Cc.Ca.Ci.TF$

The multiplicative model proposed by Bongaarts, presented above, expresses the total fertility rate (TFR), as the outcome of the fertility reducing effects of the four main proximate determinants. The rate thus obtained represents the hypothetical fertility level. On the bases of these indexes, we can separate overall fertility (*TFR*) into two determining components, (1) *Cm*, i.e. the prevailing marriage patterns among women of reproductive age, (2) *TM*, the fertility level within marriage.

The three components *TFR*, *TM*, and *Cm* are calculated for Pakistan for the period 1974-75, 1984-85, 1990-91 and 1993. The results are shown in Table 8.

Table 8

Estimates of Selected Reproductive Measures and Derived Indexes of Four Proximate Determinants

Measure	1974-75	1984-85	1990-91	1993
Total Fertility Rate	6.3	6.0	5.4	5.38
Total Marital Fertility Rate	8.0	7.7	7.9	7.70
Contraceptive Use Rate	0.052	0.091	0.140	0.255
Total Induced Abortion Rate	0	0	0	0
Lactational Infecundability (i)	10.53	12.41	13.09	13.09
Model Indices				
Cm (Index of Marriage)	0.785	0.779	0.671	0.698
Cc (Index of Non Use)	0.953	0.917	0.871	0.796
Ca (Index of Abortion)	1.000	1.000	1.000	1.000
C1 (Index of Lactational Infecundability)	0.689	0.647	0.633	0.633
TF (Natural Fertility)	15.3	15.3	15.3	15.3
TFR Estimated (Cm.Cc.Ca.Ci.TF)	7.886	7.117	5.660	5.381

Analysis of three components *TFR*, *TM* and *Cm* for the year 1974-75 and 1984-85 show a slight variation. For example a total fertility rate of 6.3 and 6.0 births per women is observed in 1974-75 and 1984-85, in which *TM* is 8.0 and 7.7 and *Cm* equals 0.785 and 0.779 in 1974-75 and 1984-85 respectively. So we can say there is small change in the proportion of women married between 1974-75 to 1984-85 and ultimately minor change in *TM* and *TFR*. but there is significant decline in the proportion of women married during 1974-75 to 1990-91. Index of marriage (*Cm*) shows a proportion of married reduced by 0.114 points during 1974-75 to 1990-91. This difference among population in the indexes of proportion married demonstrate the importance of the marriage patterns as a proximate explanation for fertility differentials. The lower the proportion of women married in a population, the lower will be the fertility level.

Contraceptive practice in Pakistan, is the proximate fertility variable, primarily responsible for the wide range in the levels of fertility within marriage.

Index of non-contraception (*Cc*) gives the value by which total marital fertility is smaller than the natural marital fertility, depending on the contraceptive use rate. Index of *Cc* equals 1 when no contraception is practiced, *Cc* equals 0 when all fecund women in the reproductive years are protected by 100 percent effective contraception.

Calculation of the indices of non-contraceptive is difficult because detailed information on the age patterns of current contraceptive practice (large proportion of women are shy users) and its effectiveness is lacking. For the present analysis we took the proportion of all married women of reproductive ages who were currently using contraception and employed use effectiveness rates of 0.84 as proposed by Bongaarts for all developing countries.

Values for indices of non-contraception reaches a maximum of 0.953 in 1974-75 and a minimum of 0.796 in 1993. In the Pakistan Fertility Survey and the Pakistan Contraceptive Prevalence Survey, fertility is found to be high and the indexes of non-contraception is also high. But according to Population and Family Planning Indictors (1993) when the prevalence of contraception is higher, (25.4 percent) and (lowest $Cc = 0.796$), *TFR* is the lowest, thus showing partly the fertility-inhibiting influence of contraception.

The practice of breastfeeding has an inhibitory effect on ovulation and thus this increases the birth interval and reduces natural fertility. According to Bongaarts quantitative estimation of the fertility reducing effect of postpartum infecundability is most easily accomplished by comparing average birth-interval lengths in the presence and absence of lactation. Proposed average birth interval without lactation is 20 months and with lactation, it equals the average of total duration of infecundable period plus 18.5 months. Then the ratio of the average birth intervals without and with lactation will be called the index of lactational infecundability (formula presented above).

Index for *Ci* has changed considerably during the period 1974-75 to 1993. It reaches to the highest of 0.689 and lowest of 0.633.

By putting all indices presented in Table 8 in the proposed equation ($TFR = Cm.Cc.Ca.Ci.TF$), we estimated *TFR* and presented in Table 8. Estimated *TFRs* has declined by 2.5 percent over the period of 19 years. It is also noted that estimated TFRs are much higher than observed *TFRs* in all four surveys. For example, it was estimated about 7.9, 7.12, 5.7 and 5.4 in 1974-75, 1984-85, 1990-91 and 1993 respectively, while observed *TFRs* were 6.3, 6.0, 5.4 and 5.38 in the above mentioned periods.

To interpret the meaning of the indices it must be borne in mind that the complement of each index is equal to the proximate reduction of fertility due to that

particular index. For example, a value of 0.68 for *ci* means that postpartum infecundability accounts for a 32 percent reduction in fertility below its potential level. Thus, the lower the index, the stronger the implied effect on fertility.

Utilising the Bongaarts techniques for indices and assuming the value of 15.3 as *TF*, we estimated *TFRs* in Pakistan for several years. The results are presented in Table 8.

On the basis of the calculations presented in Table 8, the fertility-inhibiting effect of lactational infecundability is the most significant in all four surveys followed by the effect of proportion of women married. Contraception is the least significant determinant of the total fertility rate in Pakistan. According to our calculation lactational infecundability has remained the most important factor which has reduced fertility to about 32 percent to 37 percent in these selected surveys. It is interesting to see that its effect on reducing potential fertility is increasing over time. We can see that index of *Ci* declined gradually from 0.689 to 0.633 during the period 1974-75 to 1993. Index of the Lactational Infecundability had the strongest effect among all three proximate determinants, and according to the model, accounts for the degree of the fertility decline observed among all of four surveys.

Age at first marriage is the second most important fertility-inhibiting factor. The index of marriage shows a significant decline between 1984-85 and 1993, and fertility-inhibiting effect of age at first marriage has increased from 22 percent to 33 percent during 1974-75 to 1990-91. As shown in Table 8, Index of marriage in 1993 is considerably lower 0.698 than 0.785 calculated for index of marriage for 1974-75 and 0.779 for 1984- 85.

The use rate of contraceptions has increased over time but slowly and it had a smaller effect on reducing fertility than other factors. The index of contraception shows increasing trend of fertility-inhibiting effect as shown in Table 8. Indices of contraception range from 0.953 in 1974-75 to 0.796 in 1993.

The model estimates of the Total Fertility Rates are 7.886 for the year 1974-75, 7.117 for the year 1984-85 and 5.660 for the year 1990-91 and 5.168 for the year 1993. These derived estimates are higher than TFR of 6.3, 6.0 and 5.4 calculated for all women aged 15–49 in the year 1974-75, 1984-85 and 1990-91 respectively. In the above analysis we have assumed that induced abortion rate is unknown in Pakistan. Estimated TFR indicate higher level for the period 1974 to 1991. Since induced abortion is not included in the analysis, one might argue that the difference between observed and estimated TFRs is attributed to induced abortion. Thus it is deduced that effect of abortion on fertility reduction are 1.586, 1.071, 0.26 in 1974-75, 1984-85 and 1990-91. We concluded that the effect of abortion decreases as the

prevalence of contraceptive increases.

No national study has taken place in Pakistan. However, a study in Lahore shows that 18.1 percent respondents reported that they had more than two spontaneous abortions and 9.9 percent reported one or more induced abortion [Mahmood (1976)]. It is suspected that rate of induced abortion is more than 10 percent as some of those who reported spontaneous abortions might have actually experienced induced abortion.

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Comments on
"Proximate Determinants of Fertility in Pakistan"

I feel the paper has contributed to the existing literature in two ways. Firstly, it has provided an insight into the contribution of each proximate determinants towards Total Fertility Rate (TFR). It also provides an overview of the changes occurring in these determinants of fertility over a period of 15 years.

Secondly, the declining trend in the estimated TFRs as shown in the paper, points to the process of fertility transition in Pakistan. The TFR of Pakistan Demographic and Health Survey (PDHS) as estimated by the author are in fact slightly higher (Three-tenth of a child) than the observed TFR of PDHS. The author concedes that while employing the Bongaarts Model, she has assumed no effect of 'induced abortion' – one of the indices of the model. The author argues that such an assumption was necessitated because of the unavailability of any empirical evidence to the occurrence of induced abortion in this society.

On the other hand, the author also concedes that inspite of the fact that induced abortion is illegal in Pakistan such events do occur, although the extent of such events are yet to be ascertained; which may be done through special surveys or through anthropological studies. The author affirm that had the extent of induced abortion been known and taken care of in the analysis this small difference may have been further reduced.

I have some general comments and some specific ones. My general comments are:

- Since the author is looking into over the time fertility trends, inclusion of other data sets in the analysis especially the 1979-80 PLM, which was conducted almost in the mids of PFS and PCPS would have been more desirable.
- There is a lot of repetition in the text which may be avoided.
- At the end of the paper, a section on conclusion and policy implications needs to be added.
- In the text, references to a number of authors are made but in the reference table, a lot many are missing.
- There are some typographical mistakes (typos) especially some statis-

tics were wrongly stated and sometimes even interpreted. Such typos should be taken care of.

My specific Comments are:

- In order to show an over the time trend in the Age Specific Fertility Rate (ASFR) and the Total Fertility Rates (TFRs), the author has presented these rates in Table 2 for 1974-75 PFS, 1984-85 PCPS and 1990-91 PDHS. However, it may be noted that whereas, the PFS and the PCPS rates are based on the births in the last 12 months, the PDHS rates are the average of six years. Thus the author should consider that the rates based on conceptually different methodology do not form a comparison.
- In Table 3, the author has shown the age at marriage in the three surveys and on the basis of the statistics presented in the table, the author has shown that there is an increasing trend in age at marriage over the period of time. On page 4, in the footnote the author has written and I quote "Marriage as used here encompasses *Nikah* (The marriage contract) and the actual *Rukhsati* (The departure to live with the husband and his family)" unqoute.

But what the author has said in the footnote is not true for all the three data sets compared here. The concept of age at marriage changes in the 1990-91 PDHS. In PFS and PCPS, the question on age at marriage is phrased as "what was your age when you got married". Pakistan is a traditional society, where even now in many cases *nikah* (marriage contract) is performed at an age, when the girl has not reached puberty. On analysis of various Pakistani data sets by me, it has been revealed that there were a lot of cases where the age at marriage was reported even less than 10 years. And it is in fact due to this reason that in the 1990-91 PDHS, the question on age at marriage was phrased as "How old were you when you started living with your husband". It is suggested that the author may take into consideration such technical intricacies while interpreting the data.

- The author has referred to Table 5, whereas, the statistics presented and interpreted in the text are the ones derived from Table 5. It would have been better to present the derived table rather than the given table.
- The title of the Table 6 is phrased as "Mean duration (in months) of the open interval currently breastfeeding last child in PFS 1974-75, PCPS

1984-85 and PDHS 1990-91." In the table, the statistics for 1974-75 PFS are taken from Table 4.1.2. This table reports the 'mean duration of breastfeeding in the last closed birth interval' whereas, the PCPS and PDHS statistics refer to 'mean duration of breastfeeding in the open birth interval'. The author may please note that the conceptually different statistics cannot form a comparison.

By employing the Bongaarts model, the author has arrived at an estimate of 7.9 children per women for 1974-75 PFS. By using the same model on the same data set, Sathar (1984) in an earlier study had estimated much lower rates. This discrepancy in the estimated TFRs requires further investigation.

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ISSUES IN HEALTH SECTOR