Fertility Transition in Kathmandu

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The onset of the fertility transition is widespread in Asia (Phillips and Sathar, forthcoming) and Latin America (Guzman et al., 1996), and has recently begun in some countries in Africa (Locoh and Hertrich, 1993). Changes in reproductive attitudes and behavior are first evident among the educated and urban segments of the population (Cleland, 1985). This is because many of the prerequisites for the fertility transition such as rising aspirations, changes in the functions of the family, and rising costs of rearing and schooling of children are expected to be associated with urban lifestyles. In Nepal, to the extent that fertility decline has occurred it may be expected to be most apparent in the urban areas.

The purpose of this paper is to document the onset of the fertility transition in Kathmandu, the capital of Nepal. Changes in fertility patterns are examined using various methodologies. The influence of education on fertility differentials is also analyzed.

Data and Methods

The main data for this paper come from a survey conducted in Kathmandu from November 1991 to May 1992 (Aryal, 1995). Households and house number lists, based on the 1991 census provided by the Central Bureau of Statistics, were used as a sampling frame. The 33 wards of Kathmandu city were clustered into seven homogeneous

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areas according to socioeconomic and cultural characteristics. From among the clustered wards a total of 16 wards were purposively selected to represent different characteristics of people. Finally, the sample households were selected from this sampling frame for the individual survey.

The sample of households was drawn proportionately according to the total number of houses in the selected wards. Altogether 983 currently married women aged 15-49 were successfully interviewed. I use bivariate analysis to examine the mechanisms causing changes in the fertility patterns of the study population. The extent of fertility control within marriage is assessed using the index of marital fertility control and parity progression ratios.

Results

Fertility Schedule and Fertility Control

Henry (1961) introduced the concept of "natural fertility," i.e., the absence of deliberate birth control. He argued that factors such as breastfeeding and abstinence associated with lactation may result in a reduction in fertility, but these cannot be considered deliberate attempts at birth control. Following this, Coale and Trussell (1974, 1978) developed a standard age pattern of natural fertility and a standard age pattern of deviation from natural fertility. They developed two parameters 'M' and 'm'. 'M' indicates the underlying level of fertility and 'm' indicates the degree of fertility control.

Coale and Trussell (1974: 187) noted that, "marital fertility either follows natural fertility (if deliberate birth control is not practiced), or departs from natural fertility in a way that increases with age according to a typical pattern." The faster fertility falls with age, the greater the amount of fertility control implied and the higher the value of the 'm' index. The greater the value of 'm', the greater the deviation from the natural fertility schedule indicating greater control of fertility. If 'm' equals 0, the shape of the fertility schedule is identical to that of standard natural fertility. The index 'm' is determined entirely by the age pattern of fertility; it is independent of the level of fertility.

Anderson and Silver (1992: 343) found that the indicator works "well when almost all births occur within marriage and when marriage is common by the time women are in their early twenties. It works less well in historical situations of late marriage." Guinnane et al. (1994), using a simulated population, reported that an 'm' value of 0.2

corresponds to a situation in which more than 30 percent of the population practice effective "stopping behavior." However, a value of 'm' less than 0.2 is an indication of the absence of parity dependent control. Guinnane et al. (1994) also found that fertility control initiated at lower parities (younger ages) has less impact on estimated 'm' values so that 'm' may fail to detect the initial stage of the fertility transition. Anderson and Silver (1992) argued, because of a substantial increase in nonmarital fertility in many European countries, the standard measure of fertility control, which assumes that almost all fertility occurs within marriage, may be inappropriate.

In Nepal almost all births occur within marriage (NCP, 1988). Marriage is nearly universal (Ban and Shrestha, 1993) and fertility control at younger age groups is negligible (Pradhan et al., 1993). In view of these characteristics, the index may be considered a suitable measure to examine fertility control behavior in Nepal.

For purposes of examining fertility control behavior within marriage, only 'm' is considered in this analysis. Wilson et al. (1988: 6) observed that, "Scholars interested in studying the decline of fertility during demographic transition have particularly focused on 'm'. The logic for doing so is clear. If the transition is basically a move from natural to controlled fertility, and if changes in the level of fertility are taken care of by varying 'M', the changes in 'm' should indicate changes in the age profile of fertility alone."

Table 1 shows age-specific marital fertility rates for Kathmandu (1992) and all urban Nepal. The data referring to all urban Nepal are from two surveys—the Nepal Fertility and Family Planning Survey of 1986 (MOH, 1987) and the Nepal Fertility, Family Planning and Health Survey of 1991 survey (MOH, 1993). Because Kathmandu is the capital city, hence more advanced than other urban areas in the country, the data referring to all urban Nepal are not strictly comparable with the Kathmandu survey data. Nevertheless, these comparisons provide an opportunity to assess the fertility control behavior of all urban populations in Nepal.

Table 1 Age-specific marital fertility rates (per woman), total marital fertility rates (per woman) and index of fertility control: All urban Nepal and Kathmandu

Age Group	All Urban 1986	All Urban 1991	Kathmandu 1992
15-19	0.189	0.398	0.170
20-24	0.303	0.308	0.301
25-29	0.219	0.174	0.295
30-34	0.133	0.114	0.109
35-39	0.078	0.040	0.038
40-44	0.049	0.017	0.020
45-49	0.000	0.013	0.000
Total marital fertility rate	4.9	5.3	4.7
Index of marital fertility control (m)	0.8	1.3	1.4

Sources: MOH (1987), MOH (1993), and Aryal (1995).

The fertility rate of women in the 15-19 age group in the 1991 survey is higher than that in the 1986 (all urban) and the 1992 Kathmandu survey. This may be due to the fact that women who married early also gave birth very soon after their marriage. Additionally, this should be interpreted cautiously since it is based on a relatively small number of exposed women (Shrestha et al., 1993: 58). Furthermore, there are some births in the 45-49 age group in 1991. These appear to have resulted in a higher total marital fertility rate for 1991 compared to the 1986 urban rate.

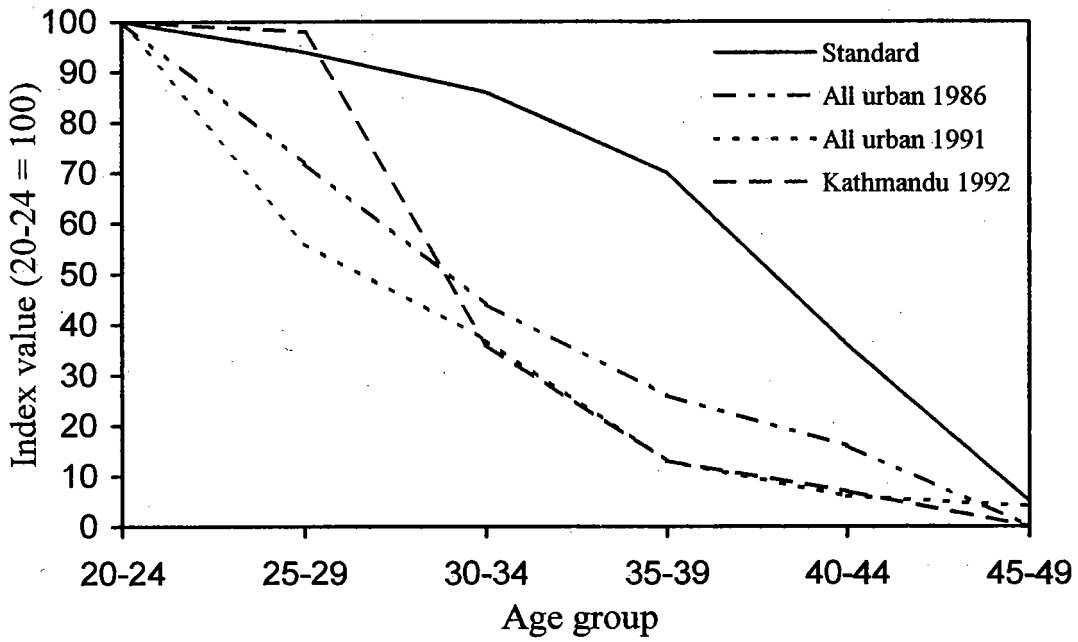
The age pattern of fertility shows that the pattern after age 30 declines sharply in the 1991 survey compared to the 1986 survey, thereby suggesting that the control of marital fertility in urban Nepal 1991 and Kathmandu 1992 is greater than that of urban Nepal 1986. Fertility control behavior in urban Nepal seems to have developed rapidly in recent years.

In societies where couples have preferences for specific family size and control their reproductive behavior accordingly, age-specific marital fertility rates at older ages tend to be low. Coale (1992: 340) states that, "when marital fertility is controlled, it declines more steeply with age than does natural fertility: the older women prevent childbearing more rigorously because a higher proportion of these women want no more children." Furthermore, Knodel (1987: 46) argues that couples concentrate their childbearing in the early part of the

women's fecund period. Once they reach their desired family size they stop further births and, as a result, marital fertility rates are particularly low at older ages. These patterns are clear in Kathmandu and all urban Nepal.

The degree and pattern of deviation from the natural fertility pattern is shown in Figure 1. It shows the index values of the marital fertility schedules (with the rate for the age group 20-24 = 100) and the rate for each subsequent age group expressed as a ratio to that rate. The age-specific marital fertility rates are as shown in Table 1. In the figure, fertility rates below ages 20-24 are not shown since they are considered unreliable (Coale and Trussell, 1974, 1978). The index values of the Coale-Trussell standard marital fertility schedule are also shown.

Figure 1 Index values of age-specific marital fertility rates: Coale-Trussell standard, all urban Nepal (1986 and 1991) and Kathmandu (1992)



In a population in which there is a tendency for increasing control of fertility, the shape of the age-specific marital fertility schedule changes from convex to concave. The curves for all three surveys are concave. However, the curves for Kathmandu (1992) and all urban Nepal (1991) are more concave at older ages than the 1986 urban Nepal curve, indicating higher marital fertility control in

Kathmandu (1992) and all urban Nepal (1991). Although the difference is small, the curve of Kathmandu (1992) is more concave than that of urban Nepal (1991) at older ages, indicating that fertility control behavior is more common in Kathmandu than in other urban areas of Nepal. Coale (1970: 8) noted the most sensitive indicator of the control of marital fertility would be the decline in the age-specific rates above age 30. Although the age pattern of fertility after age 30 is similar in these surveys, the decrease in the age pattern in the older age group is sharp in Kathmandu 1992 and the urban area in 1991 compared to the urban area in 1986.

The Kathmandu survey found considerably higher fertility among women 25-29 than the other two surveys. As a matter of fact, the fertility rate for this age group is even higher than that implied by the Coale-Trussell standard marital fertility schedule. This may have been due to the tendency of younger married women (under age 20) with children to report their age upward (on this point, see Retherford and Thapa, 1998). Consequently, fertility may have been underreported in the 15-19 age group and over reported in the subsequent, 20-24 age group. The quality of data, particularly from the 1992 survey, is of suspect because the rates from the two other surveys are considerably and consistently lower.

At the initial stage of the fertility transition the fall in marital fertility is largest among older women. Knodel (1977: 231) states that, "During the early period of fertility decline, reduction in marital fertility among younger women, aged under 30 for example, is much more modest compared to older women, but as the decline progressed this differential is reduced." He further argues that once parity specific birth control starts to increase it does not turn back to earlier forms of fertility behavior. These findings suggest that couples in urban Nepal are deliberately practicing methods of fertility control. As a result, fertility has started to decline in urban Nepal, particularly in the capital city, Kathmandu.

Parity Progression

Marital fertility control behavior is further examined using parity progression ratios. Parity progression ratios are the observed probabilities of having another child, specific to the number of children that a woman has already had, i.e., a measure of the proportion of women progressing from one to the next birth (Feeney, 1983, 1985). Thus, the first parity progression ratio is the probability for women

with no children to have at least one child, the second parity progression ratio is the probability of having at least two children having had one and so on. These ratios provide an opportunity to examine the nature of changes in the fertility of study populations.

The analysis of parity progression ratios is commonly enhanced by classifying the parity progression by age and marriage duration. In this approach to fertility analysis, the emphasis is on the process rather than on the rates of fertility, although the rates can also be derived. Bhrolchain (1987) states that parity progression ratios can display the completed fertility of the cohorts passing through the childbearing ages during a given period. The use of an age and marriage cohort has the advantage that the parity progression ratios obtained relate to the experiences of groups of real women.

Table 2 shows the parity progression ratios by current age of the women. The data show that over the years there has been a decline in the percentage of women who progressed from zero parity to parity one, from parity one to parity two and so on. For example, in the age group 45 and over, 98 percent progressed from parity two to parity three, 99 percent progressed from parity three to parity four. These ratios are substantially lower for the younger age groups, such as 25-29.

Table 2 Parity progression ratio by age, Kathmandu, 1992

	Current Age Group							
Parity	15-19	20-24	25-29	30-34	35-39	40-44	45-49	All
1	0.404	0.710	0.957	0.989	0.994	1.000	1.000	0.905
2	0.210	0.269	0.726	0.933	0.956	0.961	0.980	0.787
3	0.250	0.228	0.438	0.592	0.715	0.929	0.989	0.669
4		0.109	0.375	0.420	0.537	0.692	0.937	0.564
5				0.095	0.189	0.397	0.733	0.402
6+				0.250	0.182	0.160	0.424	0.330

The parity progression ratios by marriage duration provide further evidence of fertility decline in Kathmandu. The patterns of ratios in age cohorts and marriage cohorts are similar (Table 3). About 94 percent of the older cohort, married 20 years and longer, progressed from third parity to fourth parity. However, the corresponding figures for the younger marriage cohorts are small.

I hypothesize that women with more schooling are more likely to have fewer children. Parity progression ratios by years of schooling are shown in Table 4. Among women who have 10 or more years of

Table 3 Parity progression ratio by duration of marriage, Kathmandu, 1992

Parity	Marriage Duration					
	0-4	5-9	10-14	15-19	20+	All
1	0.665	0.989	0.994	1.000	1.000	0.905
2	0.151	0.884	0.945	0.958	0.986	0.787
3	0.037	0.336	0.613	0.768	0.937	0.669
4		0.059	0.284	0.472	0.836	0.564
5			0.074	0.120	0.601	0.402
6+					0.357	0.330

Table 4 Parity progression ratio by years of schooling, Kathmandu, 1992

Parity	Years of Schooling		
	0	1-10	10+
1	0.974	0.914	0.859
2	0.923	0.811	0.678
3	0.883	0.707	0.443
4	0.778	0.500	0.250
5	0.485	0.257	0.275
6+	0.363	0.222	0.250

schooling, 86 percent progressed from zero parity to parity one. The corresponding figure for women who have 1-10 years of schooling is 91 percent and for women who had no schooling it is 97 percent. Similarly, the ratios decrease with higher levels of schooling.

Life-time Fertility

The reported number of children ever born (CEB) is an indicator of completed, life-time fertility. The mean number of children ever born to Kathmandu women is 2.5. About 60 percent of women in the 15-19 age group do not have children; 24 percent of women have 2 children; 21 percent have 3 children (Aryal, 1995), indicating the existence of small family size norms in Kathmandu. Table 5 shows the distribution of cumulative fertility by marriage duration in the study population.

Thirty-four percent of women married for 0-4 years have no children. The majority (57 percent) have one child. For those married

for 5-14 years, the majority have 2-3 children. For those married more than 19 years, the largest percentage have 4-5 children. These data suggest that fertility rises with increasing marriage duration.

Table 5 Percentage distribution of women by number of children ever born (CEB) and marriage duration, Kathmandu, 1992

	Marriage Duration					
CEB	0-4	5-9	10-14	15-19	20+	All
0	33.5	1.1	0.6			9.5
1	56.5	11.5	5.5	4.2	1.3	19.3
2	9.6	58.1	36.3	22.2	5.6	23.6
3	0.4	27.6	41.2	38.8	13.9	20.8
4		1.7	15.2	30.6	36.8	16.1
5			1.2	4.2	27.3	7.2
6+					15.1	3.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Age at Marriage and Age at First Birth

In a society in which out-of-wedlock childbearing is negligible, the age at marriage not only indicates the timing of birth but also indicates the average length of the childbearing period. The age at which women begin childbearing influences a variety of demographic and non-demographic phenomena (Trussell and Reinis, 1989: 127). If timing of the first birth is early there will be a longer period for exposure to the risk of an unwanted pregnancy and thus a greater chance of exceeding the desired number of children if fertility control is imperfect (Trussell et al., 1979). Age at marriage and age at first birth are two related measures of the start of a woman's reproductive life (Trussell and Reinis, 1989: 127).

The birth of the first child not only establishes a bride's credentials as a provider of a potential heir to the family establishment, but also stabilizes the marital unions, and provides her with security, especially if it is a son. Fricke and Teachman (1993: 176) argue that in the Nepali context "a first birth begins a new phase in the cycle of family and household formation process." Bennett (1977) notes that there is a belief in Nepal that it is easier for a woman to have children while she is young and her body is "soft and flexible." Additionally, she found that mothers-in-law exert constant pressure on couples to have a child immediately after marriage. Levine (1987) found that in

Nepal divorce rarely occurs after the birth of a child, especially a son. In a society in which a women's position is associated with childbearing, one way of reducing fertility is to increase the age at marriage, effectively increasing the age at first birth. Due to strong cultural preferences of having the first child soon after marriage, the interval between age at first marriage and first birth is expected to be short.

Table 6 shows mean age at first marriage and age at first birth among women 20-49. (Women under 20 years of age are excluded in this analysis because of the "truncation effect," i. e., many women in the younger group have not had adequate time to begin childbearing.) The data show that there has been an increase in age at marriage over the years. The mean age at marriage for women who are 40-44 is 18.5, while it is 20.1 for those ages 25-29. In contrast, the mean age at first birth has not changed in any significant way. The mean ages at first birth among women ages 25-29 and 40-44 are 22.1 and 21.5, respectively. These data thus indicate that the timing of first birth has remained relatively constant over the years. This provides evidence that fertility regulation following marriage is negligible even among women in Kathmandu.

Table 6 Mean age at marriage (MAM) and mean age at first birth (MAFB) by current age of women, Kathmandu, 1992

Age Group	MAM	MAFB	N
20-24	19.3 (2.5)	20.9 (2.5)	130
25-29	20.1 (3.2)	22.1 (2.9)	201
30-34	19.2 (3.8)	21.6 (3.6)	181
35-39	19.8 (3.6)	22.5 (3.8)	158
40-44	18.5 (3.4)	21.5 (3.4)	102
45-49	16.1 (3.0)	19.7 (3.0)	99
Total	19.1 (3.5)	21.7 (3.3)	871

Note: Figures in the parentheses refer to standard deviation.

Table 7 shows the effect of the modernizing factor—education—on age at marriage and age at first birth in the study population. The strong effect of education on age at marriage is evident. Women who have at least 10 years of education have an average age at marriage of 21.3 years. In contrast, those without any

education are married at 16.6. years on average. Thus, there is a 4.7 year differential between the two population subgroups.

Table 7 Mean age at marriage (MAM) and mean age at first birth (MAFB) by respondents' years of schooling, Kathmandu, 1992

Years of Schooling	MAM	MAFB	N
0	16.6 (2.6)	20.1 (2.4)	254
1-5	17.7 (2.8)	20.8 (2.5)	104
6-10	18.8 (3.2)	20.7 (2.9)	135
10+	21.3 (3.0)	23.4 (3.2)	378
Total	19.1 (3.5)	21.7 (3.3)	871

Note: Figures in parentheses refer to standard deviation.

Education has some effect on the timing of first birth, but the effects are not as strong as those on the timing of marriage. There is essentially no significant difference in age at first birth between women with no education and those with 1-5 or 6-9 years of educational attainment (Table 7). The mean age at first birth is higher (23.4 vs. 20.1) only among women with relatively higher levels of educational attainment (10 or more years).

Discussion and Conclusion

The age-specific marital fertility schedule and index of marital fertility control for the study population in Kathmandu clearly indicate that the fertility transition is underway. Further, the parity progression ratios suggest that there has been a decline in the proportions of women who progress from zero parity to parity one, from parity one to parity two and so on in recent years. Overall these findings give strong evidence of a transition toward two and three child families among the couples in Kathmandu. At the same tine, the data indicate that there is a preference for wanting to have children soon after marriage. This study did not include a sample of unmarried women. Hence, the influence of age at marriage on the fertility transition in Kathmandu has not been examined.

Among the married women in Kathmandu, increasing opportunities for nonagricultural work and education are found to have motivated them to reduce demand for children, leading to control of fertility (Aryal, 1995). According to Caldwell (1980: 225-255), the major determinant of the timing of the onset of the fertility transition is

the effect of mass education which brings western ideas and views and speeds up cultural change in the family economy, thereby reversing the direction of intergenerational wealth flows as children become costlier and less productive. This results in a fertility decline as many children become less affordable and less desirable.

Historically, western Europe experienced two types of demographic transitions: the first occurred with the to transition from early and universal marriage to a reduction in the proportion married—considered the Malthusian transition and, the second occurred with a reduction in marital fertility which was caused by increased use of contraception—considered the NeoMalthusian transition (Coale, 1975: 349). New aspirations, changes in the functions of the family and new perceptions of costs and benefits of children were believed to be the key factors associated with the transition. More than 40 years ago Notestein (1953: 16) argued that when education and a rational point of view become increasingly important in society, the cost of childbearing increases and the possibilities for economic contributions by children decline. Education is thus considered to be one of the key mechanisms leading to changes in childbearing attitudes and behavior (Caldwell, 1982).

In the study population, education was found to be the main vehicle leading to increased access and higher use of modern methods of contraception (Aryal, 1995). There is a strong positive association between educational attainment of women and their contraceptive use.High use of contraception in Kathmandu is most probably a result of transformations in family relationships due to social changes rather than to vast changes in economic conditions.

Overall, the results lead to the conclusion that fertility has been declining in Kathmandu and other urban areas in recent years. Educational attainment of women is strongly associated with higher fertility control and, hence lower fertility. Fertility control within marriage is mediated largely by increased use of contraception. By implication, the pace at which the fertility transition spreads across other subpopulations in the country may largely be determined by the extent to which mass educational attainment rises and, concomitantly, the availability and accessibility of contraception increases.

References

Anderson, B. A. and B. D. Silver. 1992. "A simple measure of fertility control." *Demography* 29(3): 343-356.

Aryal, R. H. 1995. "The onset of fertility decline in urban Nepal: A study of Kathmandu city." Ph.D. dissertation. Adelaide: The University of Adelaide.

Ban, B. and A. Shrestha. 1993. "Nuptiality." In *Nepal Fertility, Family Planning and Health Survey 1991.* Main Report. Kathmandu: Ministry of Health. Pp. 1-55.

Bennett, L. 1977. "Mothers milk and mother's blood: The social and symbolic roles of women among the Brahman and Chhetries of Nepal." Ph.D. dissertation. New York: Columbia University.

Bhrolchain, M. 1987. "Period parity progression ratios and birth intervals in England and Wales, 1941-1971: A synthetic life table analysis." *Population Studies* 41(1): 103-125.

Caldwell, J. C. 1980. "Mass education as a determinant of the timing of fertility decline." *Population and Development Review* 6(1): 225-255.

Caldwell, J. C. 1982. *Theory of Fertility Decline.* London: Academic Press.

Casterline, J. B. and J. Trussell. 1980. "Age at first birth." *Comparative Studies* No. 15. Voorburg: International Statistical Institute.

Cleland, J. 1985. "Marital fertility decline in developing countries: Theories and evidence." In *Reproductive Change in Developing Countries.* Eds. J. Cleland and J. Hobcraft. London: Oxford University Press. Pp. 223-252.

Coale, A. J. 1970. "The decline in fertility in Europe from the French revolution to world war II." In *Fertility and Family Planning: A World View.* Eds. S. J. Behrman, L. Corsa, and R Freedman. Ann Arbor: Michigan University Press. Pp. 3-24.

Coale, A. J. 1975. "The demographic transition." In *The Population Debate: Dimensions and Perspectives.* New York: United Nations. Vol. 1, pp. 347-355.

Coale, A. J. 1992. "Age at entry into marriage and the date of the initiation of voluntary birth control." *Demography* 29(3): 333-341.

Coale, A. J. and T. J. Trussell. 1974. "Model fertility schedules: Variations in the age structure of childbearing in human population." *Population Index* 40(2): 185-201.

Coale, A. J. and T. J. Trussell. 1978. "Technical note: Finding the two parameters that specify a model schedule of marital fertility." *Population Index* 44(2): 203-207.

Feeney, G. 1983. "Population dynamics based on birth intervals and parity progression." *Population Studies* 37(1): 75-89.

Feeney, G. 1985. "Parity progression projections." In *International Population Conference*.. Florence, Italy: International Union for the Scientific Study of Population (IUSSP). Vol. 4, pp. 125-136.

Fricke, T. and J. D. Teachman. 1993. "Writing the names: Marriage style, living arrangements and the first birth interval in a Nepali society." *Demography* 30(2): 175-188.

Guinnane, T. W., B. S. Okun, and T. J. Trussell. 1994. "What do we know about the timing of fertility transition in Europe." *Demography* 31(1): 1-20.

Guzman, J. M., S. Singh, G. Rodrigues, and E. A. Pantelides (eds.). 1996. *The Fertility Transition in Latin America*. London: Oxford University Press.

Henry, L. 1961. "Some data on natural fertility." *Eugenics Quarterly* 8: 81-91.

Knodel, J. 1977. "Family limitation and the fertility transition: Evidence from the age patterns of fertility in Europe and Asia." *Population Studies* 31(2): 219-249.

Knodel, J. 1987. "Starting, stopping and spacing during the early stages of fertility transition: The experience of a German village." *Demography* 24(2): 143-160.

Levine, N. 1987. "Differential child care in three Tibetan communities: Beyond son preference." *Population and Development Review* 13(2): 281-304.

Locoh, T. and V. Hertrich (eds.). 1993. *The Onset of Fertility Transition in Sub-Saharan Africa*. Liege: Ordina.

MOH (Ministry of Health). 1993. *Nepal Fertility and Family Planning and Health Survey 1991*. Main Report. Kathmandu: Ministry of Health.

MOH (Ministry of Health). 1987. Nepal Fertility and Family Planning Survey Report 1986. Kathmandu: Ministry of Health.

NCP (National Commission on Population). 1988. *Population and Development*. Eds. R.D. Pant and S. Acharya. Kathmandu: National Commission on Population.

Notestein, F. W. 1953. "Economic problems of population change." In *Proceedings of the Eighth International Conference of Agricultural Economists*. London: Oxford University Press. Pp. 3-31.

Phillips, J. and Z. Sathar (eds.). Forthcoming. *The South Asian Fertility Transition*. Oxford: Claredon Press.

Pradhan, A. S., A. Shrestha, and R. P. Risal. 1993. "Family planning knowledge and use." In *Nepal Fertility, Family Planning and Health Survey 1991*. Main Report. Kathmandu: Ministry of Health. Pp. 96-130.

Retherford, R. D. and S. Thapa. 1998. "Fertility trends in Nepal, 1977-1995." *Contributions to Nepalese Studies* Special Issue on Fertility Transition in Nepal, ed. S. Thapa, S. G. Neidell, and D. R. Dahal, 25(Special Issue): 9-58.

Shrestha, A., R. P. Risal, and A. S. Pradhan. 1993. "Fertility." In *Nepal Fertility, Family Planning and Health Survey 1991.* Main Report. Kathmandu: Ministry of Health. Pp. 56-63.

Trussell, J, J. Menken, and A. Coale. 1979. "A general model for analyzing the effect of nuptiality on fertility." In *Nuptiality and Fertility.* Ed. L.T. Ruzicka. Liege: Ordina Edition, International Union for the Scientific Study of Population (IUSSP). Pp. 7-27.

Trussell, J. and K. I. Reinis. 1989. "Age at first marriage and age at first birth." *Population Bulletin of the United Nations* No. 26. New York: United Nations.

Wilson, C., J. Oeppen, and M. Pardoe. 1988. "What is natural fertility? The modeling of a concept." *Population Index* 54(1): 4-20.

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