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A Demographic Profile of the People of Jammu and Kashmir 2. Estimates, Trends and Differentials in Fertility

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Fertility is the major positive component of population dynamics, continuously adding or replenishing (in case of attrition by mortality), and in the process, ensuring perpetuation of families, societies and ultimately the human race. In spite of being a biological phenomenon, 'fertility' in demographic parlance, refers to the reproductive performance or actual bearing of children or live births, and alongside interpreted as - 'a tremendous social, economic and social-psychological force' (Ryder, 1959), involving human behaviour and decisions; or 'a statistical concept with social relevance' (Sauvy, 1969).

As the fitness, survival, and growth of populations are dependent on the fertility component, it has been attracting worldwide attention since long. It is also one of the major positive demographic components of the demographic transition theory. Besides, age-sex distribution of a population is more sensitive to the changes in fertility, than to the changes in mortality, leading to young or old-age population structure. Today, in view of the global decline in mortality, and absence of any corresponding diminution in fertility, it is held responsible for most of the population, developmental and environmental predicaments faced by nations, societies; particularly the developing ones like India, or more vulnerable ones like Ladakh. In other words, fertility presently constitutes the most important force to be reckoned with; and, knowledge of the dynamics of this process is considered vital today.

Further, fertility is an event that occurs over time. Therefore, knowledge of the "current" fertility levels, differentials and trends (at a specified time/period), as well as comulative fertility/family size estimates for a population are of vital importance. Additionally, fertility, in spite of being a biological phenomenon, is greatly influenced by a number of demographic, economic, socio-cultural, physical environmental determinants, as well as attitude, behaviour related to sex composition of children and family size (also know as independent determinants). Any study on fertility therefore, also requires an understanding of the underlying reproductive strategies and interplay between such determinants and fertility in a population. In other words, an exploratory (investigative) analysis needs to be undertaken.

In the present paper, the "current" (period) fertility levels, differentials and trends have been studied by estimating several measures of fertility ('period' measures). This has been followed by the exploratory fertility analysis, in which an attempt has been made: (i) to study the (comulative) fertility-related variables, viz., number of children ever born, and number of children surviving ("currently" living) to ever-married women (to respondents till the time of the survey); and (ii) to explore the possibility of any relationship between these two and a set of independent determinants. It may be mentioned here that all fertility-related data have been obtained from complete pregnancy/birth history of respondents (ever-married women). Household birth histories have also been checked from elders for inconsistencies.

MATERIAL AND METHODS

The study sample was collected from four district of Jammu and Kashmir state; and comprised of Buddhist and Muslim (Bodhs, Baltis, Brokpas, Arghuns) from Ladakh region; Kashmiri (Pandits and Muslims) from Srinagar region; Dogra (Brahmans, Rajputs and Scheduled Castes) and Muslim (Gujjars) from Jammu region. The households were selected after an extensive field visit to the various districts of the state and identifying the villages predominantly inhabited by these population groups. A nucelar family ultimately was taken as the unit of the study.

The data were collected using structured schedules and through genealogies. The collected information was also cross-checked from elderly members of the households. For details see Bhasin and Nag (2002).

RESULTS AND DISCUSSION

Measures of Fertility

Crude Birth Rate

Crude birth rate (CBR) is the most commonly used measure of fertility. It indicates the general magnitude of the fertility level of a population/ region at a specified time. It is also used to estimate "current" growth. However, it is a crude measure, since the estimation considers the entire population, rather than those exposed to the risk of child-bearing.

The crude birth rate for the world in 1990-95 has been estimated as 26 (UNFPA, 1993). But the variation in the birth rates between the more developed regions (14) and less developed regions (29) appears striking. This difference is also responsible for demographic polarization of the world. In fact, the regional summaries show that the birth rates of Europe (13), North America (16) and erstwhile USSR (16), where most of the developed countries are situated, are quite low. Oceania [consisting the developed Australia (15), New Zealand (17)] also show low birth rates (19), although less developed regions in Oceania as, Papua New Guinea (33), Melanesia (32) have high birth rates.

On the other hand, Africa (53), Latin America (26) and Asia (26), where most of the less developed countries are located, have high birth rates. However, even within these continents, the birth rates vary substantially. For example, countries in northern and southern Africa like, Egypt (31), Tunisia (27), Lesotho (34), South Africa (31) have lower birth rates than most of the western, eastern and central African countries (where birth rates are 40 and above). Similarly, within Latin America, many Carribean countries show birth rates of less than 20. Uruguay (18), Argentina (21) in South America also have comparatively low birth rates than other countries within the region.

Asia too, shows disparities in birth rates across regions/countries. East Asia has a low birth rate of 20, largely because of low rates in Hong Kong (13), Japan (11), Republic of Korea (16), China (20), Singapore (16) and Thailand (21) in the South-Eastern Asia also show lower birth rates than other countries within the region. At the other end, many countries in the South-Western Asia have very high birth rates: Jordan (40), Syrian Arab Republic (37), Yemen (48), Iraq (39), Oman (40). The South Asia has a moderately high birth rate of 32. But, within this region, the birth rate ranges from a low of 20 (in Sri Lanka) to a high of 53 (in Afghanistan). And, whereas Nepal (38), Bhutan (39), Pakistan (40), Bangladesh (33) and Maldives (38) also seem to have high birth rates, India has a moderately high rate of 29. Within India as well, the diversity in birth rates is quite evident.

Among the major states, the birth rate in 1992 varied from 17.7 in Kerala to 38.0 in Uttar Pradesh. The major states having birth rates above the national level are, Assam (30.0), Madhya Pradesh (34.9), Rajasthan (34.9), and Uttar Pradesh (36.3). The 1990 estimate of birth rate for the state of Jammu and Kashmir (31.4) also appears relatively high (SRS, 1990).

In the present study, the crude birth rate of the total population is 22.4. And, the inter-population comparison shows that the rate varies from 14.3 in Arghuns to 27.2 in Brokpas. Bodhs (24.5) and Baltis (23.6) have intermediate birth rates. All these estimates appear lower than the national and Jammu and Kashmir state averages (Table 1).

On the contrary, the SRS, 1992 birth rate estimate for Kerala is lower than the rate for the total study population. The same pattern has been seen when the birth rates for Bodhs, Baltis and Brokpas are compared with the estimate for Kerala. Arghuns however, show a lower birth rate. (However, very low estimate for rural Arghuns (5.5) seems most probably a chance occurrence, due to small sample size). It may also be mentioned here that whereas the low birth rate among Arghuns and moderately high rate among Bodhs, appear to be in agreement with (respective) age structure; among Baltis, who has shown relatively young age composition, the moderate birth rate seems to be somewhat contrary to the expectation. Hence, the small number of births amongst them during the one year prior to the survey, can be a chance occurrence.

It may be mentioned here that within the study area, the Muslims as a whole, have shown lower birth rate than Buddhists, but mainly on account of the very low rate in Arghuns-an economically and educationally advanced Muslim community predominantly inhabiting the Leh town and showing relatively high acceptance of family planning methods. The birth rate for the

Table 1: Crude Birth Rates, General Fertility Rates for population groups of Ladakh, Kashmir, Jammu regions, Jammu and Kashmir, and for Kerala, India, South Asian Countries

Region/Population group/State/Country		*Crude Birth Rate*	*General Fertility Rate*
Ladakh Region (Study Area)			
Buddhists			
Bodhs	Rural	24.63	99.34
	Urban	24.02	87.30
	Combined	24.46	95.79
Muslims			
Baltis	Rural	28.16	118.18
	Urban	14.41	59.88
	Combined	23.57	98.59
Brokpas[1]	Rural (Combined)	27.17	119.05
Arghuns	Rural	5.54	20.62
	Urban	19.96	67.07
	Combined	14.25	49.81
Muslims	Rural	24.12	99.80
(Pooled)	Urban	16.87	63.44
	Combined	21.44	85.51
Ladakh			
(Pooled)	Rural	24.31	99.63
	Urban	18.79	70.02
	Combined	22.44	88.98
Kashmir Region			
Hindus			
Kashmiri Pandits		15.5	55.6
Muslims			
Kashmiri Muslims		9.7	41.1
Jammu Region			
Hindus			
Dogra Brahmans		22.4	85.0
Dogra Rajputs		16.5	57.8
Dogra Scheduled Castes		24.9	102.9
Dogra Hindus (Pooled)		21.4	80.0
Muslims			
Gujjars		35.2	170.2
Jammu and Kashmir		30.1 (31.4)[b]	104.0[b]
Kerala		17.7[c]	62.0[c]
India		29.2[c]	118.6[c]
Nepal		38[d]	-
Bhutan		39[d]	-
Sri Lanka		20[e]	-
Pakistan		40[d]	-
Bangladesh		33[f]	-
Maldives		38[d]	-
Developing Countries		30[g]	-
Least Developed Countries		44[g]	-
Developed Countries		14[g]	-

1. Rates for rural/combined Brokpas are same as the sample has been drawn from rural area
   a. General Fertility rates not available for South Asian Countries
   b. Estimates for 1989 (1990) [*Source:* SRS, 1989, 1990; Office of the Registar General, India]
   c. Estimates for 1992 (rate for India excludes Jammu and Kashmir) [*Source:* Sample Registration System, 1992; Office of the Registrar General, India]
   d. Estimates for 1992 (*Source:* UN Demographic Year Book, 1992; Ministry
   e. Estimate for 1990 of Health and Family Welfare, Govt.
   f. Estimates for 1991 of India, 1997
   g. Estimates for 1991 (*Source:* UNICEF, 1993)

Ladakh Buddhists also appear higher than the Sikkim Buddhists inhabiting the Eastern Himalayas (21.8) [Bhasin, 1990]. But, as the population in the young ages of 0-14 years in the Buddhists of Sikkim has been found very high at 42.8 per cent, indicative of high fertility, the moderate birth rate appears contrary to the expectation. The most probable reason advanced (in that study) is that, it could have been a chance occurrence due to small sample size (as the number of births in a year in such small samples is often due to the chance factor).

On the other hand, Goldstein (1981) has reported a very high crude birth rate for the Tibetan population of Limi, Nepal (42.2), a high altitude area in the Himalayas, though he has also mentioned that it may not be the best indicator of population dynamics due to small sample size.

Further, according to the SRS, 1992, the birth rate in India varied from 30.9 per thousand population in rural areas to 23.1 in urban areas. The statewise comparison has shown that in rural areas, birth rates varies from 17.6 in Kerala to 38.0 in Uttar Pradesh, whereas in urban areas, it varies from 18.3 in Kerala to 28.9 in Uttar Pradesh Except Kerala, where birth rates are nearly same in rural and urban areas, in all other major states, the birth rates are higher in the former than in the latter sector. Similar pattern is seen in case of the state of Jammu and Kashmir too, in the SRS, 1988 (rural birth rate - 35.5 and urban - 24.0). The total study population data also show a similar picture, with the birth rates varying from 24.3 rural areas to 18.3 in urban areas.

However, at the individual population level, variations have been observed in case of Bodhs and Arghuns (Table 1). These variations can be chance occurrences, because rural populations seem to have younger age composition, and certain urban advantages in the form of better educational, medical, communication facilities; lower mortality levels, higher literacy rates of men and women, higher age at marriage of women; more rational attitude towards small family size, and greater usage of family planning methods etc., which are not conducive to fertility.

The regional variation in birth rates and the populations therein, are not available for the state of Jammu and Kashmir. But a comparison of the birth rates for the major populations groups of this state, based on the empirical data collected

from the three regions, has shown that the Gujjars of Jammu have the highest birth rate (35.2), followed by Brokpas of Ladakh (27.2). The lowest and the second lowest birth rates have been found in Kashmir Muslims (9.7) and Arghuns (14.3), respectively.

However, such low rate in Kashmiri Muslims also seems to be a chance phenomenon, owing to the limited sample size, as the literacy level, economic characteristics, particularly of females, status of females and contraceptive behaviour amongst them have been observed unfavourable to low fertility. Besides, their young age composition also indicates high fertility. It may additionally be mentioned here that the birth rates for Bodhs and Baltis are higher than those for Kashmiri Pandits, Dogra Rajputs and Dogra Brahmans.

General Fertility Rate

The general fertility rate (GFR) of a population is a refined measure unlike CBR, as it relates births (as a specified time) more closely to the population at risk of child-bearing, i.e., to the females at reproductive ages of 15-49 years; thereby correcting to some extent the effect of age-sex distribution. However, it is also affected by the distribution of females by age in the reproductive span.

At the national level, 119 children were born to every thousand women belonging to ages 15-49 years (SRS, 1992). Among the major states, the general fertility rate varied from 62.0 in Kerala to 161.9 in Uttar Pradesh. And, the state of Jammu and Kashmir has shown a rate of 104, in the year 1989 (SRS, 1989). In the present study, the general fertility rate for the total population has been estimate as 89, which seems lower than the estimates for India and the state of Jammu and Kashmir, but higher than the rate for Kerala (Table 1).

The inter-population comparison in general fertility rate has recorded that the ranking of the population groups in descending order, is almost same as observed in case of crude birth rates, except that the Baltis seem to be slightly ahead of Bodhs. In other words, Brokpas have shown the highest rate (119), followed by Baltis (99) Bodhs (96) and Arghuns (50). The comparison of these estimates with the national and state averages have also indicated that they are lower, excepting the rate for Brokpas. On the contrary, the general fertility rates for all except Arghuns, appear higher than the estimate for the state of Kerala. Low general fertility rate among Arghuns on the whole, however is largely due to the very low rate among rural Arghuns (21), which can be a chance occurrence. The lower rate in Ladakh Muslims on the whole, than Ladakh Buddhists also seems to be largely on account of the low rate estimated for Arghuns.

It may be mentioned here that Goldstein (1981) has reported a very high general fertility rate of 175 for the Tibetans of Limi, inhabiting the high altitude of Nepal Himalayas, in contrast to the present study population, also residing at high altitude. However, he has also pointed out that the high fertility despite the late first birth, could be due to the small sample size as well as short period of the survey.

Further, at the All India Level, the general fertility rates, varied from 89 in urban areas to 128 in rural areas (SRS, 1992). The state of Jammu and Kashmir also has recorded the same trend (91 and 150 for urban and rural areas respectively -SRS, 1988). The present study data too show the same, with the rate varying from 70 in urban areas to 100 in rural areas. On the other hand, the reverse trend has been noticed in case Kerala in the SRS, 1992, as the general fertility rate seems not much different in urban areas (64) and in rural areas (62). When the rural urban differentials in rates for individual study population groups are considered (Table 1), only Arghuns register dissimilar trend, whereas all other show the trend noticed at the national and state level. However, as already mentioned, very low estimate for rural Arghuns, can be accidental due to the small sample size.

The comparison of general fertility rates for the major population groups of Jammu and Kashmir state has revealed that the rates are the highest and the lowest in Gujjars (170) and Kashmiri Muslims (41), respectively. But, such low estimate in the latter, seems most possibly a chance occurrence due to the small size of the sample, since, their age composition and other attributes appear conducive to fertility, as already mentioned. And, whereas the Brokpas show the second highest general fertility rate, the Arghuns show the second lowest one. It may also be noted that the estimates for Bodhs and Baltis are higher than the ones for Kashmiri Pandits, Dogra Brahmans and Dogra Rajputs, as also noticed earlier in case of crude birth rate.

Age Specific Fertility Rate

A detailed picture of fertility in population at a specified time/period can be obtained by examining the schedules of age specific fertility rates (ASFRs), since the age of mother is an important factor affecting the fertility level and the rate of child-bearing is not uniform throughout all ages. In fact, fertility is usually concentrated between ages 20 to 29 years.

The ASFRs are mostly estimated for conventional five-years age groups, from 15-19 to 45-49 years; which minimize the effects of misreporting of ages by mothers, and distortions produced by variations in the age composition.

According to the SRS, 1992, in India, the fertility is relatively low in the age group 15-19 years (74), but shoots up sharply to reach a peak in the age group 20-24 years (235), and remains high in the age group 25-29 years (190). Thereafter, it declines substantially. More or less same pattern is noticed in all the major states, including Kerala, where the peak fertility is manifested in the age group 20-24 years. The age-specific fertility rate in the younger age group 15-19 years varies from 19.9 in Punjab to 121.5 in Andhra Pradesh. In the age group 30-34 years, the variation in the fertility level is from 43.2 in Kerala to 200.4 in Uttar Pradesh. Excepting the 15-19 years age group, Kerala shows lower rates at all ages than all other major states. But, unlike the pattern described here, the state of Jammu and Kashmir (SRS, 1989) seems to show a late peak pattern. In this state, the fertility reveals a peak in the age group 25-29 years (198), although rather high fertility is also noticed in the age group 20-24 years (180).

In the present study population, it has been noticed that just like the state of Jammu and Kashmir but, unlike India and the state of Kerala the fertility reaches its peak in ages 25-29 years. In Bodhs, Brokpas and Arghuns too, the same has been observed. Baltis, on the contrary, reveal maximum fertility in the age group 30-34 years (167), even though the fertility seems almost equally high in the age group 25-29 years (160). The Muslims on the whole, however, have shown peak fertility in ages 25-29 years, as also seen in Buddhist Bodhs (Table 2).

It has also been observed that the age-specific fertility rates in the younger age group of 15-19 years vary from 55 to 56 in Bodhs and Arghuns to 154 in Brokpas. The Brokpas additionally show relatively long duration of high fertility, as compared to others, which can be a cause for their high fertility level; while the reverse may be true in case of Arghuns. In the older age group of 30-34 years, the variation in level of fertility is from 113 in Bodhs to 167 in Baltis. Overall, the fertility is lower at the younger ages of 15-29 years, and higher in the older ages among Muslims on the whole, than among Buddhist Bodhs, although their age patterns of fertility appear similar. It may also be added here that the Ladakh (Pooled) group seems to have lower fertility levels than India in all age groups, barring 25-29 and 30-34 years, while the opposite trend is evident when Kerala's fertility schedule is considered, barring the peak fertility age group of 20-24 years.

The differentials in age specific fertility rates are of great relevance to follow different strategies for fertility control in different population groups/regions. Since the relatively high fertility reproductive periods have been observed different in the study population groups, women in those ages may be encouraged to adopt fertility control methods. However, the maximum emphasis should be laid on women in ages 25-29 years, which seems to be the peak age group of reproduction in the study population as a whole.

Further, at the national level (SRS, 1992), in all the age groups, fertility appears higher in rural areas than in urban areas. But, in both sectors, fertility reaches its peak in the age group 20-24 years. Kerala, however, has shown reverse pattern in some of the age groups. The Ladakh (Pooled) group too, as India, has shown higher rural than urban fertility in each age group; which may be attributed to various urban advantages. But, the fertility peaks have been noticed in ages 25-29 years in either sector, unlike India. In case of the individual population group, however, variations in age patterns of fertility by place of residence have been noticed; although in Bodhs and Baltis the fertility rates seem higher in rural than in urban areas in each age group, except in ages 20-24 years in the former population group (Table 2).

The comparison of the age patterns of fertility across the major population groups of Jammu and Kashmir (Table 2) show that in almost all groups, the fertility reaches its peak in ages 25-29 years, as also noticed in case of the Jammu

Table 2: Age-Specific Fertility States for population groups of Ladakh, Kashmir, Jammu regions, Jammu and Kashmir, and for Kerala; India

Region/Population group/State/ Country		*Age-Specific Fertility Rate*						
		15-19	*20-24*	*25-29*	*30-34*	*35-39*	*40-44*	*45-49*
Ladakh Region (Study Area)								
Buddhists								
Bodhs	Rural	60.61	142.86	250.00	113.64	32.26	-	-
	Urban	40.00	166.67	160.00	111.11	-	-	-
	Combined	54.94	150.00	219.18	112.90	20.41	-	-
Muslims								
Baltis	Rural	-	156.25	232.14	153.85	130.44	71.73	-
	Urban	-	133.33	52.63	200.00	-	-	-
	Combined	-	148.94	159.8	166.67	98.36	51.12	-
Brokpas[1]	Rural	153.85	129.03	181.82	153.85	-	-	-
	(Combined)	153.85	129.03	181.82	153.85	-	-	-
Arghuns	Rural	76.92	-	-	-	-	-	-
	Urban	44.44	60.61	333.33	-	-	-	-
	Combined	56.34	42.55	233.33	-	-	-	-
Muslims (Pooled)	Rural	36.70	128.44	197.34	123.46	83.33	51.28	-
	Urban	23.53	95.24	152.54	100.00	-	-	-
	Combined	30.93	116.28	177.78	115.70	56.08	35.71	-
Ladakh (Pooled)	Rural	45.71	133.33	217.74	120.00	67.96	27.78	-
	Urban	27.27	114.94	154.76	103.45	-	-	-
	Combined	38.60	126.98	192.31	114.75	44.87	20.62	-
Kashmir Region								
Hindus								
Kashmiri Pandits		-	83.3	90.9	142.9	-	-	-
Muslims								
Kashmiri Muslims		-	-	153.9	58.8	-	-	-
Jammu Region								
Hindus								
Dogra Brahmans		-	151.5	190.5	96.8	47.6	-	-
Dogra Rajputs		-	60.0	216.2	25.0	55.6	-	-
Dogra Scheduled Castes		48.8	108.1	222.2	80.0	66.7	25.0	-
Dogra Hindus (Pooled)		15.2	108.3	200.0	62.5	55.6	25.6	-
Muslims								
Gujjars		76.9	272.7	428.6	166.7	-	-	-
Jammu and Kashmir[a]		40.9	179.6	198.2	124.5	80.2	36.9	7.7
Kerala		24.1	145.4	115.7	43.2	11.4	2.6	0.5
India		74.4	235.2	189.6	113.0	66.0	30.9	11.4

1. The sample for Brokpas has been drawn from rural areas only
a. 1989 Estimates (*Source:* Sample Registration System, 1989; Office of the Registrar General, India)
b. Estimates for 1992 (rates for India excludes Jammu and Kashmir)
Source: Sample Registration System, 1992; Office of the Registrar General, India

and Kashmir state as a whole, except among Baltis and Kashmiri Pandits. Among them, the highest fertility has been noticed in ages 30-34 years.

Total Fertility Rate

Total fertility rate (TFR) summarizes the pattern of fertility exhibited by ASFRs and presents a single index of total fertility. It is an estimate of the expected number of children that would be born (ignoring mortality), to a hypothetical cohort of 1000 women in their lifetime, if they all pass through their reproductive years exposed to the schedule of ASFR on which the index is based). In other words, TFR expressed per woman refers to the number of children a hypothetical average woman would have if, during her life-time her chile-bearing behaviour remain same as that of cross-section of women at the time of observation. The TFR is a type of standardized rate, as it is not influenced by differences in the age composition.

The total fertility rate for India in 1992 has

been 3.6 per woman. Among the major states, it varied from 1.7 in Kerala to 5.2 in Uttar Pradesh. In fact, the state of Kerala seems to have already achieved below-replacement fertility. A replacement level fertility is the level at which each woman, on average, is replaced by one daughter, which occurs at approximately a TFR of 2.1 children per woman (IIPS, 1995). This may also be true as per Bogue's (1969) statement, - 'a population with a TFR of exactly 2 would eventually decline, because not all females born survive to the end of the child-bearing period and because slightly more than one half of the babies born are males'. The state of Jammu and Kashmir in the SRS, 1989, has shown a moderately high total fertility rate of 3.3.

In the present study, the Ladakh (Pooled) group has registered a total fertility rate of 2.7, which seems lower than the national and state averages, but higher than the rate estimated for Kerala (Table 3). At the individual population level as well, except in case of Arghuns, the same pattern of differentials are evident. However, the rates are slightly higher in Brokpas and Baltis (3.1) than in Bodhs (2.8). In Arghuns, the rate seems rather low (1.7). Hence, it may be said that despite inherent constraints of limited sample size in case of the total population, as well as Bodhs, Baltis, and Brokpas, the estimates appear to show above-replacement fertility, and therefore, the parents seem to contribute to the population growth (by more than replacing themselves). These estimates also exceed the nationally recommended small family norm of two children. Only Arghuns seem to register below-replacement fertility. But, even though the Arghuns appear to be in an advantageous position with regard to most of the determinants of fertility, the possibility of chance fluctuation owing to limited sample size (as also mentioned earlier) cannot be ruled out altogether, particularly in view of the very low rate in rural Arghuns (0.4). It may be noted that the relatively low estimate in Ladakh Muslims as a whole, than Buddhists (Bodhs) seems to be largely due to the low rate in Arghuns. In the NFHS, 1992-93, however, the Muslims have shown higher rate (4.4) than any other religious group; although the religious differentials seemed to be due to socio-economic differences among the different religious group rather than religious affiliation itself (IIPS, 1995).

The rural-urban differentials in the total fer-

Table 3: Total Fertility Rates, Gross Reproduction Rates, Mean Age of Child Bearing for population groups of Ladakh, Kashmir, Jammu region, Jammu and Kashmir, and for Kerala, India, South Asia countries

Region/Population group/State/ Country		*Total Fertility Rate*	*Gross Reproduction Rate*	*Mean Age of Child Bearing*
Ladakh Region (Study Area)				
Buddhists				
Bodhs	Rural	3.00	1.90	26.78
	Urban	2.39	1.30	26.08
	Combined	2.79	1.70	26.55
Muslims				
Batlis	Rural	3.72	1.91	30.68
	Urban	1.99	0.77	28.36
	Combined	3.12	1.53	30.45
Brokpas[1]	Rural (Combined)	3.09	1.55	25.21
Arghuns	Rural	0.39	-	17.50
	Urban	2.19	0.60	25.80
	Combined	1.66	0.38	25.16
Muslims	Rural	3.10	1.52	29.45
(Pooled)	Urban	1.86	0.62	26.93
	Combined	2.66	1.18	28.97
Ladakh	Rural	3.06	1.66	28.43
(Pooled)	Urban	2.00	0.81	26.68
	Combined	2.69	1.36	28.08
Kashmir Region				
Hindus				
Kashmiri Pandits		1.6	0.8	28.4
Muslims				
Kashmiri Muslims		1.1	0.4	28.9
Jammu Region				
Hindus				
Dogra Brahmans		2.4	1.6	27.9
Dogra Rajputs		1.8	0.8	28.6
Dogra Scheduled Castes		3.3	0.7	30.4
Dogra Hindus (Pooled)		2.3	1.0	28.7
Muslims				
Gujjars		4.7	2.4	26.1
Jammu and Kashmir		3.3[b]	1.6[b]	29.2[b]
Kerala		1.7[c]	0.8[c]	25.8[c]
India		3.6[c]	1.7[c]	27.5[c]
Nepal		5.4[d]	-	-
Bhutan		5.8[d]	-	-
Sri Lanka		2.5[d]	-	-
Pakistan		6.1[d]	-	-
Bangladesh		4.6[d]	-	-
Maldives		6.1[d]	-	-
Developing Countries		3.7[f]	-	-
Least Developed Countries		6.0[f]	-	-
Developed Countries		1.9[f]	-	-

1. The sample for Brokpas has been drawn from rural areas only
a. Gross reproduction rates, mean age of fertility not available for south Asia countries
b. Estimates for 1989 (*Source: SRS*, 1989; Office of the Registrar General, India).
c. Estimates for 1992 (rates for India exclude Jammu and Kashmir) (*Source:* Sample Registration System, 1992; Office of the Registrar General, India).
d. Estimates for 1992 (*Source:* UN Demographic
e. Estimates for 1990 Year Book, 1992; Ministry of Health and Family Welfare, Govt. of India, 1997).
f. Estimates for 1991 (*Source:* UNICEF, 1993).

tility rate for India in the SRS, 1992, have shown that the rate varied from 3.9 in rural areas to 2.6 in urban areas. Among the major states, whereas Uttar Pradesh has the highest rates in either sector (3.8, 5.2, respectively), Kerala has the lowest rates (1.7 in each sector). In fact, Kerala is the only state having the total fertility rate below 2 in both rural and urban areas. In the present study, the Ladakh (Pooled) group has recorded higher rate for rural (3.1) than urban areas (2.0), as noticed in India, although both estimates are evidently lower.

Therefore, the rural population in general, rather than the urbanites seem to prefer and achieve a family size, which crosses the nationally recommended small family norm of 2 children. And, they are perhaps contributing to the population growth in the region, since the estimate indicates above-replacement fertility. But, larger samples are required for a definitive assessment. Individually speaking, the total fertility rates are also seen higher among Bodhs and Baltis in rural than in urban areas (Table 3). But, Arghuns have recorded the opposite pattern, which however, can be a chance occurrence due to the small sample size.

The comparison of the total fertility rates among the major population groups in the Jammu and Kashmir state, shows that Gujjars have the highest rate (4.7), followed by Dogra Scheduled Castes (3.3), Baltis (3.1) and Brokpas (3.1). The lowest estimate is seen in Kashmiri Muslims (1.1), which however seem to be a chance occurrence due to small sample size, since the extent of usage of family planning method and many other attributes, including the age at marriage of women, literacy rate etc. have been observed conducive to high fertility. The total fertility rates are also noticed rather low among Kashmiri Pandits (1.6), Dogra Rajputs (1.8), and Arghuns (1.7).

Further, it may be mentioned that the total fertility rate has been reported higher among low-altitude Sherpas of Kalimpong (West Bengal) (6.6) than among high altitude ones of Upper Khumbu (Nepal) (5.1), suggesting possible fertility differences between them that is, higher fertility at low than at high-altitude (Gupta, 1980; Gupta et al., 1987), albeit the sample sizes have been small for a definitive assessment. Das et al. (1981) too, have noticed lower fertility in Bhutias of Lachen (3.8) than in Bhutias of Lachung (4.7) in Sikkim. In the present study as well, the total fertility rates among the study population groups, and in the total population appear relatively low. But, the rural-urban, inter-population, religious differences etc. broadly indicate possible involvement of effects of several factors on fertility, although the effects of altitude stresses on fertility cannot be ruled out altogether.

Table 3 additionally shows that the total fertility rate for the developed countries as a whole, is 1.9, which is higher than the rates for the developing countries (3.7), least developed countries (6.0), as well as the (developing South Asian countries [range -2.1 (in Sri Lanka) to 6.1 (in Pakistan and Maldives)]. India seems to show a moderately high total fertility rate of 3.6, almost same as the rate for developing countries as a whole. And, except Sri Lanka, all other neighbouring South Asian countries have higher total fertility rates. The total study population too, seems to register similar pattern of differences. Incidentally, Kerala's a fertility rate (1.7) appears almost same as that of the developed countries.

Gross Reproduction Rate

Gross reproduction rate indicates the average number of female children expected to be born per woman during her entire reproductive span, if there is no mortality, and the fertility schedules represented by the age specific fertility rates continue to remain the same. In other words, this rate suggests how effectively mothers are replacing themselves with daughters (ignoring mortality), who would bear the next generation. Hence, this is also considered as a replacement index. The estimated value of the gross reproduction rate for India in 1992 has been 1.7. Among the major states, it varies from 0.8 in Kerala to 2.4 in Uttar Pradesh. This rate has been found 1.6 for the state of Jammu and Kashmir (in 1989).

In the present study, the Ladakh (Pooled) group has registered a gross reproduction rate of 1.4 (Table 3). The inter-population comparison shows that while the gross reproduction rates are not much different among Bodhs (1.7), Brokpas (1.6) and Baltis (1.5), among Arghuns, the rate is much lower (0.4). It may be mentioned that mainly due to this low rate, the Muslims as

a group, exhibit slightly lower gross reproduction rate (1.2) than Buddhists (Bodhs). However, the total absence of female births in the rural sub-group (during the one year prior to the survey) seems most possibly a chance occurrence, as the sample size is small.

These findings broadly suggest that in the first three groups, a woman would bear on an average about two daughters until the end of the child-bearing age (if there were no mortality); but probably not in Arghuns. And, on the whole, it seems that the study population would be replacing itself (if mortality is ignored), and Bodhs, Baltis and Brokpas would probably contribute to that, but not the Arghuns, amongst whom the rate has been estimated less than one. But these estimates as well as their assessment as replacement indexes may be considered with reservation, since the sample sizes have been limited.

Further, the comparison with the macro-level SRS, 1992 data points out that the gross reproduction rate for the Ladakh (Pooled) group is marginally lower than the national and Jammu and Kashmir state estimates. All the individual study population groups, except Arghuns, also show similar pattern of differentials. On the other hand, the reverse is noticed when comparison is done with Kerala (Table 3).

The rural-urban differentials in gross reproduction rates reveal that at the All-India level (SRS, 1992), the rate varies from 1.2 for urban areas to 1.8 for rural areas. The gross reproduction rates for the Pooled Ladakh data also record the same trend (1.7, 0.8, respectively); and the values appear not much different from the corresponding ones estimated for India. Similar pattern has been noticed in case of Buddhist Bodhs as well as Muslims on the whole too (Table 3). But in case of Kerala, the rates for either sector have been found same (0.8).

Mean Age of Child-bearing

Differences in the pattern of child-bearing can be measured in terms of the mean age of child-bearing or fertility. It describes the age pattern of fertility of a synthetic cohort of hypothetical group of women viewed as having in their life time similar fertility experience recorded in a calender year. In general, it is observed that in populations of high fertility, the mean age of fertility is usually high and a substantial fraction of total fertility relates to the latter year of child-bearing. On the other hand, in low fertility populations, the mean age is lower and a small fraction of total fertility occurs in latter years of child-bearing. The mean age of fertility for India has been observed 27.5 years (SRS, 1992). But, the mean age of fertility for Kerala (25.8 years) appears lower. The mean age of fertility for Jammu and Kashmir state in the year 1988 stood at 29.2 years.

In the present study population, the mean age of fertility has been estimated as 28 years which appears rather close to the estimate for India (Table 3). But, while the Jammu and Kashmir state average seems higher, Kerala's mean age of fertility is lower, than the mean age of fertility for the study population. At the individual population level, the mean age of child-bearing is observed the highest in Baltis (31 years). And whereas Bodhs indicate a mean age of 27 years; Arghuns and Brokpas have recorded still lower mean ages of 25 years. Hence, among Baltis, a large fraction of total fertility may be occurring in latter fertile ears than among other population groups, which has raised their mean age of fertility. However, the relatively low mean age of fertility among Brokpas (suggesting relatively low fertility) seems most probably a chance occurrence, since certain other 'current', as well as 'cumulative' measures of fertility have indicated otherwise.

It may additionally be mentioned here that the mean age of fertility among Muslims on the whole (29 years) is higher than Buddhists (Bodhs), mainly on account of Baltis. Further, the rural-urban differentials (Table) have shown that the rural study population seems to have higher mean age of fertility (28 years) than the urban study population (27 years). The same trend is seen in Buddhists as well as Muslims on the whole.

Table 3 also reveals that in the state of Jammu and Kashmir, the mean age of fertility is the highest among Baltis (31 years) as well as Dogra Scheduled Castes (30 years). And, the mean ages of fertility are the lowest in Arghuns and also Brokpas (25 years).

Marital Fertility Rates

General Marital Fertility Rate

Since in many societies (including most of the Indian societies), only marital fertility is so-

cially and legally recognized, it is sometimes preferred to consider only those females who are actually exposed to the risks of child-bearing, i.e., the 'currently' married females in the reproductive age group of 15-49 years, while measuring the fertility level. However, as the probability of child-bearing is not uniform over all the ages, this rate is affected by the distribution of 'currently' married females in various age groups within 15-49 years. In the SRS, 1992, the general marital fertility rate for India has been estimated as 157.4, while the rate seems rather low for Kerala (97.7). The state of Jammu and Kashmir has returned a rate of 172 in 1989 (SRS,1989).

In the present study population, the general marital fertility rate is found 129 (Table 4), which thus, appears lower than the rates for India, and the Jammu and Kashmir state. On the other hand, the general marital fertility rate for Kerala seems comparatively high. The interpopulation comparison has shown that the general marital fertility rates are the highest and lowest in Brokpas (154) and Arghuns (76), respectively. In Bodhs (144) and in Baltis (137) the rates seem only marginally different. All these estimates too, appear lower than the national, and Jammu and Kashmir state averages. But, Kerala's general marital fertility rate has been noticed lower than the rates for Bodhs, Baltis and Brokpas, but higher than the one for Arghuns. But, it may be mentioned that very low rate in Arghuns can be a chance occurrence due to small sample size, since the estimate for rural Arghuns is very low (29). It may be noted that largely due to the low general marital fertility rate in Arghuns, the Ladakh Muslims on the whole, have lower rate than Buddhist Bodhs.

Further, the Ladakh (Pooled) group has shown higher rural (141) than urban general marital fertility rate (106); similar to the pattern noticed in case of SRS, 1992 estimates for rural (166) and urban (128) India. The rates have also been observed higher in case of rural Bodhs and Baltis than in case of their urban counterparts. On the other hand, the reverse pattern is noticed in Arghuns (Table 4), although this may be a chance occurrence due to the small sample size; since, the proportion of 'currently' married females at ages 15-49 years is comparatively low in urban that in rural areas (Table 4), and the urban advantages are evident amongst them too. The general marital fertility rates for rural (97.4) and urban areas (99.1) in Kerala (SRS, 1992) have registered not much different estimates.

Table 4: General Marital Fertility Rates, Total Marital Fertility Rates for population groups of Ladakh, Kashmir, Jammu regions, Jammu and Kashmir; and for Kerala; India

Region/Population group/State/Country		*General Marital Fertility Rate*	*Total Marital Fertility Rate*
Ladakh Region (Study Area)			
Buddhists			
Bodhs	Rural	150.00	5.68
	Urban	130.95	4.17
	Combined	144.37	5.20
Muslims			
Baltis	Rural	161.16	4.09
	Urban	86.96	2.23
	Combined	137.26	3.46
Brokpas[1]	Rural (Combined)	153.85	6.00
Arghuns	Rural	28.99	1.11
	Urban	106.80	3.87
	Combined	75.58	2.90
Muslims (Pooled)	Rural	135.64	4.14
	Urban	96.33	3.06
	Combined	121.21	3.76
Ladakh (Pooled)	Rural	140.63	4.55
	Urban	105.96	3.36
	Combined	128.70	4.15
Kashmir Region			
Hindus			
Kashmiri Pandits		83.3	2.8
Muslims			
Kashmiri Muslims		50.0	1.1
Jammu Region			
Hindus			
Dogra Brahmans		125.9	3.2
Dogra Rajputs		94.9	2.3
Dogra Scheduled Castes		147.5	4.7
Dogra Hindus (Pooled)		121.8	3.8
Muslims			
Gujjars		205.1	5.6
Jammu and Kashmir		171.8[a]	5.7[a]
Kerala		97.7[b]	3.8[b]
India		157.4[b]	5.1[b]

1. The estimates for rural and combined Brokpas are same as the sample has been drawn from rural areas.
a. Estimates for 1989 (*Source:* SRS, 1989, - Office of the Registrar General, India).
b. Estimates for 1992 (rates for India exclude Jammu and Kashmir) (*Source:* Sample Registration System, 1992; Office of the Registrar General, India).

The comparison of the study population groups and the major population groups of Jammu and Kashmir regions, reveals that Gujjars have the highest general marital fertility rate (205), followed by Brokpas (154). The rate are the lowest and the second lowest in Kashmiri Muslims (50) and Arghuns (76), respectively. While very high proportion of 'currently' married women (82.2 per cent) amongst Gujjars may be responsible for the very high rate amongst them, very

low estimate among Kashmiri Muslims particularly, appears to be chance occurrence owing to the limited size of sample. And, as far as the general marital fertility rates for Bodhs and Baltis are concerned, they have been noticed higher than the rates estimated for Kashmiri Pandits, Dogra Brahmans, Dogra Rajputs; but lower than the rate for Dogra Scheduled Castes (Table 4).

It may be mentioned here that the general marital fertility rate in the Tibetans of high-altitude Limi, Nepal has been reported rather high (274) (much higher than the rates noticed in the present study population groups and at the aggregate level); although this could be a function of small sample size and short period of the survey (Goldstein, 1981).

Age Specific Marital Fertility Rate

Another measure of fertility computed for ('currently') married women for different age groups is the age specific marital fertility rates. The age pattern of marital fertility for India in 1992 is nearly similar to the pattern of age specific fertility elaborated earlier. In the age groups 15-19, 20-24, 25-29 years, the marital fertility seems rather high, with the peak in ages 20-24 years. A significant decline in marital fertility is seen for females aged 35 years and above. The state of Kerala in 1992 too, shows nearly similar pattern as India, except that drastic decline in marital fertility takes place for women aged 30 onwards (Table 5). The age pattern of marital fertility in Jammu and Kashmir in 1989, however, seems slightly different from the age-specific fertility schedule presented earlier, as well as from the marital fertility schedules of India and Kerala, in that , the marital fertility reaches is peak in ages 15-19 years itself.

The present study population too, shows similar age pattern of marital fertility, with the highest rate noticed in ages 15-19 years (239). This is unlike the trend noticed in case of age specific fertility rates, probably due to the removal of the 'unmarried' women from this age group. This pattern also differs from the SRS, 1992, national marital fertility schedule, as well as that for Kerala, although relatively high marital fertility up to age 34 years, noticed at the national level, is seen in the study population too. Individually, among Bodhs and Brokpas as well, the peak marital fertility is noticed in ages 15-19 years. But, the highest marital fertility in Baltis and Arghuns, is seen in age 20-24 years (184), and in ages 25-29 years (259), respectively.

The Muslims on the whole, has recorded peak marital fertility in ages 25-29 years, as also noticed earlier in case of the fertility schedule, although it is unlike the trend seen in Buddhist Bodhs. And, the age specific marital fertility rates appear lower in Muslims on the whole, than in Buddhists up to age 34 years, while the reverse is observed in the older age groups. At the all India level too, nearly same pattern has been noticed. That is, the marital fertility rates seem higher in Indian Buddhists than in Muslims in the younger age groups of 15-19, 20-24 years, while the opposite trend is evident in the older age groups (Census of India, 1981).

Further, in India (SRS, 1992), the marital fertility in younger ages is higher in urban areas than in rural areas. From age group 25-29 years onwards, marital fertility is however, higher in rural than in urban areas. A perceptible decline in marital fertility is seen for females aged 35 years and above. In Kerala (SRS, 1992), interestingly, not only in 15-19 and 20-24 years, but in ages 25-29 years too, the marital fertility is higher in urban than in rural areas; while in the older age groups, the rural-urban differentials appear not so marked. Unlike these patterns, in the present study population as a whole, the marital fertility in all age groups seems higher in rural than in urban areas (Table); owing probably to the effects of several fertility-depressing factors in urban than in rural areas. This pattern has also been returned by the Jammu and Kashmir state (SRS, 1988).

The comparison of the schedules of marital fertility among the major population groups of Jammu and Kashmir state (Table 5) show varying levels and age patterns of marital fertility. Though the differentials in age at marriage of women, extent and age pattern of usage of family planning methods along with concomitant factors may be partly responsible, these variations can also be chance occurrence owing to the limited sample sizes.

Total Marital Fertility Rate

Like total fertility rate, the total marital fertility rate is the comulative value of age specific marital fertility rates at the end of the reproductive period. It indicates the average number of children expected to be born per married woman

Table 5: Age-Specific Marital Fertility Rates for population group of Ladakh, Kashmir, Jammu regions, Jammu and Kashmir, and for Kerala, India

Region/Population group/State/ Country		*Age-Specific Marital Fertility Rate*						
		15 - 19	*20 - 24*	*25 - 29*	*30 - 34*	*35 - 39*	*40 - 44*	*45 - 49*
Ladakh Region (Study Area)								
Buddhists								
Bodhs	Rural	444.44	235.29	292.68	128.21	34.48	-	-
	Urban	250.00	266.67	200.00	117.65	-	-	-
	Combined	384.62	244.90	262.30	125.00	22.22	-	-
Muslims								
Baltis	Rural	-	185.19	260.00	153.85	139.54	80.00	-
	Urban	-	181.82	54.05	210.53	-	-	-
	Combined	-	184.21	172.41	169.01	105.26	60.61	-
Brokpas[1]	Rural (Combined)	666.67	166.67	200.00	166.67	-	-	-
Arghuns	Rural	222.22	-	-	-	-	-	-
	Urban	285.71	100.00	388.89	-	-	-	-
	Combined	250.00	71.43	259.26	-	-	-	-
Muslims (Pooled)	Rural	173.91	162.79	217.39	125.00	90.91	58.82	-
	Urban	200.00	142.86	163.64	105.26	-	-	-
	Combined	181.82	156.25	193.55	118.64	60.00	42.55	-
Ladakh (Pooled)	Rural	250.00	183.33	245.45	126.05	73.68	32.68	-
	Urban	214.29	175.44	173.33	109.09	-	-	-
	Combined	239.13	180.79	216.22	120.69	48.28	24.29	-
Kashmir Region								
Hindus								
Kashmiri Pandits		-	333.3	90.9	142.9	-	-	-
Muslims								
Kashmiri Muslims		-	-	166.7	58.8	-	-	-
Jammu Region								
Hindus								
Dogra Brahmans		-	277.9	205.1	100.0	50.0	-	-
Dogra Rajputs		-	157.0	222.2	25.0	58.8	-	-
Dogra Scheduled Castes		285.7	148.2	222.2	90.9	71.4	125.0	-
Dogra Hindus (Pooled)		200.0	203.1	207.2	65.2	58.8	28.6	
Muslims								
Gujjars		125.0	300.0	500.0	200.0	-	-	-
Jammu and Kashmir[a]		312.7	306.0	229.4	133.2	86.3	40.6	33.6
Kerala[b]		258.6	284.9	146.8	50.1	13.0	3.1	0.7
India[b]		247.1	314.5	209.9	120.7	71.1	34.6	13.6

1. The sample for Brokpas has been drawn from rural areas only
a. 1989 estimates (*Source:* Sample Registration System, 1989; Office of the Registrar General, India)
b. 1992 estimates (rates for India exclude Jammu and Kashmir)
Source: Sample Registration System, 1992; Office of the Registrar General, India

during the entire span of the reproductive period, if the age specific marital fertility rates (on which the rate is based) continue to be the same and there is no mortality. The total marital fertility rate for India in 1992 has been estimated as 5.1, and among the major states, the rate varies from 3.8 in Kerala to 6.5 in Assam. The state of Jammu and Kashmir has returned a total marital fertility rate of 5.7 in the SRS, 1989.

In the present study population, the total marital fertility rate is observed 4.2, which seems lower than the rates for India and the state of Jammu and Kashmir, but, marginally higher than the estimate for Kerala. The differentials in total marital fertility rates across the individual study population groups have shown that the rates are the highest and lowest among Brokpas (6.0) and Arghuns (2.9), respectively. And, the Baltis show lower rate than Bodhs (Table 4). These differentials may be ascribed to differences in marital status distributions as well as extent of usage of family planning methods. But, the lower rate among Baltis than among Bodhs can also be a chance occurrence, because the mean age at marriage of women has been found higher, proportion of 'currently' married women in the reproductive ages has been found lower, and the degree of usage of family planning methods

is greater in the latter than in the former group. It may be mentioned that the Muslims on the whole, has shown lower total marital fertility rate than Buddhists, largely on account of lower rates in Arghuns and Baltis than in Bodhs. At the all India level (Census of India,1991), however, the rate appears slightly higher in Muslims (4.9), than in Buddhists (4.5) and Hindus (4.2).

It has also been observed that at the All-India level (SRS, 1992), the total marital fertility rate varies from 5.2 for rural areas to 4.6 for urban areas. The rates for rural and urban areas (7.3, 6.3) respectively in Jammu and Kashmir state (SRS, 1988) also have shown the same pattern. On the other hand, the SRS, 1992 rate for rural Kerala (3.7) seems lower than that estimated for urban Kerala (4.4).

In the present study, the Ladakh (Pooled) group too, reveals higher estimate for rural (4.6) than for urban areas (3.4), owing to lower age specific marital fertility rates at all ages in urban than in rural areas, which in turn, may be attributable to higher female age at marriage, greater extent of usage of family planning methods as well as to the involvement of several other fertility-depressing factors in the urban than rural sector. These rates however, seem lower than the corresponding rates noticed in India and Jammu and Kashmir. Individually, rural Bodhs and Baltis, have also shown higher rates than their urban counterparts, but the reverse trend has been recorded by Arghuns (Table 4) (which however, appear similar to the trend noticed in case of Kerala). But, very low marital fertility per woman (1.1) in rural Arghuns can also be a chance phenomenon owing to limited size of the sample.

Table 4 has further shown that the total marital fertility rates is rather high at 5 or above in Brokpas (6.0), Gujjars (5.6), and Bodhs (5.2). The lowest and the second lowest rates are found in Kashmiri Muslims (1.1) and Dogra Rajputs (2.3), respectively. But as already mentioned in case of other measures, very low estimate in Kashmiri Muslims seems most possibly a chance occurrence due to small sample size. This is because, the lower age at marriage, higher proportion of 'currently' married women, lesser extent of usage of family planning methods and several other determinants (of fertility) amongst them than among some of the other population groups appear conducive to high fertility.

Child-Woman Ratio

The age and sex composition of a population, is the result of the past vector of fertility, mortality, and migration. But, it is chiefly the fertility, which gives shape to the age distribution of a population. Hence, the levels and pattern of fertility in the past can be inferred from the age distribution of a population. The child-woman ratio (also called general fertility ratio), is a commonly used measure of fertility calculated from the age-sex distribution. It can also be treated as the measure of effective fertility, as it does not consider the births of children dying early in life. In other words, it reflects only the number of surviving children under 5 years (or 9 years) of age. But, this ratio is affected by distribution of women by age in the reproductive period; dramatic changes in mortality (infant and early childhood mortality) and migration, which in turn, are influenced by several independent determinants of the population components.

The child-woman ratio (C_{0-4}/W_{15-10}) for India has been estimated as 545 (Census of India, 1981). And, whereas, the state of Jammu and Kashmir has returned a relatively high estimate (632); Kerala has shown a low ratio of 406 in 1981. In the present study population as whole, the ratio has been found 564, which seems slightly higher than the ratio for India and much higher than that for Kerala. One of the reasons for the differential could be the smaller denominator in the formula considered in the present study. However, the ratio for Ladakh (Pooled) group appears lower than the ratio for Jammu and Kashmir state.

The inter-population comparison has revealed that the chile-woman ratios (C_{0-4}/W_{15-44}) are the highest and lowest among Brokpas (696) and Arghuns (360), respectively. And, the Bodhs have recorded lower ratio than Baltis (Table 6). [Muslims on the whole, seems to have higher child-woman ratio (591) than Buddhist Bodhs]. This ranking seems to be more or less comparable with that shown by the measures of population composition. The 'current' measures of fertility however, have indicated slightly different ranking, in that, some measures are not much different among Bodhs and Baltis or slightly lower in the latter group than in the former one.

Table 6: Child-Woman Ratio[a] for population of Ladakh, Kashmir, Jammu regions, Jammu and Kashmir, and for Kerala; India

Region/Population group/State/ Country		*Child-Woman Ratio*
Ladakh Region (Study Area)		
Buddhists		
Bodhs	Rural	543.17
	Urban	432.20
	Combined	510.10
Muslims		
Baltis	Rural	699.37
	Urban	668.83
	Combined	689.36
Brokpas[1]	Rural (Combined)	696.20
Arghuns	Rural	263.74
	Urban	420.69
	Combined	360.17
Muslims	Rural	617.28
(Pooled)	Urban	548.50
	Combined	591.08
Ladakh	Rural	590.30
(Pooled)	Urban	515.59
	Combined	563.93
Kashmir Region		
Hindus		
Kashmiri Pandits		480.0
Muslims		
Kashmiri Muslims		463.8
Jammu Region		
Hindus		
Dogra Brahmans		500.0
Dogra Rajputs		331.7
Dogra Scheduled Castes		635.8
Dogra Hindus (Pooled)		476.6
Muslims		
Gujjars		711.1
Jammu adn Kashmir		632[b]
Kerala		406[c]
India		545[c]

1. Estimates for rural and combined Brokpas are same, as the sample has been drawn from rural areas
a. Calculated as ratio of children age 0-4 years to 1000 women aged 15-44 years (except in case of Kerala and India)
b. Estimates for 1981 (*Source:* Census of India, Part XII, Series-8, Census Atlas-Jammu & Kashmir, DIrector of Census Operations, J & K, 1990)
c. Estimate calculated as ratio of children aged 0-4 years to 1000 woman aged 15-49 years for the year 1981 (ratio for India excludes Assam (*Soruce:* Registrar General, India-Census of India, 1981)

It also appears that the differences in the ratios would have been much greater, had the under-5 years mortality levels were almost same (under-5 mortality levels have been found higher among Baltis and Brokpas than among Bodhs and Arghuns).

The rural-urban differentials in child-woman ratios have indicated that the ratio is higher in rural areas than in urban areas (Table 6) in case of the total population. The same pattern has also been for Bodhs as well as Baltis. On the other hand, the reverse is observed for Arghuns in rural and urban sector, as also noticed earlier in case of most of the fertility measures. According to Table, in the state of Jammu and Kashmir, the child-woman ratio is the highest in Gujjars (711), indicating high fertility amongst them. Most of the other measures of fertility and measures of age compositions also have suggested high fertility among Gujjars, and several population attributes to seem to be conducive to high fertility. On the other hand, the ratios have been observed the lowest among Dogra Rajputs (332), and the second lowest among Arghuns (360). Kashmiri Pandits also have relatively low child-woman ratio (480). Most of the measures of fertility and population composition also roughly indicate relatively low fertility level among these groups. Many other characteristics noticed amongst them, including high literacy rate for females, high adoption of family planning methods, etc. also appear conducive to low fertility. Bodhs and Baltis seem to occupy the intermediate position between the extremes.

Most of the 'period' measures of fertility discussed above broadly indicate that the 'current' (recent) fertility level may be lower in the total study population than in the state of Jammu and Kashmir, and India as a whole. On the other hand, the reverse seems to be true when the 'current' fertility estimates for the demographically advanced state of Kerala are taken into consideration. Generally speaking, continuing improvement of certain life situations like, betterment of education, medical, communication facilities, economic and educational characteristics of people (particularly women), status of women; as well as increasing exposure to the outside world, and inclination towards small family size etc., in recent years may be responsible for the relatively moderate 'current' fertility level.

It may be added that in the Ladakh region, the harsh climatic conditions, limited agricultural season, and recent changes in economic opportunities and expectations due to the planned development programmes, including the accelerated promotion of tourism, seem to encourage active work-force participation in case of men as well as women. And, whereas men are the principal earners, increasing women participation in the active work-force has also been noticed in

recent years, which may not be conducive to high fertility. The macro-level data for the year 1981, also have shown higher percentage of male and female workers of total male and female population in Ladakh (56.5 and 30.5 per cent, respectively) than in the state of Jammu and Kashmir as a whole (52.2 and 5.9 per cent, respectively) [Census of India, 1981].

Further, even though the census literacy rate for the year 1981 in Ladakh (29.9 per cent), particularly the literacy rate for females (8.9 per cent), have been observed slightly lower than the corresponding estimates seen at the Jammu and Kashmir state level (30.6 and 12.7 per cent, respectively), it has been noticed during the course of the study, that, continuous efforts are being made to improve the picture, with the changing face of Ladakh. That some progress may have been made in the study areas, have already been discussed, while elaborating the educational characteristics of the household population. It has been found that, the literacy rate for persons, as well as males and females in the study population, are higher than the corresponding rates in India (in 1991) and in the Jammu and Kashmir state (in 1981), as a whole. And, high literacy level is usually not conducive to fertility.

It has also been observed that there exist variations in the 'current' fertility level across the individual study population group. Whereas in case of Bodhs and Baltis, most of the measures of 'current' fertility seem moderately high, in case of Arghuns, the estimates have been found relatively low. In fact, the relatively moderate fertility level in the present study population as a whole, as compared to the national, and Jammu and Kashmir state levels, appears to be due particularly to the relatively low ('current') fertility estimates among Arghuns. This also seems to be the main reason behind the comparatively low estimates of most of the fertility measures noticed among Ladakh Muslims on the whole, than among Ladakh Buddhists (Bodhs).

Actually, the Arghuns, who are mainly urban-based, also appear to be in a better position with respect to the economic, educational characteristics of men and women, availability of relatively superior type of educational, medical and communication facilities near residence, and housing conditions. More Arghuns than others also seem to avail of modern medical care only. Many of them are additionally seen to be adapting to the present day norm of small family size, and do not view children, particularly male ones, as economic assets (probably due to the fact that, comparatively few Arghuns than others are engaged in the agricultural sector). The level of adoption of contraception amongst them also has been found higher than among others. All these aspects, together with the low infant and child mortality rates (as compared to other study population groups), may be advanced as explanations for the relatively low fertility estimates observed among them. However, the possibility of chance occurrence of relatively small number of births (in the one year period prior to the study), due to the limited sample size, cannot also be dismissed altogether, particularly in view of the very low rates estimated for rural Arghuns. Besides, the cumulative fertility estimates (children ever born and surviving data) for Arghuns, (discussed later) have revealed a slightly different picture.

In contrast to Arghuns, the Brokpas, who are entirely rural-based, seem to exhibit the opposite of most of the above-mentioned characteristics, circumstances, along with (comparatively) low age at marriage of women, and very limited usage of family planning methods. These factors may explain the relatively high fertility noticed amongst them.

In case of Bodhs and Baltis, who are spread over both rural and urban areas of Ladakh, and who have shown moderately high estimates of 'current' fertility, most of the above mentioned factors, seem to manifest themselves in varying degrees. However, Bodhs have been observed to occupy a more privileged position with regard to the availability of communication facilities near residence, housing conditions, economic and educational characteristics of women, infant and early childhood mortality levels, and usage of family planning methods, as compared to Baltis. And, these factors are in general, not conducive to fertility. Therefore the relatively small as well as the varying pattern of differentials in the fertility estimates observed amongst them can also be a chance occurrence. This may be so, because the 'period' fertility measures estimated for urban Baltis seem rather low, although they do not exhibit characteristics unduly favourable to low fertility, when contrasted with urban Bodhs and urban Arghuns. Besides, the child-woman ratios as well as comulative fer-

tility estimates (children even born and surviving estimates) have been found higher for Baltis than for Bodhs.

From the discussion on the measures of fertility, it has additionally been seen that the 'current' fertility levels also vary in the major population groups across the three regions of Jammu and Kashmir state viz., Ladakh, Kashmir and Jammu. In general, Bodhs and Baltis seem to show relatively high fertility than the Kashmiri Pandits and Kashmiri Muslims of Kashmir region, as well as Dogra Brahmans and Dogra Rajputs of Jammu region. And, whereas Arghuns have recorded comparatively low fertility than most of the other population groups, the reverse appears to be true in case of Brokpas.

Children Ever Born and Surviving

According to the NFHS, 1992-93, the women of child-bearing age in India have borne an average of 2.5 children, and have an average of 2.2 'currently' living children. Women who are 'currently' married, have borne 3.1 children, on average, of whom 2.7 children are still living. The state differentials have shown that for 'currently' married women, the average number of children ever born ranges from 2.5 in Kerala to 3.7 in Assam. Because high fertility states tend to have high mortality as well, the range is somewhat smaller in case of the number of children still living (from 2.3 in Kerala and Tamil Nadu 3.2 in Nagaland).

In the present study, the Pooled Ladakh data show that the average number of children ever born per ever-married woman is 4.0, of which 3.1 children are 'currently' surviving. The population differentials indicate that the average numbers of children ever born and surviving for ever married women ranges from 3.43 and 2.96 in Bodhs to 5.0 and 3.33 in Brokpas (Table 7). The Muslim women on the whole, seem to have borne an average of 4.4 children, of whom 3.2 children are 'currently' surviving. The differentials in children surviving in the present study thus, seems smaller than the differentials in children ever born. This convergence seems to have been caused by the simultaneous occurrence of high fertility and relatively high levels of infant and child mortality. This appears particularly true in case of Baltis and Brokpas. Amongst them, women seem to have had more children, but lost relatively more as well. Another reason for the absence of a large difference can be the pervasive influence of infant and child mortality across all the population groups.

It may be mentioned here that, the population differentials in children ever born seem to be slightly different from the differentials in 'current' ('period') fertility measures, in that, the ranking of the study population groups is seen

Table 7: Mean number of Children ever born and surviving[a] among population groups of Ladakh, Kashmir, Jammu regions, Jammu and Kashmir, and in Kerala, India

Region/Population group/State/Country		*Mean number of children ever born*	*Mean number of children surviving*
Ladakh Region (Study Area)			
Buddhists			
Bodhs	Rural	3.63	3.12
	Urban	3.01	2.63
	Combined	3.43	2.96
Muslims			
Baltis	Rural	4.68	3.23
	Urban	4.37	3.22
	Combined	4.57	3.22
Brokpas[1]	Rural (Combined)	5.00	3.33
Arghuns	Rural	4.09	3.11
	Urban	3.47	3.05
	Combined	3.70	3.07
Muslims (Pooled)	Rural	4.63	3.22
	Urban	3.93	3.14
	Combined	4.36	3.19
Ladakh (Pooled)	Rural	4.25	3.18
	Urban	3.65	2.98
	Combined	4.03	3.11
Kashmir Region			
Hindus			
Kashmiri Pandits		2.31	2.22
Muslims			
Kashmiri Muslims		3.33	3.00
Jammu Region			
Hindus			
Dogra Brahmans		3.98	3.36
Dogra Rajputs		3.67	3.46
Dogra Scheduled Castes		3.76	3.25
Dogra Hindus (Pooled)		3.81	3.36
Muslims			
Gujjars		4.34	3.83
Kerala		2.5[b]	2.3[b]
India		3.11[b]	2.65[b]

1. The sample for Brokpas has been drawn from rural areas only
a. Mean number of children ever born and surviving per ever married woman (except in case of Kerala and India)
b. Estimates per currently married woman for period 1992-93 (*Source:* National Family Health Survey, India, 1992-93, Internation Institute of Population Sciences, 1995)

changed. Bodhs instead of Arghuns have shown the lowest estimates; although Brokpas still register the highest estimates. Baltis also show relatively high average number of children ever born. These disparities may be partly attributed to the fact that the children ever born data do not refer to 'current' fertility, but to the 'cumulative' estimates of births to ever-married women, which have occurred in the past over a long span and at varying times, in different backgrounds. Besides, the estimated 'current' measures of fertility may not be completely independent of influence of chance factor due to small size of the sample.

The comparison of mean number of children ever born for ever - married women across the major population groups of Jammu and Kashmir state (Table 7), reveal that Brokpa women of Ladakh seem to have borne 5 children, on average, which is the highest number, followed by Baltis (4.6) and Gujjars of Jammu (4.3). The average has been found the lowest among Kashmiri Pandits (2.3). The Kashmiri Muslims (3.3) and Ladakh Bodhs (3.4) also exhibit relatively low estimates. Incidentally, Arghuns (3.7) seem to occupy an intermediate position between the above-mentioned range, unlike that observed earlier in case of 'current' fertility rates.

The differentials in mean number of children surviving have registered a relatively small range (2.2 in Kashmiri Pandits to 3.8 in Jammu Gujjars) [Table 7], because of the pervasive influence of mortality, as well as the fact that, population groups showing relatively high number of children ever born, also have high number of children dead, as stated earlier too.

Further, Muslim women in each of the three regions - Ladakh, Kashmir, and Jammu, seem to have borne more children that other resident religious groups in the same region. (Table 7), as also noticed in the NFHS, 1992-93. The differentials in number of children surviving show that the average ranges from 2.2 in Hindus of Kashmir to 3.8 in Muslims of Jammu.

Exploratory Fertility Analysis

As already stated, several independent determinants may be influencing the fertility level in the study populations too, as in other cases. The observed interplay between these have been discussed in this section.

Fertility Differentials by (Present) Age of Woman

In general, the number of children ever born is expected to be related to the (present) age of women, i.e., the younger women are expected to have lesser number of children as compared to the women in the older ages (Singh, 1986; NFHS, 1992-93). In the present study, the Ladakh (Pooled) data too, have shown similar trend. However, in the older age groups of 40-44, and 45+ years, the mean number of children ever born have been found almost same - 5.20, 5.16, respectively. This may have been caused by the omission of certain births by the older respondents. (But, it may also be mentioned that in the Ladakh region, in general, the mortality level has been rather high in the past, whereas in recent few decades, this trend is changing with the changing face of Ladakh).

The completed family size of ever-married women at the end of their reproductive careers, hence, appear to be at least 5.2 births. According to the Census of India, 1981, the average numbers of children ever born to women in ages 45-49 years have been 4.99 in India as a whole, as well as in Kerala. In the NFHS, 1992-93, the completed family size of Indian women in ages 45-49 years have been reported 5.07. And, the majority of women in this age group seem to have five or more live births, and 17 per cent have had at least eight live births. In the same survey, the completed family size for 'currently' married Indian women has been found 5.2 births.

Further, the individual study population groups too, have revealed that the mean number of children ever born, in general, increases, as the age of women advanced (Table 8). However, minor discrepancies, in the older age groups among Bodhs, Arghuns, the Brokpas have also been noticed. The reasonings mentioned above for such discrepancies may also be true in these cases, although limited sample size may be responsible as well particularly in case of Brokpas. In these population groups, the completed family size for (ever-married) women at the end of their reproductive careers (45+ years), seem to be at least 4.1. 4.7 and 6.8 births respectively. (It may be added here that the weighted average numbers of children ever born for ever-married women aged 40-44

Table 8: Fertility differentials (mean number of children ever born and surviving)[1] among various population groups of Ladakh region, in Jammu and Kashmir, India; by (present) age of woman[2]

Age of woman[2] (Present)	*Buddhists*	*Muslims*				*Ladakh*
	Bodhs	*Baltis*	*Brokpas*	*Arghuns*	*(Pooled)*	*(Pooled)*
		(Mean number of children ever born)				
15-19	0.67[a]	0.50[a]	0.50[a]	0.60[a]	0.54	0.56
20-24	1.59	1.33	1.58	1.47	1.42	1.48
25-29	2.37	3.11	4.50[a]	2.36	3.04	2.79
30-34	3.59	4.32	5.50	3.36	4.15	3.96
35-39	3.93	5.80	6.33[a]	4.17	5.30	4.88
40-44	4.43	5.90	9.00[a]	5.15	5.82	5.20
45+	4.06	6.33	6.78	4.70	5.82	5.16
		(Mean number of children surviving)				
15-19	0.67[a]	0.33[a]	0.50[a]	0.60[a]	0.46	0.50
20-24	1.47	1.03	1.00	1.40	1.12	1.24
25-29	2.14	2.54	3.25[a]	2.36	2.54	2.39
30-34	3.04	3.38	3.50	3.07	3.30	3.21
35-39	3.59	4.23	4.67[a]	3.50	4.02	3.89
40-44	3.84	4.13	6.50[a]	3.85	4.16	4.01
45+	3.33	3.78	4.39	3.63	3.81	3.63

1. Differentials in fertility -related variables per woman(ever-married respondent)
2. (Present) age of ever married respondent (in years)
a. Calculation based on less than 10 cases

and 45+ years among Bodhs, Arghuns, and Brokpas have been found 4.2, 4.8 and 7.0 births, respectively).

On the other hand, among Baltis, the highest mean number of children ever born has been observed for ever-married women aged 45+ years, and so, the completed family size seems to be 6.3 births. The Muslim ever-married women on the whole, seem to have larger completed family size of 5.8 births, than Buddhist women. (These differentials hence, reveal a slightly different picture than that noticed in case of 'current' fertility measures). It may be mentioned here that Goldstein et al. (1983) have also reported high completed family size (for all women) in Muslims (7.2) than in Buddhists (5.7) of Kyilung, Ladakh. In case of married females in age 45-69 years too, the same pattern has been seen (7.2, 6.4, respectively) [although this difference was not statistically significant].

Interestingly, the inter-population comparison has indicated that given the same age of women, the mean numbers of children ever born are higher among Bodhs and Brokpas than among Baltis and Arghuns, upto the age of 24 years. But, above the age of 24 years, including the respondents reaching the end of their reproductive careers, that averages are noticed higher among Baltis than among Bodhs and Arghuns; while among Brokpas, the averages are still found the highest. It has also been observed that the older Arghuns women, above 34 years of age, have borne more children than Bodhs. It appears, thus, that these differentials are probably responsible for the higher mean numbers of children ever borne among Buddhist Bodhs than among Muslims on the whole, upto the age of 24 years, and for the opposite trend from age 25 years on wards.

Fertility Differentials by Foetal, Infant and Early Childhood Mortalities Experienced by Woman

Foetal Mortality is also recognized to affect the fertility behaviour (Davis and Blake, 1956; Miro and Potter, 1980); although there exist problems of proper assessment. In the present study, the past experience of foetal morality (all foetal mortalities, including still births), seems to increase the fertility, as the mean number of children ever born is noticed higher for women, who experienced any foetal mortality, than for those, who did not have such experience. Each of the individual study population group also have registered the same trend.

Of all mortalities, infant and early childhood mortalities (under 5 mortalities) constitute the most significant components of population change. Everywhere, the death of an infant/ young child has a much greater social, economic

and demographic importance than the death of an older person. This is because, deaths at these young ages, form a major chunk of all deaths, and they are also known to influence the fertility behaviour and /or the motivation to control fertility, particularly, in the developing countries, like India.

In fact, it has frequently been hypothersized that high fertility is due to the high general and child mortality levels; and more specifically, that the parents try to insure or replace or compensate (for) the experienced or perceived incidence of deaths by seeking the number of births that will give them the desired numbers (Harrington, 1971; Heer and Wu, 1975; Sirageldin and UN Secretariat, 1979; Chaudhury, 1982). And, it has been noticed also that the high-fertility nations have high rates of infant and child mortality, which reinforces high fertility attitudes of couples (Bogue, 1969; Chandreasekhar, 1972). A larger number of studies in India and elsewhere have also reported that infant and child mortality is associated with fertility (UN, 1961; Heer, 1966; Heer and Smith, 1968; Yankaver, 1970; Ekanem, 1972; Jain, 1974; Agarwala, 1975; Lapham et al., 1975; Frisancho et al., 1976; Mitra, 1978; Preston, 1978; Ketkar, 1979; Tuncer, 1979; Talwalkar, 1980; Mahadevan, 1985; Singh 1986; among others).

In the present study too, infant mortality seems to be related to fertility, since the mean number of children ever born has been found increased, in case of women with past experience of infant deaths than in case of those, who have not experienced any (Table 9). Each of the study population group have also shown the same trend. Similar differentials have also been noticed when the early childhood deaths experienced by women vis-a-vis children ever born are considered. Hence, it appears that in study areas, the people, probably consciously or subconsciously are seeking births, to achieve a certain desired number of surviving children, and to recompensate (for) the child loss, in view of the past experience and relatively high mortality conditions. In fact, in study areas, the perinatal, infant and under - 5 mortality rates have been observed relatively high (even though the mortality rates have been reported to be slowly de-

Table 9: Fertility differentials (mean number of children ever born and surviving)[1] among various population groups of Ladakh region, in Jammu and Kashmir, India; by foetal, infant and early childhood mortalities experienced by woman[2]

Experience of foetal/infant	*Buddhists*	*Muslims*				*Ladakh*
/early childhood mortalities	*Bodhs*	*Baltis*	*Brokpas*	*Arghuns*	*(Pooled)*	*(Pooled)*
		(Mean number of children ever born)[1]				
Foetal Mortality[3]						
Not experienced	3.29	4.32	4.64	3.54	4.14	3.81
Experienced	4.08	5.25	6.25	3.79	4.82	4.64
Infant Mortality[4]						
Not experienced	3.00	3.38	4.38	3.13	3.38	3.23
Experienced	5.14	6.37	5.91	5.84	6.21	5.91
Childhood Mortality[5]						
Not experienced	3.20	3.65	3.69	3.52	3.61	3.46
Experienced	5.26	7.04	7.42	5.33	6.88	6.51
		(Mean number of children surviving)[1]				
Foetal Mortality[3]						
Not experienced	2.89	3.20	2.86	3.07	3.12	3.03
Experienced	3.22	3.29	5.00	2.86	3.28	3.30
Infant Mortality[4]						
Not experienced	2.80	2.98	3.66	2.93	3.03	2.94
Experienced	3.58	3.59	2.86	3.59	3.50	3.52
Childhood Mortality[5]						
Not experienced	2.88	2.92	2.74	3.04	2.94	2.92
Experienced	3.58	4.05	4.42	3.40	4.03	3.92

1. Differentials in fertility -related variables per woman(ever-married respondent)
2. Types of death experienced by woman
3. Refers to all foetal deaths, including stillbirths
4. Refers to child deaths below one year age
5. Refers to child deaths at age 1 to > 5 years

clining). Potts and Selman (1979) have pointed out that, low fertility has seldom been achieved in the absence of declining mortality; and that the achieved family size in many regions of the world is highly rational, in the light of the high rates of infant and child mortality.

Fertility Differentials by Economic Characteristics/Occupation

The economic and social well being of a nation or a community is influenced by the economic characteristics of its people. These attributes are also widely acknowledged to exert dominant influence in a person's life and behaviour. Many studies have, therefore, examined the influence of economic characteristics/ occupation of men as well as women on fertility.

The work force participation of women has frequently been proposed in both the demographic literature and population policy statements, as a mean of promoting development and reducing fertility, particularly in the developing and less developed countries. The population policies of many governments include strategies directed to improve the 'status of women', which often includes encouraging women's employment. For effective reduction of population growth, and encouragement of low fertility, the creation and expansion of the alternatives to child-bearing and traditional maternal role, by providing educational and economic opportunities and economic independence, have been widely suggested along with a change in value of children (Blake, 1968; Davis, 1967; Kasarda, 1971; Bhatnagar, 1972; Dixon, 1975; Germain, 1975; Eberstadt, 1980; Cain, 1984). Mandelbaum (1974) while summarizing a number of studies relating to fertility noticed that the motivation for desiring large families was the absence of alternative roles for women except that of wife-mother.

In fact, a number of studies have reported inverse relationship between fertility and female work-force participation (UN, 1961; Heer, 1964; Namboodiri, 1964; Heer and Turner, 1965; Bangladesh Fertility Survey, 1975; Demery and Renselaar, 1979; UN, 1985; Kasarda et al., 1986). This relationship, however, is more pronounced in the industrialized developed countries than in the developing ones; and also in urban than in rural areas.

A host of explanations have been given with respect to the inverse relationship, such as: work outside home delays the age at marriage, and also increases the probability of non-marriage, and every additional child increases the 'opportunity cost' of a working mother in terms of forgoing income for sometime during pregnancy and after, which may deter future fertility behaviour; a working wife, being an earner, improves her status, economic independence, and plays a greater role in the family decision-making, while also enjoying relatively more egalitarian marital relationship, which are conducive to greater contraceptive usage and lower fertility; working woman attains positive self-image and status, and reduces the need to attain the same through procreation; work outside home provides alternative satisfaction to children, which may compete with child-bearing and rearing (Jaffe, 1959; Collver and Langois, 1962; Blake, 1965; Collver 1966; Berelson, 1969; Kasarda, 1971; Chaudhury, 1978; Standing, 1978; Shain and Jennings, 1980; Oppong, 1983; UN, 1985).

It has additionally been stressed that the female work-force participation per se does not determine the fertility behaviour, but that its effect on fertility depends on the setting, type of work, motivation and work commitment, availability of child-care alternatives etc. Many studies (Miro and Martens, 1968; Rosen and Simmons, 1971; Goldstein, 1972; Birdsall, 1977; UN, 1985) have reported that women working for wages/salary and/or those working in the modernized sector of the economy, particularly in urban areas like big metropolises and industrial cities, have lower fertility, when compared to their non-working counterparts. But, the fertility of working women or those engaged in agricultural activities, particularly in rural areas, is higher or does not differ significantly from that of non-working women. This may be due to the fact that the role of a woman as a worker in the former situation is not compatible with that of the mother; and the wage/salary employment or work in the modernized sector, call for more separation of work from home. Such type of work is also more likely to offer the opportunity for career development and raising real income over time, thereby raising the cost of interrupting or ceasing employment. In a comparative study of 38 developing countries (UN, 1985), women who worked in the modern sector tend to show lower fertility than those, who worked in the traditional, agricultural sector and women who did not work.

It has also been noticed that the lower fertility is more pronounced among the higher than among the lower occupational and educational groups (Westoff et al., 1963). This is because of more prominent role conflict (between the mother and the worker), higher work commitment, and social, economic benefits, which women belonging to the former category, are unlikely to forgo in order to have an additional child. On the other hand, the opportunity cost of children is hardly a crucial issue among women at the lower level of occupation and education, as the social and economic rewards are relatively small (Espenshade, 1977).

In the present study, it has been observed that whereas men are the principal earners in Ladakh region as also in most of the less developed regions, women seem to participate in the active work-force in a relatively limited number. However, they are engaged in a variety of activities within and outside the home, including all field activities (except ploughing), household chores, which fall outside the scope of the concept of the gainful economic activity.

Though in the recent years, increasing female participation in the active work-force has been noticed, even in the tertiary service sector, the traditional role of women as wives and mothers, which involves child-bearing and rearing, household duties, are still valued and considered norms. In this background, lower mean number of children even born to economically active women than to economically inactive women, as shown by the Ladakh (Pooled) data appear meaningful (Table 10). This inverse relationship have also been reported by many authors, as already mentioned above.

It has additionally been observed in study areas that, those engaged in the service sector have lower number of children ever born than those women, who are engaged in the agricultural sector. In other words, female work force

Table 10: Fertility differentials (mean number of children ever born and surviving)[1] among various population groups of Ladakh region, in Jammu and Kashmir, India; by economic characteristics /occupation[2] of woman[3]/husband

Economic characteristics/occupation	*Buddhists*	*Muslims*				*Ladakh*
	Bodhs	*Baltis*	*Brokpas*	*Arghuns*	*(Pooled)*	*(Pooled)*
		(Mean number of children ever born)				
Woman						
Economically inactive[4]	3.49	4.67	5.02	3.61	4.40	4.10
Economically active	3.18	3.74	4.75[a]	4.32	4.02	3.60
Cultivation/agricultural, unskilled labour	3.61	4.53	8.00[a]	6.50[a]	5.24	4.39
Trade/Commerce	3.00	4.50[a]	2.00[a]	2.80[a]	3.40	3.14
Service	2.69	2.50	1.00[a]	4.20	3.17	3.00
Husband						
Economically inactive[4]	4.00	5.00[a]	7.83[a]	4.64	5.59	5.00
Economically active	3.40	4.56	4.64	3.63	4.30	3.98
Cultivation/agricultural, unskilled labour	3.79	5.36	5.13	4.26	5.19	4.71
Trade/Commerce	3.33	4.14	7.80[a]	3.70	4.13	3.98
Service	3.23	4.04	3.82	3.43	3.80	3.56
		(Mean number of children surviving)				
Woman						
Economically inactive[4]	3.03	3.28	3.32	3.07	3.22	3.16
Economically active	2.69	2.77	3.50[a]	3.11	2.94	2.81
Cultivation/agricultural, unskilled labour	3.04	3.27	6.00[a]	4.25[a]	3.71	3.36
Trade/Commerce	2.47	2.25[a]	2.00[a]	1.40[a]	1.80	2.24
Service	2.38	2.33	0.00[a]	3.50	2.74	2.61
Husband						
Economically inactive[4]	3.15	2.40[a]	4.17[a]	3.91	3.64	3.46
Economically active	2.95	3.23	3.23	3.01	3.17	3.09
Cultivation/agricultural, unskilled labour	3.21	3.54	3.60	3.11	3.49	3.39
Trade/Commerce	2.74	2.90	5.40[a]	3.16	3.12	3.04
Service	2.87	3.12	2.64	2.90	2.99	2.94

1. Differentials in fertility -related variables per woman(ever-married respondent)
2. Refers to main occupation
3. Ever married respondent
4. Household duties/unemployed/retired

a. Calculation based on less than 10 cases

participation appears to lower fertility, particularly when employment outside home calls for relatively more separation of work from home and/or when the role of women may be more incompatible with their work status. Besides, active participation in the services, deviating from the traditional occupation, often requires a minimum educational qualification and is also frequently preceived as upward occupational mobility, which in general, are not conducive to large family size.

At the individual population level, Bodhs, Baltis and Brokpas too, have shown the same trends as mentioned above. But Arghuns, a relatively better placed socio-economic group, seem to register a different picture. (The Muslims on the on the whole, however, show similar trends as Buddhist Bodhs). It may be mentioned here that whereas limited sample size can be a reason for the varying trend seen in Arghuns; some studies (Stycos, 1965; Stycos and Weller, 1967) also do not seem to support the negative relationship between female work-force participation and fertility. Farooq and Tuncer (1974) too, have found that female labour force participation has no significant direct impact on fertility. In fact, in many less developed regions, particularly in Africa, many types of demanding work does not seem incompatible with child-bearing and rearing, and even women engaged in white collar or professional occupations have been found to have an average of five births (Ware, 1977).

Hence, it is also argued that the relationship between fertility and female work force participation is very complex, (involving such aspects as, work commitment, role incompatibility, etc.), the role of women as mothers and workers are not necessarily incompatible, fertility reduction need not occur on account of female work-force participation; and many empirical findings, particularly in developing and less developed regions and rural areas are inconclusive (Freedman, 1959; Miro and Martens, 1968; Safilios Rothschild, 1969, 1972; Goldstein, 1972; Hass, 1972; Standing, 1978; UN, 1985).

Furthermore, the economic characteristics/ occupation of husband is another determinant, which seems to influence fertility (Table 10). In the United States (1960), the cumulative natality appeared to be to be definitely linked to occupational status of men (husband), and even to specific occupations (Bogue, 1969). Natality seemed the lowest in white- collar group in the service sector, and the highest in farmers, farm labourers etc. although differences in educational attainment of the holders of each occupation accounted for much of the variations. In India as well, those involved in the service sector, have lower fertility, whereas those pursuing agricultural labour have high fertility (Pandey and Talwar, 1987). The Sri Lanka Fertility Survey (1975) too, has recorded more or less inverse relationship, with the professionals, managers at the one end, and the self-employed farmers at the other end. The Bangladesh Fertility Survey (1975) also reported higher fertility among cultivators as well as share croppers as compared to all such groups, as, white-collar, skilled and unskilled manual workers, and landless agricultural labourers. In fact, Sirageldin (1979) points out that - 'in most of the developing and less developed countries, the agricultural sector, which continues to be the largest economic sector, is also responsible for most of the growth in the total population. It is usually assumed and empirically not contradicted that raising children has some net economic benefit to parents in agricultural societies'.

In the present study too, the Ladakh (Pooled) data have revealed that the mean number of children ever born is lower when husbands are economically active than when they are inactive. The occupational differentials also show the same trend as noticed in the above-mentioned studies. That is, when husbands are engaged in cultivation, agricultural, unskilled labour, fertility seems comparatively high than when the husbands are working in various services. It may be mentioned here that, as in case of women, the active participation of men in the service sector too is perceived as upward occupational mobility, known to be conducive to low fertility as against the participation in traditional agricultural sector. Besides, the service sector jobs often require a minimum educational qualification, unlike the agricultural sector, where most men are usually illiterate or have very basic education.

Fertility Differentials by (Household) Income

Income - a relative indicator of socio-economic status and material comfort, wealth, resources of people, is often considered an explanatory determinant of fertility. And, a nega-

tive relationship between income and fertility has been reported by many studies (Stycos, 1963; Timur, 1971; Frisancho et al, 1976; Chang et al., 1979; Basu et al., 1980; Mamdani, 1981).

However, income is also widely acknowledged as a complex variable, since it is usually closely related to other socio-economic, demographic variables. Thus, attempts to separate out the particular role of income is often difficult. Freedman (1959) has put forth that, the inverse relationship between income and fertility can be due to several such factors as, educational status, social mobility, nature of familial orientation, etc. that may have forced the higher income groups to have fewer children. Heer (1966) also has argued that, in the process of economic development, rising per capita income would have exerted an upward pressure on fertility, but that, this is countered by other factors associated with development, like, increased education, declining levels of infant mortality, and the rising costs of children. According to Leibenstein (1979) as well, higher income in developing countries permit households to afford more children at the lower consumption standard. But, when groups are seen to lower their fertility in the course of development, the reason must be that the other basic developmental changes (location, occupation, education) produce motivations and constraints that counteract the influence of higher incomes.

In fact, because of the complex nature of income, its relationship with fertility is often prone to fluctuations and contradictions. Johnson (1960) finds that - 'the often - observed inverse association has with few exceptions, been significantly modified (in the majority of the industrialized countries of Europe). In general, the higher professional and wealthier classes no longer have the smallest families, this position is now occupied by intermediate occupational groups, and by married couples of average means'. A shift in the traditional relationship of classes with fertility (i.e., large families among poor, uneducated) have been pointed out by Freedman (1963) too. In fact, in the recent few decades, the class differences seem to have lessened, and the inverse relationship between income and fertility, particularly in the developed countries have also been modified. Friedlander and Silver (1967) have reported that in the developed nations, income is positively associated with fertility, while in the underdeveloped ones, it is negatively associated. Whereas Kuroda (1963) noticed that in Japan, there was no substantial reduction in fertility differentials by socio-economic status, Bogue (1969) observed a slightly U-shaped pattern of differential fertility , when the income of husband was considered (in the United State). Among the Whites, the extremely poor and wealthy had higher fertility levels, while the middle classes tended to have lower fertility. Among the Non-Whites, however, the relationship appeared inverse, with only a hint that very wealthy ones register more fertility than the middle-class ones. It has been suggested that with modern birth control readily available, the middle class seem to curtail their fertility, while the rich, who could afford, appeared to have larger families. Similar observations were also noticed in case of the income of White women (wife).

Further, while many other studies also have not found an inverse relationship between income and fertility (Grabill et al., 1958; Bean and Wood, 1974), some have reported even positive relationship between these two (Weintraub, 1962; Adelman, 1963). Becker (1960) had earlier expounded that children are like consumer durables, and the higher the income, the more the desire for children, just like the demand for refrigerator, television etc. However, this theory has attracted criticism, even though Spengler (1966), Schultz (1974) and some others have supported it. Efforts made in the 1960s to investigate empirically the relationship between income and fertility, over time, and cross-sectionally, also seemed inconclusive. Income did not seem to have a consistent positive or negative effect on fertility, and the magnitude of its effect, in any event, did not seem to be large (Willis, 1973).

In India too, some localized surveys did not reflect regular inverse gradation, i.e., lower fertility in the rich than in the poor class. And, it has been noticed that people in the highest income categories also have high fertility (Agarwala, 1966; UN, 1961). Ridker (1969) has pointed out that for prospering rural families, the initial effect of increased incomes is likely to be an improvement in health and nutritional level, which could significantly increase fecundity and live fertility rates, as well as the number of persons completing their fertile period. And, whereas in central India, Driver (1963) observed that economic status had only some indirect effect on fertility in rural areas of Delhi; inconsis-

tent relationship between fertility and income was reported by Singh (1986) too, in rural communities of Punjab and Haryana. Jain (1975), while discussing the relationship between fertility and income, concludes that the fertility differences due to income are small, especially in rural areas, possibly due to cultural practices, which are the real determinants of fertility behaviour in India, and which do not differ with change in income.

Zachariah's (1984) study in Kerala, also has registered that the economic conditions of the household do not account for the fertility decline, so much as increasing women's literacy and general reductions in infant mortality levels. The view that improvements in social services and amenities are important rather than increases in family income, has also been echoed by the World Bank (1984). The World Bank Fertility Survey in Kerala (1980) has shown that the economic variables, such as , household expenditure and land owned are positively related with children ever born and surviving.

It is additionally believed that economic conditions needing child labour lead to large family size (Nag et al., 1978). Leiberman (1976) has found agircultural income is a significant fertility determinant, probably because of their need for family labour. Similarly, Shaw (1988) has also reported positive correlation between total family income and number of children, and explained the role of children as additional earners. In Kerala, it has been noticed that, as the value of children as employable economic assets declines, so does fertility (Ratclife, 1978).

There are therefore, great difficulties in relating income to fertility at the individual/family level. Some of the difficulties also seem to arise because data on fertility, in many instances, refer to 'accumulated' or 'cumulative' fertility (the result of a series of events through time, presumably under different environmental backdrop), while income is included only as the 'current' income level and not as a measure of 'accumulated' income (Bravo-Casas, 1979). Potts and Selman (1979) and UN Secretariat (1979) too, have suggested that instead of 'current' income at one point of time, which is frequently considered, past, potential, and even anticipated incomes may be much more relevant for explaining the fertility trends and differentials.

In the present study, the Ladakh (Pooled) data have indicated that the mean number of children ever born increases with the increase in (household) income. Each of the study population group also show the same trend, excepting a few discrepancies in the lowest income group (Table 11). It may be mentioned that the largely rural setup, and relatively low level of development of the study areas, in general, may be encouraging those with relatively high (household) income, to desire and afford more children. Besides, in the study areas, it has been observed that, limited agricultural season, harsh living conditions unavailability of cheap labour, particularly during the working season (summer), necessitate everyone in the household to work, either outside for wages/salary, or in the family land, home. And hence, children are often considered important helpers too. This may also be one of the factors, which is responsible for large family size even in the high-income households, However, the possible involvement of simultaneous and/or overriding effects of several other socio-cultural, psychological factors on fertility can not also be ruled out (which would require larger sample size and more intensive focusing on income fertility relationship to arrive at a definite conclusion).

Fertility Differentials by (Household) Ownership of Land

Studies based on rural populations, primitive societies, often consider the land ownership or the size of land owned by households as another indicator of economic status, resources, as well as the possible role of the same on population processes. In Bangladesh, it has been noticed that cultivators owning their land and share croppers seem to have higher than average fertility, while the landless agricultural workers and white collar workers, manual labourers have slightly lower than average fertility (Bangladesh Fertility Survey, 1975). Recently, Flinn (1986) has also reported that individuals from households with more land tend to have more children, as well as more reproductive success (offspring surviving to 1 year of age), which could be due to a preceived need for labour and more resources.

In India too, Driver (1963) found that the average family size was slightly larger among large landowners than among small landowners. In Kerala, the World Bank Fertility Survey (1980) has also shown higher fertility among those with

Table 11: Fertility differentials (mean number of children ever born and surviving)[1] among various population groups of Ladakh region, in Jammu and Kashmir, India; by economic background

Economic background	*Buddhists*	*Muslims*				*Ladakh*
	Bodhs	*Baltis*	*Brokpas*	*Arghuns*	*(Pooled)*	*(Pooled)*
		(Mean number of children ever born)				
Income (in Rupees)[2]						
10000 and less	3.16	4.45	5.00[a]	2.00[a]	3.43	3.30
10001-30000	3.16	4.44	4.58	3.54	4.22	3.80
30001-50000	4.06	4.66	5.09	3.84	4.46	4.32
50001 and above	4.42	4.96	7.33[a]	4.32	4.86	4.77
Ownership of Land[3]						
No land	3.07	4.08	5.50[a]	2.95	3.73	3.41
Less than 10	2.84	4.22	4.75[a]	3.74	4.08	3.68
10-29	4.00	4.40	3.40[a]	4.45	4.33	4.17
30-49	4.47	5.92	5.33[a]	3.75[a]	5.13	4.87
50 and above						
		(Mean number of children surviving)				
Income (in Rupees)						
10000 and less	2.32	2.82	3.00[a]	1.56[a]	2.29	2.30
10001-30000	2.70	3.04	3.11	2.91	3.01	2.89
30001-50000	3.49	3.33	3.09	3.16	3.25	3.33
50001 and above	4.33	3.82	5.17[a]	3.70	3.86	3.96
Ownership of Land[3]						
No land	2.52	3.12	3.25[a]	2.33	2.80	2.67
Less than 10	2.51	3.09	3.00[a]	3.36	3.19	2.97
10-29	2.97	3.22	3.65	3.08	3.24	3.16
30-49	3.44	3.21	1.60[a]	3.36	3.10	3.26
50 and above	4.00	4.08	3.67[a]	3.13[a]	3.71	3.82

1. Differentials in fertility -related variables per woman(ever-married respondent)
2. Total household income per annum
3. Household ownership of cultivable land in kanals (8 kanals= approximately 1 acre)
a. Calculation based on less than 10 cases

the 100+ cents of land (owned by household) than among those with smaller sizes of land. The multiple regression analysis of the independent effects of land owned has indicated that the relationship with the children ever-born and surviving is significantly positive. Mamdani (1972), while commenting on the Khanna study, stated that in the rural areas of Punjab almost everyone seems to want large number of children. Small farmers in Punjab with little land (less than 5 acres) can not afford to hire outside labour and rely on family for such requirements; for them, the economic improvement can come only through increasing the family labour force. For the landless labourers, larger family size means greater income, since children, particularly sons can work as labourers and earn wages. And, those with large landholding do not try to reduce the family size, partly because they continue to believe that the greatest assets are their sons who can work in the family farm more efficiently and dispense with expensive hired labour.

In the present study as well, the Ladakh (Pooled) data reveal that the mean number of children ever born increases as the size of (household) land increases (Table 11). Among Bodhs, Baltis, and Arghuns too, it has been noticed that relatively large ownership of land may be contributing to the increase in fertility, and reversely, no land or relatively small size of land owned tend to lower fertility. (The Ladakh Muslims as a whole, also show the same trend). The differing trend noticed among Brokpas may be due to the limited sample size.

Several possible reasons may be cited for these findings: (1) in case of relatively large size of land, more children may have certain economic benefits (which has been empirically not contradicted for rural, agricultural societies), particularly because of the perceived need for labour, mainly male labour and also overall management, since the farming practices are still traditional, and non-mechanized. This may be encouraging people to have certain number of living sons, even if preference for son is not very obvious; (2) the small farmers may be limiting the family

size, since the small amount of land owned, may get further fragmented, when bequeathed to the heirs [Srinivas and Ramaswamy (1971) has also pointed out that the size of landholding is actually important, because more number of sons may partition the land, which may be against the concept of agircultural needs]; (3) the observed pattern of differentials may also be a function of the rural-urban differences since urbanities (in Leh and Kargil towns) either do not own land, or own very small sized land; (4) it has additionally been observed in the study areas that, some people not owning land, or little land in urban areas not only have relatively high economic standing, owing to the emergence of tourism and allied services as promising economic pursuits, but also certain socio-cultural attributes, attitudes not conducive to fertility; (5) lastly, the possible involvement of simultaneous or even overriding effects of several other factors on fertility, can not also be ruled out completely, particularly because of the inter-population variations in children ever born, given the same size of land.

Fertility Differentials by Educational Characteristics

The educational characteristics (literacy status and levels of educational attainment) are widely considered important determinants of population dynamics. Moreover, within the context of social and economic development, education is often viewed as a process of human development. In other words, education is conceived of as the process of providing with and/ or receiving wisdom, knowledge, skills, social norms and values and desirable qualities of behaviour (Bravo-Casas, 1979).

Generally, an inverse relationship appears to have existed between fertility and educational level both in the United States of America and countries in Europe since the late nineteenth century; although it seems to be diminishing or even disappearing in some low fertility countries (UN, 1973). Coale (1965) and Bougue (1969) also have reported that in the countries which have already experienced fertility decline, education is considered to be the most important variable accounting for that. More recently, Caldwell (1980) and the UN (1980) have put forward the notion that mass education is particularly capable of bringing about a demographic transition.

Many independent studies from across the world (including India) too, have stressed that education (of males and/ or females) contributes to the decline in fertility (Kiser, 1960; Adelman, 1963; Samuel, 1965; Heer, 1966; Blake, 1967; Stycos, 1968; Minkler, 1970; Kasarda, 1971; Mitchel, 1971; Ekanem, 1972; Mandelbaum, 1974; Rele and Kanitkar, 1974; Bhatnagar, 1975; Ghosh, 1975; Berelson, 1976; Graff, 1979; UN, 1979; Mamdani, 1981; Dyson and Moore, 1983; Bulatao, 1984; Tonfer 1984; Mahadevan, 1989).

It may be mentioned that many studies have particularly emphasized the importance of the literacy/educational attainment of women (wife/ mother) influencing fertility (Tuncer, 1971; Timur, 1971; Farooq and Tuncer, 1974; Snyder, 1974; Leiberman, 1976; Birdsall, 1977; Bravo-Casas, 1979; Caldwell, 1980; Srivastava and Saksena, 1981; Frenzen and Hogan, 1982; Singh 1986; UN, 1993). Most of these studies maintain that it is a better indicator than male (husband's) literacy educational attainment. Tuncer (1971) has also observed that formal education of women to be the most significant predictor of fertility in Turkey, explaining more than 65% of the variance. But, when it was replaced by the male education, the coefficient of determination dropped significantly. He pointed out that - 'such a result is interesting for a society in which men are assumed to have a bigger say in family decisions'.

In India, in the demographically advanced state of Kerala, higher literacy status and educational attainment of women are held responsible for the rapid decline of fertility, even though the economic conditions are not so good (Zachariah, 1981; Caldwell et al., 1984). According to Cleland and Rodriguez (1988), - 'in the Caribbean region, husband's education seems more likely to exert a net impact on the reproductive behaviour than the wife's. In the Arab region, the difference is marginal, but in the other regions, greater importance of wife's education is more clear-cut. However, the results vary in different populations in Africa and Asia'.

A large number of reasons have been suggested to explain the inverse relationship. Education lowers fertility: i) by providing opportunities for personal advancement; awareness; social mobility; advanced and new outlook; freedom from close familial control as well as traditions, values and patterns of behaviour; and developing rationalism; ii) by meeting certain ba-

sic psychological needs and desires such as, the need for creativity, desire to acquire knowledge; iii) by allowing greater female participation in the family decision-making process; iv) by increasing the age at marriage and also the probability of non-marriage and delaying the age at first birth; v) by reducing the desired family size by fostering a higher standard of living and stimulating woman's interest and involvement with activities outside home, particularly by employment; vi) by increasing the chances of survival of infants or reducing mortality; better understanding of reproductive processes and by exposing women to knowledge, attitude, practice favourable to birth control; viii) by changing attitudes towards children and not considering them as economic entities and assets, and also raising the consciousness of the parents towards the emotional needs of children; ix) by increasing the cost of educating successive children (UN, 1961; Driver, 1963; Dandekar, 1966; Coale, 1965; Krishnamurthy, 1968; Hawthorn, 1970; Husain, 1970; Dixon, 1975; Germain, 1975; Berelson, 1976; Holsinger and Kasarda, 1976; Shields, 1977; Chaudhury, 1978, 1984; Cochrane, 1979; Caldwell, 1980; Khan et al., 1980; Jain and Nag, 1985; UN, 1993). In the Sri Lanka Fertility Survey (1976) as well, the variation in the completed parity was almost totally accounted for by the relationship between education and age at marriage.

Education also acts as a proxy measure of socio-economic status (Leibenstein, 1974) as well as modernization (Inkeles and Smith, 1974). Recently, Cleland and Rodriguez (1988) pointed out that in Latin America and the Arab states of North Africa and West Asia, the wife's education is strongly associated with fertility behaviour. But in Asia, the effects of women's education on fertility behaviour and limitation are less pronounced, since nearly half of the effect is attributable to related socio-economic characteristics of the husband, place of residence or differences in age at marriage.

In the present study, as also noticed in many others listed above, the educational characteristics of women seem to influence fertility, that is, fertility seems higher among illiterate than is, among literate women (Table 12). Each of the study population group has also recorded the same trend. Additionally, the number of children ever born seems to decrease with the increase in the educational attainments of women. However, in this case, at the individual population level, slight discrepancies have been seen, in that, a decline in fertility is evident only beyond the primary educational level (although Muslims as a whole, have not shown such tendency). The recently conducted National Family Health Survey, 1992-93, in India, has also reported higher fertility among illiterate women and those with low educational attainment.

Further, the educational characteristics of husband too, appears to influence fertility, as the number of children ever born is less, when they are literate than when they are not (Table 12). Also, fertility is lower, when husbands are more educated, i.e., a decline in number of children ever born has been noticed at the post - primary levels.

It may be mentioned here that the patterns of the education - fertility association have registered considerable variations around the world, particularly where fertility is high due to the varied set-ups. Certain important aspects of the variations are that the relationship does not hold throughout the entire range of values for educational attainment, and that the 'threshold value' or the level at which association becomes negative varies widely in different areas and populations. Miro and Martens (1968) have observed that the transition from illiteracy to primary education had little effect on family size, and the difference came only after the secondary levels, but thereafter remained unaltered in Latin America. In developing countries too, fertility seemed to remain high for women below the completed primary level as well as for the illiterate (Bravo-Casas, 1979; Ahmad, 1985). In many African countries as well, the influence of women's education on their fertility has been found significant only after the post-primary levels. The Bangladesh Fertility Survey (1975) also yielded no evidence that women with no education differ in fertility from those with primary schooling. Likewise, in India, many studies (UN, 1961; Driver, 1963; Agarwala, 1970) have indicated that the effect of education in lowering fertility is visible only with higher education. According to Jain (1981) the education-fertility relationship may be curvilinear, because their is a slight rise in fertility with education and then a decline in India. Cochrane (1979) and Holian (1984) also pointed out although educational levels may first

Table 12: Fertility differentials (mean number of children ever born and surviving)[1] among various population groups of Ladakh region, in Jammu and Kashmir, India; by educational characteristics of woman[2]/husband

Educational characteristics	*Buddhists*	*Muslims*				*Ladakh*
	Bodhs	*Baltis*	*Brokpas*	*Arghuns*	*(Pooled)*	*(Pooled)*
		(Mean number of children ever born)				
Woman						
Illiterate	3.55	4.77	5.19	4.14	4.68	4.27
Literate	2.88	2.63	3.71	3.12	3.03	2.98
Primary	3.62	3.00[a]	3.67[a]	4.13	3.81	3.76
Middle	3.07	2.40	5.00[a]	2.94	2.97	3.00
Matriculation/secondary and above	2.29	2.50	0.00[a]	2.25	2.24	2.26
Husband						
Illiterate	3.64	4.6	5.77	4.97	5.05	4.47
Literate	3.27	4.14	4.54	3.34	3.88	3.69
Primary	3.64	6.59	7.67[a]	4.14[a]	6.16	5.51
Middle	3.28	4.90	3.44	3.96	4.32	3.92
Matriculation/higher secondary	3.23	3.28	4.47	3.02	3.30	3.28
Graduation and above	3.00	1.67	6.00[a]	2.91	2.87	2.91
		(Mean number of children surviving)				
Woman						
Illiterate	3.02	3.31	3.53	3.38	3.35	3.23
Literate	2.67	2.41	2.00	2.66	2.55	2.59
Primary	3.31	2.67[a]	2.67[a]	3.13	2.97	3.06
Middle	2.73	2.10	2.00[a]	2.71	2.43	2.53
Matriculation/secondary and above	2.24	2.50	0.00[a]	2.17	2.18	2.20
Husband						
Illiterate	3.10	3.23	3.86	3.72	3.38	3.27
Literate	2.92	3.14	3.00	2.95	3.05	3.01
Primary	3.09	4.32	5.67[a]	3.43[a]	4.25	3.95
Middle	2.90	3.67	1.89	3.48	3.35	3.18
Matriculation/higher secondary	2.89	2.71	3.43	2.69	2.74	2.78
Graduation and above	3.00	1.00	3.00[a]	2.63	2.33	2.57

1. Differentials in fertility -related variables per woman(ever-married respondent)
2. Ever married respondent
a. Calculation based on less than 10 cases

be associated with rising levels of fertility in a community; as the process continues, fertility ultimately declines.

Fertility Differentials by Age at Marriage of Woman

The age at marriage of woman is an important determinant of population dynamics and growth, especially where fertility control practice is not widespread; because the institution of marriage represents the socially sanctioned initiation of cohabitation and child bearing/rearing. And, any shift in this age, can prepone, or postpone the beginning of the reproductive span in societies, where generally the marital fertility is encouraged. Since the day of Malthus [who was one of the earliest persons to recognize that the preventive checks, such as, delayed marriage and permanent celibacy affect fertility (Malthus, 1798)], considerable interest has been generated in studying this determinant, and its relaitonship with fertility. Demographers and planners see the age at marriage as one of the policy alternatives 'beyond family planning' that might be able to initiate or accelerate population growth changes on a major scale.

It is widely known that age at marriage varies across and within countries/regions. It is higher in the developed countries than in the developing ones (Fernando, 1982). In many Asian countries, the age at marriage is remarkably low, and child bearing rarely occurs outside legal unions. In India too, marriage is considered an important institution and is nearly universal because of the stigma attached to unwed mothers. Practically, all births here occur within marriage. In addition, the age at marriage is relatively low, which leads mostly to early cohabitation and childbirth, resulting in undesirable demographic

consequences. It also registers variation across cultural, sub-cultural groups, rural and urban regions and states.

The mean age at marriage for Indian women in 1981 has been found 18.3 years (Census of India, 1981). Although according to the Child Marriage Restraint Act of 1978, the minimum legal age at marriage in India is 18 years for women and 21 years for men, earlier marriages are still quite widespread and remain unchecked due to a number of economic, socio-cultural and other reasons. The estimate for Kerala in 1981, however, has been noticed higher at 21.9 years; which undoubtedly is responsible for the state's advanced demographic scenario. On the other hand ,the lowest estimate in 1981 was recorded by Rajsthan at 16.1 years. This is because there do not exist sufficient infrastructure to effectively enforce the Act; as well as the fact that the age at marriage itself, is influenced by such factors as, place of residence, per capita income, degree of modernization and urbanization, status of women and work force participation, particularly by women, educational characteristics and opportunities, family structure, religion, caste, certain cultural practices like dowry, etc. (UN, 1961; 1980; Agarwala, 1962; Bumpass, 1969; Dixon, 1971; Srikantan, 1977; Conde, 1978; Mahadevan, 1979; Eberstadt, 1980; Zachariah, 1981; Caldwell et al., 1983; Chaudhury, 1984; Singh, 1986; Srivastava, 1986).

In the present study the mean age at marriage of women is noticed 18.1 years. And, among the individual study population groups, it seems to vary from 16.8 years in Brokpas to 19.3 years in Bodhs. Muslims on the whole, also seem to show relatively low mean age at marriage of 17.4 years (Table 13). The comparison of mean age at marriage for women across the major population groups in Jammu and Kashmir state has revealed that it varied from 16.5 years among Gujjars to 21.6 years among Kashmiri Pandits. The intermediate values fluctuate within a very narrow range of 16.7 years to 17.7 years, with the exception of Bodhs, amongst whom it is 19.3 years, the second highest one. Hence, only among Bodhs of Ladakh and Kashmiri Pandits of Kashmir, the mean ages at marriage of women seem to be above the legally permissible age of 18 years.

It has already been mentioned that the age at marriage assumes significance in demographic studies because of its relationship with fertility, and consequently with population growth. In fact, early marriage is believed to promote survival of clans and lineage in many societies. After Mathus, several others from across the world have reported that delayed marriage contributed to the decline in fertility (Pearl, 1939; Glass and Grebnik, 1954; Davis, 1963; Freedman, 1963; Hanjal, 1965; Bogue, 1969; Coale, 1971; Dixon, 1971, 1978; Busfield, 1972; Ross et al., 1972; UNECA, 1981; Udry and Cliquet, 1982; Dyson and Moore, 1983). However, in Sweden and some other west European Countries no correlation between increasing age at marriage and declining level of fertility have been found (Coale, 1965).

Chaudhury (1984) reported that the age at marriage was the most important factor explaining fertility behaviour in Bangladesh. In the African continent, where marriage is virtually universal as well as early marriage of girls is very common, fertility is high (Conde, 1981). Nag (1974) pointed out that in both developed and

Table 13: Fertility differentials (mean number of children ever born and surviving)[1] among various population groups of Ladakh region, in Jammu and Kashmir, India; by age at marriage of woman[2]

Age at marriage	*Buddhists*	*Muslims*				*Ladakh*
(in years)	*Bodhs*	*Baltis*	*Brokpas*	*Arghuns*	*(Pooled)*	*(Pooled)*
		(Mean number of children ever born)				
10-14	3.54	5.60	5.90	4.64	5.43	5.02
15-19	3.88	4.87	4.12	3.95	4.52	4.33
20-29	2.87	3.25	6.82	2.69	3.42	3.13
		(Mean number of children surviving)				
10-14	3.31	3.52	3.90	3.64	3.63	3.56
15-19	3.30	3.38	3.00	3.28	3.32	3.31
20-29	2.50	2.60	3.82	2.31	2.63	2.56

1. Differentials in fertility -related variables per woman(ever-married respondent)
2. Age at marriage of ever married respondent

less developed countries, increase in age at marriage of women has been found to be crucial in the reduction of fertility, although the use of contraceptives diminishes its importance. In India, many studies have demonstrated lower fertility for those women who marry late compared to those who marry at younger ages (UN, 1961; Agarwala, 1962, 1966; Driver, 1963; Wyon and Gordon, 1971).

In more recent times, Chakraborty and Malaker (1980), World Bank Fertility Survey (1980), Singh (1986), and Mahadevan (1989) have also observed that the average number of children ever born is negatively related with age at marriage.

In the present study as well, it has been found that relatively high age at marriage of women, particularly beyond 19 years of age, seems to lower fertility. At the individual population level however, Brokpas seem to register a varying pattern, which can be due to small sample size. It may be mentioned here that the findings seem meaningful, in view of the ages at marriage of women among the study population groups, mentioned earlier. Broadly speaking, the higher age at marriage of women coupled with higher age at menarche observed among Buddhist Bodhs than among other may be partly responsible for the lower number of children ever born amongst them. Among others, the reverse may have been the case. Moreover, relatively early marriage in Baltis and Brokpas may also have denied them higher educational and employment opportunities, proper exposure to the outside world, resulting in relatively limited usage of contraception, and high number of children ever born. Arghun women, however, appear to be more favourably positioned with respect to these aspects, which seems to reflect in their fertility behaviour, despite the low age at marriage.

Fertility Differentials by Type of Marriage

It has already been mentioned that marriage a socio-cultural institution, is the basis for procreation almost everywhere. Hence, the comprehension of certain marriage practices of assortative nature is also considered important. The practice of consanguineous marriage or inbreeding, i.e., marriage between relatives who have at least one traceable common ancestor, has been receiving extensive attention from various fields including anthropology, demography, and genetics. This is because of the effects of consanguinity on population components, viz., fertility, mortality, morbidity, which in turn, influence the structure of a population. Up to 1950, the studies from America, Europe, England, Japan on consanguinity were few, but important in throwing light on the incidence and measures of inbreeding as well as allied aspects. The successive years saw a spate of studies on the incidence of consanguinity from different parts of the world. But, the level of inbreeding appeared rather low with the inbreeding coefficient rarely exceeding 0.01. Only certain isolates and isolated communities, as well as traditional Muslim Communities returned relatively high inbreeding levels.

In India, a land of profuse diversity, reflected in the vast congregation of castes, communities and tribes, the consanguineous marriages are also practised for long amongst several groups, although many others seem to proscribe the same. But, the studies about incidence and effects of consanguineous marriages have been widely attempted only after the publication of Sanghvi et al. (1956) on the twelve endogamous group of Bombay. A detailed review of the studies on the incidence and effects of consanguinity have recently been published by Bhasin and Nag (1994). It has shown that consanguineous marriages are practised not only in small isolates or geographically restricted communities, but also in numerically large caste groups, communities, Scheduled Castes and Tribes, due to diverse economic and socio-cultural reasons.

Regional appraisal has broadly indicated that the states of the southern region of India overwhelmingly prefer and practise consanguinity across all major religious groups and ethnic entities, except Kerala, where comparatively low incidence has been found, owing perhaps to relatively high educational characteristics, and near absence of a major type of consanguineous marriage (prevalent especially in the southern states), those between Uncle-Niece, most probably due to the prevailing matrilineal traditions there till recent times. In the western region, many communities of Maharashtra appear to submit to the Dravidian influence, thereby preferring such marriages fairly frequently. In the other states of western region; and the northern, eastern regions, as well as in the Islands, consanguinity in general, seems to be proscribed or practised occasionally. However, the review also

pointed out the incomplete and inconclusive picture regarding the practice in various regions and populations of India.

In the Ladakh region, the practice of consanguineous marriage has been noticed among Muslims (among Baltis, Brokpas, Arghuns) (Table 14). But, the percentage of Muslim women on the whole, marrying a relative seems not exactly high (19.3 per cent). Some of the main reasons behind this practice, which have been noted are: maintenance of social and economic status by upper classes; low socio-economic status of the lower classes; strengthening of ties between families; social solidarity; traditionalism; conformity to Islamic customs; maintenance of family property and land; parental domination in decision making and arranging marriages; extended family structure; preference for mates within kin groups; low level of educational attainment; and also to a certain extent, relative isolation in terms of distance, etc. Similar reasons for the practice of consanguinity have been cited by Basu and Roy (1972), Basu (1975), in their study among Delhi Muslims; by Haq (1976) among Muslims of West Bengal. Several others have also endorsed similar viewpoints (Dronamraju and Meera Khan, 1961, 1963; Devi et al., 1982; Reddy, 1983; Rao and Murthy, 1984, among others). However, it has been reported that there seems a general tendency of decline in the incidence in recent years, due to such factors as, spread of education; increasing mobility and communication facilities; as well as deviation from the traditional ways of mate selection etc. although specific study on the temporal changes is needed for a proper assessment.

The practice of consanguinity has also been observed among two Muslim population groups in the Kashmir and Jammu regions of the State, viz., among Kashmiri Muslims (23.9 per cent) of Kashmir and Gujjars (13.8 per cent) of Jammu. The Hindus of both regions seem to proscribe such marriage practice. The Muslim study population groups in the Ladakh region hence, appear to occupy intermediate rank as far as the incidence of consanguinity is concerned (range - 14.8 per cent in Brokpas to 21.8 percent in Arghuns). Similarly, the highest and lowest mean inbreeding coefficients are also registered by Kashmiri Muslims (0.0149) and by Gujjars (0.0086), respectively. However, unlike the Muslim population groups in the Ladakh region, Muslims of Kashmir and Jammu have reported only first cousin marriages.

It may be mentioned here that the nomadic Muslim Gujjars of Garhwal Himalayas in Uttar Pradesh have also shown relatively very high frequency of consanguinity (61.6 per cent) [Bandyopadhyay et al., 1986]. But, in the Jammu and Kashmir state, whereas the frequency of consanguineous marriages among Ahmediyya Muslims (38.7 per cent) reported by Kashyap (1976) also seems rather high; the frequency among Muslims in general, has been found only 18.6 percent by Roychaudhury (1976). The frequency of consanguineous marriages in Ladakh Muslims as a whole, (19.3 per cent) appears not

Table 14: Fertility differentials (mean number of children ever born and surviving)[1] among various population groups of Ladakh region in Jammu and Kashmir, India; by type of marriage (consanguineous/non-consanguineous)

Type of marriage	*Buddhists*	*Muslims*				*Ladakh*
	Bodhs	*Baltis*	*Brokpas*	*Arghuns*	*(Pooled)*	*(Pooled)*
		(Mean number of children ever born)				
Non-consanguineous	3.43	4.50	4.98	3.57	4.28	3.94
(All) consanguineous	-	4.91	5.13[a]	4.18	4.68	4.68
Uncle-niece/aunt-nephew	-	8.50[a]	-	3.25[a]	5.00[a]	5.00[a]
First cousin	-	4.89	3.50[a]	4.32	4.60	4.60
Second cousin/others	-	4.00[a]	10.00[a]	4.25[a]	5.00	5.00
		(Mean number of children surviving)				
Non-consanguineous	2.96	3.21	3.46	3.03	3.19	3.10
(All) consanguineous	-	3.29	2.63[a]	3.21	3.21	3.21
Uncle-niece/aunt-nephew	-	5.50[a]	-	1.75[a]	3.00[a]	3.00[a]
First cousin	-	3.26	1.33[a]	3.28	3.12	3.12
Second cousin/others	-	2.86[a]	6.50[a]	4.25[a]	3.85[a]	3.85

1. Differentials in fertility -related variables per woman(ever-married respondent)
2. Calculation based on less than 10 cases

much different from this finding. The above mentioned studies have mentioned that the most frequent type of consanguineous marriage is between first cousins, similar to the findings of the present study.

The comparison of the frequencies of consanguineous marriages across the northern region of India, has revealed that the Muslims of Ladakh region are practising the same with much lesser frequency (19.3 percent) than the Muslims of Jammu and Kashmir (38.7 per cent - Kashyap, 1976); Delhi (range 22.1 to 37.9 per cent - Basu and Roy, 1972; Basu, 1975; Krishan, 1975); Uttar Pradesh (49.4 per cent -Basu , 1975; 61.6 per cent - Bandyopadhyay et al., 1986); Rajasthan (43.0 per cent - Roychoudhury, 1976). These data additionally indicate that such marriage practice is not confined to isolates and geographically restricted communities but is preferred even in numerically large groups without similar constraints.

Further, studies on the effect of consanguineous marriage or inbreeding on fertility have shown varying findings. Darlington (1960) postulated that human stocks could maintain the highest fertility with regular consanguineous marriages. And, elevated fertility levels in such marriages than in non-consanguineous ones have been observed in various populations of the world by many authors (Eaton and Mayer, 1954; Book, 1956; Schull et al., 1970; Freire-Maia and Azevedo, 1971; Hussein, 1971; Schull and Neel, 1972; Phillippe, 1974; Shami et al., 1990).

In India, higher fertility levels in consanguineous marriages were noticed in Delhi and Uttar Pradesh by Basu (1975); in Orissa by Reddy (1979); in Karnataka by Devi et al., (1981), Saheb et al., (1981), Bittles et al., (1985, 1987), Hann (1985); in Andhra Pradesh by Ray (1979), Sirajuddin and Basu (1984), Srikumari et al., (1985), Reddy (1987); in Tamil Nadu by John and Jayabal (1971), Asha Bai et al., (1981) [among others]. Among the Ladakh Muslims as well, in the present study, fertility seems higher in consanguineous marriages than in non-consanguineous ones.

Hence, the assumption that consanguinity is confined mostly to areas of low population density and leads to decreased fertility (Cavalli-Sforza and Bodmer, 1971) appear nullified. Recently, Rao (1991) concluded that inbreeding has not resulted in a marked decrease in fertility in South India, except in pre-selected groups such as, sick children, or among the mentally retarded individuals. And, therefore, rather than disturbing the established social practice of consanguinity (in south India) it would be advisable to provide genetic counselling to those families that have an affected child.

However, lower fertility levels in consanguineous marriages than non-consanguineous ones have also been reported in many studies (Bemiss, 1858; Marcallo et al., 1964; Post, 1965; Centerwall and Centerwall, 1966; Kumar et al., 1967; Conterio, 1969; Ghosh, 1972; Barua, 1976; Reid, 1976; Ansari and Sinha, 1978; Devi et al., 1981; Srikumari et al., 1985).

Fertility Differential by Religion

Religion refers to a system of beliefs, values, norms, practices, and is held responsible for affecting the behavioural pattern of our life, including the fertility behaviour. The important facets of religion which influences the population dynamics in a region are the ways different religion views marriage and progeny, status of women, value of sons etc., more so, in traditional societies (Misra, 1982). Many studies (Kirk, 1968; Lannoy, 1971; Visaria, 1974; Rele and Kanitkar, 1976) have suggested that the differential population trends are the function of these aspects along with value of children, preference for a particular sex of children, age at marriage etc., which are also dictated by religion.

It is well known that high fertility in some populations and regions is partly a response to religious doctrines promoting pro-natalist behaviour and opposing fertility control. The Anabaptist Hutterite community with their high fertility is an example of this (Eaton and Mayer, 1953). Even today, Roman Catholicism remains as one of the important world religions that still opposes contraception. Many studies have shown higher fertility among Catholics than among other religious groups in the same region (Westoff and Potvin, 1966; Day, 1968; Westoff and Ryder, 1977; Potts and Selman, 1979); although recently, Pick et al. (1990) reported the opposite in Mexico.

Another religion often considered to be the most pro-natalist of all world religions, and against the diffusion of contraception is Islam (Lorimer et al., 1954; Kirk, 1968). However, Kirk (1966) has earlier noted that it is not Islam per se that is against the usage of contraception, but,

the culture and backwardness of Muslims; which has recently been reported by Mahadeven (1989) too, in India. Studies in several Muslim countries by Lorimer et al. (1954), and more recently by Nagi (1981) indicated that Muslim fertility has remained universally high and appeared generally higher than non-Muslim countries in the same region, in spite of development and modernization. Interestingly, in the Sri Lanka Fertility Survey (1978), Buddhists returned the highest fertility (completed fertility estimate-6.1), followed by Muslims (5.8), Hindus (5.6) and Christians (5.6).

In India too, where a number of religious groups reside, fertility differentials by religion are evident. Davis (1951) reported higher fertility rates among Muslims than among Hindus in the Census report for the undivided India. Many other studies since 1947 in India and Bangladesh seemed to corroborate this (UN, 1961; Rele, 1963; Agarwala, 1966; Dandekar, 1967; El-badry, 1967; Srinivasan, 1967; Stoeckel and Chaudhury, 1969). Driver (1960) also found that the standardized average number of children born was the highest among Buddhists, followed by Muslims and Hindus. Visaria (1974) too observed slightly lower fertility among Hindus, than among Muslims and Christians, and attributed the difference to the differential use of contraception and partially to the incomplete coverage of census.

A number of other studies (Driver, 1960; 1963; Rizk 1963; Mazur, 1967; UN, 1971) have also suggested that the higher fertility among Muslims may be attributed to the pronatalist institution pressures, low status of women, resistance to family planning, and agricultural occupation. Moreover, a greater proportion of Indian Muslims that caste Hindus appeared at the poorer and less educated levels of society, levels at which people of all religions have higher fertility (Weiner, 1970; Aitken and Stoeckel, 1971). According to Mandelbaum (1974), religious affiliation may have some bearing on fertility, though the operative forces seem to be economic and educational, than directly religious. But, in a study in greater Bombay, the fertility differential between Muslims, Christians and Hindus seemed to narrow down, but did not disappear, after controlling educational attainment and present age (Rele, 1963).

In the present study also, as in many other mentioned above, fertility appears higher among Muslims on the whole, than among Buddhists. However, individually speaking, among Muslim Baltis and Brokpas, who are mainly rural-based, and predominantly inhabiting the Karigil district a relatively more backward area in the Ladakh region, in terms of developmental socio-cultural transformation, the mean numbers of children ever born seem higher, than among Muslim Arghuns, who are mainly urban-based, and residing largely in the Leh district. Besides, in case of Baltis and Brokpas, relatively high infant and child mortality levels, low educational level, low women participation in the active work-force, low age at marriage of women, as well as limited use of family planning methods also seem to contribute to the rise in the number of children ever born.

It may however be mentioned here that, in West Bengal, Muslims registered lower fertility rates than Hindus (Nag, 1968; Rao and Mathen, 1970). Chaudhury (1984) also reported that the higher fertility rate for Muslims than for Hindus existing at the bivariate level not only changed completely but also reversed, when allowance was made for the effects of socio-economic factors.

Fertility Differentials by Family Structure

An individual is first an integral part of a family and only then, he/she is part of bigger environment. A family in turn, being the permanent institution of every society and the basic decision-making unit, immensely influence the life of an individual. Hence, the family structure is believed to influence fertility, as well as contraceptive behaviour. According to Lorimer et al. (1954) - 'in societies, where the kinship group must fulfill a multiplicity of functions, numerous children are valued as contributory to the strength of the group, economically as well as militarily and of ensuring its continued survival.' Davis (1955) too, hypothesized that the extended family system caused high fertility in traditional cultures. Their argument was based on the following aspects of extended family set-ups: improvement and/or establishment of status of women through child-bearing; low age at marriage; sharing of cost and burden of child-bearing, childcare and socialization; cooperation in labour; financial stability for newly married; insurance against economic misfortune; social

security in illness and old age. Davis and Blake (1956) also concurred with these.

However, it is generally hypothesized that industrialization/urbanization favour nuclear family as against the extended family. And in extended families, the real and opportunity cost of children are expected to be lower, thereby encouraging fertility (Tuncer, 1979). In fact, the lower fertility in urban than in rural areas has been explained by a shift to nuclear families from joint ones, in which more number children are a liability rather than an asset (Hall, 1972). In rural India (Maharashtra), Karkal (1975) also observed higher average number of live births in extended families. But Burch and Gendell (1971), while reviewing worldwide evidence pointed out that the - 'widespread conviction that extended family structure is (statistically) associated with -, late alone a cause of high fertility is not yet empirically warranted'.

On the other hand, a number of studies have reported that the nuclear family structure may raise fertility; or that there is little or no relationship between the nuclear family set-up and fertility; and the joint family set-up instead may depress fertility (Bebarta, 1961, 1977; Datta, 1961; Driver, 1963; Hashmi, 1965; Nag, 1967, 1975; Pakrasi and Malakar, 1967; Stoeckel and Chaudhury, 1969; Straus and Winkelman, 1969; Husain, 1970; Caldwell et al., 1981; Singh, 1986; Shaw, 1988).

The reasons in case of the nuclear family organization are; children are valued for economic productivity; relatively adequate living space and high privacy leading to higher coital frequency; and dominating parents-in-law and relatives are absent. In case of joint family set ups, it has been indicated that fertility may be low due to lower coital frequency and lesser husband-wife communication; which in turn, may be attributed to the relative lack of privacy and deliberate control such as, more adherence to traditional taboos, abstinence and frequent separation of young couples (Driver, 1963; Hashmi, 1965; Nag, 1967, 1972; Gould, 1972). It has also been suggested that in extended families in rural areas, adult males are often encouraged or are more prone to move out to urban areas in order to supplement family income, leaving their progeny behind with the rural kin, which may have depressing effect on fertility (Nag, 1975).

Therefore, any assumption and any finding regarding fertility-family structure relationship cannot be viewed without reservation. Vlassoff and Vlassoff (1983) have pointed out that, it is the life cycle and not family type which shows different levels of fertility at different stages of the cycle. If relevant factors like age, or stage in the life cycle are controlled, there is little evidence of any intrinsic connection between fertility and family type. And, Morgan and Rindfuss (1984) maintain that both nuclear and joint family structures may give rise to higher fertility depending on the cultural milieu, beliefs, structure, etc. In fact, the UN (1973) has pointed out that the fertility studies that include family type as an explanatory variable have been neither clear in their theoretical conceptualization nor conclusive in their empirical findings. Similarly, a review by Chaudhury (1982) also has pointed out the inconclusive nature of family structure and fertility relationship.

In the Ladakh region, since long, the extended (joint) family structure has been rather prevalent, due to the finite resources, and chiefly rural, traditional set-up. But, in the recent decades, with the onset of rapid planned and unplanned changes, the conventional family organization too, has been undergoing change, leading to the formation of many nuclear families.

With regard to the family structure - fertility relationship, the Ladakh (Pooled) data have shown higher mean number of children ever born to ever-married women in case of nuclear families than in case of joint families, as also noticed in many studies mentioned above. But, when individual study population groups are considered, only Baltis and Arghuns indicate this trend, and the reverse is noticed among Bodhs and Brokpas. Muslims on the whole however, seem to record higher fertility in nuclear than in joint family set-ups (Table 15).

Because of these inter-population variations, it is felt that there is a need to investigate further certain aspects, which may be responsible for the varying interplay between family structure and fertility. These are: (1) the degree of social, economic and psychological interaction between members and kin in nuclear as well as extended family set-ups, because in Ladakh, the nuclear families especially, have been observed not entirely isolated with respect to these, despite the physical isolation. And, the decision-making process of couples is not exactly independent.

Table 15: Fertility differentials (mean number of children ever born and surviving)[1] among various population groups of Ladakh region, in Jammu and Kashmir, India; by family structure and attitude related to sex composition of children

Family structure/attitude	*Buddhists*	*Muslims*				*Ladakh*
	Bodhs	*Baltis*	*Brokpas*	*Arghuns*	*(Pooled)*	*(Pooled)*
		(Mean number of children ever born)				
Family Structure						
Joint family	3.64	4.19	5.18	3.62	4.12	3.93
Nuclear family	3.20	4.95	4.88	3.77	4.58	4.12
Gender Preference[2] (Offspring)						
Preference for son	3.82	5.04	5.40	3.78	4.75	4.40
No (offspring) gender preference	3.29	4.42	4.85	3.68	4.24	3.91
		(Mean number of children surviving)				
Family Structure						
Joint family	3.16	2.97	3.45	3.17	3.08	3.11
Nuclear family	2.73	3.47	3.25	2.99	3.30	3.11
Gender Preference[2] (Offspring)						
Preference for son	3.32	3.86	3.53	3.25	3.66	3.53
No (offspring) gender preference	2.84	3.02	3.26	3.03	3.05	2.97

1. Differentials in fertility -related variables per woman(ever-married respondent)
2. Preference of respondent

(2) The degree to which parents realize that the chances of survival for their children have improved, because in the study area, the infant and child mortality levels, overall health infrastructure seem unsatisfactory. (3) The extent of urbanization/modernization, and their impact on family structure, because in Ladakh, these processes are relatively recent phenomena, and still has not touched the larger rural set-up effectively. This has resulted in various complexities, including the differential effect of these processes on different population groups, which should be probed deeply. In other words, the process of nuclearization and degree of nuclearization of families vis-a-vis fertility may be explored.

A part from these aspects, possible involvement of simultaneous effects of several other factors may also be involved. However, it may be added that, in case of Bodhs, amongst whom several traditional institutions, including, primogeniture, polyandry etc. have broken down with the ongoing changes, the large family size in nuclear family set-ups (which are usually one of the offshoots of the change), may not be preferred due to economic constraints, and/or hindrance to the life style and mobility of couples. On the other hand, this may not be true in case of Ladakh Muslims. Besides, amongst Muslims in general, lower fertility in joint families can also be conscious/subconscious response to prevent the fragmentation of limited landholding.

Fertility Differentials by (Offspring) Gender Preference

The birth of a child in a family is of great importance everywhere and has a profound effect on the social and personal position of the parents and/or of any previously born siblings. The importance of the birth is often enhanced by the sex of the child. More so, in most of the developing world, comprising of many traditional, rural agricultural societies, which are in turn, mostly paritriarchal and patrilinial. In such societies offspring gender preference, mainly preference for male child or son(s) over daughters, as well as differences in upbringing are rather common; due to ethnic, religious, economic, legal and social needs like, continuation of family lineage, old-age security, increase in group strength, etc. Many authors (Freedman, 1963a; Kirk, 1966; Stinner and Mader, 1975) have pointed out that due to such reasons, a high premium is placed on sons, and sons are presumed to have a greater net utility; and these substantially influence the parental preference for both sex composition and number of children in the developing countries.

The evidence of preference for sons over daughters and their multifarious values have also been reported by many other authors from across the developing world, including India (UN, 1961; Pathare, 1966; May and Heer, 1968; Minkler, 1970; Wyon and Gordon, 1971; Arnold et al., 1975; Cain, 1977; Jones, 1977; Nag et al., 1978;

Chaudhury, 1982; Arnold and Zhaoxiang, 1986). Williamson (1976) while reviewing the parental preference for son or daughter, found that in the overwhelming majority of cultures, there is a strong son preference. It may however, be noted that in India, these seems to exist a North-South divide for gender preference, attributed to the differences in status of women and sex differentials in child mortality (Bourne and Walker, 1991). Hence, the cultural context in which it originates appears important. Several studies in India have observed a strong preference, particularly in North India (Miller, 1981; Das Gupta, 1987; Basu, 1989).

On the other hand, in the industrially developed countries, there seems to be very little or virtually no preference for one particular sex over the other (Coombs, 1974; Arnold et al., 1975; Goody et al., 1981). However, it has been argued that this may be due to a lack of sensitivity in the measures to determine it. A major cross-cultural study by Freedman and Coombs (1974) has also shown that countries change their position on son preference according to the criteria employed to measure the phenomena. And, even though that study too, found consistently higher evidence of son preference in Korea, Taiwan, Delhi, and India as a whole, it has also observed no consistent pattern in other places. Moreover, it has been noticed that within the same country, viz., India, evidence of son preference varies greatly. Hence, it appears that the preference of sons over daughters is not a universal phenomenon. It seems to vary by the mode of production of society and culture. In other words, it is determined by differential participation in productive activities by males and females, which is conditioned by the prevailing type of economy and cultural practices (Mueller, 1976; Cain, 1977; Nag et al., 1978; Chaudhury, 1982).

Further, according to Stinner and Mader (1975) and Park (1978), the very nature of sequence of sexes and/or sex wise count within the children begotten already by couples is extremely likely to influence their latent desires for one or more issues of a particular sex and accordingly the procreation functions of the couples are significantly conditioned by such latent desires to affect the ultimate sequel of actions pertaining to sex-preference motives. In fact, the parental attitudes and aspirations regarding the sex of their children have attracted considerable research interest, because of the belief that sex preference may sustain higher fertility levels that would be the case if parents are indifferent to the sex of their children (Cleland et al., 1983). Davis (1963) and Freedman (1963) have earlier said that the first child is thought to continue the lineage, but further family size is dependent upon sex preference strengthening the family economically. Many other have reported that the sex of the child in first and second parities determines the size of the family (Kirk, 1972; Nag, 1985). It may be mentioned here that, the sex or gender preference almost always, refer to son preference, and it is that factor, which is believed to affect fertility behaviour. In a study in Korea, Park (1978) has remarked that both the number of sons and the sequence of sons and daughters play an important role in determining subsequent fertility.

Heer and Wu (1975), Chaudhury (1978, 1982), and Arnold and Zhaoxiang (1986) have also found that son preference affects fertility. The World Fertility Surveys in the neighbouring countries, viz., Bangladesh (1975), Nepal (1976) and Pakistan (1976) also revealed a strong son preference which seemed to act as a factor behind fertility motivation and regulation there. It has been found that in many developing societies, parents depend on their (male) children for social and economic security and lack alternatives to child-bearing; due to which fertility is relatively high, if the first one or two children are not males (Chaudhury, 1982). Nag (1985) has also found preference for sons, enhancing family size among certain Scheduled Tribes in West Bengal (India).

In the present study areas , as also in many developing regions mentioned above, preference for son seems to exist. The stated preference about the sex composition of children in terms of ideal member of sons and daughters desired also confirm the existence of son preference. Overall, the mean ideal number of children desired consists of 2.0 sons and 1.3 daughters. This seems to agree broadly with the finding reported by the ORG (1971) in India, which mentions that the majority of Indian couples want children of both sexes, while putting forward a modest preference for sons. In a study in the city of Calcutta in 1970 as well, the mean ideal numbers of sons and daughters have been estimated as 1.8 and 1.2, respectively (Raman and Pakrasi, 1980). Freedman and Coombs (1974) have also reported higher ideal number of sons

than daughters, when ideal family sizes has been considered, in India and several other Asian countries. In the NFHS, 1992-93, the ideal family size consists of 1.6 sons, 1.1 daughters, and 0.2 children of either sex.

In the study areas, it has been observed that sons are preferred over daughters due to a variety of economic, socio-cultural reasons, such as, continuation of family name and lineage, fulfillment of religious duties and rites, including last rites, participation in the active work-force, since males are the principal earners, and also old age security. Besides, in the largely rural Ladakh region, where agriculture is one of the main occupations, ploughing in the fields is done only by males, it encourages the need for a male child.

Further, in the context of offspring gender preference vis-a-vis fertility, it has been noticed in the present study that, the mean number of children ever born is higher, when there is an expressed preference for son, than when there is no such preference. This trend appears similar to the findings reported by many authors in India and elsewhere, already discussed above. In a large-scale study across three major states of India also, the high percentage of population desiring a son in Uttar Pradesh (87 per cent), and lower and lowest percentage in Andhra Pradesh and Kerala respectively (59 and 54 per cent), appear linked with the trends in differential fertility in these three states. That is, the mean live birth have been 4.4 in U.P., followed by 3.9 in A.P., and 3.4 in Kerala (Mahadevan 1989). Within each state also, the value attached to son seems to increase fertility significantly.

It may however be mentioned that, on the other hand, weak and/ or inconsistent relationship between the stated sex (son) preference and fertility behaviour have also been reported by Freedman and Coombs (1974), Kwon and Lee (1976), Bairagi and Langsten (1986) and Arnold (1987).

Fertility Differentials by Ideal Number of Children Desired

As already stated, the fertility behaviour is a complex phenomenon resulting from the inter play of a number of factors, including the psychological (attitudinal) factor, i.e., attitudes related to family size and sex composition of children. In fact, ideal number of children desired or the ideal family size desired is also considered as an explanatory variable for fertility analysis, because of certain values attached to children. In the developing regions particularly, including India, owing to the cultural importance of kinship network, relatively high mortality among children and the prevailing economic structure, the traditional desire for a relatively large family is embedded in the preceived values and roles that children perform in their families. Children are valued for their role in perpetuating tradition and ancestral line, providing economic and social support for parents in their old age, and strengthening the marital bond. Freedman (1963) believes that where fertility is high, this is generally the result of norms supporting a high average family size. And, Inoue (1978) suggests that unless the desired number of children is ultimately reduced, there are limits to sustained fertility decline.

Though the data on fertility preference in terms of the ideal number of children, and its interpretation, are often fraught with limitations, these are considered as useful indicators of general fertility attitudes, and possible future course of fertility. According to Van Keep (1971) too, the very idea that a population may sustain about 'ideal' family size is strongly presumed to act as an important factor in 'demographic prognostication'. It has been reported that, in general, in the countries of Asia and Middle East, the preferred ideal number of children is relatively higher than those in the countries of Europe and USA. In Asian populations, the range of variation in average ideal number of children happens to be 2.9 to 4.9, while in Western countries, the same is from 2.2 to 2.9 (Raman and Pakrasi, 1980). Such overt differences in mean ideal number of children emerges from the basic ideology related to family-building motives and actions, as well as kinship obligations of the couples concerned.

In the NFHS, 1992-93, the average ideal number of children for ever-married women has been estimated as 2.9. Among the states, the mean seems to vary from 2.1 in Tamil Nadu to 4.6 in Meghalaya. The state of Kerala seems to show 2.6 children as ideal family size. And hence, it has been pointed out that, although the two child family norm cannot be said to exist in India at this time, the majority of women giving a numeric response to the ideal family size question consider a small, or moderately sized family as

ideal rather than a very large one. The third All India Survey conducted in 1988-89 has also found the ideal family size to be 3.0 (Operations Research Group, 1990).

In the present study, the mean ideal number of children desired (for ever-married women) has been found 3.3, which thus, seems 1.3 children more than the nationally recommended norm of two children. This is also higher than the ideal family sizes estimated for India and Kerala, mentioned above. Inter-population comparison has shown that the mean numbers of ideal children desired is higher among Brokpas (3.6) and Baltis (3.5) than among Bodhs (3.1) and Arghuns (3.0). Muslims on the whole, seem to record the ideal family size as 3.4.

But, as this variable has been measured ex post facto, there could be a tendency to rationalize the desired family size by the respondents in view of the achieved fertility (since, the mean number of children surviving appear slightly lower). Some critics have also argued that women tend to adjust their fertility ideals upwards in keeping with increase in actual family size (Lightbourne and Mac Donald, 1982.)

On the other hand, the stated preference for the ideal family size may be relatively genuine, in view of the prevailing high infant and child mortality conditions, relatively low level of socio-economic development and agro-pastoral economy. Besides, it may be added that, the mean numbers of children ever born amongst all have been observed slightly higher than the corresponding estimates of ideal family size. This broadly indicates that women in study areas may have borne more children than they desire, to offset high child loss (or low child survival). [The mean numbers of children ever born and surviving have also been noticed positively related to the ideal number of children desired, in the present study, as also reported by Kagiticibasi (1979) in Turkey].

[It may however, be mentioned that, in the present study, the ideal number of children desired has been considered to explore in a general way, the family size preferences of women in study areas as well as the psychological aspect influencing fertility behaviour and regulation, in addition to several other types of factors, despite certain inherent limitations].

Fertility Differentials by Age at Menarche

The age at menarche denotes the first outward sign of sexual maturity. Although a biological phenomenon, it is also of considerable social interest. Therefore, it has been a subject of many studies. A brief discussion has been attempted here too. The average ages at menarche in hot, temperate, and cold climate are reported to be 13, 14.3 and 15.8 years respectively; and enumeration of the average age at menarche of girls of 24 countries give the range as 10-18 years (Shah, 1958). In India, an abundance of literature is available on the age at menarche across different regions/states and population groups. However, in case of northern State of Jammu and Kashmir, such data are negligible. In the present study, the age at menarche [shown by the Ladakh (Pooled) data] has been found relatively high at 15 years; which appears somewhat closer to the above-mentioned one for the cold climate. The inter-population comparison indicates that Buddhist Bodhs have slightly higher age at menarche (15.4 years) than Muslims as a whole (14.8 years). [The estimate among the three individual Muslim population groups seem hardly different (Table 16)].

The comparison of the mean ages at menarche across the major population groups of Jammu and Kashmir State has revealed that the age at onset is the highest in Ladakh Bodhs (15.4 years), while it seems the lowest in Dogra Brahmans as well as Dogra Scheduled Castes (13.3 years). The mean ages at menarche among Baltis, Brokpas and Arghuns of Ladakh too, appears slightly higher than the estimate noticed among Gujjars, Kashmiri Pandits, and Dogra Rajputs (14.4, 14.3, 13.6 years, respectively). Hence, it broadly appears that the population groups of the high-altitude Ladakh region with semi-arctic climate has slightly higher ages at menarche than other population groups of the state, inhabiting lower altitudes.

Even though the fact that age at menarche is largely regulated by the genetic factor, health and nutrition (Flatz, 1967; Ghosh and Kumari, 1973; Eveleth and Tanner, 1976; Gray, 1979; Danker-Hopfe, 1986) which may be responsible for the differences, the effect of high altitude stresses on the same cannot also be ruled out altogether per se. Actually, many studies have reported that such stresses (mainly hypoxia), seem to delay the onset of menarcheal age in the Andean region (Frisancho and Baker, 1970; Frisancho, 1981), and also in the Himalayan region (Lang and Lang, 1971; Pawson, 1976;

Table 16: Fertility differentials (mean number of children ever born and surviving)[1] among various population groups of Ladakh region, in Jammu and Kashmir, India; by age of at menarche of woman[2]

Age at menarche (in years)	*Buddhists*	*Muslims*				*Ladakh*
	Bodhs	*Baltis*	*Brokpas*	*Arghuns*	*(Pooled)*	*(Pooled)*
			(Mean number of children ever born)			
10-12	3.41	4.83	4.33	3.36	4.41	4.03
13-14	3.66	4.90	5.39	3.61	4.55	4.34
15-16	3.64	4.67	4.19	4.08	4.42	4.14
17-20	2.99	3.65	6.56[a]	2.36	3.75	3.37
			(Mean number of children surviving)			
10-12	3.09	3.39	2.17	2.71	3.09	3.09
13-14	3.17	3.46	3.72	3.12	3.38	3.34
15-16	3.03	3.16	2.90	3.28	3.18	3.12
17-20	2.68	2.87	4.33[a]	2.14	2.91	2.79

1. Differentials in fertility -related variables per woman(ever-married respondent)
2. Ever married respondent
a. Calculation based on less than 10 cases

Miklashevskaya, 1979; Bangham and Sacherer, 1980; Beall, 1983; Lebedeva and Musuraliev, 1987).

However, it may also be mentioned that the ages at menarche for the study population groups seem relatively low than the ages reported by Bhasin (1990) among Lepchas, Bhutias, and Sherpas of Sikkim Himalayas (15.6 years), by Malik and Hauspie (1986) among Bods of Ladakh (16.1 years), by Bhalla et al. (1983) among Punjabi Sportswomen (15.7 years), by Piplai (1983) among Tamangs of West Bengal (15.8 years), by Pawson (1974) among Sherpas of Nepal (18.1 years), as well as by Nag (1965) among Christian and Non-Christian Khasis of Meghalaya (19 and 18 years, respectively). In a recent review, Gage et al. (1989) have mentioned that among the developed and developing nations today, the age at menarche ranges from 12.2 years in urban Italian girls (reported by Danker-Hopfe, 1986) to 18.8 years in poorly nourished new Guinea women (reported by Gray, 1979). Wood et al. (1985) have reported even later age at menarche among the Gainj of New Guinea (20.4 years). Thus, it seems many other factors may be having certain bearing on the age at menarche.

Many studies have also discussed the influence on the age at menarche, of such factors as, hygienic awareness, type of physical activities, physique, dietary habits, socio-economic status, rural-urban residence, settlement size, and even family size (Sen, 1953; Shah, 1958; Biswas, 1967; Hillman et al., 1970; Bhardwaj and Virmani, 1971; Dubey and Srivastava, 1973; Roberts et al., 1977; Reddy, 1984; Talwar et al., 1987; Sharma, 1990; Chakravorti and Sinha, 1991; among others).

Further, in the context of population dynamics, the age at menarche becomes important in those societies, where age at marriage is relatively low. Menarche exposes a woman to possible child-bearing. In fact, in many societies, age at menarche determines the age at marriage (Mandelbaum, 1974). And, according to Freedman et al. (1981), and Udry and Cliquet (1982), women with the early onset are more fecund than the ones with late age at menarche leading to earlier pregnancy and earlier births for a given exposure to the risk of conception.

In the present study, the mean number of children ever born appears to decrease as the age at menarche increases from 13-14 years to 17-20 years. Individually, Bodhs and Baltis also register the same trend. But Arghuns and Brokpas show varying trends, although in case of the former, the lowest number of children ever born is seen, when the age at menarche is high at 17-20 years (Table 16). Hence, it appears that relatively late onset of menarche seems to lower fertility, but the impact of relatively early onset on fertility seems not exactly clear amongst all. (Muslims on the whole however, have shown similar decreasing trend in fertility as Buddhists, with increasing age at menarche from 13 years onwards).

Fertility Differentials by Place of Residence

The rural-urban place of residence is a widely studied determinant of population components. Most of the determinants as well as the population attributes are also generally influenced by the type of place of residence (which has also been noticed in the present study). The rural-urban difference is in fact, attributed to the existence of an urban advantage. This in turn, is a function of urbanization and modernization-inevitable processes of development, which is expected to result in fertility decline (De Jong, 1972; Bertrand et al., 1981; Nag, 1980). The theory of demographic transition also mentioned the urbanization, modernization processes ultimately regulating all demographic phenomena. These processes include, industrialization, spread of literacy, improvement of health, nutrition, and modern medical care, control of epidemic diseases, increased and effective communication and other basic facilities, erosion of traditional customs and emergence of secular values and beliefs (Nag, 1980).

The UN (1979) has also pointed out that the urban environment characterised by housing shortages, prolonged schooling for girls, greater female employment in modern economic sector, nuclearization of family and individualization of child care, and breakdown of pronatalist cultural values and norms etc., operates as incentives for small family norms. It has also been suggested that housewives in urban areas are most likely to find alternative roles and to postpone procreation or put it off altogether (Petersen, 1975). Besides, in urban areas, children are often considered an economic liability and the cost of rearing children are relatively high while in rural areas most ofthe children start being economically productive at a very tender age. Hence, in the former sector, the cost benefit balancing weighs against more children (Oberai and Singh, 1980; Kasarda et al., 1986).

A large number of studies in developed as well as developing countries, including India, have shown that rural fertility is higher than the urban fertility (UN, 1953, 1961; Taeuber, 1958; Whelpton et al. 1966; Bogue, 1969; Caldwell, 1976; Sri Lanka Fertility Survey, 1975; Bravo-Casas, 1979; Trovato and Gridstaff, 1980; Gaisie, 1981; Cochrane, 1983; Pick et al. 1988). In India, in the past too, differences in fertility have also been observed between rural and urban India, and also between larger cities like Bombay, Calcutta, Madras and smaller cities (Davis, 1951). Presently, the macro-level Census and Sample Registration System data continuously show higher rural than urban fertility.

In the present study too, as already stated, an attempt has been made to study the influence of rural-urban place of residence on fertility. This is in spite of the facts that, the Ladakh region is predominantly rural in character, the urbanization level of Leh and Kargil towns are relatively low, and these towns have been given urban status, largely because of administrative and strategic reasons. However, with the opening up of Ladakh, and rapid planned developmental initiatives, including the accelerated promotion of tourism, the process of urbanization in terms of socio-economic transformation, relatively better infrastructural facilities seems to have started, particularly, in case of Leh town, although its progress lags far behind the other towns and cities of Jammu and Kashmir State. In this background, it is interesting that rural women in study areas, in general, seem to have borne more children (4.3 children, on average) than urban women (3.7 children, on average); as also seen elsewhere. The recently conducted NFHS, 1992-93 in India too, have reported similar trend.

Individually, rural Bodhs, Baltis and Arghuns (as well as Muslims on the whole) have also shown higher mean numbers of children ever born than their urban counterparts. The lower fertility in urban than in rural study areas may be attributed to the existence of certain urban advantages conducive to smaller family size such as, relatively better educational, communication, medical facilities, better overall housing conditions, as well as relatively diverse employment opportunities, and exposure to the outside world. These in turn, seem to be responsible for higher literacy and educational attainment, more workforce participation, particularly in case of women, higher age at marriage of women, lesser infant and child mortality levels, lower family size ideals, and greater usage of contraception. It may be added here that, various 'current' measures of fertility discussed earlier, also have shown lower fertility among the urban than among the rural study population (as shown by the Ladakh (Pooled) data). But, even though Bodhs and Baltis have also shown similar trend, the reverse has been noticed in case of Arghuns, which can be a chance occurrence, due to the

sample size, since, the above-mentioned urban advantages are evident amongst them too. Muslims on the whole however, have registered the expected pattern.

Fertility Differentials by Infrastructural Facilities Available

The infrastructure services form a part of the living environment, and hence, influence the population processes. According to Sirageldin and the UN Secretariat (1979), the educational, medical, and communication facilities particularly, may be considered as explanatory variables in the fertility analysis. However, these are often not only affected by various determinants, but also influence fertility via other determinants.

The educational facilities facilitate the education of individuals, which is known to be one of the most important determinants influencing fertility. Caldwell and McDonald (1982) put forth that - 'it is wasteful to put large inputs into health services without putting equivalent input into education, especially that of girls' The communication facilities in terms of improved transport and communications not only increase mobility, but are also responsible for new ideas about family formation (Miro and Potter, 1980). In addition, such communication facilities as, radio, television, newspapers are viewed as excellent channels to convey useful information regarding health, sanitation, nutrition, small family size, usage of family planning methods etc., as well as initiate life-style changes. In other words, these are considered valuable sources of informal education, exposure to the outside world, which can get through even the non-literate.

The availability as well as the types of medical facilities available affect the general health conditions, knowledge and usage of family planning methods, which in turn, influence the population dynamics of a region. It has been stressed that such direct actions as improvements in the health system directed at reducing morbidity and mortality, often produce a more favourable climate for family planning acceptance thereby reducing fertility (Tabah, 1980; UN 1980). In India too, the extension of health services is widely endorsed and undertaken to achieve the ultimate objective of 'well-being'. It may be noted that all these facilities are also seen as important processes for modernization or development, which is not conducive to high fertility. While commenting on the advanced demographic picture in Kerala in India, Nag (1983) mentioned the development of such social services as transport, education and health to be playing more important role, than favourable environment and hygienic conditions.

In the present study, it has been noticed that the presence of relatively higher educational facilities (near residence), such as, higher secondary schools, lowers the mean number of children ever born, amongst all, whereas the impact of the presence of other types appear unclear. Similarly, the presence of better medical facilities near residence, such as, hospital, allopathic dispensary, tuberculosis clinic, as well as family planning centre, also seem to lower fertility, on the whole (Table 17). These differentials however, may be reflecting the urban-rural differences, since higher secondary schools, hospitals, family planning centres are present only in urban areas, i.e., in the two towns. So, other urban advantages may also be responsible.

It may be added here that varying pattern of influence of other types of medical facilities, can be attributed to the facts that, the effectiveness of medical facilities in the rural Ladakh is not satisfactory till today, and people, even from far flung areas, often prefer to go to the hospitals (whenever possible). But, possible involvement of several other factors in the interplay cannot also be ruled out. In fact, this may be the reason (apart from the limitations of sample size), behind the varying pattern of differentials noticed when the mean number of children ever born have been classified by the communication facilities index, among the study population groups, and absence of a difference at the aggregate level.

However, it has been observed that when radio and television and/or newspapers are present in the house or in the immediate neighbourhood, fertility is relatively low than when this is not so. Hence, it appears that, media exposure, which is often considered important in influencing the population components via the psychology, behaviour of couples, may also have certain bearing in the study areas. In Turkey, it is considered crucial for modern attitudes, and it has been noticed that those who experience more media exposure have lower number of children, desire fewer children, and tend not to emphasize traditional reasons, such as, boy preference for wanting another child and

Table 17: Fertility differentials (mean number of children ever born)[1] among various population groups of Ladakh region, in Jammu and Kashmir, India; by some background characteristics

Background characteristics	*Buddhists*	*Muslims*				*Ladakh*
	Bodhs	*Baltis*	*Brokpas*	*Arghuns*	*(Pooled)*	*(Pooled)*
Type of Educational Facilities Available[2]						
Primary/middle school	3.53	4.75	5.09	3.85	4.71	4.12
Primary/middle/high school	3.76	4.64	4.94	4.16	4.58	4.34
Primary/middle/high/higher secondary school	3.01	4.37	-	3.47	3.93	3.65
Type of Communication Facilities Available						
Radio and Television and/or Newspaper[3]						
Not available	3.56	4.75	5.00	4.19	4.70	4.30
Available	3.31	4.38	-	3.48	4.00	3.75
Communication Facilities Index[4]						
Poor	3.10	4.67	-	4.20[a]	4.64	4.00
Good	3.51	4.55	5.00	3.68	4.31	4.03
Type of Medical Facilities Available[2]						
Not available	5.00[a]	4.38	-	-	4.38	4.40
Medical subcentre/Aid centre/Dispensary	3.56	5.23	5.64	4.02	4.89	4.18
Primary health centre	4.52	4.23	4.31	6.00[a]	4.29	4.33
Hospital/Allopathic dispansary/Tubreculosis clinic/ Family planning centre	3.01	4.39	-	3.47	3.98	3.69
Type of Medical Facilities Availed						
Folk and modern[5]	3.54	4.85	3.90	3.63	4.60	4.19
Modern[5]	3.21	4.11	5.88[a]	3.75	4.03	3.77
Housing Attributes and Condition						
Housing Condition Index[4]						
Poor	2.61	4.25	3.90	3.63	4.08	3.43
Fair	3.73	4.61	5.21	3.39	4.44	4.20
Good	3.67	4.74	6.00[a]	3.94	4.38	4.14

1. Differentials in fertility -related variables per woman(ever-married respondent)
2. Facilities not available/available with in 5 km of house (residence)
3. Available in the house and/or in the immediate neighbourhood
4. Index variables explained in the text
5. From both government and private sources
6. Calculation based on less than 10 cases

intend to use family planning methods sooner (Kagitcibasi, 1979). Earlier, Heer (1966) found negative relationship between fertility and newspaper circulation. However, he mentioned that this could also be indicative of education.

Fertility Differentials by Type of Medical Care Utilized

Even though the availability and effectiveness of medical facilities are considered important in influencing fertility as discussed above, the type of medical care utilized is also believed to have differential impact on the same. Access to and utilization of modern medical care particularly, which usually includes the mother and child health (MCH) services, seem to enhance the child survival chances, and acceptance of family planning methods, which in turn, are known to influence the fertility levels.

During the present study, it has seen that in the Ladakh region as a whole, both folk and modern medical care exist side by side, although the Health Authorities do not acknowledge most of the practitioners of folk medicines/treatments due to lack of scientific basic. In the study areas, it has also been noticed that the utilization of different types of medical care seems to have differential impact on fertility. That is, the number of children ever born to ever-married women appear higher when both folk and modern care is utilized amongst all. This finding may be important in view of the state of modern medical care in the region, as well as the fact that, the rural population often seek modern medical care only when all types of folk treatments fail.

Fertility Differentials by Housing Condition and Attributes

The housing condition and attributes i.e., the type and quality of the dwelling place is an ag-

Table 18: Fertility differentials (mean number of children surviving)[1] among various population groups of Ladakh region, in Jammu and Kashmir, India; by some background characteristics

Background characteristics	*Buddhists*	*Muslims*				*Ladakh*
	Bodhs	*Baltis*	*Brokpas*	*Arghuns*	*(Pooled)*	*(Pooled)*
Type of Educational Facilities Available[2]						
Primary/Middle school	3.07	3.28	3.18	3.08	3.24	3.15
Primary/Middle/high school	3.17	3.20	3.44	3.12	3.22	3.20
Primary/Middle/Higher secondary school	2.63	3.22	-	3.05	3.14	2.98
Type of communication Facilities Available						
Radio and Television and/or Newspaper[3]						
Not available	3.01	3.23	3.33	3.17	3.24	3.16
Available	2.91	3.22	-	3.03	3.14	3.05
Communication Facilities Index[4]						
Poor	2.57	3.22	-	3.00[a]	3.21	2.94
Good	3.05	3.23	3.33	3.08	3.19	3.14
Type of Medical Facilities Available[2]						
Not available	5.00[a]	3.26	-	-	3.26	3.30
Medical subcentre/Aid centre/Dispensary	3.01	3.54	3.36	3.10	3.36	3.18
Primary health centre	3.86	2.83	3.31	3.50[a]	2.98	3.14
Hospital/Allopathic dispansary/Tubreculosis clinic/ Family planning centre	2.63	3.23	-	3.05	3.15	2.99
Type of Medical Facilities Availed						
Folk and modern[5]	3.04	3.20	3.28	3.00	3.17	3.09
Modern[5]	2.81	3.26	3.63[a]	3.12	3.22	3.09
Housing Attributes and Condition						
Housing Condition Index[4]						
Poor	2.23	2.95	2.36	2.37	2.76	2.52
Fair	3.15	3.17	3.51	2.87	3.16	3.16
Good	3.32	3.55	4.25[a]	3.38	3.48	3.43

1. Differentials in fertility -related variables per woman(ever-married respondent)
2. Facilities not available/available with in 5 km of house (residence)
3. Available in the house and/or in the immediate neighbourhood
4. Index variables explained in the text
5. From both government and private sources
6 .Calculation based on less than 10 cases

gregate of determinants, which characterizes the immediate physical environment of human beings. These are also indicative of the level of living or the socio-economic status of households to some extent. The housing condition therefore, as other physical environmental determinants, has been recognized to influence the dynamics of population components, viz., fertility and mortality. In India, the Mysore study (UN, 1961) has reported positive association between type of dwelling and fertility (completed family size). In the present study as well, the Ladakh (Pooled) data have shown that relatively better housing condition and attributes may be increasing fertility. Individually, among Bodhs, Baltis and Arghuns too, the mean numbers of children ever born seem higher when housing conditions are better, that when the same is observed 'poor' (Table 17). [The Muslims on the whole, also registered the same trend]. However, it may be mentioned that certain studies have instead reported the reverse trend too. Singh (1986) has found negative influence of type of dwelling on live births in rural communities of Punjab and Haryana. Likewise, Mahadevan (1989) have also observed negative association between house types and live births in Andhra Pradesh, Uttar Pradesh, and Kerala; although the Pooled data have not shown such trend.

Fertility Differentials by Altitude

Many studies have considered the (high) altitude as one of the physical environmental determinant of population components. This is because, such zones are characterized by multiple - stress complexes, particularly hypoxia, which is believed to affect fecundity, fertility, mortality, physical maturity, growth and development.

Many studies have reported the adverse effects of high altitude stresses (mainly hypoxia)

on fecundity and fertility in the Andean region (James, 1966; Heer, 1967; Hoff, 1968; Baker and Dutt, 1972; Abelson et al., 1974; Hoff and Abelson, 1976). Similarly, certain studies in the Himalayan region, also generally seem to support the same concept (Bangham and Sacherer, 1980; Gupta, 1980, Weitz et al., 1981). But, some of these authors as well as others have also pointed out the adverse effects of hypoxia on neonatal and infant mortalities, spontaneous abortions, leading to reduced fertility and lower survival rate of offsprings (James, 1966; Whitehead, 1968; Baker and Dutt, 1972; Abelson et al., 1974; Hoff and Abelson, 1976).

And, in a detailed analysis is Bolivia, Dutt (1980) did not find any significant altitude related difference in the mean numbers of total pregnancies and live births, but noticed a significant reduction in numbers of living children, as a result of significantly increased childhood mortality rates at high altitudes. He stated that differences in neonatal and early childhood mortalities might have biased or complicated the study of the impact of altitude on fertility. However, contradictory reports on altitude-infant and child mortality and altitude-prenatal mortality also exist (Cruz-Coke, 1967; Buck et al., 1968; Hoff, 1968; Clegg et al., 1970; Dutt, 1976; Gupta 1980; Basu et al., 1985; Gupta et al., 1987; Lebedeva and Musuraliev, 1987; Kashiwazaki et al., 1988).

Many studies, however, have doubted the single-factor concept of adverse effects of hypoxia on fertility and pointed out that, apart from the genetic factor, various demographic, economic, socio-cultural and other physical environmental factors (like, migration of males to lowland, relatively high age at first birth and average pregnancy gap, higher proportion of women in the labour force, least acculturation, differences in marriage practices and exposure to the risk of conception, rural-urban differences, as well as health differences, underenumeration of children, underreporting of births etc., are responsible for the low fertility at high altitudes (Stycos, 1963, 1965; Heer, 1964; Heer and Turner, 1965; Whitehead, 1968; Bradshaw, 1969; De Jong, 1970; Goldstein, 1981; Goldstein et al., 1983, Gupta, 1985; Laurenson et al., 1985). Kashiwazaki et al. (1988), in their study in Bolivia, observed that late age at first pregnancy due to later age at marriage and age at menarche are the major factors explaining fertility performance, while altitude (hypoxic stress) explains only less than 3 per cent of the variance in the same. However, Abelson et al., (1974) earlier mentioned that the differences in marital patterns and socio-economic status, as well as migration in itself did not appear to account for the differences in fertility between the study populations. Basu et al. (1984) have explained the low fertility in Lachen than in Lachung in the Sikkim Himalayas in terms of differential transhumance pattern - a socio-economic attribute, which seems to have led to differential exposure to the high altitude stresses, thereby affecting fecundity/fertility.

Further, contradictory evidence have also been presented. In the Ethiopian study by Harrison et al. (1969), the reproductive capacity seemed similar in both lowland and highland samples. And, relatively high fertility, particularly in reference to the Gupta's (1980) completed fertility rate have been reported by Goldstein (1981), Goldstein et al. (1983) in the Himalayan region (Nepal, Ladakh). They stated that the low fertility in Khumbu Sherpas (Nepal), as reported by some authors, is not typical of high-altitude Tibetan populations, but rather that the Himalayan (Tibetan) populations generally have moderately high fertility as compared to other Tibetan populations living at moderate altitudes.

It has also been pointed out that the direct effect of hypoxia on reducing fertility in the long term resident native populations in the Andes and the Himalayas is questionable because of contradictory findings, lack of comparability of samples, methodological shortcomings, serious problems in the quality of the Census and retrospective data, and conceptual oversimplification, failure to take account of and control for cultural factors, such as exposure to the risk of conception; although these do not imply that such an effect does not exist (Goldstein et al., 1983).

In fact, the direct effect of hypoxia in reducing fertility appears rather controversial (Abelson, 1984; Basu and Gupta, 1984; Goldstein et al., 1984a,, 1984b; Hoff, 1984), and the relative contributions of hypoxic stress as well as ethnic, demographic, other physical environmental factors in determining the fertility level in high altitudes do not seem to be clear as yet. Recently, Gupta et al. (1987) have reported that, although their fertility data among Sherpas (mean completed fertility rate, mean number of live births and surviving children and total fertility rate) do not rule out the possibility of alti-

tude effects per se, concomitant socio-cultural factors may also have important, and perhaps even overriding effects on the same. It may be noted that Lebedeva and Musuralev (1987) have instead reported higher mean fertility rate per woman, and mean number of live births at high altitudes of Pamir than at low altitudes of Tien Shah in Kirghizia.

That the effect of high-altitude stresses may not have uniform or universal but varied effects on fertility, and that a host of independent determinants other than hypoxic stress are also influencing the same, can be grasped, when the range of completed fertility rates for high-altitude populations, reported in the literature is considered. The completed fertility rates seem to vary from the low values of 5.8 in Chilean Aymara (Cruz-Coke et al., 1966), or 3.2 in Bhotias of Nepal (Laurenson et al., 1985) to the high values of 8.5 in Chilean Aymara (Cruz-Coke et al., 1966), or 7.4 in Limi, Tibet (Goldstein, 1981). [Bangham and Sacherer (1980) have reported a completed fertility rate of 7.6 for the Sherpas of Helambu, Nepal, situated at 2600 m, while Goldstein et al. (1983) have presented a rate of 7.2 for the same population]. In a more recent study, the completed fertility rate at age 45 years (estimated from the regression equation) for the Japanese married women living at Bolivian high altitudes (3600m) throughout their reproductive period has been found rather low at 2.5 (for their low land counterparts at 350m, it is 3.9) [Kashiwazaki et al., 1988].

It may be noted that, in a recent overview of current knowledge, the range of completed family sizes (for all women) among historical and national populations seem to be varying from 5.3 (among rural population of northern China as well as in villages in near Bombay) to 9.5 among Hutterites of North America. And, reliable estimates of level of fertility suggest that hunters and gatherers and horticultural populations (inhabiting different parts of the world, having varied physical environment) tend to have values in the lower range of natural fertility of national populations. For example, the completed family sizes (for all women) for Dobe !Kung Bushmen of Africa seems to be about 4.7 (Howell, 1979), and for the Gainj of New Guinea, it appears 4.3 (Wood et al., 1985).

Although Early (1985) has questioned the low fertility estimates reported for forager populations, on the basis of data quality and infanticide, most of the completed fertility values reported by him too, seem to lie within the range of natural fertility mentioned above for historical and national populations, except in case of Kuinga Subdist (3.5), and N. Territory, Australia (4.2). Besides, he seems to have ignored the methodologically more rigorous studies.

In relation to these estimates, the completed family sizes among most of the high-altitude populations, reported in the literature, seem to be within the range of natural fertility and are not very low. And, according to another classification of completed fertility rates (Nag, 1968) also, most of the estimates noticed in high-altitude populations, seem to lie in the 'high' category (5.51 and above). Baker (1978) has additionally pointed out that, even though all of the reported completed fertilities are somewhat below the maxima, they are providing for rapid population growth and would provide for more than replacement at even the highest of expected mortality rates.

In the present study, the completed family sizes (for ever-married women aged 45+ years) among Bodhs, Arghuns, Baltis, and Brokpas have been observed 4.1, 4.7, 6.3, 6.8 births respectively. The estimate for the Muslims as a whole, seem to be 5.8 births. And, for the Pooled Ladakh data, it is 5.2 births. Hence, on the whole, the completed family size for ever-married women in study areas, at the end of their reproductive careers, seem to be 'low' according to the classification by Nag (1968). However, the average number of surviving children to ever-married women aged 45+ (3.6) broadly indicates potentials for population growth, rather than decline. The age structure for the total study population (39 percent in ages 0-14 years, as well as broad based pyramid with narrow top), the estimated crude birth rate in conjunction with the crude death rate, and the total fertility rate, child-woman ratio discussed earlier, too indicate the same. Individually, Bodhs and Arghuns also seem to have 'low' completed family sizes, while Baltis and Brokpas have 'high' ones (as per the categorization by Nag). Muslim ever-married women as a whole, too, seem to have 'high' completed family size.

It may be mentioned here that a host of demographic, economic, socio-cultural, psychological, and physical environmental determinants (other than the altitude-related ones), seem to be influencing the fertility component in study

areas, as also seen elsewhere, and their differential interplay may be responsible for the observed fertility levels and differentials (as already discussed in detail under the 'period' measures of fertility and exploratory fertility analysis). But, at the same time, the possible involvement of altitude-related stresses cannot also be ruled out per se.

It may however, be added that, even though the completed family sizes (for ever-married women) in Bodhs and Arghuns seem lower than the estimates in many other high-altitude populations across the world, including Ladakh Buddhists (6.4) and Ladakhi Muslims (7.2) reported by Goldstein et al. (1983), the estimates reported by Das et al. (1981) for Lachen Bhutias (3.8), by Laurenson et al. (1985) for Muktinath Bhotias (3.2) in the Himalayan region, and by Kashiwazaki et al. (1988) for Japanese women in Bolivian highlands (2.5), appear still lower. Besides, the scenario in case of Baltis and Brokpas of the high-altitude Ladakh seem different.

In addition, many 'period' measures of fertility, and even children ever born and surviving estimates for Kashmiri Pandits, Dogra Brahmans, and Dogra Rajputs inhabiting lower altitudes of Jammu and Kashmir Himalayas, have been observed slightly lower than even the corresponding estimates for Bodhs and Arghuns. These findings also point to the involvement of simultaneous effects of several factors including the ethnic factor (which may be socio-cultural and/or genetic factor) other than altitude stresses on fertility. It may also be mentioned that in India, the completed family sizes for women aged 45-49 years, across the major states, having varied physical environment seem to be consistent, 4 to 5 births (Census of India, 1981; NFHS, 1992-93). And, the completed family sizes of currently married women in ages 45-49 years in the Jammu region of Jammu and Kashmir, in Kerala, and in India as a whole, have been observed 5.4, 4.3, and 5.2, respectively (NFHS, 1992-93).

The above discussion broadly points out that the effect of high-altitude stresses (mainly hypoxia) on fertility are not uniform and universal across the world, and even within the same region, such as, the Himalayas, due to the involvement of several factors (as mentioned in many studies, and noticed in present study as well).

It may further be mentioned here that, the differentials in the mean number of children surviving (to ever-married women, classified by various independent determinant appear smaller than the differentials in mean number of children ever born, classified by the same independent determinants. Nevertheless, in most cases, the observed pattern of the differentials seem more or less similar, barring certain exceptions. The relatively small differences as well as the discrepancies may have been caused by the pervasive effects of infant and child mortality amongst all, and simultaneous convergence of high fertility and high infant and child mortality, as well as possible involvement of effect of several other determinants, apart from the one considered.

KEY WORDS Fertility Measures. Caste Groups. Tribal Groups. Jammu and Kashmir.

ABSTRACT In the present study, an attempt is made to study the fertility patterns of various population groups from the state of Jammu and Kashmir. The relationship between fertility and ecological, biological and socio-economic factors are highlighted. The fact that fertility behaviour and gender inequality have a strong relationship is also emphasized. The various population groups of the state show differental fertility as a result of their diverse development profiles.

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