

Anthropo-Demographic Study Among the Caste and Tribal Groups of Central Himalayas: 3. Mortality Differentials and Determinants

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ABSTRACT Mortality measures and determinants have been presented for the caste groups of Kumaun and the Bhotia tribal groups from Uttar Pradesh hills or Uttarakhand. The various population groups reveal differential mortality particularly infant, child and under-five mortality which are indicators of the groups environment and development. The major socio-cultural determinants found to influence child survival are education levels of the father and mother, income of the household and occupation.

Since the beginning of this century most of the developing countries including India have been successful in bringing down their death rates quite dramatically; in fact today the death rate of the developed and developing countries of the world are almost similar. According to 1992 Sample Registration System India has a low death rate of 10.1 per thousand population which varies from 10.9 in rural to 7.0 in urban areas. However, as far as infant and child mortality is concerned the reduction though considerable has not yet reached the desired level with India's infant mortality still being high (79).

Regional diversity in mortality exists in India, particularly for infant and child mortality. Both the general and infant mortality rates are higher in rural than in urban areas. The Infant Mortality Rate (IMR) in India ranges from 17 in Kerala to 115 in Orissa. In fact, Kerala is the only state having IMR of below fifty. The states of Orissa, Madhya Pradesh and Uttar Pradesh have the highest IMR in India. Female infants experienced higher mortality than male infants in the states of Bihar, Gujarat, Haryana, Orissa, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh.

For a further reduction in the mortality rate a reduction in the infant mortality rate is essential. It is very important for the developing world to bring down their infant and child mortality

rates. The infant mortality rate is taken to be a very sensitive indicator of development.

In this study an attempt is made to derive the mortality levels of the Kumauni caste groups and Bhotia tribal groups and also to highlight some of the determinants of mortality.

MATERIAL AND METHODS

Data were collected from two major groups, the caste groups of Kumaun and the Bhotia tribal groups. A total of 847 households was covered comprising of 316 and 531 households from the Bhotia tribal groups and caste groups of Kumaun, respectively. The districts from which the data collected were Pithoragarh, Chamoli and Almora. The caste groups are Brahmins, Rajputs and Scheduled Castes whereas the Bhotia tribal groups are the Dharchula Bhotias, the Juhar Bhotias and the Marcha Bhotias. For details see Paul Chachra and Bhasin (1998).

RESULTS AND DISCUSSION

MORTALITY MEASURES

Crude Death Rate (CDR)

Table 1 shows that for both the populations under study, i.e. the Bhotia tribal groups and Kumauni caste groups the combined death rate is 10.21. Variation in the death rate exists among the different groups. The Brahmins (7.61) have a much lower crude death rate than the Scheduled Castes (12.54). The Bhotia tribal groups have a higher crude death rate (11.47) than the caste groups (9.52), a result of the tough environment and settlement pattern of the Bhotias. Among the Bhotia tribal groups the Dharchula Bhotias have a very high crude death rate of 18.12 whereas the crude death rates of the Marcha Bhotias and Juhar Bhotias are on the lower side being 8.22 and 10.01, respectively.

According to the 1992 SRS data the death

rate for India was 10.1 per thousand population. Within India the death rate varied from 10.9 in rural areas to 7.0 in urban areas. States like Madhya Pradesh (12.9) and Uttar Pradesh (12.8) have death rates higher than the national average whereas Kerala has a very low death rate of 6.3.

Table 1: Crude Death Rate Among the Kumauni Caste Groups and Bhotia Tribal Groups of Uttarakhand

Group	Death Rate		
	Male	Female	Total
I. Kumauni Caste Groups			
Brahmins	8.79	6.46	7.61
Rajputs	8.96	7.23	8.08
Scheduled Castes	14.15	10.82	12.54
Kumauni (Total)	10.80	8.23	9.52
II. Bhotia Tribal Groups			
Marchas	9.27	7.17	8.22
Juhars	18.07	18.18	18.12
Dharchulas	11.04	8.94	10.01
Bhotias (Total)	12.24	10.69	11.47
Total	11.31	9.10	10.21

According to the SRS, death rate for females is higher than that of males in the states of Bihar, Madhya Pradesh, Orissa, Rajasthan and Uttar Pradesh whereas the opposite holds true for states like Kerala, Tamil Nadu, Andhra Pradesh, Karnataka and West Bengal. However in the present study the death rate for females is lower than that for males.

In the beginning of this century the death rate had declined sharply. This decline occurred first in the developed countries of the world with the less developed countries following suit. Currently, *i.e.* 1990-95, the death rate in the more developed regions (10) and the less developed regions (9) of the world are almost similar (UNFPA, 1993). In fact the slightly higher death rate in the more developed regions of the world than the less developed regions of the world could be attributed to the higher proportion of older age groups in the population for the more developed regions of the world.

The death rate of the world in 1990-95 is a low 9 as in most parts of the world; even in some of the less developed countries the death rate has been contained. Latin America has got the lowest death rate in the world (7). Asia and Oceania with a death rate of 8 comes second. It is followed by Northern America (9), Former

USSR (10), Europe (11) and Africa (14).

Some of the African countries have got the highest death rates in the world particularly those in Eastern (16), Middle (15) and Western Africa (15). However the death rates of Northern (9) and Southern (9) Africa are low.

The countries of Europe have low death rates and there is not much fluctuation in the death rates of different regions of Europe. The death rate in Europe ranges from 5 (Albania) to 14 (Hungary) but most of the countries have a death rate between 10 to 12. Latin America, Oceania, Former USSR and Northern America also have low death rates. In fact certain Latin American countries have death rates as low as five (Mexico, Panama and Venezuela).

Asia too has a low death rate of eight. The death rate of Eastern (8), Southeastern (8) and Western Asia (7) are low and Southern Asia has a slightly higher death rate (10).

Sri Lanka (6) and Iran (7) have the lowest death rates in Southern Asia. Afghanistan is the highest (22). It is followed by Bhutan (17), Bangladesh (14) and Nepal (13). India and Pakistan also have low death rates of 10.

The death rate of the present population (10) is similar to that of the Indian population (10.21), lower than that of Uttar Pradesh (12.8) but higher than that of Kerala (6.3). It is also lower than that reported by Bhasin (1990) for the Sikkim population (18.8) and Gaddis (14).

Per cent Distribution of Deaths by Broad Age Groups

For the population on the whole 24 per cent of deaths occur in the 0-4 age group whereas 54 per cent of deaths occur among persons aged 50 and above. A higher percentage of deaths occur in older age groups for the Kumauni caste groups than for the Bhotia tribal groups who in turn have a higher percentage of deaths occurring in the 0-4 age group (Table 2).

According to the 1992 SRS data at the national level 34 per cent of the deaths belonged to the 0-4 age groups and around 43 per cent of the deaths occurred to persons aged 50 and above. However, a lot of variation is present among the different states of India when per cent distribution of deaths is considered. Kerala has a very high percentage of deaths in the older age groups (75 per cent) whereas Uttar Pradesh has

a comparatively higher percentage of deaths in 0-4 age groups (43 per cent). In other words,

deaths in Kerala mainly occurs in the older age groups whereas in Uttar Pradesh a significant proportion of deaths occur in the 0-4 age group.

Table 2: Per cent distribution of deaths by broad age groups among Bhotias and Kumauni Caste Groups, Total (Caste and Tribal Groups) of Uttarakhand, Uttar Pradesh, Kerala and India

Group	0-4	5-14	15-49	50 +
I. Kumauni Caste Groups				
Brahmins	10.71	—	10.71	78.57
Rajputs	20.00	8.57	11.42	60.00
Scheduled Castes	18.18	12.72	9.09	60.00
Kumauni (Total)	16.94	8.47	10.16	64.04
II. Bhotia Tribal Groups				
Marchas	12.50	6.25	25.00	56.25
Juhars	43.75	3.12	18.75	34.37
Dharchulas	40.00	6.66	16.66	66.00
Bhotias (Total)	35.89	5.12	19.23	39.74
Total	24.48	7.17	13.77	54.59
Uttar Pradesh	43.60	6.4	15.40	34.6
Kerala	60.00	2.3	16.10	75.6
India	34.05	4.9	17.50	43.0

Age Specific Death Rates (ASDR)

Table 3 shows the age specific death rates for the various population groups. For the population on the whole the age specific death rate is the typical "U" pattern with the mortality high among the young and the old age groups of the population. Mortality is high for the 0-4 age groups, after that it recedes for the following age groups and again picks up at around age 50 onwards. The present population also shows a death rate of 20 for the age group 0-4 years and a death rate of 54 for the age group 50 years and above. Between the two populations, i.e. the caste groups and Bhotia tribal groups, difference in the pattern of age specific death rate exists. The Bhotia tribal groups have a high death rate

Table 3: Age Specific Death Rate (ASDR) Among the Kumauni Caste Groups and Bhotia Tribal Groups of Uttarakhand

Age Group (in Years)	Kumauni Caste Groups											
	Brahmins			Rajputs			Scheduled Castes			Kumauni (Total)		
	M	F	T	M	F	T	M	F	T	M	F	T
0-4	11.42	4.65	7.69	11.11	10.81	10.93	15.87	15.62	15.74	13.15	11.04	12.01
5-9	—	—	—	2.63	3.27	2.91	5.79	5.88	5.83	3.01	3.44	0.53
10-14	—	—	—	3.22	—	1.66	6.06	3.70	5.00	3.40	1.22	2.35
15-19	—	—	—	—	11.42	5.19	—	—	—	—	3.60	1.60
20-24	—	7.14	3.84	—	5.00	2.89	5.55	—	2.56	2.29	3.63	3.04
25-29	—	—	—	—	—	—	11.11	—	5.71	4.00	—	1.85
30-34	—	7.40	3.84	—	—	—	—	8.00	4.00	—	4.70	2.36
35-39	—	—	—	8.00	—	3.77	9.09	—	28.57	5.97	—	2.85
40-44	11.11	—	6.45	—	—	—	—	—	—	3.07	—	1.76
45-49	—	—	—	—	—	—	—	—	—	—	—	—
50-54	15.38	—	6.45	66.66	—	25.00	56.66	50.00	53.33	43.24	15.00	28.57
55-59	44.44	14.28	31.28	85.71	50.00	66.66	88.88	80.00	84.21	64.70	43.75	54.54
60+	94.11	72.72	82.05	106.66	66.66	84.84	133.33	127.27	130.76	110.63	82.35	95.91
	Bhotia Tribal Groups											
	Marchas			Juhars			Dharchulas			Bhotias (Total)		
	M	F	T	M	F	T	M	F	T	M	F	T
6.66	11.76	8.51	35.71	72.00	52.83	35.71	51.85	43.63	25.58	49.27	36.12	17.54
11.76	—	5.40	—	—	—	—	—	—	2.32	—	1.19	2.80
—	—	—	—	4.65	2.10	9.52	13.33	11.11	2.19	5.00	3.50	2.99
—	—	—	—	—	—	—	—	—	—	—	—	2.10
—	—	—	—	10.00	4.08	—	11.76	6.89	—	7.40	3.70	1.41
—	—	—	11.11	—	4.25	—	—	—	3.84	—	1.72	3.94
13.33	—	7.14	—	—	—	—	—	—	5.00	—	2.08	1.61
57.14	—	20.00	42.10	—	17.77	28.57	—	14.81	40.00	—	1.73	18.69
—	—	—	—	—	—	—	—	—	—	—	1.92	—
22.22	—	11.11	—	—	—	57.14	—	50.00	15.78	—	9.67	6.59
—	—	—	14.28	—	7.69	33.33	50.00	40.00	12.90	8.00	10.71	29.41
—	33.33	20.00	50.00	—	26.66	66.66	—	133.33	40.00	30.76	35.71	57.14
46.15	83.33	64.00	66.66	37.50	51.61	75.00	85.71	93.33	61.11	68.57	64.78	89.15

(36) at the 0-4 age group compared to the caste groups (12). The death rate for the older population is higher for the caste groups than for the Bhotia tribal groups.

It is seen that female mortality appears to be higher than male mortality among the younger age groups whereas male mortality appears to be higher at the older age groups. However, variation is seen among the different population groups. For the Kumauni caste groups for almost all the age groups mortality is higher among the males than the females. Among the Bhotia tribal groups, specifically among the Dharchula and Juhar Bhotias, mortality in the 0-4 age group is exceptionally high particularly for the females. The terrain and environment could play a role for this high child mortality among the Bhotia tribal groups.

According to the 1992 SRS, the death rate for India in the age groups 0-4 is 26, whereas the death rate for people 50 years and above is 33. Kerala has very low death rate in the age group 0-4 years (3.9). Uttar Pradesh has a death rate higher than the national figure for the same age group (37).

Infant Mortality Rate (IMR)

The Infant Mortality Rate for the population on the whole is low. There is a sharp difference in Infant Mortality Rate between the Kumauni caste groups and Bhotia tribal groups, the caste groups having a low infant mortality rate of 40 whereas the Bhotia tribal groups infant mortality rate is double (81). Among the caste groups the Brahmins have a comparatively low infant mortality rate (28) than the Rajputs (48) and Scheduled Castes (38). The Dharchula and Juhar Bhotias have an exceptionally high infant mortality rate of 120 and 150, respectively while the Marcha Bhotias have a low infant mortality rate. The infant mortality rate is one of the most sensitive indicators of the overall development in an area including the medical and health facilities prevalent. The diverse infant mortality rate could be a reflection of the facilities available. The exceptionally high infant mortality rate among the Bhotia tribal groups could also be due to small sample size.

In India Infant Mortality Rate in 1992, according to the SRS, was 80 and varied from 87 in rural areas to 53 in urban areas. Among the major states it varied from 17 in Kerala to 115

in Orissa. The other states having a high infant mortality rate are Madhya Pradesh (104) and Uttar Pradesh (98). Kerala is the only state having infant mortality rate below 20 both in rural and urban areas. On the other hand the states of Madhya Pradesh, Orissa and Uttar Pradesh had IMR above 100 in rural areas and above 60 in urban areas.

The present population has a low IMR (53.6) compared to Uttar Pradesh (98), signifying a lot of difference in infant mortality rate in "Kumaun" or the hill region and the state of Uttar Pradesh. According to the 1981 census, the infant mortality rate for Uttar Pradesh was 150 whereas it was quite low for the three districts, Chamoli-97, Almora-82 and Pithoragarh-91. Apparently these three districts had a low Infant Mortality Rate in 1981 and a further decline by 1991 should have occurred as according to the SRS infant mortality rate in the period 1985-87 to 1990-92 had declined in India and all major states except Karnataka. Unfortunately district level 1991 census data for Uttar Pradesh is not available.

Since Infant Mortality can be taken as an indicator of development the IMR existing in less developed and more developed regions of the world shows a sharp contrast. The IMR for the world (1990-95) is 62, with the more developed regions having a low IMR of 12 whereas the less developed regions have a high IMR of 69. The regions of the world with a low IMR are Northern America (8), Europe (10), Former USSR (21) and Oceania (22). In the less developed regions of the world *i.e.* Africa (95), Asia (62) and Latin America (47) the IMR is high.

Africa being one of the most undeveloped regions of the world has got highest IMR of the world, particularly some of countries in Western Africa (102), Eastern Africa (95) and Middle Africa (96). In Northern (69) and Southern Africa (55) the IMR is comparatively lower.

In Europe all the countries have a very low IMR, in fact the IMR ranges from 6 (Sweden and Finland) to 23 (Romania, Albania, Yugoslavia). Western (7) and Northern Europe (7) have the lowest IMRs in the world. Eastern Europe has slightly higher IMRs. Canada (7) and United States of America (8) in Northern America and Australia (7) and New Zealand (8) in Oceania also have low IMRs. Less developed Melanesia

and Papua New Guinea in Oceania have higher IMR of 49 and 54, respectively. In a comparative framework Latin America can be said to have a moderate IMR but still in the less developed bracket.

Southern Asia (90) is the region with the highest IMR in Asia. It is followed by South-eastern (55) and Western Asia (54). Eastern Asia has got a very low IMR of 26. Japan with an IMR of five has got the lowest IMR of the world. In Western Asia IMR ranges from 9 (Israel) to 106 (Yemen). Kuwait too has a low IMR of 14. Afghanistan with an IMR of 162 has got the highest IMR in Asia. In Southern Asia it is followed by Bhutan (129), Bangladesh (108), Nepal (99) and Pakistan (98). Sri Lanka is the only country in South Asia with a low IMR (24). India's IMR of 88 is also high (UNFPA, 1993).

Hence it is seen that for the present population IMR of 53.6 is lower than India's (80) and Uttar Pradesh's (98) but is higher than Kerala's (17). The IMR of Sikkim (117.7) and Gaddis (170.1) of Himachal Pradesh are much higher than that of the present population (Bhasin, 1990) though the Bhotia's IMR of 81 is quite close.

For the population on the whole the neonatal mortality rate (deaths less than a month) is quite low (22), it being higher for the Bhotia tribal groups than the caste groups. Only 42 per cent of infant deaths are neonatal deaths. However early infant deaths have not been severely under reported as the ratio of deaths under seven days to all neonatal deaths is quite high, in fact 54 per cent for the population on the whole (a ratio of less than 25 per cent is often used as a guideline to indicate under reporting of early neonatal deaths). The neonatal mortality rate for India is 50, for Uttar Pradesh it is high (57) whereas for the state of Kerala it is low (10.9).

A similar trend as seen for the crude death rate and infant mortality rate is seen in the perinatal mortality rate with the Bhotia tribal groups having a higher perinatal mortality rate (55) than the caste groups (25). The perinatal mortality rate for population on the whole is 37. Even among the various subgroups the trend is the same. Among the caste groups the scheduled castes (34) have a higher perinatal mortality rate than the Rajputs (29) and among the Bhotias the Dharchula Bhotias (75) and the Juhar

Bhotias (60) have high perinatal mortality rate whereas the Marcha Bhotias have a comparatively low perinatal mortality rate (35).

Child Mortality

Child mortality takes into consideration deaths of children from one year old to under five years. Child mortality can be also defined as the probability of dying between the first and fifth birthday. For this mortality measure also there is a large difference between the Bhotia tribal groups and the Kumauni caste groups. Child mortality for the caste groups is 100. Child mortality for the Bhotias on the whole is 49. Such high mortality for the Bhotias could also be partly due to small sample size.

Child mortality which has been high in most developing countries has been declining, though the decline rate has been slow. Besides Africa other high mortality populations, such as those of the Indian subcontinent (excluding Sri Lanka) and Haiti, have also experienced below-average declines (Hill and Pebley, 1989).

According to the National Family Health Survey 1992-93 despite improvements in infant and child mortality, in India one in every thirteen children still dies in the first year of life, and 1 in 9 dies before reaching age five. According to this survey India child mortality of 9.7 whereas the state of Uttar Pradesh has a high child mortality of 51.3. The Scheduled Tribes in Uttar Pradesh has a high child mortality of 66.6. Hence it is seen that the child mortality for the present population is higher than that of Kerala but below that of India and Uttar Pradesh.

Under Five Mortality

Under five mortality considers all deaths from 0 to under five years of age, in other words it is the addition of infant mortality rate and child mortality. Under five mortality can also be defined as the probability of dying before the fifth birthday. Under five mortality for both the populations is 103 with the Bhotia tribal groups having a high under five mortality of 181 whereas the Kumauni caste groups have a low under five mortality of 64. Among the caste groups the under five mortality ranges from 42 for the Brahmins to 84 for the Scheduled Castes. The under five mortality for the Dharchula Bhotias and Juhar Bhotias is very high (Table 4).

Table 4: Neonatal Mortality (NM), Post Neonatal Mortality (PNM), Infant Mortality Rate (IMR), Child Mortality Rate (CMR), Under Five Mortality (U5M) and Perinatal Mortality Rate (PMR) among the Kumauni Caste Groups and Bhotia Tribal Groups of Uttarakhand

Group	NM	PNN	IMR	CM	U5M	PM
I. Kumauni Caste Groups						
Brahmins	—	28.57	28.57	14.28	42.85	29.6
Rajputs	16	32	48	8	56	34.8
Scheduled Castes	30.76	7.69	38.46	46.15	84.6	25.7
Kumauni (Total)	18.46	21.53	40	24.61	64.61	35.28
II. Bhotia Tribal Groups						
Marchas	14.28	—	14.28	28.57	42.85	75
Juhars	40	80	120	120	240	60
Dharchulas	50	100	150	200	350	81
Bhotias (Total)	31.25	50	81.25	100	181.25	55.81
Total	22.68	30.92	53.68	49.48	103.09	37.16

Since the under five mortality is a measure of mortality upto the age of five years it appears that for this age the Scheduled Castes among the caste groups and the Dharchula Juhar Bhotias among the Bhotias have high under five mortality. Also Bhotia tribal groups have a much higher under five mortality than the caste groups.

According to the National Family Health Survey under five mortality for India in 1992 was 118 with the state of Uttar Pradesh having a high under five mortality rate of 161.5 and Kerala having a low under five mortality of 40.3. The under five mortality for Scheduled Tribes in Uttar Pradesh is a high 222.9, Scheduled Castes also have a high under five mortality (202.1). For the population under study under five mortality is 103. However there is a sharp difference in under five mortality between the caste groups (64) and Bhotia tribal groups (181).

For all the mortality measures in the younger age group the Bhotia tribal groups have a much higher death rate than the caste groups of Kumaun. This could be a reflection of the terrain and settlement pattern of the Bhotias which necessitates living for part of the year in areas not approachable by road nor served by basic health facilities. Unlike the Marcha Bhotias the Juhar Bhotias and the Dharchula Bhotias do not have proper facilities like roads and hospitals in areas where their summer settlements are situated. This could be a reason for their high infant and child mortality found in these groups. Adequate communication facilities is a prerequisite for development of an area. The caste groups though living in a hilly region appear to have

more access to health facilities. Among all the three Bhotia groups studied most of the Marcha Bhotias live in a urban areas (Gopeshwar) for their winter settlement and due to development in their summer settlement area (a tourist area for religious purposes - Badrinath) their summer settlements are approachable by road and have other basic amenities. The Juhars though are mainly permanently settled in Munsyari have no facilities in their summer villages and so is the case of the Dharchula Bhotias. Also a sizable number of the Dharchula Bhotias still practise transhumance and beyond Tawaghat there is no road. Hence it is seen that the Dharchula Bhotias rely mainly on herbs in times of sickness, this is not seen among the Marcha Bhotias and Juhar Bhotias.

Differential Mortality

Mosley and Chen (1984) had indentified five factors as the determinants of child survival: maternal factors, environmental contamination, nutrient deficiency, injury and personal illness control. All these are influenced by socio-economic determinants (Mosley and Chen, 1984). Stockwell and Wicks (1984) have highlighted the important relationship between infant mortality and socio-economic status. According to them infant mortality rate exhibits a pronounced inverse association with a wide variety of socioeconomic variables. "Of all the variables examined, the one factor that emerged as the strongest and most consistent determinant of census tract variations in infant mortality was the proportion of low income families."

According to Kost and Amin (1992) infant and child mortality can be said to be affected by two sets of factors - factors related to reproductive or maternal characteristics and socioeconomic factors. In their study involving villages of Punjab they found that reproductive and socioeconomic factors affect mortality at differing ages of children. Socioeconomic factors do not appear to be associated with the neonatal period whereas reproductive factors dominate only in the neonatal period and the rest of first six months. The socioeconomic factors significantly affecting child mortality were education level of head of household, caste and family income.

Das Gupta (1990) in a study in rural Punjab found that child mortality is highly clustered within families. According to her death cluster-

infant mortality in rural India are availability of medical facilities and medical care at village level. Kulkarni et al. (1990) also found that socioeconomic variables (education and income) are highly (negatively) correlated with mortality rate.

Bourne et al. (1991) in her analysis involving education of mothers and child mortality in India confirmed the association between mother's education and child mortality and also showed that in India a mother's education has an even greater effect on the survival of her daughters than it does on her sons.

Natarajan (1989) in his study on child mortality in Uttar Pradesh found that female literacy and the availability of protected drinking water are important factors in determining

Table 5: Survival ratios by educational level of women (wife) among Kumauni Population Groups (Caste Groups and Bhotia Tribal Groups) of Uttarakhand

<i>Education status of women (wife)</i>	<i>No. of women</i>	<i>No. of children ever born</i>	<i>Average No. of children ever Born</i>	<i>No. of surviving children</i>	<i>Average No. of survivors</i>	<i>Proportion of survivors</i>
Illiterate status	550	2430	4.41	1990	3.61	0.81
Primary	155	537	3.46	477	3.07	0.88
Middle	17	49	2.88	45	2.64	0.91
High School	89	239	2.68	223	2.50	0.93
Intermediate	14	28	2	25	1.78	0.89
Graduate	16	34	2.12	33	2.06	0.97
Post Graduate	6	9	1.5	9	1.50	1.00

Table 6: Survival ratios by educational level of men (husband) among Kumauni Population Groups (Caste Groups and Bhotia Tribal Groups) of Uttarakhand

<i>Education status of men (Husband)</i>	<i>No. of women</i>	<i>No. of children ever born</i>	<i>Average No. of children ever born</i>	<i>No. of surviving children</i>	<i>Average No. of survivors</i>	<i>Proportion of survivors</i>
Illiterate	111	518	4.66	404	3.69	0.78
Primary	140	649	4.63	538	3.84	0.83
Middle	53	181	3.41	162	3.05	0.89
High School	255	884	3.46	791	3.10	0.89
Intermediate	84	258	3.07	233	2.77	0.90
Graduate	43	117	2.72	106	2.46	0.91
Post Graduate	26	67	2.57	64	2.46	0.95

ing is due to the basic abilities and personality characteristics of the mother of the primary carer. An incompetent mother is unable to look after the child effectively and hence lose children.

Jain (1985) found that for rural India mother's education and poverty level are important factors in explaining regional differences in infant mortality. According to him these two indicators explained about 60 per cent of the regional variation in rural India. Other determinants of

child mortality.

Dyson and Moore (1983) had linked female autonomy and child mortality. According to them differences in kinship structure and female autonomy between north and south India may influence patterns of child care, and hence child mortality. On the other hand Nag (1983) in his comparative study of West Bengal and Kerala has attributed Kerala's low infant mortality to its more advanced social development.

Survival Ratios and Education

The proportion of surviving children by the education of wife reveals that in general as the education level of the mother increases the proportion of children survivors increases. In other words children of an illiterate or less educated mother have less chances of survival whereas children of mother's who are more educated have higher chances of survival. For instance as seen in table 5 the proportion of surviving children an illiterate mother has is a low 0.81 whereas it is 91 for high school educated mothers and 0.97 for mother's who are graduates. As can be observed in table 6 a similar trend is seen when the education level of the husband is considered. An illiterate husband has low 0.78 proportion of survivors whereas high school educated husbands the proportion of survivors is 0.89 and husband's who are graduates have a higher proportion of survivors (0.90).

As mentioned earlier a number of studies

have shown that education, particularly mothers education, is important for the level and trends in infant and child mortality of a population. The negative effect of women's education on infant and child mortality is mainly attributed to better usage of available health services like immunization.

Survival Ratios and Income

As can be observed in table 7 the proportion of surviving children increases as the level of income increases. For instance, households having an annual income less than Rs. 7000 has a rather low proportion of survivors of 0.73 whereas those households whose annual income is above Rs. 28001 their proportion of survivors is a comparatively high 0.89. In general in households/families who are economically not well off the proportion of children who survive is much less compared to the more economically well off families.

Many research findings and the present

Table 7: Survival ratios by annual income among the Kumauni Population Groups (Caste Groups and Bhotia Tribal Groups) of Uttarakhand

Annual income	No. of women	No. of children everborn	Average No. of children ever born	No. of surviving children	Average No. of survivors	Proportion of survivors
Below 7000	97	485	5	358	3.69	0.74
70001-14000	403	1570	3.89	1317	3.26	0.84
14001-21000	239	881	3.68	774	3.23	0.88
21001-28000	54	194	3.59	177	3.27	0.91
Above 28000	54	196	3.62	176	3.25	0.90

Table 8: Survival ratios by occupation of husband among the Kumauni Caste Groups and Bhotia Tribal Groups of Uttarakhand

Education status of husband	No. of women	No. of children everborn	Average No. of children ever born	No. of surviving children	Average No. of survivors	Proportion of survivors
Service	322	1046	3.24	961	2.984	0.9187
Business	94	373	3.96	313	3.329	0.8389
Animal Husbandry	33	135	4.09	109	3.303	0.8075
Labourer	107	433	4.04	360	3.364	0.8314
Agriculture	117	533	4.55	436	3.726	0.818
Others	41	163	3.98	127	3.097	0.7791

Table 9: Survival ratios by occupation of wife among the Kumauni Caste Groups and Bhotia Tribal Groups of Uttarakhand

Occupation of women	No. of women	No. of children everborn	Average No. of children ever born	No. of surviving children	Average No. of survivors	Proportion of survivors
Agriculture	388	1566	4.03	1369	3.52	0.87
Agri. and Weaving	161	559	3.47	454	2.81	0.81
Weaving	127	484	3.81	375	2.95	0.77
Service	14	36	2.57	34	2.42	0.94
Others	10	44	4.40	36	3.60	0.81

research have consistently shown that the lower income groups are characterised by high infant mortality and low child survival. These groups have inadequate access to health services and also have poor knowledge of proper health care practices. Their access to basic requirements like safe drinking water is also hampered. Income could determine the nutritional levels and access to medical care of children which in turn are determinants of child survival.

Survival Ratios and Occupation

Husband's who are in the service sector appear to have a higher proportion of survivors (0.91) whereas those involved in farming and animal husbandry have a comparatively lower proportion of surviving children of 0.81 and 0.80, respectively. Labourer's children survival ratios are also low (0.83). When the wife's occupation is considered (Table 9) a similar trend in survival ratios is seen.

Since occupation is a reflection of a person's economic status and also their education level it too has similar effects on fertility and mortality as these other two variables. Along with income it defines the socioeconomic class or status of an individual.

The hill region of Uttar Pradesh appears to have a much lower death rate and infant child mortality rates the exception being the infant mortality rate than that of Uttar Pradesh but it is higher than that of Kerala. The lower death and infant and child mortality rates (the exception being the infant mortality rate among certain Bhotia tribal groups) could be attributed to better development and infrastructure in the hill region than the rest of Uttar Pradesh. Certain important socioeconomic determinants of child and infant mortality like education, income and occupation has also been highlighted.

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