

INFANT AND CHILD MORTALITY IN HIMACHAL PRADESH

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Abstract: This study has been undertaken to investigate determinants of mortality behaviour in Himachal Pradesh. A total sample comprises 200 households and 245 ever-married women aged 15-49 from both tribal and non-tribal regions in Himachal Pradesh collected in 2015. The risk of mortality is higher in the first year of life than later in childhood. Mother's higher level of education has shown negative effect on child mortality rate. Infant mortality among children of migrant women is lower than those of non-migrant women in both tribal and non-tribal region. Infant mortality rate is higher among children of rural non-migrant women with low household level of standard of living as compared to women with high household standard of living index. In urban areas of non-tribal region child mortality is prevalent among women with low level of household standard of living index. Infant female mortality is higher than male mortality. Infant mortality varied inversely with total number of children born. The study indicates that for successful reduction in mortality there is a need to improve women's education, employment opportunities and better health facilities in Himachal Pradesh.

Keywords: Child mortality, Infant mortality, Migrant and non-migrant, Tribal and non-tribal region.

1. Introduction

Mortality is one of the three components of population change, the other two being fertility and migration. Usually it is believed that end of life is death. A death can occur only after a live birth. The United Nations (1953: 6) and the World Health Organisation have defined death as, "Death is the permanent disappearance of all evidence of life at any time after birth has taken place (post-natal cessation of vital functions without capacity of resuscitation)." This definition of death does not include any death prior to a live birth. Live birth has been defined by the United Nations (1953: 6) as "Live birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered live-born." Therefore any death such as abortion and still birth (foetal deaths) prior to a live birth is not considered as a death.

Information regarding mortality can be used to identify population groups that are at high risk and in need of health services.

Factors such as biological, economic and cultural affect health of an individual and consequent by the mortality rate in the society. These factors affecting mortality can be classified as hereditary, constitutional and environment (Harold, 1959: 440). Demographers study mortality in reference to population size and structure rather than medical angle. The constitutional factors that are important for demographers to analyse mortality are age and sex. The factors affecting mortality include the natural physical surroundings of the individual as well as his/her social and economic environments and personal habits. The occurrence of death is one of the vital events. Factors that affect foetal and neonatal primarily endogenous (age of mother, the birth order, the period of spacing between successive births, prematurity, weight at birth and multiple births), while those that affect post neo natal deaths are mainly exogenous (social, cultural, economic and environmental).

2. Methodology

2.1 Objective

The present study has been undertaken to find out the determinants of infant and child mortality in Himachal Pradesh.

2.2 Hypotheses

On the basis of findings of earlier studies, theoretical frame work and the objectives under consideration, following hypotheses have been generated:

1. The higher levels of mother's education may exhibit a negative relationship with infant mortality.
2. Higher household income/better socio-economic status may be associated with lower risk of infant and child mortality.
3. Age at marriage may exhibit an inverse relationship with infant mortality i.e., higher the age at marriage, lower may be the infant mortality.
4. Shorter the duration of birth interval, higher may be risk for the survival of infants.

2.3 Sample Design

In order to achieve the objectives of the present study, the primary data has been collected from Himachal Pradesh in 2015. A systematic, multi-stage stratified random sampling design has been adopted to select the sample data. In sampling procedure block, panchayat, village, town, ward and household are the different stages of random sampling. For this purpose, two districts i.e. Lahul & Spiti (tribal region) and Una (non-tribal region) out of twelve districts in Himachal Pradesh have been selected following simple random sampling, while arranging them in ascending order on the basis of their respective population.

In Lahul & Spiti district, there are two development blocks i.e. Lahul and Spiti, and one sub-development block i.e. Udaipur, according to 2011 census. In order to collect data from tribal region, Lahul development block and Udaipur sub-development block (from two development blocks and one sub-development block), two panchayats from each block and sub-block and two villages from each panchayat have been selected following simple random sampling. A sample of ten households has been selected from each village, and 80 households have been actually surveyed from eight villages in tribal region. In 80 interviewed households, data for 101 eligible ever married women aged 15-49 have been collected.

For urban areas in non-tribal region, two urban areas (i.e. Una and Mehatpur), and from each area, two wards have been selected following simple random sampling. From four wards, data from total forty households have been collected, while selecting ten households from each ward. From 40 interviewed households, data for 45 eligible ever married women aged 15-49 have been collected.

In order to collect data from rural areas of non-tribal region, two blocks (i.e. Una and Bangana) have been selected out of total five blocks, two panchayats from each block, and two villages from each panchayat have been selected following simple random sampling. From eight villages, data for total eighty households have been collected, while selecting ten households from each village. In rural area, from 80 interviewed households, data for 99 eligible ever married women aged 15-49 have been collected. A total sample comprises 200 households and 245 ever-married women aged 15-49 from both tribal and non-tribal regions in Himachal Pradesh.

3. Infant and child mortality

In this study, complete history of births and deaths of child born to all ever-married women age 15-49 has been collected. The information collected has been used to calculate the following direct estimates of infant and child mortality:

Neonatal mortality (NN) - the probability of dying in the first month of life

Post neonatal mortality (PNN) - the probability of dying after the first month of life but before the first birthday

Infant mortality – the probability of dying before the first birthday

Child mortality – the probability of dying between the first and fifth birthdays

In this study, movements that resulted in the change of usual place of residence (UPR)¹ of the individuals have been treated as migration, and a household member whose last usual place of residence (UPR) was different from present place at the time of enumeration has been considered as migrant. The other types of movements that do not involve change of usual place of residence, but are short-term (less than six months) or seasonal in nature have not been considered. The changes of usual place of residence of women due to marriage have been excluded from being treated as migration in this study.

¹Usual place of residence (UPR) of a person was defined as a place (village/town) where the person had stayed continuously for a period of six months or more.

3.1 Levels and trends in infant and child mortality

The region is also an important because infant and child mortality vary by region. Tribal region is likely to experience lower mortality than non-tribal region.

Table 3.1.1 levels, trends and differentials in infant and child mortality- Tribal region

Years preceding the survey	Neonatal mortality (NN)		Post neonatal mortality (PNN)		Infant mortality		Child mortality (1-5 years)	
	Migrant	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant
3 years	0.00	21.05	0.00	0.00	0.00	21.05	0.00	10.53
2 years	0.00	16.95	0.00	0.00	0.00	16.95	0.00	8.47
Present	0.00	12.12	23.26	18.18	23.26	30.30	0.00	12.12

Levels and trends in infant and child mortality rates for tribal region have been presented in table 3.1.1. These levels and trends relate to the period 2 and 3 years preceding the study as well as those of current period when data for the study have been collected. The cases of mortality decrease, as we go backward in time from the study period. The whole covered area for tribal region is rural. Neonatal mortality among children of non-migrant women has shown a decline over time, it being 21.05 (three years preceding the study) and 16.95 (2 years preceding the survey), and it further declined to present level 12.12 (child deaths per 1000 live births during neonatal period). Child mortality also registered a decline among children of non-migrant women. It declined from 10.53 (three years before the study) to 8.47 (2 years before the survey), however it rose to 12.12 (at present). Infant mortality among children of migrant women (23.26) is lower than those of non-migrant women (30.30).

Results for the non-tribal region reveal (Table 3.1.2) that overall neonatal mortality rate among children of migrants (rural and urban together) has recorded a decline over time, it being 41.67 (three years before the study), it dropped from 34.48 (two years preceding data collection) to 26.32 (present level). Child mortality rate (1-5 years) has also exhibited a declining trend, it being 5.92, 4.32 and 3.44 for respective periods, among children of non-migrant women. Infant mortality of children of non-migrant women has shown a rising trend, varying between 47.34 and 51.55. Infant mortality rate of children of migrants is lower than that of children of non-migrant women, it being 41.67 and 47.34 for children of migrant and non-migrant women (three years preceding the survey), 34.48 and 47.41 (two years preceding the survey) and 26.32 and 51.55 at present.

Table 3.1.2 levels, trends and differentials in infant and child mortality- Non-tribal region

Years preceding the survey	Neonatal mortality (NN)		Post neonatal mortality (PNN)		Infant mortality		Child mortality (1-5 years)	
	Migrant	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant
Rural								
3 years	0.00	15.27	0.00	30.53	0.00	45.80	0.00	7.63
2 years	0.00	11.49	0.00	40.23	0.00	51.72	0.00	5.75
Present	0.00	18.26	0.00	41.10	0.00	59.36	0.00	4.57
Urban								
3 years	90.91	23.67	0.00	0.00	41.67	47.34	0.00	5.92
2 years	83.33	34.48	0.00	0.00	83.33	34.48	0.00	0.00
Present	50.00	27.78	0.00	0.00	50.00	27.78	0.00	0.00
Total								
3 years	41.67	23.67	0.00	0.00	41.67	47.34	0.00	5.92
2 years	34.48	14.70	0.00	25.74	34.48	47.41	0.00	4.31
Present	26.32	20.62	0.00	30.93	26.32	51.55	0.00	3.44

3.2 Socio-economic differentials in mortality

The risk of mortality is higher in the first year of life than later in childhood. This has been supported by the mortality rates as presented. Table 3.2.1 presents differentials in infant and child mortality rates in tribal region by selected socio-economic characteristics. No mortality is found among children of migrant and non-migrant women of Buddhist community, who have educated more than matric and those of households with high standard of living. Infant mortality rate (30 deaths per 1,000 live births) among scheduled tribes Hindu non-migrants with education less than matric and low standard of living is higher as compared to that among Hindu migrants (23.26 deaths per 1,000 live births). Migrant Scheduled tribal women with educational level less than matric in tribal region reported no child mortality (age 1-4 years) as compared to non-migrant Hindu women (12 deaths per 1,000 live births). Infant mortality is higher than child mortality in tribal region.

Table 3.2.1 Mortality by socio-economic characteristics in tribal region

Socio-economic characteristics	Neonatal mortality (NN)		Post neonatal mortality (PNN)		Infant mortality		Child mortality (1-5 years)	
	Migrant	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant
Religion								
Hindu	0.00	12.12	23.26	18.18	23.26	30.30	0.00	12.12
Buddhist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Caste								
Scheduled tribes	0.00	12.12	23.26	18.18	23.26	30.30	0.00	12.12
Mother's education								
< Matric	0.00	12.12	23.26	18.18	23.26	30.30	0.00	12.12
Above matric	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard of living								
Low	0.00	12.12	0.00	18.18	0.00	30.30	0.00	12.12
Medium	0.00	0.00	23.26	0.00	23.26	0.00	0.00	0.00
High	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Residence								
Rural	0.00	12.12	23.26	18.18	23.26	30.30	0.00	12.12

Infant and child mortality rates for children of migrant and non-migrant women of rural and urban areas of non-tribal region by socio-economic characteristics have been presented in Table 3.2.2. Selected rural areas have been predominantly inhabited by Hindu community, whereas only two members of non-migrant Sikh Community have been selected in the sample. A neonatal mortality rate of children of rural Hindu non-migrant women (18.26) is lower than that of children of urban Sikh non-migrant women (27.78). Caste wise mortality rates reveal that neonatal mortality rate of children of rural non-migrant women of OBC is two-times higher than that of scheduled caste. Infant mortality of children of non-migrant women of General Category is lower (13.70) as against those of Scheduled caste and OBC (22.83, each). In urban area, infant mortality rate of children of scheduled caste women is lower than that of general caste. Mother's higher level of education has shown effect on child mortality rate, mortality occurs to children of women with less than matric standard of education only. Infant mortality rate is higher among children of rural non-migrant women with low household level of standard of living as compared to women with high household standard of living index. In urban areas of non-tribal region child mortality is prevalent among women with low level of household standard of living index.

Table 3.2.2 Mortality by socio-economic characteristics in non-tribal region

Socio-economic characteristics	Neonatal mortality (NN)		Post neonatal mortality (PNN)		Infant mortality		Child mortality (1-5 years)	
	Migrant	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant
Religion- rural								
Hindu	0.00	18.26	0.00	41.10	0.00	59.36	0.00	4.57
Sikh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Religion- urban								
Hindu	50.00	0.00	0.00	0.00	50.00	0.00	0.00	0.00
Sikh	0.00	27.78	0.00	0.00	0.00	27.78	0.00	0.00
Caste- rural								
General	0.00	0.00	0.00	13.70	0.00	13.70	0.00	0.00
Scheduled caste	0.00	4.57	0.00	18.26	0.00	22.83	0.00	0.00
OBC	0.00	13.70	0.00	9.13	0.00	22.83	0.00	4.57
Caste- urban								
General	50.00	0.00	0.00	0.00	50.00	0.00	0.00	0.00
Scheduled caste	0.00	27.78	0.00	0.00	0.00	27.78	0.00	0.00
OBC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mother's education- rural								
< Matric	0.00	18.26	0.00	41.10	0.00	59.36	0.00	4.57
Above matric	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mother's education- urban								
< Matric	50.00	27.78	0.00	0.00	50.00	27.78	0.00	0.00
Above matric	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard of living- rural								
Low	0.00	0.00	0.00	27.40	0.00	27.40	0.00	0.00
Medium	0.00	9.13	0.00	4.57	0.00	13.70	0.00	0.00
High	0.00	9.13	0.00	9.13	0.00	18.26	0.00	4.57
Standard of living- urban								
Low	50.00	27.78	0.00	0.00	50.00	27.78	0.00	0.00
Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Residence								
Rural	0.00	18.26	0.00	41.10	0.00	59.36	0.00	4.57
Urban	50.00	27.78	0.00	0.00	50.00	27.78	0.00	0.00
Total	26.32	20.62	0.00	30.93	26.32	51.55	0.00	3.44

3.3 Demographic differentials in mortality

Table 3.3.1 presents infant and child mortality rates by sex of the child, mother's age at delivery (birth of child), child birth interval, total children born and birth order of child. Child mortality rate among male and female children of non-migrant women is evenly distributed. Male infant mortality rate among male children of non-migrant women is three times higher than that of female children. Among women aged less than 20 years at child birth, infant child mortality is higher for migrant women (23.26) as compared to non-migrant women (12.12). Children of non-migrant women has higher infant mortality rate, with average previous birth interval exceeds three years.

Table 3.3.1 Mortality by demographic characteristics in tribal region

Demographic characteristics	Neonatal mortality (NN)		Post neonatal mortality (PNN)		Infant mortality		Child mortality (1-5 years)	
	Migrant	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant
Sex-rural								
Male	0.00	12.12	23.26	12.12	23.26	24.24	0.00	6.06
Female	0.00	0.00	0.00	6.06	0.00	6.06	0.00	6.06
Mother's age at birth								
< 20	0.00	6.06	23.26	6.06	23.26	12.12	0.00	12.12
20-29	0.00	6.06	0.00	12.12	0.00	18.18	0.00	0.00
30-39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average of previous childbirth-intervals								
1 year	0.00	0.00	23.26	6.06	23.26	6.06	0.00	0.00
2-3 years	0.00	6.06	0.00	0.00	0.00	6.06	0.00	6.06
> 3 years	0.00	6.06	0.00	12.12	0.00	18.18	0.00	6.06
Total children ever born								
1-2	0.00	6.06	23.26	0.00	23.26	6.06	0.00	0.00
3-4	0.00	6.06	0.00	12.12	0.00	18.18	0.00	6.06
5+	0.00	0.00	0.00	6.06	0.00	6.06	0.00	6.06
Birth order								
1	23.26	12.12	0.00	6.06	23.26	18.18	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	6.06	12.12
3	0.00	0.00	0.00	0.00	0.00	0.00	6.06	0.00

Infant mortality rate is higher for children of non-migrant women with 3-4 children ever born. Fifty percent of mortality occurred in first order (solely infant mortality) in tribal region, followed by second birth order and third order each 6.06. All child deaths (1-5 years) took place in second birth order. Fifty percent of infant deaths occurred to children of those non-migrants who have borne 3-4 children. Neonatal mortality has been 6.06 each for women who have born 1-2 and 3-4 children, respectively.

Table 3.3.2 Mortality by demographic characteristics in non-tribal region

Demographic characteristics	Neonatal mortality (NN)		Post neonatal mortality (PNN)		Infant mortality		Child mortality (1-5 years)	
	Migrant	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant	Migrant	Non-migrant
Sex- rural								
Male	0.0	4.57	0.00	18.26	0.00	22.83	0.00	0.00
Female	0.00	13.70	0.00	22.83	0.00	36.70	0.00	4.57
Sex- urban								
Male	50.00	0.00	0.00	0.00	50.00	0.00	0.00	0.00
Female	0.00	27.78	0.00	0.00	0.00	27.78	0.00	0.00
Mother's age at birth- rural								
< 20	0.00	9.13	0.00	4.57	0.00	13.70	0.00	0.00
20-29	0.00	4.57	0.00	31.96	0.00	36.53	0.00	0.00
30-39	0.00	4.57	0.00	4.57	0.00	9.13	0.00	4.57
Mother's age at birth- urban								
< 20	50.00	13.89	0.00	0.00	50.00	13.89	0.00	0.00
20-29	0.00	13.89	0.00	0.00	0.00	13.89	0.00	0.00
30-39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average of previous childbirth-intervals- rural								
1 year	0.00	0.00	0.00	18.26	0.00	18.26	0.00	0.00
2-3 years	0.00	13.70	0.00	22.83	0.00	36.53	0.00	4.57
> 3 years	0.00	4.57	0.00	0.00	0.00	4.57	0.00	0.00
Average of previous childbirth-intervals- urban								
1 year	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-3 years	50.00	0.00	0.00	0.00	50.00	0.00	0.00	0.00
> 3 years	0.00	27.78	0.00	0.00	0.00	27.78	0.00	0.00
Total children ever born- rural								
1-2	0.00	4.57	0.00	4.57	0.00	9.13	0.00	0.00
3-4	0.00	4.57	0.00	18.26	0.00	22.83	0.00	4.57
5+	0.00	9.13	0.00	18.26	0.00	27.40	0.00	0.00
Total children ever born- urban								
1-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3-4	50.00	27.78	0.00	0.00	50.00	27.78	0.00	0.00
5+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Birth order- rural								
1	0.00	13.70	0.00	9.13	0.00	22.83	0.00	4.57
2	0.00	4.57	0.00	9.13	0.00	13.70	0.00	0.00
3	0.00	0.00	0.00	9.13	0.00	9.13	0.00	0.00
4	0.00	0.00	0.00	4.57	0.00	4.57	0.00	0.00
Birth order- urban								
1	50.00	0.00	0.00	0.00	50.00	0.00	0.00	0.00

2	0.00	13.89	0.00	0.00	0.00	13.89	0.00	0.00
3	0.00	13.89	0.00	0.00	0.00	13.89	0.00	0.00

Table 3.3.2 shows that among children of rural non-migrant women, female neonatal mortality (13.70) is two-times higher than that of males. Infant female mortality is also higher among rural non-migrant women than male mortality. Only one female child (1-5 years) death has been recorded for rural non-migrant women. In urban areas, the neonatal mortality among children of migrant and non-migrant has been 50.0 and 27.78, respectively.

Infant mortality is more prevalent among children of rural non-migrant women aged 20-29 years at delivery than other age groups. Infant mortality is higher among children of rural non-migrant women with birth intervals 2-3 years (36.53) and one year (18.26), respectively. Infant mortality varied inversely with total number of children born, it being 9.13 for rural non-migrant women who have borne 1-2 children, 22.83 for those with 3-4 children and 27.78 for those who have borne five or above number of children.

4. Conclusion

The risk of mortality is higher in the first year of life than later in childhood. This has been supported by the mortality rates. Mother's higher level of education has shown negative effect on child mortality rate. Levels and trends in infant and child mortality rates for tribal and non tribal region shows the cases of mortality decrease, as we go backward in time from the study period. Infant mortality among children of migrant women is lower than those of non-migrant women in both tribal and non tribal region. Infant mortality rate is higher among children of rural non-migrant women with low household level of standard of living as compared to women with high household standard of living index. In urban areas of non-tribal region child mortality is prevalent among women with low level of household standard of living index. Infant female mortality is higher than male mortality. Infant mortality varied inversely with total number of children born.

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