Original Research Article

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Socio-demographic determinants of under-five mortality in rural Agra

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ABSTRACT

Background: One of the most important indicator or index of socio-economic development of a country or region is infant mortality rate. The present study was undertaken to assess the quantum of childhood mortality and to find out the social factors associated with these deaths by verbal autopsies.

Methods: This one year cross-sectional study was undertaken in a purposively selected community Development Block Sainyan, district Agra among children aged between 0-5 years using multistage random sampling technique. Suitable statistical methods were applied.

Results: Out of total 8355 families surveyed, a total of 185 deaths were reported among children. Number of deaths was higher among those belonging to nuclear family and lower socioeconomic status. The neonatal mortality rate was estimated to be 33.55/1000 live births. The post neonatal mortality rate was found to be 40.78/1000 live births and infant mortality rate was 74.33/1000 live births. Mortality rate in 1-5 year age group children was 10.6/1000 same age group children, while 0-5 yrs. mortality was estimated to be 22.39/1000 children of same age group. Out of 185 children who died, 52.7% were unimmunized and another 35.67% were partially immunized.

Conclusions: Female education and socioeconomic well-being should be strengthened.

Keywords: Under 5 mortality, Determinants, Rural Agra

INTRODUCTION

One of the major goals of the National health policy is the reduction of the mortality rate in the children under five years of age. There has been a significant reduction in child mortality world-wide since the Millennium Development Goals (MDGs) were first launched. Child mortality indices are principal indicators of population health and well-being. Therefore, there are many indicators of child mortality which have been used to determine levels and trends of population health, including the neonatal and post neonatal, infant, child and under-5 mortality rates (U5MR).

Most of the available studies do not accurately reflect the socio medical factors related to these deaths. Identifying and assessing the factors affecting the child mortality could be the first step in planning to reduce the mortality and promoting the society health and life expectancy. Therefore the present study was undertaken to find out the socio-demographic determinants of deaths among children under 5 years of age.

METHODS

Research setting

This study was undertaken at Community Development Block, Sainyan, district Agra. This block was purposively selected as it is field practice area of Department of Social and preventive medicine, S.N. Medical College, Agra and covering a rural population representing different religions, casts and socio-economic groups.

Study population

The study was conducted on all the children (0-5 years) of 15 randomly selected villages comprising of 50150 populations of Primary Health Centers, Saiyan and Tehra, belonging to community Development Block of Sainyan.

Sampling technique

Multistage random sampling technique was adopted, sampling involved three stages of selection.

Stage 1: Agra is divided in number of primary Health Centers of 15 Blocks. Out of these Blocks, PHC Sainyan was purposively selected for reasons already mentioned. Another PHC Tehra of this block was selected by simple random sampling technique.

Stage II: A total of 15 villages (6 villages from PHC Sainyan and 9 villages from PHC Tehra) were selected randomly, which makes our population 50150.

Stage III: Village mapping of the selected villages was done for the under-five mortality

Determination of sample Size

According to park and park (1998), the estimated overall maternal mortality is 4/1000 live births and under five children mortality 99/1000 live births. This is taken as a baseline information. Based on this a correction in this estimate in 95 out of 100 attempts was made by applying the formula. On the basis of under five children mortality and maternal mortality which were approximately 0.3% and 0.012% of the population respectively which makes a total of 0.312% of the population. To determine sample size the following formula was used.

Formula=
$$2\frac{pq}{n}$$
=20% of P

Where P – total of mortality percentage of the population, q – 100 – p, n – sample size.

The sample size came out approximately 31950. Keeping in view the known response and personal error the working population has been enhanced to 35000 for selecting out the villages.

Sampling frame

Village in PHC Sainyan&Tehra of Community Development Block of Sainyan, district Agra.

Sampling unit

Villages of selected Primary health Centers.

Working unit

Children 0-5 years age residing in the 8355 households surveyed covering about 50150 population.

Period of study

One year

Data processing and analysis

The analysis was done by applying suitable statistical methods to draw valid inferences, finally to match the values with the reviews.

RESULTS

The study covered an estimated population 50,150, residing in 8355 families of the 15 villages.

Table 1: Distribution of under five deaths in study area according to the type of family.

Type of family	Total families No (%)	Deaths No (%)
Nuclear	4720 (56.5)	116 (62.7)
Joint	3635 (43.5)	69 (37.3)
Total	8355 100	185 100

The total number of families in study area was 8355, out of which 56.5% families were nuclear and the remaining 43.5% joint families. The number of deaths was disproportionately more in nuclear families (62.7%) in comparison to joint families (37.3%) (Table 1).

The under-five proportional mortality rate was more than double amongst Muslims than Hindus (Table 2).

The neonatal mortality was 33.55/1000 live births, the post neonatal mortality (1-11 months) was 40.78/1000 live births and the infant mortality was 74.33/1000 live births. Mortality rate in 1-5 years old children was 10.6/1000, whereas mortality rate in 0-5 years age group was 22.39/1000.

The under five deaths were relatively more among the females (51.9%). Comparison of age wise mortality pattern in male and female shows dissimilarity, the differences being not statistically significant (p>0.5) (Table 3).

Out of 185 under five deaths, the common occupation of head of the families were farmers (58.4%) and labourers (36.2%) (Table 4).

The under-five mortality was much less in socio-economic class I and II (proportional mortality rate 1.20 and 1.76/100 population respectively) than class III, IV and V (being 5.06, 4.7 and 4.39/1000 population respectively) (Table 5).

Table 2: Distribution of under-five mortality in relation to religion and caste.

Religion	Population	No. of deaths	% of total deaths	Proportion mortality rate per 1000 population
Hindu	48670	173	93.52	3.56
SC	11720	65	37.57	5.54
OBC	13630	58	33.53	4.25
Other	23320	50	28.90	2.14
Muslims	1480	12	6.45	8.10
Total	50150	185	100.00	

Table 3: Distribution of under-five mortality according to age and sex (N=50150).

Age group (Months)	No. of male deaths	% male deaths	No. of female deaths	% female deaths	Total no. of deaths	% deaths
Below 1	28	31.46	23	23.95	51	27.56
1 to 11	26	29.22	36	37.5	62	33.52
12 to 60	35	39.32	37	38.55	72	38.92
Total	89	100.00	96	100.00	185	100.00

 $x^2 = 1.8448$, p>0.05.

Table 4: Distribution of under five deaths according to occupation of their head of the families.

Occupation of head	Number of deaths	Percentage (%)
Professional	1	0.5
Service	3	1.6
Business	6	3.3
Farmers	106	58.4
Labourers	67	36.2
Total	185	100.0

Table 5: Distribution of under five deaths in relation to socio-economic status.

Class	Population (Approx)	Religion and cast	No. of death	Proportion mortality rate/1000 population
I	6360	Hindu	6	1.20
	1100	SC	2	1.8
	780	OBC	1	1.2
	4500	Others	3	0.6
	40	Muslim	0	0.0
	12450	Hindu	22	1.76
	2950	Sc	6	2.03
II	3000	OBC	10	3.3
	6500	Others	6	0.9
	340	Muslim	1	2.90
	14220	Hindu	72	5.06
	3600	Sc	27	7.5
III	4500	OBC	21	4.6
	6120	Others	24	3.9
	400	Muslim	3	7.5
	13800	Hindu	65	47
	3550	Sc	28	7.8
IV	5050	OBC	23	4.5
	5200	Others	14	2.7
	375	Muslim	4	10.0
	1820	Hindu	8	4.39
	220	Sc	2	9.0
V	700	OBC	3	4.2
	900	Others	3	3.3
	325	Muslim	4	12.3
Total	50150			

Table 6: Distribution of under five deaths according to educational status of parents.

Father	Mother					
	Illiterate	Primary education	Secondary education	Senior secondary education		
Illiterate	86	02	01	-		
Primary education	16	-	-	-		
Secondary education	21	02	01	-		
Senior secondary education	23	09	11	03		
Graduate	01	01	-	06		
Postgraduate	01	-	01	-		

Table 7: Distribution of under five deaths according to immunisation status.

Immunization status	Male de	Male deaths		Female deaths		% of total
	No.	%	No.	%	Total	deaths
Unimmunized	40	44.94	53	55.20	93	50.27
Partially immunized	33	37.08	33	34.38	66	35.67
Fully immunized	16	17.98	10	10.42	26	14.06
Total	89	100.00	96	100.00	185	100.00

Amongst 185 deaths, the parents of 86 (46.5%) children, both mother and father were illiterate (Table 6).

Almost half of the (50.27%) children who died were unimmunized and another about $1/3^{rd}$ (35.67%) were partially immunized (Table 7).

DISCUSSION

The present study shows that number of deaths were disproportionately more in nuclear families (62.7%) in comparison to joint families (37.3%). This may be due to the fact that mother do not have to bother about household work in a joint family thus can devote more time to child care, joint families have more hands for child care these families are also a natural insurance of finance and food during crisis.

The under-five proportional mortality rate was noticed to be more than double amongst Muslims (8.1/1000 population) than Hindus (3.35/1000 population) in this study. Amongst Hindus under five proportional morality was higher in scheduled cast (5.54/1000 population) and backward classes (4.25/1000 population) than other caste (2.14/1000 population). The differences may be attributed to social-factors like poor literacy, poor income, poor environment conditions, customs and customs and culture amongst Muslims, schedule caste and backward classes.

Thora et al also reported neonatal, post-neonatal and infant mortality significantly more in Muslims (111.6/1000, 74.8/1000, 192.5/1000 live births respectively) as compared to Hindus (58.3/1000, 40.9/1000, live births respectively).³

In the present study, it was found that out of 185 under five deaths, relatively more females (51.9%) died than males (48.1%). The mortality of female child was also found more compared to male child in other studies.⁴⁻⁶

This may be attributed to neglect of the female children in our society. Further research is required to establish these gender differentials in mortality.

The estimated neonatal mortality was found to be 33.55/1000 live births. NHFS-3 data of India shows neonatal mortality of 67.4% which is more as compared to our study. The relatively lower mortality in the present study may be in consonance with the declining pattern of neonatal mortality during past few decades. It may also be attributed to regional variations like literacy, income, socio-economic status of the population, physical facilities, medical care and MCH services available in the area.

The infant mortality rate in the present study was 74.33/1000 live births. It is higher than that (57%) reported by NFHS-3 data. In the present study, the mortality rate in 1-5 years age group was 10.6/1000 live births. The neonatal, infant and under five mortality rates were reported to be 48.57, 82.96 and 125.60 per thousand live births in rural Aligarh respectively.

The difference may be due to difference in methodology adopted and of course due to regional variation.

It was observed that most of heads of the family with under five deaths were farmers (58.4%), and 36.2% were labourers. The likelihood of experiencing under-five morbidity and mortality significantly increased with paid/civil service and farming/petty trading jobs (OR: 2.35 and OR: 2.08, respectively) in a Nigerian study.

It was observed in the present study that most of the deaths occurred in lower socio-economic group of the population. The proportion of respondents in the rich tertile that experienced under-five death was slightly less than that of the middle class and the relatively poor tertiles in Ghana study. 10 Poor households increased the

risk of postneonatal, infant, child and under-5 mortality among Nigerian children.¹¹

In the present study about half (46.5%) of parents were illiterate. Green also observed a strong association of mortality of the child with the literacy status of the mother. 12 Mother's level of education, was found to have significant robust association with childhood mortality in the rural northern Ghana study. 10 Father's was found to have a significant influence on under-five mortality in Bangladesh.¹³ Out of total 185 deaths of under five children, 52.7% children died were unimmunized, while another 35.67% were partially immunized. Only 14.06% children were full immunized. This study shows that child immunization had definite protective role in preventing childhood mortality. It has been found in the analysis by Nand et al that the rate of infant mortality is lower in case of vaccinated babies or infants in comparison to that of nonvaccinated babies. 14 Addressing low immunisation coverage requires improvements in workforce quality, quantity and distribution, a more efficient health greater system, community communication about the benefits of vaccination, and improved vaccination surveillance especially among poor rural-based communities.¹⁵

CONCLUSION

Majority of the deaths in children under the age of five years are preventable. Verbal autopsy tool can be conveniently used by the peripheral health worker who acts as the first contact at or around the time of bereavement. Integrated efforts are needed to generate the community awareness about the magnitude of problems of childhood and maternal mortality.

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Institutional Ethics Committee

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