Research Article

A CASE STUDY OF MORTALITY - NATALITY INCIDENCE AMONG DARJEELING HILL POPULATION FOR THE PERIOD COVERING 2012 TO 2016, BASED ON THE RECORDS OF THE BIRTH AND DEATH REGISTRATION OFFICE, PUBLIC HEALTH DEPARTMENT, DARJEELING MUNICIPALITY, DARJEELING

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ARTICLE INFO	ABSTRACT

Introduction: The aim of this study was to determine the incidence of mortality and natality among the Hill population of Darjeeling for the period covering 2012-2016. The mortality rate is constituted by various factors such as age, gender, place of birth, occupation, cause of death, number of death per year in Darjeeling Municipality area. The study of birth rate is constituted by factors such as total birth, number of males and females born per year, age of the mother, whether born in government hospital, house or other places, medical attention available, body weight of the new born infant and nature of birth. *Materials and Methods*: The data pertaining to the death and birth occurrence in the Darjeeling Municipality area was collected from the Death and Birth Registration Office, Darjeeling Municipality, Darjeeling (Under Public Health Department, Government of West Bengal,) with the kind permission of, The Chairman, Darjeeling Municipality, Darjeeling. The mortality and natality data was collected covering the period from 2012 to 2016. *Results:* The life expectancy of the population under study has increased over the period, with highest mortality rate (42.85%) seen in age group (61-80 years) and there is also considerable increase in the life expectancy of age group (81-100 years), Table 1. The causes of death was complied and it was found that there were seventeen major causes of deaths in the survey area, and accordingly, five most prominent disease causing death was found to be Heart disease, Liver disease, Cancer, High Blood related diseases and Diabetes mellitus.(Table 3). The comparative account of the most prevalent causes of death in Darjeeling area and world showed striking similarities, where the heart disease, cancer and strokes were the major causes of mortality (Table 4). In the current study of the birth rate or natality, the average birth rate of males was found to be 57.58% and that of females 42.41%. It was found that the number of Caesarean Births has steady increased as compared to normal birth. This may be due to increase in the age of the mother during delivery of a child (Table 7), as it is found, females giving birth at the age between 25-30 years is 30.53%, followed by 31-35 years (29.34%) (Table 7). *Conclusion*: It is to be noted that the study of a human resources is important form the point of view of human welfare because human beings are not only instruments of production but also ends in themselves. A study of such a pilot project on defined geographical population is necessary as it is an important determinant of overall development of mankind in all aspect such as social, economical, mental and above all, the sustainable conservation and propagation of human race.

INTRODUCTION

A preliminary study of the incidence of mortality and natality among the Hill population of Darjeeling from the period spanning 2012 to 2016, have been considered. It is an important study in the field of population genetics, which gives us an insight into the health status and socio-economical parameters of the population under study. The current study projects the incidences of mortality and natality prevalent in the Darjeeling Municipal area, District Darjeeling, West Bengal,

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India. It is a pilot study intended to create a humble beginning towards understanding a local population, which may be helpful in providing an insight into the population's health status, health facility, nutrition, public health care, etc.

Mortality is the subject to being mortal or susceptible to death and mortality rate or death rate is a measure of the number of deaths (in general, or due to a specific cause) in a particular population. The mortality database is constituted by various factors such as age, gender, place of birth, occupation, cause of death, number of death per year, which gives us an insight into the, health care facilities, sanitation, life style, professional demands and pressure. Currently, several critical mortality indicators (e.g. infant, child and maternal mortality rates) are estimated using data from demographic surveys. (Turkey 1995)(Akin A,et al.,1997). Data on mortality by age, sex and cause are primary inputs for assessing population health status, and ultimately becomes the cornerstone for formulating health policy, in combination with other epidemiological and socio-economic information. While medically certified cause of death data from complete civil registration systems is the 'gold standard' for such statistics.(Mathers *et al*.,2005). To the best of our knowledge, this is the first ever attempt to estimate and report the order and magnitude of leading causes of death in Darjeeling Municipality area.

Natality is the ratio of the number of births to the size of the population, it is also known as "birth rate". The birth rate database is constituted by various factors such as total birth, number of males and females born per year, age of mother, whether born in Govt. hospital, house or other places, medical attention available, body weight of the new born infant and nature of birth. The significance of considering various natality factors gives an indication of the fertility rate and effect of age of mother, socio-economical condition, nutritional, food habit, social norms and customs, geographical and climatic influence on fertility and child birth. Universally, there is huge literature that focused on the determinants of infant and child mortality. Most of the studies have shown significant association between socioeconomic, demographic factors and infant-child mortality (for example, Caldwell, 1979; Debpuur, 2005, Hosseinpoor, 2005, Madise and Diamond 1995), demographic (for example, Hobcraft, 1985, Manda, 1998), biological (for example, Forste, 1994) or environmental factors (for example, Mutunga, 2004) through making use of survey or censuses data.Infant mortality rate (IMR) is an important indicator of the socioeconomic and health status of any community under study. This is because more than any other age-group of a population, infant's survival depends on the socioeconomic conditions of their environment (Madise et al 2003). It is one of the components of United Nations human development index (UN, 2007). Hence its description is very vital for evaluation and planning of the public health strategies (Park, 2005).

METHODOLGY

In this study, we describe the characteristics of various sources of mortality data, such as age, gender, place of birth, occupation, cause of death, number of death per year in Darjeeling, and study cause-specific mortality estimates for the period covering 2012-2016. It is important to note that we emphasize the value of using 'local' data in such estimation exercises. The data collected is an official figure and death registration takes place at the time of funeral/burial of the deceased person, which is a mandatory protocol in Municipality area. The estimate of age, gender, place of birth, occupation, cause of death, number of death per year, specific-mortality rates was compiled and analyzed.

In the study of the birth rates in the Darjeeling Municipality region, parameters such as total birth, number of males and females born per year, age of mother, whether born in Govt. hospital, house or other places, medical attention available, body weight of the new born infant and nature of birth was complied and analyzed. It is important here to mention that the data on the Death and Birth solely relies on the records on The Death and Birth Registration Office, Darjeeling Municipality, Darjeeling (Under Public Health Department, Government of West Bengal,), Darjeeling. To the best of our knowledge, this is the first ever attempt to estimate and report the cause and magnitude of leading causes of death compilation of birth rates in Darjeeling Municipality area.

Collection of Data

The data pertaining to the death and birth occurrence in the Darjeeling Municipality area was collected from the Death and Birth Registration Office, Darjeeling Municipality, Darjeeling (Under Public Health Department, Government of West Bengal,) with the kind permission of, The Chairman, Darjeeling Municipality, Darjeeling. The mortality and natality data was collected covering the period from 2012 to 2016. During the process of data collection on mortality, all relevant information like cause, place, gender, age, occupation, etc was also recorded and likewise data on birth rate, information like age of the mother, weight of the new born child, place of birth, nature of birth was collection for analysis and study.

RESULT

Mortality

The life expectancy of the population under study has increased over the period, with highest mortality rate (42.85%) is seen in age group (61-80 years) and there is also considerable increase in the life expectancy of age group (81-100 years), Table 1.In the year 2015 and 2016 there are also people who had crossed the 100 year mark. It is evident that the life expectancy of people has been steadily increasing in the world and the same can be seen in this study. This increase in life expectancy may be due to improved medical facility and better quality of life.

Table 1 Mortality (%) at different age groups found in Darjeeling Municipality area

Year	Mortality at different Age Groups					
	0-20 (yrs)	21-40 (yrs)	41-60 yrs)	61-80 (yrs)	81-100 (yrs)	100 & + (yrs)
2012	0	19.51%	53.65%	21.95%	4.87 %	0
2013	0	15.21%	50%	28.98%	5.79 %	0
2014	1.01%	10.65%	30.96%	45.17%	12.18%	0
2015	0	10.68%	36.75%	38.03%	14.10%	0.42%
2016	0	7.59%	31.30%	42.85%	17.93%	0.30%

In the study made in municipality area in Darjeeling hills, it has been seen that mortality is higher in males as compared to females.(Table 2). When the places of death were compared, it

was evident that most of the deaths occurred in house followed by deaths in Government Hospitals and other places.(Table 2).

Table 2 Mortality (%) in Males and Females; place of death occurrences, in Darjeeling Municipality area

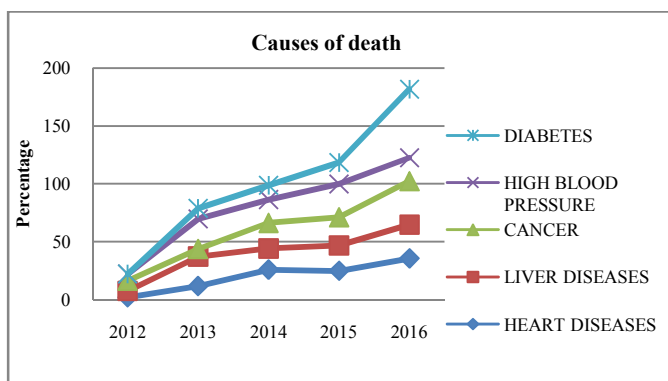| YEAR	Mortality in Males and Females		Places of Death		
	Percentage of Death in Males	Percentage of Death in Females	Percentage of Death in Hospital (%)	Percentage of Death in House (%)	Percentage of Death in Unknown (%)
2012	70.73	29.26	10.25	61.53	28.21
2013	67.39	32.60	21.01	68.12	10.86
2014	60.91	39.08	19.28	62.94	17.76
2015	61.70	38.29	21.27	43.40	35.31
2016	62.00	37.99	26.44	50.15	23.40

The causes of death was complied and it was found that there were seventeen major causes of deaths in the survey area, and accordingly, five most prominent disease causing death was found to be Heart disease, Liver disease, Cancer, High Blood related diseases and Diabetes mellitus.(Table 3). It is important to note that the highest causes of mortality in Darjeeling Municipality area is Natural death and Old Age, it is encouraging that population under study have lived to the ripe age, this may owe to multiple reasons like food, healthy life style, congenial environment, improved medical facility etc.

As we consider the reasons of mortality, it was found that life style related diseases like High Blood pressure related diseases and diabetes mellitus (related complication), has drastically increased over the years. Diseases like cancer, heart disease and liver related diseases has been the other major causes of mortality in Darjeeling municipality area. It is important to note that mortality due infectious diseases like Tuberculosis, water borne diseases, etc has considerably decreased, it may be due rigorous research in the field of medicine and robust policy measures by the Government to eradicate such ailments. (Table 3). The comparative account of the most prevalent causes of death in Darjeeling area and world shows striking similarities, where the heart disease, cancer and strokes were the causes of mortality.(Table 5).

Natality

In the current study of the birth rate or natality, the average birth rate of males was found to be 57.58% and that of females 42.41%.It is important to note that from 2012-2016 the birth rate of male child was found to be higher. When place of birth was taken into consideration it was seen that there have been a considerable decrease in the birth taking place at homes (Table 6), and there is steady rise in the birth taking place in others places (private hospitals/nursing homes).

Table 3 List of the most common causes of Deaths in Darjeeling Municipality area as per the data collected between 2012-2016

Causes of Death	Depression	Tuber Culosis	Paralysis	Sucide	Accident	Stomach problem	Brain diseases	Lung disease	Kidney disease
Percentage (%)	0.09	0.39	0.48	0.48	0.97	1.17	1.56	1.56	2.15
Causes of death	Diabetes	Blood pressure	Old age	Cancer	Liver disease	Unknown	Heart disease	Natural death	Total
Percentage (%)	3.12	3.41	3.70	4.39	5.36	18.14	19.21	33.75	100

Table 4 Comparative account of the most prevalent causes of death as per Municipality records in Darjeeling

Year	Causes of Death (%)				
	Heart diseases	Liver diseases	Cancer	High blood pressure	Diabetes
2012	2.03	5.45	8.88	5.71	-
2013	11.67	25.45	6.66	25.71	9.37
2014	25.88	18.18	22.22	20	12.5
2015	24.87	21.81	24.44	28.57	18.75
2016	35.53	29.05	37.77	20	59.37

Fig 1 Comparative account of the most prevalent causes of death as per Municipality records in Darjeeling.

Table 5 Comparison between top five causes of death prevalent in the World and in Darjeeling Municipalilty area

Distribution	World Wide (Global Health Estimates, 2016)	Darjeeling Municipality Area
1.	Ischaemic Heart Disease	Heart Disease
2.	Stroke	Liver Disease
3.	COPD	Cancer
4.	Lung, Tracheal and Bronchial cancers	Blood pressure (Related Disease)
5.	Diabetes Mellitus	Diabetes Mellitus

This may be due to rapid development of sophisticated and high end medical facility in private hospitals/nursing homes, though such facilities may be costlier but people prefer better services.

Table 6 Comparative study of the Gender; Place of Birth; Nature of Birth of New Born in Darjeeling Municipality area

Year	Gender		Place of birth			Nature of birth	
	Male (%)	Female (%)	Hospital Govt.	Home	Others	Normal	Caesarean
2012	58.90%	41.04%	59.82%	16.07%	24.10%	85.71%	14.28
2013	52.50%	45.60%	56.25%	16.25%	27.50%	71.42%	28.57
2014	53.20%	46.79%	50.64%	6.41%	42.94%	47.61%	52.38
2015	56.40%	43.50%	16.66%	0	83.33%	54.54%	45.45
2016	64.80%	35.10%	45.50%	0	54.45%	-	-
Average	57.58%	42.41%					

Table 7 Body weight of new born and average age of the mother during child birth in Darjeeling Municipality area

	Body Weight			Age of the mother during child birth						
	Percentage of 2.0 – 2.9 Kg (%)	Percentage of 3.0 – 3.9 Kg (%)	Percentage of 4.0 – 4.9 Kg (%)	Below 15 yrs	15-19 yrs	20-24 Yrs	25-30 Yrs	31-35 Yrs	36-40 Yrs	40 yrs & above
2012	38.23%	55.88%	5.88%							
2013	39.21%	58.82%	1.96%							
2014	48.38%	50%	1.61%							
2015	36.36%	63.63%	0							
Average	42.40%	55.06%	2.53%	3.59%	4.79%	14.30%	30.53%	29.34%	5.38%	1.79%

According to the study, it was found that the number of Caesarean Births has steady increased as compared to normal birth. This may be due to increase in the age of the mother during delivery of a child (Table 7), as it is found, females giving birth at the age between 25-30 years is 30.53%, followed by 31-35 years (29.34%) (Table 7). It is also important to note that there are a group of minor females below the age of 15years who have reportedly given birth to a child. Though child marriage is a punishable offence, a small percentage of females (3.59%), have given birth to new born at an age below 15 years. The average body weight of 3.0 - 3.9 Kg per new born child was found to be most prevalent (55.06%), followed by new born body weight of 2.0 to 2.9 kg (42.40%).The body weight of a new born child is an indicator of general health of the neonate.

DISCUSSION

This study is not intended to create a thorough and conclusive database but to have a humble beginning of a very significant work towards understanding a local population in a very small way. The mortality database of the population under study gives us an insight into the, health care facilities, sanitation, life style, professional demands and pressure. The significance of considering natality factors gives an indication of the fertility rate and effect of age of mother, socio-economical condition, nutritional, food habit, social norms and customs, geographical and climatic influence on fertility and child birth. A study like this which is based on defined geographical population is necessary as it is an important determinant of overall development of mankind in all aspect such as social, economical, mental and above all, the sustainable conservation and propagation of human race.

Acknowledgement

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