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Research Article

Cause of death by verbal autopsy among women of reproductive age in Rajasthan, India

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ABSTRACT

Background: Reliable data on mortality and morbidity among women of reproductive age are scarce in India. The present study is the Rajasthan component of a large multi-centric study on cause of death by verbal autopsy conducted in five states of India. The data pertaining to deaths among women of reproductive age are presented.
Methods: House-to-house surveys of a representative population from rural and urban areas in six districts of Rajasthan were undertaken by Probability of Proportion to Size (PPS) sampling. Information on death was obtained from the relatives of the deceased and cause of death was assigned using the standardized algorithm prepared for the purpose. International Classification of Diseases - ICD-10 was used to code the assigned cause of death.
Results: A total of 231 deaths of women of reproductive age were investigated, of which 36 (16%) were maternal deaths while 195 (84%) were non-maternal deaths. Nine out of ten maternal deaths were in rural area.
Conclusions: Certain infectious and parasitic diseases; pregnancy, childbirth and the puerpurium; injury, poisoning and other consequences of external causes; and symptoms, signs and abnormal clinical and laboratory findings not elsewhere classified were found to be the major killers among the women of reproductive age. A comprehensive approach that includes in addition to reproductive health interventions, interventions addressing underlying illiteracy among women and social reforms needs to be undertaken.

Keywords: Maternal deaths, Non-maternal deaths, Women of reproductive age, Verbal autopsy

INTRODUCTION

Pregnancy related deaths remains the leading killer of women of reproductive age in developing countries in spite of World Health Organization (WHO) global campaigning of 20 years to reduce maternal mortality.[1] The burden of maternal mortality is very high in Sub-Saharan Africa and South Asia.[2] Every year, approximately 287000 women die due to complications in pregnancy and childbirth, 99% of them are in developing countries.[3]

According to the International Classification of Diseases, maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.[4]

Maternal mortality level is a sensitive index of the prevailing health conditions and general socio-economic development of a community.

As per latest estimates, Maternal Mortality Rate (MMR) in India for 2007-2009 is 212 per 100000 live births. The highest MMR is 390 in Assam and lowest is 81 in Kerala.[5]

Women of reproductive age form a vulnerable section in the society as they are confronted with the dual burden of pregnancy related complications and communicable and non-communicable diseases prevalent in the population. Women's unequal access to resources including health care is well known in which severe gender disparities are a reality. Women in rural India experience more episodes of illness than males and are less likely to access health care facilities before the illness is well advanced.[6,7] This situation is directly linked to poverty. A vast majority of poor women caught in this vicious circle are young mothers in their reproductive age who are deprived of their basic right to be healthy.[8]

No specific estimates are available to indicate health related disease burden in women of reproductive age in India. Reliable data on mortality and morbidity during pregnancy are scarce, and for female morbidity in general, the information is almost non-existent in rural areas. [9] Paucity of adequate data makes the understanding more complex, for knowledge of the causes of death that may reveal the sickness load. In India, the data on cause of death are available from sources such as Medical Certification of Cause of Death in urban areas and Survey of Cause of Death in rural area. Although these sources exist, a good percentage of cases go unregistered and only 20 percent of deaths are medically certified. [10]

The Indian Council of Medical Research (ICMR) conducted a study on the cause of death by verbal autopsy during 2003-2005 in five states, namely, Assam, Bihar, Maharashtra, Rajasthan and Tamil Nadu to assess the probable causes of deaths in male and female population.[11] A total of 3140 verbal autopsies were conducted in Rajasthan state during the study period. Findings on the cause of death by verbal autopsy among women of reproductive age are enumerated in this paper.

METHODS

The study covered urban and rural population on sample basis and one district from each SRS region was selected. Thirty Primary Sampling Units (PSUs: villages in rural and census enumeration block in urban) were selected from each selected districts using stratified probability proportional to size (PPS) sampling methodology. A total of 180 clusters were selected - 131 from rural area and 49 from urban area. The districts selected were Jaipur, Jodhpur, Udaipur, Alwar, Sirhoi and Kota. Villages or wards were selected based on rural and urban population in the district. ICMR had conducted a pilot study to develop and test the data collection instruments for still birth, neonatal deaths, post neonatal deaths, adult deaths and maternal deaths and the diagnostic algorithms to arrive at the cause of death. These instruments were bilingual (both English and Hindi) and included both narrative histories and structured questions related to death.

A coordinating team from ICMR conducted a training programme for the field investigators for two days on three occasions - one in the beginning and two midterms. Refresher trainings were also held focusing on the discussion of difficulties, problem in the use of questionnaires, diagnosis and operational issues etc. Training programme included detailed discussion of the questions/items in the questionnaires; conduction of mock interviews and real interviews in the field under supervision followed by discussions.

Deaths occurred during the period from 1st January 2003 to 30th June 2003 were covered in the first round of the study and deaths occurred during the period from 1st July 2003 to 31st December 2003 were covered in the second round of the study to reduce recall bias. Field investigators collected data using the standardized instruments by visiting the households. The survey was conducted twice a year at six-monthly intervals. The recall period was fixed at 6 months (i.e., deaths occurring in the last 6 months). All households of the selected PSUs were covered.

The verbal autopsy used for the data collection in the present survey was exhaustive. It contained verbatim questions on symptoms, signs and modules. Based on the responses about the signs and symptoms preceding death, the causes of death were determined using the diagnostic criteria in the guidelines developed. Wherever the medical certification and medical records were available, they were used in arriving at the cause of death. International Classification of Diseases (ICD)-10 codes up to a minimum of three digits were used.[4] A trained doctor independently assigned the cause of death by reading the collected data. Written informed consent was obtained from the respondent during household survey. Confidentiality was maintained regarding the cause of death arrived at during verbal autopsy.

RESULTS

In this study, verbal autopsies were done for 1227 female deaths, 989 in rural area and 238 in urban area. A total of 231 deaths were reported in women of reproductive age. Of these, thirty six (16%) were maternal deaths while 195 (84%) were non-maternal deaths. Out of 36 maternal deaths, 32 deaths (89%) were in rural area while 4 deaths (11%) were in urban area. Hence, nine out of ten maternal deaths were in rural area.

Among those women who died due to maternal causes, 92 percent were Hindus and 6 percent were Muslims. Seventy eight percent were illiterate and 16.6 percent had primary education. Majority (80%) were engaged in household work. A large number of deaths (47.2%) occurred at home, while 27.8 percent deaths occurred in government hospitals, 8.3 percent in private hospitals and 16.7 percent at other places.

Rural-urban distribution of maternal deaths by cause of death has been given in Table 1. The causes of maternal deaths have been classified according to major groups in ICD-10. The specific causes of death have been arrived at in most of the cases studied by translating subgroups of ICD code. Quantitative estimates of causes were made from the translated sub categories of ICD code.

Table 1: Cause of death of maternal deaths (n=36).

Cause of death	Rural	Urban	Total
Certain infectious and parasitic diseases	1	1	2
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	4	0	4
Diseases of the circulatory system	1	0	1
Pregnancy, childbirth and the puerperium	24	3	27
Symptoms, signs and abnormal clinical and laboratory findings not elsewhere classified	1	0	1
External causes of morbidity and mortality	1	0	1
Total	32	4	36

Distribution of causes of maternal deaths shows that, conditions pertaining to pregnancy, childbirth and puerperium (viz., pregnancy with abortive outcome; other direct obstetric deaths; other obstetric conditions, not elsewhere classified) were the leading causes of maternal mortality (75%).

Other important cause of maternal death were disease of blood and blood forming organs (11.1%); deaths due to certain infectious and parasitic diseases (5.6%); deaths due to symptoms, signs and abnormal clinical and laboratory findings, not classified elsewhere (2.8%); disease of circulatory system (2.8%); and external causes of morbidity and mortality (2.8%).

Out of 231 deaths of women of reproductive age, 81 percent deaths were in rural area and 19 percent deaths were in urban area. Ninety two percent were Hindus and 6 percent were Muslim.

Seventy five percent were illiterate and 12.5 percent had primary education. Majority (77%) were engaged in household work.

A large number of deaths (70.1%) occurred at home, while 21.7 percent deaths occurred in health facility and 8.2 percent at other places.

Table 2 shows the cause of death among women of reproductive age according to ICD-10 classification.

The leading cause of death among these women was certain infectious and parasitic diseases (22.1%). The other causes were pregnancy, childbirth and the puerperium (18.2%); injury and poisoning and certain other consequences of external causes (16%); and symptoms, signs and abnormal clinical and laboratory findings not elsewhere classified (12.1%) etc.

Table 2: Cause of death in women of reproductive age (n=231).

Cause of death	Rural	Urban	Total
Certain infectious and parasitic diseases	39	12	51
Neoplasms	9	5	14
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	8	1	9
Endocrine, nutritional and metabolic diseases	2	0	2
Mental and behavioural disorders	0	1	1
Diseases of the nervous system	3	0	3
Diseases of the circulatory system	15	5	20
Diseases of the respiratory system	6	0	6
Diseases of the digestive system	3	1	4
Diseases of the genitourinary system	6	2	8
Pregnancy, childbirth and the puerperium	38	4	42
Symptoms, signs and abnormal clinical and laboratory findings not elsewhere classified	24	4	28
Injury, poisoning and certain other consequences of external causes	30	7	37
External causes of morbidity and mortality	4	2	6
Total	187	44	231

Maximum number of deaths among the illiterate women of reproductive age in rural area was due to pregnancy, childbirth and the puerperium; certain infectious and parasitic diseases; and injury, poisoning and certain other consequences of external causes (Table 3).

Maximum number of deaths among the illiterate women of reproductive age in urban area was due to certain infectious and parasitic diseases; injury, poisoning and certain other consequences of external causes; and symptoms, signs and abnormal clinical and laboratory findings not elsewhere classified (Table 4).

Table 3: Cause of death in women of reproductive age, rural by literacy level (n=187).

Cause of death	Literacy level					
	Illiterate	Primary	Middle	Hr. Sec	College	Total
Certain infectious and parasitic diseases	30	6	3	0	0	39
Neoplasms	8	1	0	0	0	9
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	7	0	1	0	0	8
Endocrine, nutritional and metabolic diseases	2	0	0	0	0	2
Diseases of the nervous system	3	0	0	0	0	3
Diseases of the circulatory system	14	0	1	0	0	15
Diseases of the respiratory system	6	0	0	0	0	6
Diseases of the digestive system	3	0	0	0	0	3
Diseases of the genitourinary system	4	1	1	0	0	6
Pregnancy, childbirth and the puerperium	32	5	1	0	0	38
Symptoms, signs and abnormal clinical and laboratory findings not elsewhere classified	18	5	0	1	0	24
Injury, poisoning and certain other consequences of external causes	23	4	2	1	0	30
External causes of morbidity and mortality	3	1	0	0	0	4
Total	153	23	9	2	0	187

Table 4: Cause of death in women of reproductive age, urban by literacy level (n=44).

Cause of death	Literacy level					
	Illiterate	Primary	Middle	Hr. Sec	College	Total
Certain infectious and parasitic diseases	7	0	1	3	1	12
Neoplasms	2	2	0	1	0	5
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	0	0	0	0	1	1
Mental and behavioural disorders	0	0	0	1	0	1
Diseases of the circulatory system	0	1	0	2	2	5
Diseases of the digestive system	0	0	0	1	0	1
Diseases of the genitourinary system	1	0	1	0	0	2
Pregnancy, childbirth and the puerperium	2	2	0	0	0	4
Symptoms, signs and abnormal clinical and laboratory findings not elsewhere classified	3	0	0	1	0	4
Injury, poisoning and certain other consequences of external causes	4	1	1	1	0	7
External causes of morbidity and mortality	1	0	0	1	0	2
Total	20	6	3	11	4	44

DISCUSSION

Among the deaths of women of reproductive age, a large proportion of (70.1%) deaths occurred at home. More deaths at other places, such as on the way to hospital/clinic in rural areas indicate the problems of accessibility of proper medical facilities in the vicinity of the rural areas.

The leading cause of death among the women of reproductive age was certain infectious and parasitic diseases (27.3%) which are well supported by a similar study conducted in Maharashtra[12] and it is more than that reported in the Medical Certification of Cause of Death (MCCD) report- 2003 for Rajasthan state (16.6%).[13]

Maximum number of deaths due to pregnancy, childbirth and the puerperium; certain infectious and parasitic diseases; and injury, poisoning and certain other consequences of external causes occurred among the illiterates in rural area which lays emphasis on

importance of education as it can bring a behaviour change in seeking early treatment and preventing deaths.

In the present study, nine out of ten maternal deaths occurred in rural areas which indicate that more intervention measures for reducing maternal mortality should be done in rural areas. Besides medical causes, many other factors at personal and community level may contribute to maternal deaths.

In conclusion, certain infectious and parasitic diseases; pregnancy, childbirth and the puerpurium; injury, poisoning and other consequences of external causes; and symptoms, signs and abnormal clinical and laboratory findings not elsewhere classified were found to be the major killers among women of reproductive age in rural areas. In urban areas, certain infectious and parasitic diseases; and injury, poisoning and other consequences of external causes were found to be the major killers. Hence intervention measures must be done in both the areas. A comprehensive approach that includes in addition to reproductive health interventions, interventions addressing underlying illiteracy among women and social reforms needs to be undertaken.

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