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A rapid appraisal of causes of child death in community settings in district Bhopal

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ABSTRACT

Background: Child mortality is considered as a core indicator for child health and well-being. SRS (December 2016) has shown that maximum IMR is in Madhya Pradesh which is 50 per 1000 live births and U5MR is 77 per 1000 live birth (2011). The study was carried out with the objectives to list out and categorize medical as well as socioeconomic factors associated with these deaths and to evaluate the current status of child deaths in terms of the provision of health services and gaps in planning and execution of these services.

Methods: This cross sectional study was conducted on 42 deaths which occurred in Home settings in Bhopal District. A team visited the identified household and conducted in depth interview regarding the entire event related to antenatal care, place of delivery, intranatal and postnatal care, accessibility of the health services and quality of care rendered that contributed to poor child health that resulted in the death of the child.

Results: Out of 42 child deaths covered, 23 took place in the neonatal period, of which 21 were home deaths. 47.61% were attended by trained birth attendant. Breastfeeding was started immediately in 94.11% neonates whereas 5.88% were breastfed second day or later. 19 deaths took place in the post neonatal period, of which 17 were home deaths. (68.75%) were breast fed immediately within one hour of birth.

Conclusions: A majority of home based child deaths are occurring in families with high illiteracy rates and those belonging to BPL families.

Keywords: Child death review, Community based, Berasia, Phanda, Bhopal

INTRODUCTION

Child mortality is considered as a core indicator for child health and well-being. India prevented the deaths of about 1 million under five children in 2005-15, driven by significant reductions in the mortality rates of pneumonia, diarrhoea, tetanus and measles. The study stressed that India would need to maintain the rapid decline in mortality of children in the under 5 group annually to achieve UN global goals of reducing child mortality to at least 25 per 1,000 live births by 2030 as a part of SDG. More than two-thirds of infants die in the very first month. Ninety per cent of these deaths are due to easily

preventable causes like pneumonia and diarrhoea.³ Per 1,000 live births, the mortality rates of under 5 mortality rate fell from 45.2 to 19.6. Pneumonia and diarrhea mortality rates for the under 5 group declined substantially in 2010-15, at an average of 8-10 per cent annual decline nationally. Mortality rates from vaccine-preventable diseases such as tetanus and measles fell by about 90 per cent. Children are at greater risk of dying before age 5 if they are born in rural areas, poor households, or to a mother denied basic education.²

SRS (December 2016) has shown that maximum IMR is in Madhya Pradesh which is 50 per 1000 live births and

U5MR is 77 per 1000 live birth (2011). 4.5 Till date the studies done on child death review mainly focuses on facility based deaths in under5 group of children and no study has been done to review the community based child deaths in Bhopal. Our study is therefore an attempt to cover all the listed home based child deaths and conduct community-based verbal autopsies in all the Blocks of Bhopal district which will further help in finding out the lacunae in overall service delivery system. This study was therefore planned in collaboration with National Health Mission, MP.

Objectives

- To identify and locate the reported home child deaths occurred from April to September 2017 in Bhopal district.
- To list out and categorize medical as well as socioeconomic factors associated with these deaths.
- To evaluate the current status of child deaths in terms of the provision of health services and gaps in planning and execution of these services.
- To identify the practices related gaps in the performance of service providers.
- To suggest recommendations to avert home deaths.

METHODS

This was a cross sectional study conducted on all the blocks of district Bhopal. The study was conducted for a period of 2 months (1st January 2018- 28th February 2018). The study was conducted on under 5 children home deaths which occurred in Berasia and Phanda block of Bhopal district. Inclusion criteria were all the under 5 children deaths which occurred at home from a period of 1st January 2017 to 31st December in Berasia and Phanda block of Bhopal District. Exclusion criteria were deaths which occurred in above specified period, but were registered in Anganwadis other than those of Berasia and Phanda block. The list of reported child deaths which occurred from April to September 2017 in home settings in district Bhopal was provided from NHM which includes 42 deaths.

A community block mobilizer along with ASHA traced, identified and located each and every death for a period of 15 days. Verbal autopsy was conducted for 42 home deaths for a period of 6 weeks. In depth interview regarding the entire event was carried out related to antenatal care, mode and place of delivery, intranatal and postnatal care, availability and accessibility of the health services and quality of care rendered that contributed to poor child health that resulted in the death of the child

In addition, the investigators also assessed the child health facilities available at various health systems. The data obtained was compiled and tabulated using MS excel and analyzed using Epi-info 7 software.

RESULTS

Observations of neonatal deaths

Out of 42 child deaths, 23 took place in the neonatal period, out of which 19 were home child deaths; 2 died on the way to the facility and 2 were hospital deaths and hence were excluded.

Table 1 shows that most of the neonatal deaths i.e. 14 (66.67%) comprises of male deaths and nearly one-third i.e. 07 (33.33%) are female deaths. Late neonatal death (from day 8th to 28th day) were 11 (52.38%) followed by 10 (47.6%) deaths in the early neonatal period. Majority of the deceased neonates i.e. 18 (85.71%) belonged to Hindu religion whereas only 03 (14.29%) belonged to Muslim religion. Majority of the neonates who died i.e. 13 (61.90%) belonged to OBC caste whereas 06 (28.57%) belonged to SC/ST followed by 02 (09.52%) of the total 21 deceased neonates belonged to UR category.

Table 1: Distribution of neonatal deaths according to socio-demographic status (n=21).

	Frequency	Percentage
	N	(%)
Gender		
Male	14	66.67
Female	07	33.33
Age in completed days		
Less than 1 day	05	23.8
1-7 days	05	23.8
8-28 days	11	52.38
Religion		
Hindu	18	85.71
Muslim	03	14.29
Caste		
OBC	13	61.90
SC/ST	06	28.57
UR	02	09.52
Education of the respond	lent	
Illiterate and literate with no formal education	09	42.86
Literate, primary or below	04	19.05
Literate, middle	06	28.57
Literate, matric (class X)	02	09.52
Availability of BPL card		
Yes	18	85.71
No	3	14.29

Majority of the respondent i.e. 12 (57.14%) were literates out of which most of them i.e. 06 (28.57%) were literates with education up to middle school. Rest 09 (42.86%) of the 21 respondents were illiterate with no formal education. 18 (85.74%) of the families has BPL card with them whereas 03 (14.29%) families were not having a BPL card with them (Table 1).

Most of the neonates who died were of term gestation i.e. around 16 (76.19%). Most of the neonates who died i.e. 13 (61.9%) were born in the hospital. Rest 08 (38.10%) were born at home. Most of the births i.e. in 10 (47.61%) were attended by ANM/Nurse followed by 07 (33.33%) births were attended by trained birth attendant. Only 03 (14.29%) births were attended by allopathic doctor. New knife or blade was used to cut the umbilical cord during delivery in all the neonatal deaths. 19 (90.48%) off the deceased neonates were live births and only 02 (09.52%) out of the total of 21 deceased neonates were still born. Majority of the neonates i.e. 20 (95.24%) did not have any visible malformations (Table 2).

Table 2: Distribution of neonates according to pregnancy and related outcome (n=21).

	· _		
	Frequency	Percentage	
	N	(%)	
Duration of pregnancy			
Term	16	76.19	
Preterm	05	23.80	
Place of birth			
Home	08	38.10	
PHC/CHC/Rural hospital	10	47.62	
District hospital	03	14.28	
Delivery attended by			
Trained birth attendant	07	47.61	
ANM/Nurse	10	33.33	
Allopathic doctor	03	14.28	
Any other (Relative)	01	04.76	
Use of new blade for cutti	ng umbilical c	ord	
Yes	21	100.00	
No	00	00.00	
Live/still birth			
Live birth	19	90.48	
Still birth	02	09.52	
Visible malformations at birth			
Yes	01	04.76	
No	20	95.24	

Table 3 segregates the deceased neonates on the basis of their birth weight. 07 (36.84%) were low birth weight babies with weight less than 2.5 kg. Whereas nearly 08 (42.1%) of deceased neonates were of normal weight. 02 (10.52%) neonatal deaths with unknown birth weight were home deliveries, according to their perception, 01 (5.26%) was smaller than average and 01 (5.26%) was average in size.

Majority of the deceased neonates i.e. 16 (94.11%) were breastfed immediately or within one hour of birth whereas 01 (5.88%) were breastfed on second day or later since the child was shifted to NICU. Majority of neonates i.e. 15 (88.23%) were able to suck normally according to the respondents. Around 13 (76.47%) neonates were not given drinks other than breast milk to feed. In cases where the answer was affirmative, 02 (11.76%) neonates

were given cow milk and the other 02 (11.76%) were given nutmeg (jaiphal) because of family's cultural belief (Table 4).

Table 3: Distribution of neonatal deaths on the basis of birth weight.

Birth weight	Number	Percentage (%)
Low birth weight (≥1.5 - <2.5)	07	36.84
Normal (2.5 – 3)	08	42.1
Overweight (>3)	02	10.52
DNK	02	10.52
Total	19	100.00

Table 4: Distribution of neonatal deaths according to breastfeeding practices (n=17).

	Frequency N	Percentage (%)	
Neonate first breastfed			
Immediately/within one hour of birth	16	94.11	
Second day or later	01	5.88	
Able to suck normally on day 1 of life			
Yes	15	88.23	
No	02	11.76	
Ever given anything other than breast milk within first 6 months			
Yes	04	23.52	
No	13	76.47	

Majority of the deceased neonates i.e. 11 (57.90%) did not go to any health facility due to underestimation of signs and symptoms or unawareness on the part of family/parents. Fever was the most common reason among the neonates who did go to the facility i.e. among 04 (21.05%) out of the total of 19 deceased neonates.

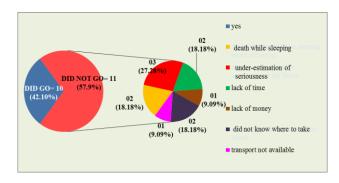


Figure 1: Distribution of participants according to their reasons for going to the first health facility.

Majority of the mothers i.e. 18 (85.71%) mothers did not have any pregnancy related complication. Out of 03 (14.29%) cases which were affirmative about the complication during delivery, in 01 case (33.33%),

mother had suffered prolonged labour, in the other one, there was excessive bleeding during delivery, similarly in another, and the female had premature rupture of membrane (PROM) one or more days before contraction started. All these 03 cases were home deliveries.

In majority of cases i.e. 13 (61.90%) ASHA/AWW/VHN/ANM did advise the family to take hospital treatment. 8 (38.1%) families did not seek any health care reason mainly due child was stillborn (12.5%), child died while sleeping (37.5%) or parents did not seek any advice (50%) (Figure 1).

Table 5: Distribution of the assigned causes of neonatal death as per verbal autopsy.

Disease	Codes	Frequency	Percentage (%)
Septicemia	A40- A41	05	23.80
Respiratory infections (Pneumonia/ARI)	J 12- J 18, J00-J 11	04	19.04
Other respiratory conditions (Aspiration)	P 24- P 28	05	23.80
Fetus and newborn affected by maternal factors and by complications of pregnancy, labour and delivery (stillbirth)	P00- P 004	02	09.52
Birth asphyxia	P20 – P 21	01	04.76
Respiratory distress of newborn	P22	02	09.52
Sudden infant death syndrome	R 95	02	09.52
Total		21	100.00

Table 5 shows that around 05 (23.80%) Neonatal deaths resulted due to Septicemia and other respiratory conditions (Aspiration) each, followed by 04 (19.04%) due to respiratory infections followed by RDS, SIDS and stillbirths which constituted 02 (9.52%) of the total deaths respectively followed by birth asphyxia in 01 case (4.76%).

Table 6: Distribution according to socio-demographic information of post neonatal deaths (n=17).

	Frequency N	Percentage (%)
Age		
29 days-1 year	09	52.94
>1-5 years	08	47.06
Gender		
Male	07	41.17
Female	10	58.83
Religion of the head of ho	ousehold	
Hindu	14	82.36
Muslim	03	17.64
Caste		
OBC	12	70.58
SC / ST	04	23.52
UR	01	5.89
Education of the respond	ent	
Illiterate and literate with no formal education	08	47.05
Literate, primary or below	03	17.65
Literate, middle	05	29.41
Graduate and above	01	5.89
BPL card availability		
Yes	13	76.47
No	04	23.53

Observations of post neonatal deaths

Out of 42 child deaths, 19 took place in the post neonatal period, out of which 15 died at home, while 2 died during the transit.

Table 6 shows the distribution of deceased children and according the socio-demographic family to characteristics. Out of 17 post neonatal deaths, 9(52.94%) belonged to the age group of 29 days to 1 year and the rest 8 (47.05%) belonged to the age group of 1 to 5 years. Out of 17 deaths, 7 (41.17%) were of males and the rest 10(58.82%) were females. 14 (82.36%) were from the Hindu religion and the rest 3 (17.64%) belonged to Muslim religion. Out of 17 households of deceased, 12 (70.58%) belonged to OBC and 2 (11.76%) each belonged to SC and ST, while the remaining 01 (5.89%) belonged to UR category. Out of 17 respondents, 8 (47.05%) were either illiterate or literate with no formal education. 5 (29.41%) of the respondents were literate and educated up to middle, 3 (17.65%) were literate with education level primary or below and rest 1 (5.89%) respondent was educated up to graduation. Out of 17 households of deceased, 13 (76.47%) were having BPL cards while 4 (23.53%) were not possessing the card.94% of child deaths occur in the family where respondents literacy level up to middle class.

Out of 17 deceased, 7 (41.18%) families were having MCP card, out of which 04 (57.14%) had MCTS number written on MCP card whereas 03 (42.86%) did not have MCTS number on the card. Rest 10 (58.82%) families were not having the card with them and it was either destroyed or lost (Figure 2).

Out of 17 children, 16 (94.11%) had no history of injury or accidents and the rest 1 (5.89%) child suffered from snake bite.

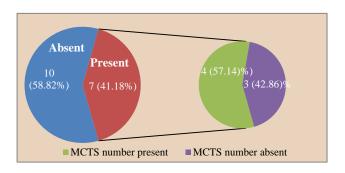


Figure 2: Distribution of post neonatal deaths according to MCP card.

Table 7 shows the distribution of children according to the history related to breast feeding. Out of 17 children, 12 (70.5%) were breast fed immediately within one hour of birth. 3 (17.6%) of them, were breastfed on the same day of birth showing good knowledge and practice regarding breast feeding. Out of 17 children, 11 (64.7%) were exclusively breastfed, while the rest 6 (35.3%) were given other feeds during first 6 months of life. Although initiation of breast feeding is very good (about 85%), more than 1/3rd does not practice exclusive breast feeding for 6 months.

Table 7: Distribution of post neonatal deaths according to breast feeding practices (n=17).

	Frequency N	Percentage (%)	
Time of initiation of breas	st feeding		
Immediately/within one hour of birth	12	70.5	
Same day child was born	03	17.6	
Second day or later.	01	5.9	
Never breastfed	01	5.9	
Exclusive breast feeding in 0-6 months of life			
Yes	11	64.7	
No	06	35.3	

Table 8: Immunization status of the deceased child.

Immunized as per age	Yes (%)	No (%)
BCG (n=17)	17 (100)	0
DPT (n=10)	09 (90)	01 (10)
OPV (n=10)	09 (90)	01 (10)
Measles (n=07)	06 (85.72)	01 (14.28)

Out of 17 deceased children, all 17 (100%) were vaccinated with BCG. Out of 10 eligible children for DPT and OPV among the deceased, 9 (90%) were immunized with both and 1 (10%) was not immunized. Out of 7 eligible children for measles vaccine, 6 (85.7%) were vaccinated and the rest 1 (14.28%) was not immunized with measles. Inspite of poor health seeking behavior, the immunization status of the children was

found to be adequate which reflects the appropriate services rendered by ASHA/ANM/AWW (Table 8).

Out of 17 deceased children, 6 (35.3%) were having fever. 3(17.6%) children had episode of convulsions and . 3(17.6%) were unconscious during the sickness that led to death. Out of 16 children, 3 (17.6%) developed neck stiffness/ stiffness of whole body during the illness, 03 (17.6%) developed cough during the sickness, 02 (11.8%) children had complaints of difficulty in breathing/fast breathing/chest in-drawing, wheezing was present in 01 (5.9%) child, 02 (11.8%) had complaints of diarrhea and 01 (5.9%) had complaints of abdominal pain (Table 9).

Table 9: Details of symptoms preceding death (n=17).

Symptoms	Frequency N	Percentage (%)
Fever	6	35.3
Convulsions or fits	3	17.6
Child unconscious during the illness	3	17.6
Stiffness of the whole body / neck stiffness	3	17.6
Cough	3	17.6
Breathing difficulties/ chest in drawing/ fast breathing	2	11.8
Diarrhoea	2	11.8
Abdominal pain	1	5.9
Body rashes	1	5.9
Swelling of hand, feet, or abdomen	1	5.9
Lack of blood /pale appearance	1	5.9
Less than normal growth	12	70.6
Did the child have multiple illness	3	17.6

Table 10: Condition of the child at the time when it was decided for medical consultation (n=17).

Condition of the infant	Frequency N	Percentage (%)
Alert/Active/Feeding	6	35.29
Conscious but drowsy/inactive/unable to feed	3	17.65
Unconscious	1	5.88
N/A (Sudden death at home)	7	41.18

Body rashes and swelling of hand/foot was found in 1 (5.9%) child, and another 1 (5.9%) child had pale appearance, 12 (70.6%) children were found to have a slower pace of growth than its counter parts. 03 (17.6%) child had history of multiple illnesses. It is a well-known fact that morbidity and mortality are manifold higher in children suffering from malnutrition. In the present study

also, 70.6% children were probably suffering from malnutrition. This indicates towards the need of special care and attention towards children suffering from malnutrition.

7 (41.18%) were sudden home death and did not seek any medical attention, 6 (35.29%) were alert/active/feeding, 3 (17.65%) were conscious but drowsy/ inactive/ unable to feed, and the remaining 1 (5.88%) was unconscious (Table 10).

Regarding the social history of deceased children's family, out of 17 families, 4 (23.52%) families had the history of alcoholism, 6 (35.29%) families had the history of smoking and 4 (23.53%) families had history of domestic violence. Out of 4 families that showed history of domestic violence, majority i.e. 3 (75%) belonged to families with deceased female child. Out of 4 households reported to have domestic violence, 3 (75%) had history of alcoholism too.

Table 11: Distribution of assigned causes of post neonatal deaths after verbal autopsy.

Disease	Codes	Number	Percentage (%)
Septicemia	A40-A41	3	17.64
Meningitis	G00,G03	3	17.64
Aspiration	J001-J11,J20-J22	3	17.64
ARI With Pneumonia	J12-J18	1	5.88
Severe malnutrition with growth retardation and recurrent infections	E40-E64	1	5.88
Sudden death due to unknown reasons	R95	2	11.76
Congenital intestinal anomaly	Q10-Q18,Q30-Q89	1	5.88
Congenital neuropathological disorder	Q00-Q02,Q04,Q06-Q07	1	5.88
Cerebral palsy with convulsions	P20-P21	1	5.88
Snake bite	X40-X49	1	5.88
Total		17	100.00

Out of 17 deaths, 3 (17.64%) each died due to Septicemia, Aspiration and Meningitis. 2 (11.76%) deaths were sudden due to unknown reasons, while the rest were due to ARI and pneumonia, congenital neuropathological intestinal anomaly, congenital anomaly, cerebral palsy with convulsions, snake bite and severe malnutrition with growth retardation and recurrent infections. Out of 17 deaths covered in the present study, 11 (64.70%) were preventable. Out of 9 deaths belonging to age group 29 days-1 year, 8 (89%) was found to be preventable. 3 (33.33%) cases each of Septicemia and Aspiration, 1 (11.11%) each of Meningitis and ARI with Pneumonia. While in the 8 deaths belonging to the age group of 1-5 years, 3 (37.5%) were found to be preventable 2 (25%) cases of meningitis and 1 (12.50%) case of severe malnutrition (Table 11).

DISCUSSION

In our study, 66.67% were male neonatal deaths highlighting the well-established fact that male gender is biologically more vulnerable than a female gender during neonatal period. MCTS Number is an important no. which denotes that the child is enrolled in the system which helps to back track the child if there is any gap in service delivery. Only 11 (52.38%) families in our study had the MCTS number with them whereas 10 (47.61%) families did not have any record of the MCTS number. Reasons being, in 20% cases the MCP card was destroyed after the death of the neonate, in 20% cases the family had lost the card, in another 20% cases new cards were not available at the time of birth of the neonate and

hence the MCTS no. was not allotted to them, in 20% cases the MCTS number was not entered on the MCP card, in 10% cases, the MCP card was with the ASHA and in the remaining 10% cases, ASHA was on leave at the time of delivery of the neonate and hence MCP card was not made for the child.

In our study, only 03 (14.29%) cases had complications during delivery like prolonged labour (33.3%), excessive bleeding during delivery (33.3%), premature rupture of membrane (33.3%). Our study finding is in accordance to the study done by Samiya et al where the complications during pregnancy were found to be 10-30%.

In our study, history of feeding was collected from 16 deceased children's family, of them, 11 (68.75%) were breast fed immediately within one hour of birth. 3 (18.75%) of them, were breastfed on the same day of birth showing good knowledge and practice regarding breast feeding. 62.50% were exclusively breastfed, more than $1/3^{\rm rd}$ does not practice exclusive breast feeding for 6 months. Our study findings are similar to a study done by Patel et al.⁷ More than half of mothers (57.5%) started feeding within an hour of birth, and 55.9% gave exclusive breastfeeding for six months.

CONCLUSION

A majority of home based child deaths are occurring in families with high illiteracy rates and those belonging to BPL families. Exclusive breastfeeding practices were average among mothers of deceased. Majority of parents could not recognize symptoms to be severe, early identification of illness and their timely treatment will help in reducing child death.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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