

Validity of Causes of Infant Death by Verbal Autopsy

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Abstract. The aim of this study was to investigate the suitability of the verbal autopsy technique in identification of cause of death during infancy. The study was carried out in 23 randomly selected clusters with 70 live births each, in districts Cuttack and Koraput of Orissa State. Each death occurrence during the reference period (1992-93) was investigated by the field investigator and cross checked by a medical professional using the same proforma. The probable cause of death in each case was analysed separately by the field investigator and then by the professionally qualified medical person. These were then compared using suitable statistical tests.

A total of 179 infant deaths and 16 still births were reported by the field investigator in the area as compared to 183 deaths and 12 still births by professionally trained personnel. There was an agreement for 85.79 percent deaths and 75 percent still births. Disagreement was observed for fever, pneumonia, septicemia and meningitis as causes of deaths. It was more in rural area as compared to urban areas. The sensitivity and specificity of the tool were found to be 85.6 percent and 90.4 percent respectively.

The technique is found to be cost effective, time saving and reasonably reliable. After intensive training the lay reporters can be used for recording easily recognizable signs and symptoms of infant deaths and thus help in monitoring infant mortality rate and causes of infant death in a vast country like India so as to achieve "health for all" by 2000 AD. (*Indian J Pediatr 1999; 66 : 647-650*)

Key words : *Verbal autopsy; Validity; Infant death.*

Infant mortality rate (IMR) is considered as one of the most sensitive indicators of health status of a community¹. The reduction of IMR from 110\1000 to below 60\1000 live births is one of the goals of "health for all" by 2000 AD, set by the Govt. of India². To achieve this goal, monitoring of IMR and assessment of its causes (s) is a necessary prerequisite.

Nearly 80 per cent of births take place at home in India. These are looked after by the traditional birth attendants³. Hence the technical data available from institutional

setting is clearly inappropriate for monitoring of IMR and its causes. The information provided by the Registrar General of India is available after considerable time following its completion and is generated infrequently⁴. Thus it has a limited role in monitoring of IMR and its causes. Further, there is a limitation in investigation of cause of death in the community since the information of the event is known only weeks after its occurrence.

Verbal autopsy is one method which can be of help in recognizing the cause of death where it is difficult to employ highly trained personnels in countries like India. It is a method which helps in recognizing the cause of death through interviewing by

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recalling the sequence of events (symptoms, signs) which occurred before the terminal event⁵. The data is collected using a predesigned questionnaire through either paramedical staff or graduate students. Thus, there is a need to evaluate the feasibility of verbal autopsy questionnaire and reliability of data.

This study was undertaken to validate

the cause of death of infants by comparing information gathered by the field investigator (graduate with training) with that of the professional (medical personnel).

METHODS AND MATERIALS

The study was carried out in 23 clusters (urban-7 and rural-16) of districts of Cut-

TABLE 1. Per cent Agreement in the Causes of Infant Death by Professionals and Field Investigators

	Urban			Rural		
	F N1	M.P. N2	% Agreement (N1 × 100/N2)	F N3	M.P. N4	% Agreement (N3 × 100/N4)
<i>Endogenous</i>	16	16	100.00	36	36	100.00
Cong. Malformation	1	1	100.00	3	3	100.00
Immaturity	9	9	100.00	21	20	105.00
LBW	6	6	100.00	12	13	92.3*
<i>Intra Partum</i>	4	4	100.00	8	12	66.67*
Birth injury	2	2	100.00	3	5	60.00*
Birth anoxia	2	2	100.00	5	7	71.43*
<i>Exogenous</i>	21	21	100.00	48	48	100.00
Convulsion	1	2	50.00	1	1	100.00*
Fever	4	5	80.00	10	12	83.3
Septicemia	4	3	133.00	10	8	125.00
Meningitis	1	1	100.00	1	2	50.0*
Jaundice	2	2	100.00	3	2	150.00*
Diarrhoea	4	4	100.00	10	10	100.00
Pneumonia	5	4	125.00	13	11	118.18
<i>Vaccine Prn.</i>	2	2	100.00	4	4	100.00
Tetanus	1	1	100.00	1	1	100.00
Whooping cough	0	0	100.00	0	0	100.00
Measles	1	1	100.00	3	3	100.00
<i>Feeding Problem</i>	5	5	100.00	10	10	100.00
Poor feeding	2	2	100.00	4	6	66.67*
Malnut.	3	3	100.00	6	4	150.00*
<i>Others</i>	8	6	133.3	17	5	340.00*
		2			12	
G Total	56	56		123	127	

Significant $p < 0.05 = *$; F = Field investigator; M.P. = Medical professional

tack and Koraput. In each cluster 70 births with a random start from the villages selected by Probability Proportional to Size (PPS) sampling were recorded during one financial year (1992-93) by the field assistant. Information on all the infant deaths in the clusters was also collected.

Field investigators holding graduate or postgraduate qualifications were trained to investigate deaths by using verbal autopsy technique. The training comprised of classroom lecture as well as field demonstration. In the field, emphasis was given on conversation, interview, interpretation and recording of data. A field tested descriptive proforma containing probe questions with common symptoms and manifestations was used.

Each death that occurred during last one year was investigated by the field investigator. This information was cross checked by a medical professional. Both groups used the same proforma. The probable cause of death in each case was analysed separately, first by the field investigator and then by the professionally qualified medical person.

The sensitivity and specificity were calculated assuming field investigator's diagnosis as screening test and medical officer's diagnosis as confirmatory test.

RESULTS

A total of 179 infant deaths and 16 still births were reported by the field investigators in the area. The professionally trained medical personnel identified 183 infant deaths (99 male and 84 female) and 12 still births i.e. 4 still births were found to be infant deaths on probing by professionally trained personnel.

There was an agreement for 85.79 per-

TABLE 2. Sensitivity and Specificity

	Urban	Rural	Total
Sensitivity	92.8	82.4	85.6*
Specificity	99.1	87.1	90.4*

Significant $p < .05 = *$

cent deaths and 75 per cent still births. Underdiagnosis was observed among intra-partum cases by the investigator. Disagreement was observed for fever of unknown causes, pneumonia, septicemias, meningitis. Forty per cent of causes could easily be diagnosed with the help of signs and symptoms mentioned by the field investigator. For about eight per cent causes the investigator could neither diagnose nor could mention the symptom/manifestations properly. Disagreement was observed more among rural areas and compared to urban areas. All the four still births were underdiagnosed in rural areas. It was again more among illiterate respondents as compared to literates. The sensitivity and specificity of the tool were found to be 85.6 per cent and 90.4 per cent respectively. Statistically significant difference was observed between urban and rural area (Table 2).

DISCUSSION

This community based study demonstrates that the verbal autopsy technique is a very useful tool in investigating the cause of infant mortality.

There was an agreement with respect to the sex of the infant, age at death and 85 per cent of causes of death. All these factors substantiated the confidence in the suggested technique.

Conditions like LBW, immaturity, jaundice, diarrhoea, and measles were reliably

recalled because of their incontrovertial clinical characteristics and hence there was no difficulty in recognising them. For other diseases like septicemia and convulsions, there were some difficulties which were found in the group with pyrexia of unknown origin (PUO). This warrants the need to develop simple and easily recognisable manifestations related with these diseases which can be readily recalled by the family members and proper interpretation can be made by the field investigator.

There was considerable confusion in differentiating still birth from live birth causing difficulty, especially in deciding the IMR of the area. Traditional birth attendants usually inform the mothers about a 'dead born baby' if the baby dies immediately after birth because of the fear from the society. Similar finding was observed in the present study where the number of still births reported by the field investigator were higher as compared to those reported by the professional. Hence, the need to impart more vigorous training to the field investigators for probing using verbal autopsy technique when a still birth is reported by the mother or else the professionals should carry out in depth investigation of all still births reported by the investigator.

Conclusions

Verbal autopsy technique was found to be a reasonably reliable method (t = non-significant) to identify IMR and its causes

with the investigators properly trained in collection of information, in understanding the various causes of infant deaths so as to be able to interpret the diagnosis correctly. Nevertheless, there is a need of a professional while giving final diagnosis of the information collected by the field investigator. Thus, this tool is very useful, cost-effective, time saving in monitoring the IMR and cause of death, and can enable appropriate strategies to be designed to achieve the goal of IMR (60/1000 live birth) by the year 2000 AD.

Acknowledgement

The authors are grateful to Dr. N.P. Gupta for his guidance in the study.

REFERENCES

1. Report of the working group on health for all - An alternative strategy. Joint committee of ICMR and ICSSR New Delhi. 1980.
2. Health for all by the year 2000 AD. Report of the working group of India Ministry of Health and Family Welfare, New Delhi.
3. Benara S.K., Chaturvedi S.K. Evaluation of training of T.B.A in three PHC under ROME Scheme, Rajasthan. 1982. (unpublished).
4. Registrar General of India, Survey on infant and child mortality 1979. Ministry of Home Affairs, New Delhi. 1996.
5. Kumar V, Datta N. Lay reporting and verbal autopsy in assessment of infant mortality. *Indian J Pediatr* 1986; 672-73.