P. H. Reddy and M V. Sholapnrkar

Type of Birth Attendant and Infant Mortality in Rural Karnalaka

Introduction

SlNCE the beginning of the present century, crude death rate in India has declined from more than 40 per 1,000 population to about 13. But, during the same period, infant mortality rate has declined from about 250 per 1,000 live births to only about 130. Evidence shows that there has been no significant decline in infant mortality rate since 1970 (Padmanabha, 1982 : 1287). The continuing high infant mortality rate in India is naturally a cause for general concern. The concern for population policy makers is all the more serious because of the assumption that unless infant mortality rate is reduced drastically, fertility and population growth cannot be reduced.

Several programmes are formulated and implemented to reduce infant mortality in India. One of them is a programme for the training of *dais* (traditional birth attendants) in the conduct of safe deliveries. The *dais* training programme was started during the Second Five-Year Plan period (1956-61), but has been intensified since 1977-78 with the ultimate objective of having at least one trained *dai* in each of the 580,000 villages in the country by 1982-83. About 76,000 *dais* were trained during 1979-80 and about 66,000 during 1980-81; from the inception of the programme till the end of March 1981, about 345,000 *dais* were trained; and, the target of training about 93,000 *dais* was set for 1981-82 (Government of India, 1981 : 22; 1982 : 12).

Broadly, the objectives of the Jaw training programme are: (i) to improve the midwifery services in the rural areas so as to reduce infant and maternal mortality, and (ii) to motivate currently married women in reproductive ages to practise family planning (Government of India, 1980: 1).

The training is for a period of one month. Each *dai* selected for training is required to attend Primary Health Centre (PHC) or Sub-Centre (SC) for two days in a week. On the other four working days in the week, she has to accompany the Auxiliary Nurse-Midwife (ANM) who attends to ante-natal, natal and post-natal period of women in villages. In addition, she receives instructions from ANM and Lady Health Visitor (LHV). She is expected to conduct at least two deliveries under the supervision and guidance of ANM or LHV. During the training period, a *dai* is paid 10 rupees (approximately one US $) per day. After the completion of the training, a *dai* is provided with a kit containing requisite items for conducting safe deliveries. The cost of the kit and contents is about 50 rupees. Every trained *dai* is entitled to a payment of two rupees per delivery conducted by her towards the cost of cotton, soap, drugs, etc. But the condition is that the *dai* should have registered the name of the pregnant woman with the ANM concerned. In the absence of such registration the payment allowed is only one rupee. The payment is made to the *dai* by the Medical Officer (MO) of the PHC concerned. To keep her interest alive in family planning programme, she is paid incentive money for every IUD or sterilization acceptor that she enlists in the family planning programme. Also, other things being equal, she is given preference in the appointment as an Attendant at a Rural Family Planning Centre or a SC.

Studies of infant mortality in India have concentrated on either measurement of infant mortality, or estimate of infant mortality rate and its two components, namely, neonatal and post-neonatal mortality rates, or identification of biological, clinical, socio-economic and demographic factors associated with perinatal, neonatal, post-neonatal and infant mortality. A comprehensive study of infant mortality in India by Chandrasekhar (1972) deals with measurement of infant mortality, comparison of infant mortality in India and the world, causes of infant mortality, etc. A study by Saksena and Srivastava (1980 : 69-81) attempts to identify the biological, clinical and socio-economic .characteristics of infants and their families, associated with perinatal mortality. Another study by the same authors (1981: 467-478) aims at estimating infant mortality and its differentials by socio-economic, demographic and health care characteristics of infants and their families. Yet, another study (Gunasekaran, 1974 : 59-69) is concerned with estimating neonatal, post-neonatal and infant mortality, and the influence of certain demographic factors on infant mortality. A recent study by Badri, Gopal and Devaramani (1979 :1-11) attempts to assess the influence of distance of maternal and child health centre on infant mortality and to identify socio-economic factors associated with infant mortality.

Studies of the impact of programmes aimed at reducing infant mortality are scarce. Insofar as we know, no study has been undertaken to find out the impact of the programme for the training of *dais* on infant mortality. It is, of course, assumed that such a training programme will help reduce infant and

maternal mortality. In fact, it has been asserted that "natal and post-natal care in the hands of a trained birth attendant is found to lower both maternal and infant mortality" (Walia, 1979: 29). This obviously lends support to the training programme of *dais.* The underlying presumption is that *dais* attend to most deliveries, particularly, in the rural areas, and since they are not formally trained in midwifery, their performance contributes to infant and maternal mortality. That they attend to a large number of deliveries is obvious. But there is no firm evidence to suggest that their performance contributes to infant mortality. Adverse reflections on the *dais* are based on tenuoes ground. For example, Chandrasekhar (1972 : 205) says, "The meddlesome midwifery of dai *(sic)* is as much a part of the cultural scene as the absence of trained medical personnel during labour. It is, of course, impossible to estimate how much the dai *(sic)* contributes to the present high infant and maternal mortality. On the basis of circumstantial evidence one may say that it must be considerable."

While, in the light of this position, it will be interesting to investigate differentials in mortality rates among infants according to whether attending dais were trained or not, the data presently available with us does not permit us to do so. Only 23 of the 1,810 births studied were attended to by trained *dais. In* the alternative, the paper attempts to compare mortality rates among infants whose births were attended to by all trained and untrained personnel. Trained ,*nd untrained attendants were as follows : trained attendants included government male MOs (2), lady MOs (30), private medical practitioners (10), LHVs (10), ANMs (473), other government hospital staff (8) and trained *dais (23);* and, untrained attendants included untrained *dais* (756) and relatives/friends/ neighbours (493).* Thus, of the 1,810 live births, 561 were attended to by trained personnel and 1,249 by untrained personnel.

Data and Method

The present analysis is based on part of the data collected for a study of infant mortality undertaken by the Population Centre, Bangalore. The study is longitudinal in design. The sampling procedure is described at length elsewhere (Badari, Gopal and Devaramani, 1982 :2-6) and will be presented here only briefly.

In mid-1977, about 2,000 pregnant women in the third trimester had been registered for ante-natal care in five randomly selected PHC areas, one each from five of the 19 districts in the State of Karnataka. A survey of these pregnant women conducted between August and November 1977 collected information on the length of gestation, and their socio-economic and demographic characteristics.

Some women were found to have already terminated their pregnancies. *In* order to minimise recall lapse, all the women who had terminated their pregnancies more than four weeks prior to the date of interview were excluded from the study. Information on the type of pregnancy termination, type of birth attendant, survival status of the infants, date and cause of death, if dead, etc., was obtained from the rest of the women. The survey showed that some women in the third trimester of pregnancy had not been registered for ante-natal care; they too were included in the study. The total of pregnant women and those with pregnancy termination falling within four weeks of the interview was 1,920.

A second survey was undertaken one year after the first survey to find out the type of pregnancy termination, type of birth attendant, survival status of the infants, date and cause of death, if dead, etc. The number of women, informa* tion about whose pregnancy terminations is available, is 1,856.

Between the two surveys, the AN Ms concerned were advised to visit all women understudy once a month during pregnancy, and once a week during the first month following pregnancy termination and register the date and type of pregnancy termination, survival status of infants, date and cause of death, if dead, etc. The information thus registered has also been utilised in the study.

Findings

Abortions and Stillbirths

Before proceeding to the analysis of infant mortality, it may be noted that out of 1,856 pregnancy terminations, 13 were spontaneous abortions, 51 stillbirths, 16 twin births, 1 triplets, and the rest, 1,775 single live births. The abortion rate comes to 7 per 1,000 pregnancies and the stillbirth ratio to 28.7 per) ,000 births. The abortion rate is apparently an underestimate as it represents the experience only of women in the third trimester of their pregnancies. About nine out of 1,000 pregnancies resulted in twin births and only one out of the total of 1856, pregnancies in triplets. These rates may be compared with those revealed by a study of infant mortality in an urban setting, showing an abortion rate of about 56 per 1,000 pregnancies and a stillbirth ratio of about 15 per 1,000 total births and about eight out of 1,000 pregnancies resulting in twin births (Ruzicka and Kanitkar, 1972 : 196).

Mortality among Infants

Table 1 presents summary data on the neonatal, post-neonatal and total mortality rates among infants whose births were attended to by trained and untrained personnel. It is immediately clear that all the three rates were higher

among infants whose births were attended to by untrained personnel. But tests of significance revealed that the difference between none of the three rates was statistically significant. Should not the difference between the two be statistically significant? Perhaps it is not unreasonable to expect statistically, significant higher death rates among infants whose births were attended to by untrained personnel, particularly in view of the apprehensions expressed about the way untrained *dais* conduct deliveries and of the fact that the trained attendants included also highly qualified doctors, LHVs and ANMs, while the untrained attendants included relatives/friends/neighbours having no regular experience in midwifery.

Bhattacharya, Srivastava and Lamba reported a higher mortality rate among both male and female infants whose births were attended to by trained personnel than among those whose births were attended to by untrained personnel. The explanation offered by the authors for such an unexpected finding was that perhaps a trained birth attendant was called in, or pregnant woman was taken to the hospital, only when the delivery was difficult or beyond the capacity of the untrained *dai* to handle (Bhattacharya, Srivastava and Lamba, 1980 : 41).

TABLE 1—NEONATAL, POST-NEONATAL AND INFANT MORTALITY RATES BY TYPE OF UIRTH ATTENDANT

Type of Birth Attendant	*Number of Live Births Attended*	*Neonatal Mortality Rate*	*Post-neonatal Mortality Rate*	*Infant Mortality Rate*
Trained	561	55	30	86
Untrained	1,249	65	44	109
Total	1,810	62	40	102

A careful observation of Table 1 reveals that the difference attributable to distinction in attendance at birth between trained and untrained personnel for the neonatal mortality rates was less than that for the post-neonatal mortality rates. Neonatal deaths measure about 64.6 per cent of all deaths from among those whose births were attended to by trained personnel and about 59.6 per cent of all deaths from among those whose births were attended to by untrained personnel. If the midwifery of untrained birth attendants was all that 'med-dlesome', neonatal deaths should have accounted for a higher percentage of all deaths among infants whose births were attended to by them.

Infant mortality is influenced apart from the type of birth attendant by a number of other factors. In the remainder of the paper, comparison of mortality among infants whose births were attended to by trained and untrained personnel is made after controlling for more important among these factors.

Religion and Caste

Table 2 gives infant mortality rates by religion and major castes. Amongst Hindus, IMR is higher for those whose births were attended to by untrained personnel than for those whose births were attended to by trained personnel, but the difference is not statistically significant. Amongst Muslims, the opposite is true, although here again the difference is not statistically significant. Incidentally, infant mortality rate was higher among Hindus that among Muslims. This corresponds to the finding of a nation-wide study than infant mortality rate in the rural areas is higher among Hindus than among Muslims (Office of the Registrar General, 1980 : 35).

TABLE 2—INFANT MORTALITY RATE BY TYPE OF BIRTH ATTENDANT,'AND RELIGION AND CASTE

Religion! Caste	*Trained Attendant*		*Untrained Attendant*		*Total*	
	Number of Live Births Attended	*Infant Mortality Rate*	*Number of Live Births Attended*	*Infant Mortality Rate*	*Number of Live Births Attended*	*Infant Mortality Rate*
Hindus						
Vokkaliga, Lingayat, etc.	178	67	335	92	513	84
Scheduled Caste	74	81	340	106	414	101
Other Hindus	249	101	507	124	756	116
All Hindus	501	86	1,182	110	1,683	103
Muslims	56	89	64	78	120	83
Christians	4	..	3	..	7	..

. . Rates were not calculated because of small number of live births.

Similarly, there were no statistically significant differences in the mortality rates of infants belonging to different castes, although the rates are generally higher in respect of births attended to by untrained personnel than of those attended to by trained personnel. This lack of statistical significance of the differential in IMR between trained and untrained birth attendance may be said at least to discount the belief that untrained *dais* contribute to infant mortality.

Size of Land-Holding

The size of land-holding of a household is presumed to reflect its economic status. This is quite reasonable considering that the study setting comprised

rural areas where there was little or no scope for income from sources other than cultivable land. Table 3 presents data on infant mortality rate by type of birth attendant and size of land-holding. Clearly, when the size of land-holding is held constant, IMR for those whose births were attended to by untrained personnel are higher than for those whose births were attended to by trained personnel. But the differences between the two is not statistically significant.

TABLE 3—INFANT MORTALITY RATE BY TYPE OF BIRTH ATTENDANT AND SIZE OF LAND-HOLDING

Trained Attendant			*Untrained Attendant*		*Total*	
Size of Land-Holding (acres)	*Number of Live Births Attended*	*Infant Mortality Rate*	*Number of Live Births Attended*	*Infant Mortality Rate*	*Number of Live Births Attended*	*Infant Mortality Rate*
0	169	89	318	119	487	109
1 -10	306	98	773	J06	1,079	104
11+	71	42	104	67	175	57
Unknown	15	..	54	..	69	..

. . Rates were not calculated because of small number of live births.

Age of Mother

It is known that age of mother and parity influences infant mortality and that there is a high positive correlation between the former two (Pathak, 1979 : 14-15). This is particularly true of the present case where all women marry at about the same age and bear more or less the same number of children. It was, therefore, decided to hold constant only age of mother for examining differences in IMR by trained or untrained birth attendance.

TABLE 4—INFANT MORTALITY RATE BY TYPE OF BIRTH ATTENDANT AND AGE OF MOTHER

	Trained Attendant		*Untrained Attendant*		*Total*	
Age Group (Years)	*Number of Live Births Attended*	*Infant Mortality Rate*	*Number of Live Births Attended*	*Infant Mortality Rate*	*Number of Live Births Attended*	*Infant Mortality Rate*
15- 19	81	74	170	129	251	*112*
20-24	198	76	414	101	612	101
25-29	165	79	389	108	554	99
30-34	74	122	202	74,.	276	87
35 +	43	J16	74	135	117	129

Notably, only for the age group 30-34 years is the IMR comparatively higher for infants whose births were attended to by trained personnel. For all the other age groups, it is higher among infants whose births were attended to by untrained personnel. But for none of the age groups are the differences statistically significant.

Literacy of Parents

It is known that literacy of parents, particularly of mothers, influences infant and child mortality (Caldwell, 1979 : 395-413). It would, therefore, be important to hold literacy of parents constant and examine differences in infant mortality by the two types of birth attendant.

TABLE 5—INFANT MORTALITY RATE BY TYPE OF BIRTH ATTENDANT AND LITERACY OF PARENTS

Trained Attendant			*Untrained Attendant*		*Total*	
Literacy Status	*Number of Live Births Attended*	*Infant Mortality Rate*	*Number of Live Births Attended*	*Infant Mortality Rate*	*Number of Live Births Attended*	*Infant Mortality Rate*
Mother						
Illiterate	*403*	102	1,140	112	1,543	109
Literate	155	45	109	73	264	57
Unknown	3	..	-	—	3	..
Father						
Illiterate	263	106	865	118	1,128	115
Literate	280	68	354	85	634	77
Unknown	18	..	30	..	48	..

.. Rates were not calculated because of small number of live births.

The parents are divided into only two groups, namely, literates and illiterates on account of data constraints. All those with four or less years of schooling are regarded as illiterates and those with five or more years of schooling as literates. The above table shows that IMR is comparatively lower among infants born to literate parents. But when literacy of parents is held constant, the rate is higher among those whose births were attended to by untrained personnel, but the difference is in no case statistically significant.

Cause of Death

It is interesting to examine the proportions of deaths by cause]among infants whose births were attended to by the two types of personnel.

TABLE 6—PERCENTAGE DISTRIBUTION OF INFANT DEATHS BY TYPE OF ATTENDANT AND CAUSE OF DEATH

Cause of Death	*Trained Attendant (N* = 48)	*Untrained Attendant (N = 136)*	*Total (N* = 184)
Prematurity	33.3	17.6	21.7
Birth injury	2.1	2.2	2.2
Respiratory infection of the newborn	16.7	21.3	20.1
Cdrd infection	2.1	0.7	1.1
Diarrhoea of the newborn	29.2	19.1	21.7
Malnutrition	4.2	4.4	4.3
Convulsions	4.2	6.6	6.0
Others	3.3	24.3	20.1
Unknown	—	3.7	2.7
Total	100.0	100.0	*100,0*

N stands for number of infant deaths.

It may be observed that the percentage of deaths due to prematurity was higher among infants whose births were attended to by trained personnel than among those whose births were attended to by untrained personnel. There was an apparent tendency to prefer trained personnel in the case premature deliveries. However, the percentages of deaths due to causes like birth injury and respiratory infection of the newborn, which untrained birth attendants are less likely to avoid or treat, were about the same for the two types of attendance. Interestingly, deaths due to diarrhoea of the newborn were higher 10 per cent among infants whose births were attended to by trained personnel than among those whose births were attended to by untrained personnel. It is often alleged that the *dais* cut the umbilical cord of the newborn with sickle and that this results in cord infection leading to the death of infants. But, as the above table shows, deaths due to cord infection accounted for less than one per cent

of all deaths among infants whose births were attended to by untrained personnel, while they accounted for more than two per cent of all deaths among those whose births were attended to by trained personnel. The differences in the distribution of infant deaths by cause do not suggest that untrained birth attendants contribute to high infant mortality rate.

Discussion

The paper examined the differences between death rates among infants whose births were attended to by trained personnel (including doctors, LHVs, ANMs and trained *dais)* and untrained personnel. Mortality rates are comparatively somewhat higher among infants whose births were attended to by untrained personnel; but the differences are not statistically significant. The two exceptions to the general trend related to Muslims among the religious groups and to 30-34 age span among age groups of mothers; the rates these two groups were higher for those whose births were attended to by trained personnel; here again the differences were not statistically significant.

If there were adequate number of births attended to by trained and untrained *dais* and if differentials in IMR as between the two types of *dai* were not stat istically significant, it would have been easy enough to cast reflections on the effectiveness of the training programme of *dais.* But now this cannot be done because only a small number of births were attended to by trained *dais* and many births, by well-trained personnel like doctors, LHVs and ANMs.

The ANMs in the study setting were asked to visit all women in the sample once a month during pregnancy, and once a week during the first month after delivery for recording the necessary information. One might, therefore, Say that they might have also provided ante-natal and post-natal services at the time of their respective visits. This might have influenced IMR among infants whose births were attended to by untrained personnel. There seems to be an clement of logic in the argument, but it cannot be stretched far because from the number of deliveries conducted by untrained attendants it is obvious that the ANMs had not followed the instruction seriously. If they had, they would have also conducted much larger number of deliveries than they actually did.

The results of the present study cannot be explained away by saying that more women with difficult deliveries approach trained birth attendants and that this results in lack of significant differences between the death rates among infants whose births were attended to by the two types of personnel. The analysis of infant deaths by cause does not lend support to such an explanation.

There is no reason to question the methodology of the study. It was a strictly scientifically designed and conducted field study and the sample size was adequate.

Admitting non-existence of any significant difference made by training on

delivery attendance, we are inclined to forward two possible reasons for this outcome. One is that the apprehensions of the educated and urban-bred academics and administrators about the way untrained *dais,* go about conducting deliveries are not quite true; the so-called untrained *dais* have enough informal training and experience in midwifery. The other is that infant mortality rate is for a variety of other factors high unrelated to training or skill of birth attendance and the difference that the latter factor may cause fails to come up to the surface. When the level of infant mortality decreases, differences in IMR by type of birth attendant may become statistically significant.

References

1. Badari, V. S., Gopal, Y. S. and Devaramani, S. C., 1979, Infant mortality in rural Karnataka : findings from a longitudinal enquiry. *Bangalore, Population Centre Newsletter* 5(1).
2. Badari, V. S., Gopal, Y. S. and Devaramani, S. C., 1982, Infant mortality and its correlates : findings from a longitudinal study in rural Karnataka. *Mimeo., Bangalore.*
3. Bhattacharya, B. N., Srivastava, V. K. and Lamba, I. M. S., 1980, Some sex differentials of infant mortality in rural areas. *Journal of Family Welfare,* 27(34).
4. Caldwell, J. C., 1979, Education as a factor in mortality decline : an examination of Nigerian data. *Population Studies,* 33, 395. 5/ Chandrasekhar, S., 1972, *Infant Mortality, Population Growth and Family Planning in India.* Alien & Unwin, London.
6. Government of India, 1980, *Primary Health Centre Training Guide, Part III: Training of Dais.* Ministry of Health and Family Welfare, New Delhi.
7. Government of India, 1981, *Family Welfare Programme in India : Year Book, 1979-80.* Ministry of Health and Family Welfare, New Delhi.
8. Government of India, 1982, *Family Welfare Programme in India : Year Book, 1980-81.* Ministry of Health and Family Welfare, New Delhi.
9. Gunasekaran, S., 1974, A note on infant mortality in Athoor block, 1964-69. *Bulletin of the Gandhigram Institute of Rural Health and Family Planning, 9,*59.
10. Office of the Registrar General, 1980, *Survey on Infant and Child Mortality, 1979.* Ministry of Home Affairs, New Delhi.
11. Padmanabha, P., 1982, Mortality in India: a note on trends and implications. *Economic and Political Weekly,* 17, 1285.
12. Pathak, K. B., 1979, Infant mortality, birth order and contraception in India. *Journal of Family Welfare,* 25, (12).
13. Ruzicka, L. T. and Kanitkar, Tara, 1972, Infant mortality in an urban setting : the case of Greater Bombay. Chapter 10. In : *Studies on Mortality in India,* Monograph Series No. 5. Edited by K. E. Vaidyanathan, Gandhigram Institute of Rural Health and Family Planning, Gandhigram.
14. Saksena, D. N. and Srivastava, J. N., 1980, Biosocial correlates of perinatal mortality : experiences of an Indian hospital. *Journal of Biosocial Sciences,* 12, 69.
15. Srivastava, J. N. and Saksena, D. N., 1981, Infant mortality differentials in an Indian setting : follow-up of hospital deliveries. *Journal of Biosocial Sciences,* 13, 467.
16. Walia, B. N. S., 1979, Challenge of infant mortality in India. *Health and Population-Perspectives and Issues, 2, 26.*