Impact of Women Health and Nutrition Entrepreneurs and Mobilizers on Health and Nutrition of Rural Children and Mothers' Knowledge and Health-related Practices.

By

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Abstract

To improve the health care outreach in villages, an experiment was carried out in five non-Integrated Child Development Scheme (ICDS) villages (total population 4 400) of the Narsapur Mandal of Medak district of Andhra Pradesh (AP). Local women (one per village) with an education level equivalent to seventh grade, were trained in aspects of preventive and curative health care, and nutrition. These women advise the community, particularly women, on health, nutrition, sanitation and family planning. They register all pregnant women, ensure antenatal check-up, compliance with taking of iron folic acid tablets, record blood pressure, identify at–risk pregnant women and treat minor ailments for which the community pays them. Records of deaths with age and cause, and births with birth weight (wherever possible) are maintained. *'Dais'* (traditional birth attendants) are also being trained so that both groups of women can work in tandem. While no monthly stipend is paid, a daily wage is given for days of training and small incentive money of Rs.5/- for each vital event reported.

The positive outcomes after three years were: remarkable improvement in mothers' knowledge of nutrition, and practices related to maternal diet, and child feeding; increase in institutional deliveries; reduction in perinatal and neonatal mortality, (infant mortality also declined after three years), and reduction in morbidity and in the incidence of vitamin A deficiency (Bitot's spots) in preschool children. There was only marginal improvement in child nutrition, and no improvement in the incidence of low birthweight, which was around 20%.

Key words: *Health and nutrition entrepreneurs, maternal and child health and nutrition, infant mortality, morbidity in children, nutrition status-child, nutrition knowledge-mother.*

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Introduction

Despite a vast network of primary health centres and sub-centres, health care outreach in rural areas of India is unsatisfactory. The Community Health Workers' model has been tried internationally with varying degrees of success[1-6]. One criticism of this model is its poor sustainability due to creation of a separate cadre of stipended workers. Jajoo[3] has reported a programme, which overcame this problem through a village-level health insurance scheme in which the families pay for health workers as well as for primary health care and medicines by contributing the local crop, *sorghum* to a common pool. The participants get subsidized health care at the Sevagram Hospital in Wardha, which receives government funding.

In a study on health problems and `health care seeking practices of women', conducted by the Dangoria Charitable Trust, in five villages with no ICDS (total population 4 400) of Narsapur Mandal of Medak district in the South Indian State of Andhra Pradesh, most women reported consulting private practitioners in the block ('mandal') headquarters at Narsapur[7]. They preferred paying these doctors, rather than receiving free treatment at the government Community Health Centre at Narsapur. The reason mentioned was "better service offered by private practitioners". On discussion with the community, it was realized that they were willing to have one of their women trained and to pay her for her services if they were satisfied. They were unhappy when told that the trained women would not be allowed to give injections, nor would they receive free drugs. But they accepted these terms, when it was explained to them that this was not a government-supported programme and that the Health and Nutrition Entrepreneurs and Mobilizers (HNEMs) were not receiving any stipend.

In response to the community's interest, the Dangoria Charitable Trust (DCT) initiated a programme of training local women as Health and Nutrition Entrepreneurs and Mobilizers (HNEM) ('arogya karyakartas') in five villages- one per village in 1998. While four of the selected villages were from the earlier survey, one of the villages had to be replaced with another comparable village, where a health worker could be identified for training. A baseline survey was done for that village as well. Local *'dais'* (traditional birth attendants) are also being trained, so that both groups of women can work in tandem. The focus is on maternal and child health. While no fixed stipend is paid except when women come for training to the centre, the HNEM charges for the cost of drugs from her kit with an extra 1-2 rupees for her services. Advice to pregnant women and mothers is given free. In addition to delivering preventive and curative health care, the HNEMs record all deaths with age and cause, and births with birthweights where possible. For this reporting, a small incentive of Rs 5/- per case is paid. For family planning motivation, Rs 10/- is paid. The payment was initially made out of project funds, but now DCT makes the payment. Sometimes the patients ask one of the HNEMs to accompany them to the doctor, and for that they may or may not pay her. The impact of this model of health care delivery is discussed in this paper.

Methodology

HNEM's training and functions

The HNEMs are adult women, permanent residents of the village with a minimum of seven years of schooling. Due to very low levels of female literacy (10%), it was not possible to find women with even 10 years of schooling in three out of the five villages. All the HNEMs are from families, which are below the poverty line. One scheduled cast woman and one Muslim woman are from landless families, while the other three women have 2-3 acres of dry land with a borewell which works intermittently. All except the Muslim woman are married and have one or two children. They have accepted to undergo training and do this work because it gives them prestige in the village besides helping the community. Each day that they come for training, they recite a pledge of doing this work honestly and sincerely, without any discrimination on the basis of cast or creed and without expectation of monetary reward.

The HNEMs received intensive training for two months on aspects of health, hygiene and nutrition (theory and practice), including conduct of safe deliveries, at the DCT hospital in Narsapur. This was followed by contact training- twice a week for 10 months, and twice a month for one year. The once-a-month contact training is continuing. The women bring their records of registered pregnant women, births and deaths during these visits. On-site training was also given for a year during the visits of the doctor to the villages. The DCT staff continue to make unannounced visits to villages, to reassure the community and the workers, and also assist with holding of meetings with mothers and answering the queries from the community

After one year of training, the HNEMs were given a medical kit, which included a blood pressure apparatus, a stethoscope, a thermometer, first-aid kit, and essential drugs[8], and were allowed to work in the village. The cost of the first supply of drugs was met from project funds, but the subsequent replenishments are being made by the HNEMs. A detailed guide for dispensing of drugs was provided in the local language. A baby-weighing balance was provided to measure the birth weight on day one or on day seven when the body weight approximates the birth weight[9]. More recently, the second day weight is also included to improve the coverage.

The HNEMs register all pregnant women, and advise them on antenatal care, and maternal and child nutrition. At-risk pregnancies and other cases are identified and referred. They assist the multi-purpose health worker (MPHW) who visits the village once a month, with immunization, and the 'dais' with deliveries conducted in the village. Three workers have learnt to conduct deliveries on their own. They also motivate people for institutional deliveries and family planning. Only the terminal method of family planning (tubectomy) is popular in this community.

Not being paid workers, no specific demands on their time in terms of fixed hours of work are made. They adjust their time depending on the workload – preventive and curative care, record of vital events,

deliveries, assistance to MPHW, referrals etc. Specific criteria of impact assessment for judging the performance of HNEMs are discussed later.

'Dai' training: 'Dai' training was for a period of one week, followed by periodic contact training for one or two days. In addition, four-five women belonging to different *'bastis'* (localities) in each village were sensitised on issues of health and nutrition, so that they could help the HNEMs in mobilizing the community. 'Dais' were provided with delivery kits.

Impact Assessment

The impact of the project was assessed by studying the process (functioning of the HNEMs and their acceptance by the community), as well as by the outcome. The latter included: (i) Knowledge, Attitude and Practice (KAP) survey of mothers regarding health and nutrition, before initiation of the project and three years later using pre-tested, structured schedule; (ii) nutrition status of preschool children as judged by the weight for age classification of the Indian Academy of Paediatrics (currently being adopted by the ICDS), and signs of vitamin A deficiency (Bitot's spots); (iii) morbidity among pre-school children during alternate, monsoons; (iv) number of institutional deliveries, and (v) peri-natal, neonatal and infant mortality. Morbidity and mortality surveys were continued beyond the three-year period of project funding by the Science and Society Programme of the Department of Science and Technology, Government of India.

Morbidity survey was done during monsoons in alternate years (1998, 2000, 2002), by interviewing the mothers/family during the first week of July, August and September, using a simple pre-tested, coded questionnaire. The reference period was 15 days. Mothers were asked if during the previous 15 days the child had suffered from any of the following: gastrointestinal disorders (diarrhoea, dysentery, vomiting) and its duration in days, respiratory infections (cough, cold and fever), skin ailments (scabies, rash, boils, measles, chickenpox). Information was also obtained on feeding during diarrhoea, doctor consulted, and treatment given. Reliable data on frequency of motions, which varies with each day, could not be obtained.

Data on morbidity and mortality continued to be obtained even after three years.

Statistical analysis

Data on KAP of mothers were analysed by proportions test (since there were only two groups), while that on morbidity were analysed by the Chi-square test since there were more than two groups.

Results

Process evaluation

Rural women with seven years of schooling are able to understand the causes of diseases, do symptomatic diagnosis of common ailments, and treat minor ailments using listed drugs for which a detailed user guide in local language is provided. They are able to identify at-risk cases of pregnancy

including blood pressure measurements, and some other illnesses for referral, and assess the stage of pregnancy through abdominal examination.

In the survey covering mothers with preschool children, conducted after three years of the programme, 98% mothers were aware of the HNEMs in their village, and 70% had consulted them for minor ailments such as respiratory infections (27.7%); diarrhoeas (24.1%); body ache and pain (29.1%); reproductive and pregnancy-related issues (24.1%)[2], and others including first aid (7.7%). Most (95%) were satisfied with an HNEMs treatment (though a few complained about not getting injections and free drugs), and 96% reported paying her for her services. Eighty four per cent said that she had advised them regarding antenatal care and nutrition. Out of the five HNEMs, three are able to conduct deliveries independently in the village, but others assist the *'dais'*. So it appears that the community has accepted the HNEM and utilize her services.

Outcome- KAP of mothers

Table 1 shows that at the end of three years more mothers reported increasing their food intake during pregnancy and lesser numbers reported eating less during pregnancy. Food taboos such as avoidance of papaya, and banana during pregnancy also came down substantially. The number of infants who received breast milk from the first day, as well as those who received complementary food before nine months (mostly between six-nine months; two-three reported starting by four months) increased markedly.

Table 1. *Health-and nutrition-related practices among mothers with pre-school children in Medak district of Andhra Pradesh, India 1997 and 2000*

Parameter	Initial-Winter 1997 (% respondents)	Final-Winter 2000 (% respondents)
Sample size	289	220
Food consumed during pregnancy		
More food (than usual)	12.5	43.2*
Less food	54.7	7.3*
Same quantity	32.9	49.1*
Pregnancy food taboos.	54.3	19.1*
Initiation of breast-feeding		
Day 1 within 24 hours.	16.6	59.5*
Day 2	14.9	5.5*
Day 3	68.5	34.1*
Complementary feeding between 4 -9 months	39.6	60.0
Massive dose vitamin A 1 dose	22.5	24.1
2 doses	32.2	51.4*
Immunization done more than three times- Polio	85.8	93.5**
DPT	85.8	93.5*
Measles	61.6	80*
BCG	91.7	95.9
	Nil	5.5

*P< 0.001; **P< 0.01 by proportion test

Immunization coverage (DPT, polio) was over 80% initially and increased to 93% at the end of three years. Now it is almost complete. Immunization for measles also increased from 61% to 80%. Only few mothers reported giving hepatitis vaccine, because of the cost. In the initial survey only 32.2% infants had received the recommended two massive doses of vitamin A during the previous year. This percentage increased to 51.4% in the survey done three years later. Some children (22% and 24% respectively in the two surveys) had received only one dose of vitamin A. The percentage of households who grew β carotene-rich fruits and vegetables in their home gardens or farms increased from 52.3% initially to 82.3%. Mothers said that they used these fruits and vegetables for their homes. Most mothers usually feed their children with the food cooked for the family, sometimes making necessary modifications, such as making softer rice, and cooking lentils and vegetables without chillies for infants.

In general, the mothers' knowledge about the causes of diseases, other than diarrhoea was poor. While 50% mothers knew the cause of diarrhoea, they were unable to describe the symptoms of dehydration. Most (96%) mothers breast–fed their infants during diarrhoea, and 80% gave oral rehydration with fluids such as sago gruel (73.6%); sugar-salt solution (66.6%); ORS (30.3%); tea (27.8%); rice water (17.9%), and 'dal' (lentil) water (6.5%).

While over 70% mothers in the final survey reported washing the vegetables before cutting, the adverse practice of discarding excess rice water after cooking the rice persisted in over 60% households despite repeated advice against this practice.

Malnutrition in preschool (six months to 60 months) children

Children in the age group 6-24 months tended to be more malnourished (moderate and severe grades of malnutrition) in the initial survey. Some improvement in their status was seen at the end of three years but the difference was statistically not significant (Table 2). However**,** the overall reduction in moderate and severe malnutrition was only marginal being 20.0 % initially and 17% at the end of three years. (Table 2). The incidence of Bitot's spots decreased from 4.5% to 2.3 %.

Table 2. *Moderate and severe grades of malnutrition in pre-school children in Medak district, Andhra Pradesh, India 1997 and 2000*

Year	1997		2000	
	Number	%	Number	%
Total	289	20.0	218	17.0
< 24 months old	145	25.5	110	17.3
> = 24 months old	144	14.6*	108	16.7

Significantly lower than < 24 months, P < 0.05, by proportions test

Morbidity among preschool children

Tables 3 and 4 show that morbidity (GI disorders, respiratory infections-cough, cold and fever, and skin ailments-scabies, boils, etc.) as judged by the percentage of prevalence during the two-weeks period prior to interviewing the mother, tends to be high at the onset of monsoon – July and then comes down. The Morbidity prevalence showed a declining trend over the five-years

period. Table 3(a) shows some reduction in the duration of diarrhoea. Since getting reliable information on the frequency of motions is difficult, that data is not reported.

Antenatal check-up and institutional deliveries

In the final survey, almost all mothers reported having undergone at least one antenatal check–up the distribution being: more than three check-ups: 91%; three check-ups: 1.9%; two check-ups: 3.7%, and one check-up: 2.8%. Almost all the mothers (99%) had received TT injections. The percentage of institutional deliveries increased from 37.4% in 1997-1998, during the baseline survey, to 46.5% in 1998-1999; 53.3 in 1999-2000; 49.5% in 2000-2001; 68.2% in 2001-2002; 59% in 2002-2003, and 61.9 during 2003-2004. Almost 90% institutional deliveries were in private institutions. The main reason for the home delivery is the medical cost in private institutions and lack of faith in the government hospital (Community Health Centre), which is free. Transportation problem used to be quoted earlier, but not now since all villages have autorickshaws, which can be hired.

Birth weight

Birth weight could be recorded in only 45%-50% of the cases, where the deliveries took place in the study village, or at the Dangoria Hospital. Most hospitals including the government hospital do not record birth weight. Many deliveries took place in other villages since daughters often go to their parental homes for delivery. Most birth weights were recorded on the day of delivery. Few infants, who were missed, were weighed on day seven since earlier reports showed that after initial loss, body weight tends to approach the birth weight between days 5-10. The percentage of infants born with low birth weight (<2.5Kg) varied between 18.5 and 22.3. Though this average is lower than the national average of 30%, there was no improvement over the five-year period.

Table 3. *Morbidity during monsoon in pre-school children. Percentage of children who suffered during previous 15 days, Medak district, Andhra Pradesh, India, 1998-2002*

Type of morbidity	July			August			September			Overall		
Year	**1998**	**2000**	**2002**	**1998**	**2000**	**2002**	**1998**	**2000**	**2002**	**1998**	**2000**	**2002**
Sample	**221**	**268**	**245**	**219**	**278**	**250**	**233**	**279**	**236**	**673**	**825**	**731**
Diarrhoeal diseases	47.5	18.3	8.6	25.6	7.9	8.8	11.6**	6.1**	7.6	27.9	10.7	8.3@
Respiratory infections	78.7	58.6	34.7	50.7	42.8	16.0	47.2**	41.2**	10.0	58.7	47.6	19.2@
Skin infections	19.0	3.0	5.1	9.6	3.2	4.8	7.3**	1.1	0.4*	11	2.4	3.8@

** p< 0.001; *p< 0.01 between months in a given year; by Chi-square test. @-P< 0.01 between years, by Chi-square test.

Perinatal, neonatal and infant mortality

Table 5 and Figure 1 show a marked decline in perinatal mortality. Neonatal and infant mortalities show a transient increase but a subsequent decrease. Maternal factors associated with these early infant deaths are being investigated in a separate retrospective study.

Maternal deaths

Over the six-year period there were three maternal deaths. Two of these women had been away from the study village during their pregnancy and had come just a month before their delivery to their mothers' home. They died of toxaemia (high blood pressure and fits). One woman was epileptic and died in fits.

Table 4. *Duration of diarrhoeal diseases; percentage of children, Medak district, Andhra Pradesh, India, 1998, 2000 and 2002*

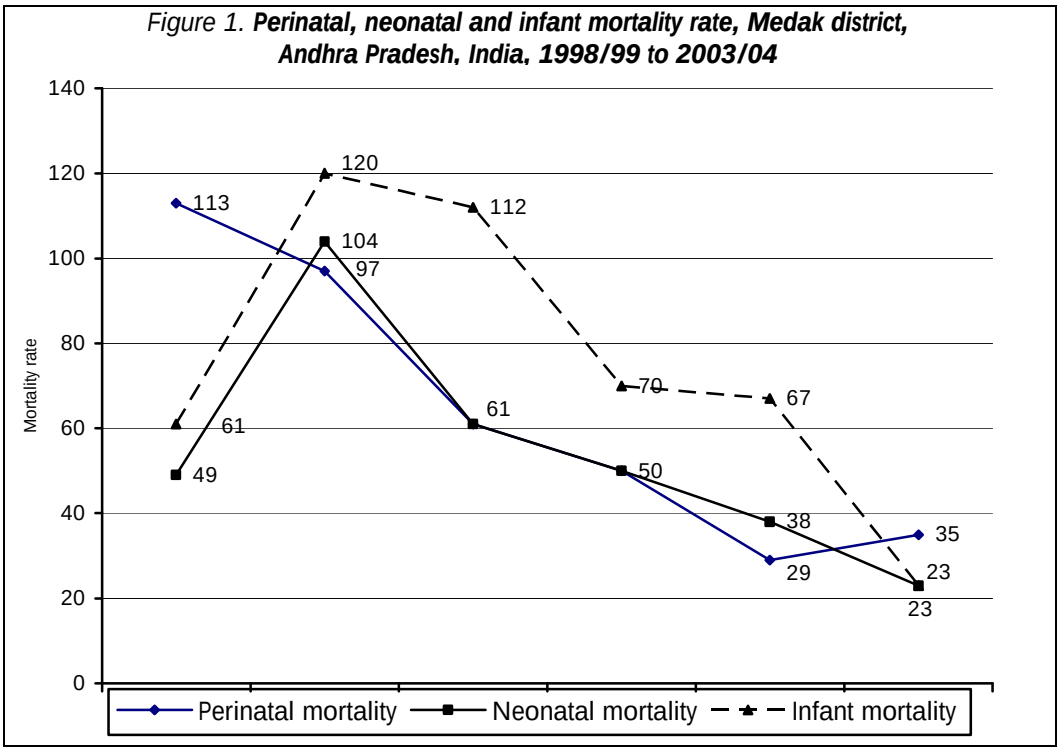
Days of diarrhoeal disease	1998	2000	2002
One	0.8	0.7	0.1
Two	5.1	2.8	4.8
> = 3	26.8	10.5	3.4

Table 5. *Perinatal, neonatal and infant mortality, Medak district, Andhra Pradesh, India, 1998/99 to 2003/04*

Event/year	1998/99@	1999/00	2000/01	2001/02	2002/03	2003/04
Total deliveries	88	124	99	126	105	86
Institutional deliveries (%)*	41 (46.5)	66 (53.2)	49 (49.5)	86 (68.2)	59 (56.2)	52 (60.5)
Livebirths	82	124	98	124	105	85
Still-births	6	-	1	2	-	1
Deaths < 7 days	4	12	5	6	3	2
7-28 days	-	1	1	1	1	-
28 days – 1 year	1	2	5	2	3	-
1-6years	1	2	2	-	-	-

@ Data from June 1998 to March 19999 * During 1997/1998, there were 37.4 institutional deliveries

Figure 1. ***Perinatal, neonatal and infant mortality rate, Medak district, Andhra Pradesh, India, 1998/99 to 2003/04***



	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003 –2004
Deliveries	88 *	124	99	126	105	84

* Deliveries from June 98- March 99

Data from June 1998-March 1999

Acceptance of family planning

In the initial survey 31.6% mothers had undergone tubectomy- the only method of family planning used. In the survey done three years later, the percentage increased to 41.4%. The women adopted no other family planning method. The unmet family planning need as judged by the percentage of women who wanted to adopt family planning but could not do so due to pressure from elders or their husbands, or difficulties like no one to take care of home and look after the children, increased from 10.7% to 15.5%.

General observations

While the HNEMs interacted with the mothers individually or in small groups, they lacked the confidence to call mothers' meetings or organize cooking demonstrations on their own. The project staff had to help them with these activities.

One of the HNEMs was from the scheduled caste community, and the other a Muslim woman, but the higher thost from cast Hindu families utilized their services, which was a matter of pride for them. Right from the beginning, the HNEMs were told that they were serving the community and may not earn much money. They accepted this and sometimes let go the charge for inexpensive drugs if the patient was poorer than them. Initially, the HNEMs kept many drugs including antibiotics, but later they kept only a few less-expensive ones of common use for dispensing and advised the patients to buy the others from the market.

The rapport between the HNEMs and the *dais* was good. The *dais* helped the HNEMs in identifying pregnant women, advised the mothers on antenatal care and made sure that breast-feeding was initiated on the day of the delivery if not within one hour. If the HNEM was away, the *dais* recorded the birthweight with the help of some educated person. Sometimes the mother-to-be asked the HNEMs to be present during the delivery conducted by the *dai*. In one of the villages, the HNEM though most intelligent of the group, tends to feel shy of reaching out to the community. Besides she has two small children and finds it difficult to go out of the house. The *dai* encourages the community to consult her and take her advice. She also acts like a big sister and scolds the concerned HNEM for not being bold.

Discussion

The HNEMs are a human resource for the village. They continue to perform their domestic and economic activities like farming for self or working as wage labourers. While no fixed hours of work are demanded from them, they know their responsibilities and allocate time as needed. They do their job sincerely. This is a low- cost model of health care delivery in villages. However, institutional support (private or government hospital, health centre) and continuing education are necessary for a grass–roots health workers' programme to succeed. In all villages, the selected women were the only educated women, who were permanent residents (daughters-in-law) and willing to undergo training and work as health workers. In some of the villages there were couple of upper-class, educated and relatively better-off women, but they refused to undergo training and work as HNEMs.

One of the limitations of the present study is small coverage- only five villages (population around 4 400). Many women move during pregnancy from their husbands' homes to parents' homes and vice versa, which may be outside the study area. Better impact of the health workers' intervention would be possible if the captive area was larger and there were no escapees during pregnancy. This model has the potential of being replicated through the ICDS. Since the *'anganwadi'* workers (AWW) in ICDS are already trained in some aspects of maternal and child health and nutrition, additional sound training in symptomatic identification of common diseases, at-risk cases, their causes, prevention and treatment would be needed to enable them to function as health workers. Alternatively, a separate HNEM can play a complimentary role and fill in the gaps in services extended by the AWW.

Private non- profit organizations, which do not receive any support from government,

can also adopt this model, though some financial inputs for giving the stipend during the training programme and supply of medical kits initially would be required. Some financial support towards payment of incentive money for recording deaths and births would also be required. It may be advisable to have two trained workers per village, so that if one goes away the other is still available. Recording of birth weight should be made mandatory for all institutions- both government and private.

The observed improvement in mothers' knowledge of health and nutrition, particularly the latter, is encouraging. This however was not reflected adequately in child nutrition though some improvement in moderate and severe malnutrition in children 6-24 months old was seen. The degree of malnutrition in children seen in this study is comparable to the values reported recently for Andhra Pradesh[10]. Though maternal awareness is important, constraints of access to and affordability for nutritious diet, have to be addressed if maternal and child nutrition have to improve. In the present study most mothers were below the poverty line, illiterate and engaged in farm work, and hence further analysis correlating socioeconomic factors with child nutrition could not be carried out.

The small sample size prevents definite pronouncements regarding infant mortality, but declining trends in perinatal, neonatal and infant mortality are apparent.(Figure1). The transient increase in neonatal and infant mortality may be due to saving of weaker infants at the perinatal stage, particularly reduction in still births (Table 3, Fig.1). Andhra Pradesh has the dubious distinction of highest infant mortality among the southern states of India[11,12]. The relatively high infant mortality figures (except during the last year 2003-2004), despite the fact that almost 90% mothers had undergone more than three antenatal check-ups, and had received TT injections, iron folic acid tablets and advice on diet, shows that the problem is complex. The maternal factors associated with perinatal and neonatal mortality in this community are being investigated. Effective implementation of the ICDS with the component of supplementary feeding for mothers may help. The selected villages do not have the ICDS. Most mothers in this community drink *'toddy'* (fermented palm juice mixed with stimulant drugs) daily. The effect of this on pregnancy outcome needs to be examined. Since most surrounding villages are covered by the ICDS, it was not possible to include/control non-intervention villages. The credit for good immunization coverage must go to the efforts of the state government.

The reduction in morbidity among preschool children is also encouraging. Apart from the role of HNEMs in advising on hygiene, the pre-monsoon anti-diarrhoea campaign conducted by the DCT, in these five and other villages, with the help of students in the village, through handbills may also have contributed. The reduction in respiratory infections without specific intervention may partly be due to relatively drier monsoons during 2001 and 2002. Surprisingly, pneumonia is rarely seen and is not the major cause of infant deaths as it is in some communities.

While DCT continues to support the HNEM project in the five villages, the

possibility of replicating this model through the *'Velugu'* scheme of AP government, is being explored. The aim of the *'Velugu'* project is to reduce poverty among the poorest of the poor, improve the health and nutrition status through a trained grassroot worker, and to effect better health care outreach.

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