Health problems and practices of a community are deeply linked with its ecological, social, economic and political organization. Health services are but only one of the many factors that influence the health status of the people in any setting. An understanding of the health status of a community is therefore more meaningful if attempted within the overall context of the social, economic, ecological and political system. Within this perspective, our study of the status of diarrhoeal diseases in children, of its consequences, of how people perceive and respond to diarrhoea brings out some critical correlates of diarrhoea. These when incorporated into the national diarrhoeal disease control programme will strengthen the programme. However, before we discuss these correlates and their implications given the specificity of the area studied, it is important to keep in mind its specificities.

The population of Tigri, one of the nearly 700 slums in the city of Delhi is of interest to the social scientist for many reasons. It is envisaged that nearly 40 percent of India’s population is likely to be living under such conditions during the next 2-3 decades (Ministry of Urban Development 1988). It is obvious then, that the focus has to be on populations living under the conditions of poverty and deprivation of different levels.

The life in an urban slum such as the study population is characterized by two basic factors. A migrant population is forced to exist on the periphery of the city with extremely restricted
facilities and access to services. Secondly, their very different cultural backgrounds create an interface between rural and urban cultures which has an additional influence on their strategies for survival and health seeking behaviour. These interactive factors in turn determine the quality of their health and the disease patterns of the family and individuals, the response to diseases and their consequences for the individual, the family and indeed, the community as a whole.

Some insights were gained into what triggered the movement of the inhabitants of Tigri from their villages. These are the need for gainful and sustainable employment and less frequently, the need to 'start again' afresh after heavy losses incurred in business, theft or family disputes.

Most men seem fairly satisfied with their decision, those with government jobs, more so. The women seem less certain, they miss the familiarity, the openness and the cleanliness of village life; they find less to do when husbands are away.

There is a subtle but distinct change in the lives of women with a strong ethnic influence. The women from Rajasthan and Uttar Pradesh, under the pressure of their changed circumstances fetch household supplies, visit their childrens schools and take them to physicians when they are ill. On the other hand, women from Bihar continue to live as if in their native village, primarily because their men want it to be so. In these households, supplies, interaction with childrens' schools and treatment for ailments are the exclusive preserves of the males, the females role being
restricted to within the household.

Apart from employment, men are happy about the lesser interference of family and other village elders in their life, about greater access to medical care and to a lesser extent, about educational facilities. Gainful, stable employment and improved housing remain a strongly felt need as is a cleaner environment and availability of latrines close to the households. The men vary in their clothes, hair styles and the way they communicate. The more confident relatively better groomed men are quite in contrast with majority of women who are poorly clothed and ill kept, reflecting their lower status within the family.

7.1 Some features of the slum
Organization

A truly representative indigenous leadership is vital for the development of any community be it small or large. There is no organized leadership at the community level in Tigri. Some individuals have projected themselves as the local pradhans with the support of small groups of men. They are not democratically elected nor do they have universal support. Noticeably, women totally refuse to identify with these individuals, men find it more easy to accept aggressive individuals becoming self appointed 'captains'. Admittedly, these so called 'pradhans', do sometimes succeed in mobilizing people to extract concessions from the politicians and indeed, the agencies working in the area are afraid to earn their displeasure. They charge the community small sums of
money for getting jobs done through the government, local contractors or non governmental organizations. They do serve a useful role as a contact between the community and the agencies involved with development. This fact only serves to emphasize the point that a more responsive, democratic community leadership would serve a very important role in improving the quality of services through schools, dispensaries and public works in the area. The existing system of self appointed community leadership supported by opportunistic politicians, does not effectively involve people in the development and running of local institutions that are meant to serve them.

Education

This study is too limited in scope to permit an indepth understanding of the process of education in Tigri. Nevertheless, some impressions gained are noteworthy. Access to primary schools is good but the nearest secondary school is three kilometers away and this seems to particularly affect the schooling of girls. The population views the primary schools run outside the government system more favourably and identifies with these more closely. Several local young girls are involved in these schools as attendants and helpers and some elderly women are actively involved in their management. The governmental system is noticeably lacking in any participation or interaction with the community.

It is important to note that the teachers within the government system have little belief in the abilities of the people
in the community and consider all the problems of enrollment and dropouts as essentially those of the community itself. Quite in contrast, the teachers in the non governmental primary schools showed greater belief in the abilities of the community. They enjoy greater access to and interaction with the people as many local women are involved with them in different capacities.

Many studies in the past have highlighted the fact that for basic services to be effective, be in education or health, their development and management must be an active concern of the community; the successes and failures of the schools must be those of the community as a whole. The observations from this community clearly indicate that although we have created a vast infrastructure, these institutions are largely isolated from the people they claim to serve. One of the key factors that this situation influences are the rates of enrollment and dropouts from the school system.

Has migration to an urban setting changed attitudes towards education, particularly of the girl child. The rate of school enrollment is higher than in the villages, partly due to easy access, however, half of those enrolled drop out over the next few years. The reasons for low enrollment despite easy access, for female children are both attitudinal and administrative such as the need to obtain birth certificates for children who are mostly delivered in the home. The reasons for premature withdrawals are noteworthy. Most often, children are struck off from school rolls when they visit villages for several weeks or months due to
marriage, death, illness or festivals. Educating the girl child is still not viewed as an asset by most as it only creates more difficulty in finding a suitable match and the need for a larger dowry. On the other hand, a girl is useful in performing household chores or looking after the younger children. Some of these reasons for school dropouts could be avoided in a more informal system of education, one that is more responsive to the needs of the population. Our educational system functions at the extremes, the totally non formal adult literacy programme and a primary school system which is too rigid for the social realities of people living in slums. A more informal system of education at the primary level is needed if the purpose is to broaden the base of education and not only to reward the most competitive individuals in the society. Secondly, the community must have a greater participation in the development and management of the school system.

Incomes and Occupation

An income of Rs. 958 per month is the current recommendation of minimum wages for an unskilled worker (HT 1992). In this community, nearly half the households had incomes below this range.

Although this data is limited in scope for a full understanding of the determinants of low income, some trends are noteworthy. Fathers literacy did not correlate with higher income, suggesting that school education, due to its lack of relevance for employment, paradoxically may decrease the likelihood of sustained, reasonable employment, at least in this setting. This can be
explained by the fact that as the paying jobs at these sites or in small workshops are available to skilled workers therefore those who pick up skills early in life rather than high school certificates earn more. In Tigri incomes are also higher or almost the same in the unskilled than among the skilled workers. This is not difficult to explain as work as labourers in construction sites has been liberally available in this city while jobs that require education or skills are not. Even in a setting where literacy does not translate into better or more sustained employment, caste was strongly correlated to low income, the low caste, being the worse affected followed closely by other castes which mainly comprised of the other backward castes.

**Nutritional status**

The remarkably high rate of wasting and stunting with nearly 17 percent households having at least one wasted child (below -2 SD) and with 45% of households with at least one stunted child, indicates the poor quality of life in this slum. Considering the definition of wasting according to weight for age as defined by the Indian Academy of Paediatrics (IAP 1975) more than 10% percent children in the study households had grade III malnutrition. This rate is among the higher levels observed in different parts in India (Gopalan 1989). Nutrition surveys in India, Colombia and Morocco have revealed that the nutritional status of the poorest urban socioeconomic groups is worse than that of corresponding poor rural groups in the same countries (Gopalan 1989). Though even our
data shows high morbidity rates in this setting compared to those obtained from nearby rural areas (Ghai 1969, Bhan 1986), it is important to indicate that such comparisons need to be interpreted with caution. The slum population constitutes a specific category of the rural population, possibly the most deprived, who are forced to migrate and before it is said that they are worse off than they were in villages it is necessary to obtain data on the poorest in the villages.

The importance of social, cultural and economic factors in the etiology of malnutrition, seen in this study is consistent with early Indian reports. Thus, illiteracy of the mothers, low caste, domicile of Bihar and low income were correlated with low household nutritional status. Amongst the Biharis, it was observed that their practices of living and maintaining the household including the mothers appearance compared to the other groups was definitely more careless. The disease burden among children was high and this has been previously shown to influence children's nutritional status (Mata 1977, Black 1984a, Rowland 1988). Anorexia during diarrhoea was an important factor limiting food intake.

Importantly, in terms of the nutritional status, children of the low castes were most severely affected; the other castes performed somewhat better than the low castes but distinctly poorly when compared to the upper castes. Fathers literacy was not correlated to nutritional status of children. This seems consistent with the lack of a direct correlation between fathers literacy and household income. It is noteworthy that none of the educated
mothers had a severely malnourished child although they were all of low caste (Table 4.1.3). We explored these mothers and except for one who had dropped out of school in the 12th standard and was qualitatively better, no such differentiating features could be identified between the others and those who had not received any schooling indicating that the level of schooling is also important. Family case studies showed that the decisions regarding feeding, about treatment seeking for children were made by mothers with the exceptions of Biharis where decisions that require interactions outside the household are made by men.

As pointed out in the review of literature extensive longitudinal studies have indicated the relationship between socioeconomic levels and the growth and development of children (Gopalan 1989). In our study wasting had maximum correlation with socioeconomic groups followed by stunting. What is critical to note is that in Tigri the highest income group was 1500 and above and in this only four families earned the maximum of Rs. 2000 per month. Table 4.1.3 which compares the nutritional status in four income groups does not bring out any correlation between nutrition and income groups within Tigri the reason being that the majority live below subsistence level. It is only when incomes are clustered into two groups that the relationship begins to emerge (Table 4.1.4).

Food intake

Case studies show that in Tigri, food intake of children is low. Previous Indian studies have found deficit of overall intakes
of staple Indian foods to account for both the calorie and protein intake (Gopalan 1971). The decreased food intake, as seen in family case studies seemed related to low income. This results in low food availability in the home and to lack of fuel which limits the number of mixed gruels that can be cooked for the children. The lack of information among mothers makes the response towards feeding during illness of the child less effective. The reduced food intake during illness in some and the failure to increase food offered during convalescence to promote catch up growth, thereby contribute to the malnutrition.

7.2 Diarrhoea in underfives

The diarrhoea incidence rates of 3.4 episodes per child per year are consistent with reports for other Indian studies except the report by Bhatnagar et al (Bhatnagar 1986) in which an attack rate of 7 per child per year was deduced from a two week period prevalence in a similar slum population but in this study the major flaw is that both the incident and prevalent episodes were considered in the numerator. In our study diarrhoea incidence was estimated using household and the individual child as the unit. There was considerable variability in diarrhoeal incidence during childhood among the study households. One sixth of the households had extremely low attack rates and over one third had very high rates of >4 episodes per child per year (Table 4.2.1).
7.3 **Socioeconomic and cultural correlates**

Several factors, on an initial examination were seen to be related to high diarrhoea incidence. These include a wasted child in the household, origin from Bihar, illiteracy of the father and mother, low income or non possession of valuable goods. However, many of these factors could be co-travellers of which only one may be related to diarrhoea.

Among factors correlated with high diarrhoeal attack rates, malnutrition was an important factor (Table 4.2.2). Among the malnourished children, only wasting but not stunting was correlated with high diarrhoea incidence. The findings of several earlier studies relating antecedent malnutrition to diarrhoeal incidence show conflicting results (Gordon 1964, Ghai 1969, James 1972, Tomkins 1981). However, studies consistently demonstrate that malnourished children experience more severe diarrhoea and the risk of death due to diarrhoea is about 20 fold higher in malnourished than in well nourished wasted children (James 1972, Tomkins 1981, Chen 1981, Black 1984b, Bhan 1986, Bhandari 1991). Control of childhood malnutrition is thus a key factor towards reducing the incidence of severe diarrhoea and related mortality. Intensive nutrition education may help reduce diarrhoea and its severity in these children; however, low income, caste and illiteracy among mothers, the other determinants of poor nutritional status identified in this study require social and political action.

A multi variate analysis was performed and after control for the confounding variables, four variables were independently
related with high household diarrhoea attack rates; household income, mothers literacy at a significant level and a weak correlation with caste and family size. In earlier Indian studies also, low family income, maternal illiteracy, living in kuccha houses, high number of persons sharing a room, large family size were associated with high diarrhoeal incidence in children (Datta Banik 1969, Ghai 1969, Bhatnagar 1986).

Households that owned their own hand pumps experienced less diarrhoea than those that obtained water from a public hand pump in the community. Case studies of these households revealed that the availability of water is much greater and the time for which water is stored before it is used is much shorter when hand pumps are owned and as a consequence, located inside the household. Thus, provision of potable, tap water with ready access to water close to the household is important because it ensures greater water availability and reduced storage time. The findings of earlier studies have also highlighted that water must not be merely available, it must be so in sufficient quantities and for sufficient number of hours in a day, so that the intra household contamination with prolonged storage is reduced (Esrey 1985).

That ORT programmes as implemented at present have little nutritional impact has been clearly demonstrated in international studies and in ICMR supported studies in Delhi and Calcutta (ISG 1981, Deb 1983, Ghai 1988, Walia 1989). The very fact that the government of India documents refer to the diarrhoeal disease control programme as the 'National ORT Programme' clearly
indicates that malnutrition and its prevention is not a key element of the programme strategy. Action is therefore required on a broader front; sustained minimum wage to ensure fulfillment of minimum food needs, potable water supply, proper facilities for disposal of waste and mothers literacy; only in this background will additional efforts towards, safe weaning education be effective. Considering the enormity of the challenges this poses the mere slogan of continued feeding during diarrhoea in the national diarrhoeal disease control programme will have no nutritional impact. The diarrhoeal disease control programme though specific in its intervention cannot function in complete isolation from this reality. It is important to realize that the programme has to be linked with a multi pronged development strategy.

Hand washing has been shown in several studies to reduce transmission of diarrhoeal pathogens within a household or a community (Khan 1982, Clemens 1987). However, to be effective hand washing has to be frequent and appropriately timed. In the survey, a high proportion of mothers claimed to be washing hands with water, with soap and water or mud but the timing was related more to cooking of food, defecation and before eating but few mothers claimed to wash hands before feeding the child or at the time of offering it water. This is consistent with the low frequency with which mothers implicated contaminated food or water as the cause of diarrhoea or of recurrent diarrhoea. Food is mentioned as related to diarrhoea but as being too 'hot' 'cold' or 'difficult to digest', the perception of germ theory as basis of disease in
relation to food or water is not commonly perceived.

The hand washing behaviour seems triggered more by a sense of what is pure or clean with a religious connotation and not by perceptions of avoiding germ contamination. The communication through mass media, through health care providers and through the school education system currently mentions hand washing without a focus on when it is most beneficial and it is therefore, unlikely to be optimally effective. In such an approach, mothers possess knowledge that hands must be washed, but the timing is determined by their own perceptions of its purpose. Education must first create an understanding that diarrhoea is linked to contaminated food and water and that hand washing must be particularly practiced after defecation by self and the child and before offering the child food or water. Clearly, overall education of men and women must be the process through which this understanding is achieved. Since the literacy among the mothers rather than the fathers was found to be correlated with household diarrhoea burden it does not necessarily mean that men should be excluded from educational campaigns. In Tigri, the indepth study shows that men influence the role of mothers not only through economic but also through information, advice and order.

7.4 Health Seeking Behaviour during Childhood Diarrhoea

Diarrhoea in Tigri, occurs due to a wide range of causes like the season, teething, food and dirt. Although environmental dirt, eating mud and food consumed outside the home are described by some
mothers as being associated with the disease the linkage between contaminated food, water and diarrhoea is not perceived.

Similarly, the role of malnutrition in recurrent diarrhoea is never mentioned (Table 5.1.4).

The population has ready access to a pluralistic health care system; both traditional and modern systems coexist here. In this regard, the situation is strikingly different from that in rural India.

Home remedies are used in a small proportion, nearly 60 percent of diarrhoeal illnesses are treated outside the home. This may in part be due to the easy access to health care providers within the neighbourhood itself.

However, the common pattern of seeking of help from health care providers during diarrhoea in Tigri is need based. The desire to stop diarrhoea is an important felt need among families. A strong belief exists in the community that diarrhoea can be stopped when the doctors and medicines are right. This results from the perception of diarrhoea even when mild as being cumbersome for the mother who has to wash the child and his clothing and pacify him frequently. Mothers cited diarrhoea to be the most common as well as serious illness in children during the survey.

Social and economic factors and illness characteristics influence the decision to seek or not to seek care; higher income, literacy among mothers, increase the likelihood of treatment during diarrhoea. Similarly, episodes considered more severe by mothers ie those associated with fever, anorexia, vomiting, watery stools
≥ 7 per day or diarrhoea lasting longer than 2-3 days are more likely to seek treatment. Younger infants and males are the host factors associated with more frequent treatment seeking.

The WHO criteria for when a family should take a child with diarrhoea to the nearby health care provider are admittedly arbitrary. These include, presence of one or more of the following; many (7 or more) watery stools, repeated vomiting, marked thirst, eating or drinking poorly, fever and blood in stools. In this study setting, a fair degree of agreement between mothers perception of when to seek help and the programme criteria for referral during diarrhoea was observed through the case studies and supported by the survey findings. Using these criteria of severity out of the 261 (89.7%) episodes categorized as severe by these criteria, help outside home was rightly sought in 162 (62%). However, 99 episodes (38%) characterized as severe did not receive treatment from the health care providers.

Three major factors were revealed to be associated with such behaviour. Of these 99, nearly half were considered mild by the mothers. Another 20% percent had financial constraints that prevented a visit to a health care provider; this may be remediable only if the health care is totally free. Nearly 15% could not go due to work pressures at home and 15 percent of such non treatment seekers had recurrent diarrhoea and the mother after seeking treatment repeatedly in the past now felt the cause was beyond her and the physicians control. Surprisingly, children with recurrent diarrhoea, although at a higher risk of nutritional decline, are
not listed in the programme indications for referral. The prevention of these types of recurrent episodes requires changes in social, economic and environmental conditions outside the scope of the programme with its limited, narrow focus on ORT. Nevertheless, it may be useful to promote interaction of such high risk children with health care providers provided the latter are equipped with skills to impart meaningful and practical nutritional and other diarrhoea prevention education.

Severity of illness and the associated cost largely determine the choice of the source of treatment. Overall, private sources of care are preferred for giving more effective medicine; often cited mothers statements are, 'cures faster', 'lesser waiting time' and a more patient hearing despite the greater cost of care. Thus, when stools in the local taxonomy are 'patle patle', 'pani wale' or watery, treatment is more likely sought from private health care providers; when diarrhoea is mild or associated with teething, treatment is sought with increasing frequency from the government dispensary.

Family income influences the choice of health care provider. The very poor are more likely not to seek treatment or to use a cheaper source of care e.g. government dispensary or the mobile van for their low cost sometimes, even when the illness is perceived to be severe and despite a belief that their medicine is less effective than that provided by private practitioners. Physicians in practice are also preferred if they give credit, highlighting the importance of the economic factor. Interestingly, there is
extreme reluctance to seek treatment from hospitals even for prolonged or recurrent diarrhoea because of the difficulties involved. Only 3% of diarrhoeal episodes lasting longer than 14 days sought treatment from a hospital.

There are several implications of this paradoxical situation. The government claims to spend significant resources on its health care infrastructure and service delivery and considers this an achievement. Yet more and more people, even the very poor are turning away from this source of health care because it does not satisfy their needs for compassionate and patient dialogue about their health problems with providers of health care. This reveals a grave lacunae in the way physicians are trained today and services organized which are self centered rather than people oriented.

In the diarrhoeal disease control programme, training is given to those working in government institutions when over 90% of persistent diarrhoea cases and most acute diarrhoea cases are actually treated by physicians of the modern and traditional systems working in the private sector. Thus, the focus of training needs to be broadened to include these health care providers and community health workers. The current orientation of medical practitioners of modern medicine and their institutions is such that the less privileged find them distant, unfamiliar and unfriendly. Yet, most of the considerable inputs for training remain focussed on them. A serious consideration needs to be given to extending training to traditional practitioners and others in
the private sector.

The low esteem for government aided health care services is related, as seen in case studies, to several factors which need to be remedied. Poor communication with patients which is mainly one way and physician availability which suits the physicians more than the patients. The private physicians on the other hand are seen to be more communicative, listen to mothers, spend more time with the patient and are generally better liked even though more expensive. Although, the possibility that any free or low cost service is likely to be less appreciated may be a contributory factor, a perceptibly better communication with patients is seen among private physicians and this seems to fulfil a strong felt need among the people. Physicians training is lacking in awareness of social realities and in effective communication. This is particularly important to rectify because the poorest people can ill afford private care and are also more likely to have recurrent episodes. Government health care must therefore be humane and skilled to an extent that it encourages its use by such subgroups.

The decision for seeking treatment is strongly influenced by cultural factors; woman are encouraged to act on their own by Rajasthani and Uttar Pradesh husbands but Bihari women must wait for the husbands to return, leading to delay in attention to emergencies. In a pathetic case, several Bihari women collectively took courage to seek treatment for a febrile child in the absence of his father. In the absence of a joint family system and thus elders at home, neighbours are an important influence in treatment
seeking. Although early help seeking during diarrhoea is common, it is of concern that the treatment of diarrhoea in this community is characterized by an alarming high rate of drug use and relatively low rate of ORT use. This raises several issues regarding the prevalent medical practice which is the best educator of people.

According to expert opinion and WHO recommendations, no more than 25 percent cases should benefit from antibacterial therapy and anti diarrhoeal drugs are of no clinical use. Indeed, much of such therapy may cause potentially serious side effects (WHO 1990). Despite this most practitioners in Tigri heavily depend on drugs (Appendix 6).

Physicians perceive that mothers expect drugs as they believe these to be effective. By prescribing drugs they reinforce this belief and this vicious cycle continues. Interviews with physicians seem to indicate that they really believe that almost all diarrhoeas would benefit from drugs. Why has the programme failed to convince them with its own perspective of the role of drugs? Most physicians claimed never to have seen and heard the evidence, only the recommendations that drugs are ineffective. Lack of large, multicentre trials, evaluating value of empiric antibiotic therapy may be one such limitation. On the other hand, the unscrupulous drug companies are more effective in persuading physicians, using poor quality research carried out by some senior physicians in disregard of the vigours of research methods. These studies are often funded by the companies themselves, through the salesman of medical knowledge, the medical representatives. Several physicians
working in Tigri reported learning about drugs only from the medical representatives.

The laws of the land are such that they permit use of drugs which have no impact. The manufacturers do not have to prove that these drugs actually work. Not only is the information on drug efficacy poorly communicated by the programme to the actual users, education on diarrhoea management is currently focussed only on health staff within the government service who seem to cater only to a minority of episodes. Those who actually treat most of the patients are only reached by the industry.

7.5 Feeding practices
Diarrhoea is often followed by growth faltering (Martorell 1975, Black 1984a, Rowland 1988, Wittenberg 1989) and because recurrent, severe or prolonged episodes may change marginal to severe malnutrition, feeding behaviour during diarrhoea assumes special significance. Feeding during diarrhoea may be appropriately considered in the context of child feeding practices in general.

A common limitation of many earlier Indian studies on infant feeding practices has been that these were based on recall information, unsupported by any direct observation (Arora 1985, Gayatri 1988, Kumar 1989, MOHFW 1990). In this study household visits provided an opportunity to observe children and adults eating a meal at different times of the day. However, physical constraints did not permit observing food intake over extended intervals of 8-12 hours in a day in the same children. Instead,
repeated visits to the households of children with diarrhoea were possible and made on the same day as long as new observations were yielded.

Colostrum is discarded by most mothers as in other communities; physicians and health educationists and International agencies often emphasize this issue. In Tigri, this practice was not associated either with lactational failure or with increased use of supplementary foods during the initial 3 or 4 months of life. The concern with regard to discarding of colostrum voiced globally therefore seems disproportionate to the actual risks this practice involves.

On the other hand, although the practice of initiating breast feeding infants is universal as seen in other studies (Gurudeva 1982, Gopujkar 1984, Vishwanathan 1990), there is very little exclusive breast feeding practiced in this setting in the initial 4 to 5 months and such behaviour has recently been convincingly shown to increase risk of diarrhoea, to make it more severe and to increase risk of death (Chitkara 1986, Bhatnagar 1986, Victora 1987, Victora 1989). There is general complacency about breast feeding in India but this study shows that there is reason for major concern. It is true that most mothers breast feed, but that the use of ghuttis, tea, plain water, glucose water is very common during the initial 4-5 months is not widely recognised to be a major health hazard in India.

The extent of lack of exclusive breast feeding in the initial 4 months needs to be determined in different parts of India. If the
situation is as in Tigri, then feasibility of educational programmes to promote exclusive breast feeding during the initial 4 months should be explored.

Some insights into why mothers in this cultural setting use 'non food additives' in early infancy were obtained. Except in the initial 2 or 3 days when these are used to avoid offering breast milk and for easy passage of meconium these substances are offered as a general tonic, to avoid common problems like excessive crying, constipation or flatulence or to keep the baby healthy. Further, water is offered to counter excessive heat, a belief that was shared by most physicians until recently, when Indian studies showed that healthy infants who consume adequate breast milk to satisfy their energy needs receive enough fluid to meet their fluid requirements even in hot and dry environments (Almroth 1978, Almroth 1990, Sachdev 1991). Whether the load of the minor problems is excessive in this population and the extent to which they are linked with the additives themselves and to the practice of rejecting colostrum needs to be assessed.

The determinants of use of such substances in early infancy and their nature may vary in different parts of India; in rural or urban sites and in different cultural groups. Educational approaches can be evolved only when such information is available. Studies may then address to what extent such behaviours are modifiable through education and to identify factors facilitating or inhibiting compliance. Further, in the initial 3-4 months of life, health care providers could provide critical support to
mothers to respond to several minor complaints babies have and thus avoid the need for these harmful remedies.

Based on interviews, group discussions and case studies, a possible explanation is proposed for the ineffective weaning in Tigri. There is widely shared perception that supplementary foods during the 6-12 months age groups are only required to familiarize the child, to prepare him or her for feeding at a later date. Beyond one year of age, lack of energy dense feeding and of feeding smaller than required amounts results in low food intake.

Fuel, mostly kerosene oil is not enough for the households. This leads to a behaviour where major cooked mixed meals on an average are low in frequency. Although the average number of total feeds in a day for children over a year of age is about 5-6, these mostly comprise of precooked snacks purchased from nearby shops and vendors and are often of low density like rusks, 'phen' or 'phulwadis'.

Nearly one third of households did not have oil or sugar during spot checks, few had legumes although most claimed to buy these on a daily basis. These are essential to provide an energy density of about 70-80 Kcals/100g with rice or wheat based gruels and this caloric density is required to achieve optimum food intakes when the feeding frequency is 5-6 times a day (Creed 1990). Previous studies from India have clearly shown the relationship between socioeconomic deprivation and caloric intake. It is well established that if children consume the required amount of staple Indian foods; protein requirements are automatically
fulfilled. However, when caloric intakes in the low energy dense staple diets are low, protein intakes also suffer and lead to widespread stunting or height retardation commonly seen in city slum dwellings (Gopalan 1973). A similar situation seems to prevail in this setting.

Educational programmes to promote increased use of energy dense gruels may improve food intakes in some households but in a significant proportion the problem of low income causing low food availability and fuel for cooking will restrict the likely impact of education. On the other hand, information to mothers regarding weaning foods may be most beneficial when sustainable minimum income is achieved.

The diarrhoeal disease control programme is attempting to promote 'continued' or 'uninterrupted' feeding during diarrhoea assuming that decreased maternal effort at feeding the child is a common phenomenon. The case studies at Tigri of infants and children with diarrhoea suggest that while a few mothers withhold specific foods or introduce new foods considered helpful, or alter the method of preparation of usual foods, majority of the mothers make the usual effort at feeding the child. A significant proportion actually increase their effort than prior to the illness. On the other hand, anorexia was significant and limited the intake of the offered foods in one third the episodes. The case studies also show that the anorexia is restricted usually only to the febrile days usually the initial 2 or 3 days, and during the remaining illness, foods are well accepted by children.
However, the low energy density of foods offered, as an extension of the pre illness feeding behaviour continues during diarrhoea; this limits the energy intake which falls short of the enhanced requirement due to associated malabsorption and the need for catch up growth during and immediately after diarrhoea (WHO 1984b). The programme is trying to ask mothers to incorporate an extra meal during convalescence ie during the phase when stools are beginning to get normal. In Tigri, there was no evidence during the case studies that mothers were offering food more frequently or in larger amounts than they would usually do during this phase. Mothers did try harder when they found that the child had anorexia but when diarrhoea and appetite improved the extra effort ceased.

The implications of these observations are that the message of 'continued feeding' during diarrhoea as a key strategy of the diarrhoeal disease control programme will have no impact unless child feeding on a routine basis improves. This requires equitable social and economic development not a mere slogan of 'continue feeding during diarrhoea'.

7.6 Oral Rehydration Therapy

Although it is apparent that ORT can only be a single element of a larger package required to prevent diarrhoea and reduce its severity or the risk of death, an important purpose of this study is to view the current efforts at ORT promotion in the social context of this community.

Defining an ORT user is a complex task. For example a mother
who offers fluids for the first time to the child during the illness even in small quantities is an ORT user by the WHO definition because it represents increase from usual intakes. On the other hand, a child already receiving fair amounts of various fluids both in health and during diarrhoea but with no actual increase during the latter is categorized as a non user even though the actual fluid intake may be relatively greater. This important limitation must be considered in interpreting any studies on ORT use.

In Tigri, a little less than one third of all diarrhoeal episodes in the study children were treated with ORT. According to the programme perspective this represents a low use rate of ORT. It is possible, that sufficient fluid intakes are achieved in a higher proportion of episodes that get arbitrarily classified as ORT non users because of the problem of defining an ORT user.

Higher rates of ORT use were found in male children, literate mothers and fathers and higher incomes. Season is important as fluids that are considered cool and good during summer are believed to cause cough in winter. The advice to use warm water for ORS in winter may increase ORS use during that season. Further, mass media must not altogether stop communications about diarrhoea in winter months.

Illness characteristics associated with high use were presence of watery stools, high frequency of stools, presence of fever, anorexia, vomiting and blood with the episode.

An important issue addressed in this study is why people do
not use ORT when they possess the knowledge about it. In general, this study, suggests that ORT tends to be used more in episodes considered severe by mothers. Using a definition of 'severe' on the presence of one or more of the following ie fever, vomiting, blood, dehydration, anorexia, frequency of watery stools ≥ 7 based on concerns reflected by mothers during the case studies, it was found that for 168 (57.7%) such severe episodes ORT was used in 57 (33.9%). For the 123 (42.3%) categorized 'mild' the use rates were 23 (18.7%).

Nevertheless, a very significant proportion of these severe episodes did not use ORT. One third of these did not perceive its utility or thought it was ineffective or that they had not used it 'aise he'. Fifteen percent each had not used it because the child did not accept it or the season was winter or he had recovered with medicine. Ten percent each said they had no knowledge about these fluids or because of situational constraints of time and money. The poor are less likely to seek treatment and since physicians endorsement was closely associated with the use of ORS packets, this factor contributes to low ORS use rates in the more underprivileged.

Why did only about half of those with knowledge about ORT use it? There is a need based search for treatment of diarrhoea except under extreme poverty in this setting. The search is more to stop the diarrhoea and less for prevention of complications like dehydration. Indeed, a concept of dehydration related to fluid loss seems not to exist in this culture according to interviews.
Although a third of the users report prevention of dehydration as the reason why they used ORT, the factor causing satisfaction with such treatment most commonly reported was that the diarrhoea ceased or stopped. The effort to introduce a concept of dehydration alien to this community is expectedly not successful. On the other hand, dry throat, weakness and lethargy are the concerns expressed by the mothers spontaneously and these could well be more appropriate reasons for promoting ORT through media and the health care system.

Within the ambit of the term ORT, several different types of fluids are included. Home available fluids and sugar salt solution were used much more commonly and ORS packets by only a few. This is consistent with the observations of the National diarrhoea survey (MOHFW 1990) and of other smaller studies (Chowdhury 1988).

One way to explain this is that mass media in recent times have preferentially advocated their use. However, this study suggests that factors other than knowledge are also important in determining this trend. The much greater acceptance of home available fluids and sugar salt solutions by the community may be because they fit into the local belief system of what is useful during diarrhoea. Also, the ingredients for these are usually available within the household. Mothers interviewed reported that these fluids 'cool' the body, which is desirable for diarrhoea during summer according to the humoral theory of causation of diarrhoea widely believed here. The common choice of home fluids viz lassi, lemon water and plain water is also consistent with this view; many mothers named sugar salt solution when asked which home
remedies were used for diarrhoea. The acceptance by children is also good. Thus observations suggest that compliance with messages from the mass media may be better when they are consonant with the community's own conceptual framework and preferably feasible without dependence on the health care system.

On the other hand, physician contact and endorsement is important for ORS packet use; majority of the few ORS packet users did so on the physicians advice, contrary to other fluids for which mass media was the predominant source of information. The mothers perceive ORS to be closer to a drug than home fluids. Advice by the physician regarding use of ORS was felt by mothers to be very important as they would say 'the doctor would have advised it if it was needed'. Further, in case studies, frustration at frequent non-availability of ORS packets from the dispensary have fostered a negative attitude towards ORS packets. The implications for the programme are it should not allow promotion to exceed its abilities to supply ORS if credibility with people is to be sustained.

Interviews with doctors suggest that they perceive ORS use to be for the treatment of dehydration rather than for its prevention. As gauged from mothers several tend to recommend it as a second line therapy, if drugs fail to stop the diarrhoea. The doctors during interviews indicated patients' reluctance to buy ORS packets with their own money as another reason for this lesser emphasis. Promotion of ORS use in a sustainable way seems difficult without physicians' endorsement and this requires their education.
When a certain threshold of severity is reached, lack of physicians endorsement, cost and unassured availability, make ORS packets less readily acceptable. Thus, the recent orientation to focus on promoting what mothers can do with their own capability, to prepare simple fluids at the household itself without depending on an external product is well directed.

In recent years, the national programme has been advocating through mass media that cereal based fluid be preferentially used instead of sugar salt solution for its demonstrated greater efficacy in clinical trials. This technologically superior approach is not accepted by this community and this may be true of others as well (MOHFW 1990). The low acceptance of this approach by the community may be because rice based fluids are considered less cooling during summer when diarrhoea occurs than are lassi, plain water, increased breast milk or sugar salt with lemon which are the commonly used fluids. Only, 5 percent of mothers in the community named rice water as a fluid they may use for diarrhoea and this too as a second response. Apart from Biharis, the other cultural groups especially Rajasthanis usually do not use or store rice frequently. Further, the lack of fuel required for cooking cereal based fluids is a constraint for some mothers; they say how often can one light the stove. Pre cooked salted rice, locally called ‘murmura’ is commonly available in the community and this may be promoted instead, as it needs no cooking.

An important indicator of community acceptance of ORT is its sustained use when repeated diarrhoeal episodes occur in the same
child. Our study reveals that nearly 40 percent of the mothers did not use ORS during diarrhoea after using it once in the same child. While the mild nature of the subsequent episode or association with teething or social preoccupation explain some part of the non use; lack of satisfaction with earlier use is also an important factor. The strong desire of mothers for diarrhoea to stop is not fulfilled, 'kutch phaida nahin hota'. The pattern of ORT use is usually not a sustained one, mothers use it for an episode, omit it for the next and may use it again later. This suggests even the existing ORT use rates may be difficult to sustain particularly when promotional efforts decline.

It is equally important to identify factors that facilitated use of ORT. Clearly consonance of the message with the community’s own belief system is important. Exposure to mass media, higher family income and a literate mother are also important in this setting.

The question of whether the wide advocacy of drugs by physician is a source of resistance to ORT use has been raised by other workers as well (WHO 1990). The findings of this study suggest that it may well be so for ORS packets but less so for the latter because home fluids were considered a home remedy, an initial response and ORS packets close to a medication though not exactly a drug. However, this hypothesis needs exploration in future studies.

Although ORS is claimed by the programme to be a major tool of prevention, commercial exploitation by the industry has led to
numerous names, packing methods and different instructions for mixing to be used. This is causes confusion among mothers. For example, many mothers using electrolyte solutions claimed to be using glucose water. On the other hand, glucose water was often used as a home available fluid because, in an earlier episode, glucose ORS had been advised by a physician. Lack of consistency of messages and products is also contributing to low use of ORT. Several mothers said they had heard about ORS and sugar salt but did not remember the instructions for mixing. Thus, while the message about ORT has reached many, the skills on how to make and use it have not.

The national programme advocates preparing ORS in one litre of water. The community of physicians and some of the manufacturers have been promoting both a glassful (200ml) and a litre of water for preparing sugar salt solution and the ORS solution. The methods of measuring salt and sugar promoted also vary. Overall, this lack of consistency in the message has led to a chaotic situation where more than three fourths mothers know about ORT but in most the knowledge about how to mix a sugar salt solution is usually incorrect and very often, this is true of the solutions made from ORS packets as well.

An observation relevant to the programme is that the estimated concentration of sodium in solutions prepared according to mothers responses in the survey would be much more often in the safe range of 40-90 meq recommended for home fluids if a litre of water is used. It would tend to yield extremely high sodium levels in a
significant proportion of respondents if a glass or less of water were used. Overall, larger the volume of water advocated, lesser is the risk of very high sodium concentration. Although the problems of lower sodium concentration would be more common when a litre is used, this is less dangerous. The findings of this study suggest, that from the perspective of safety, one litre solutions are advantageous.

The study also highlights the urgent need for evolving a consensus and for standardization of messages related to ORT. It emphasizes the need to find out a way to persuade all concerned to work towards this uniformity. Otherwise, with increasing use of ORT, the potentially dangerous complications may well increase. The national programme should resist pressure to advocate preparation of a glassful of ORS solute rather a litre by physicians and the industry.

The use of glucose for infants who are well and during diarrhoea is common as it is considered by the community to be strength giving. Unfortunately, when used without salt it is of little use and when used in large quantity, it will cause osmotic diarrhoea. In our communication effort, this issue needs to be addressed, recommending either addition of salt to glucose or discouraging its use altogether.

Case studies showed that a significant proportions of ORT users only fed spoonfuls to the child with diarrhoea and usually for no longer than a day. The survey findings reveal that knowledge regarding amount and duration of ORT use is correct in the majority
ie that there is a wide gap between reported and observed behaviours. Sugar salt solutions are used in larger amounts and this is consistent with the mothers perception of its being a routinely consumed fluid. ORS being perceived similar to drugs tended to be administered in small amounts even in the presence of a free packet at home.

7.7 Diarrhoea mortality

The issue of what the likely impact of a well implemented oral rehydration programme may be in terms of child health, although not well within the scope of this study is extremely important to consider.

This study clearly shows that childhood malnutrition is rampant and related to social and economic inadequacies and widespread illiteracy particularly among mothers. The lack of food and fuel causes malnutrition and this together with contamination of water and food increase the risk of infection and its consequences. Several studies in India and other countries have shown that up to two thirds or more of children dying due to diarrhoea or with other communicable diseases have antecedent malnutrition (Bhan 1986). The nutritional component of the current programme is too weak to have any impact on childhood malnutrition. Studies evaluating impact of ORT programmes on childhood nutrition in some regions of India have clearly shown this to be true (Deb 1983, Ghai 1988, Walia 1989).
The lack of data on the likely impact of community based ORT programmes on diarrhoea mortality is limited (Rahman 1979, NDDCP 1988). However, recently, more has been learnt about the immediate mode of death during diarrhoea. In studies based in urban and rural Haryana, in urban Brazil, rural Bangladesh, dysentery and persistent diarrhoea were observed to account for nearly 65-70 percent of all diarrhoea associated deaths. On the other hand in Senegal, the same multinational study showed dehydration to be a possible factor in nearly 60 percent of deaths. This multinational study has made the WHO revise its estimates of the proportion of diarrhoea deaths likely to be prevented through ORT programmes to a median of 40 percent (Victora 1991). Given that in this study, at the current performance only 34% of the more severe episodes were treated with ORT, the achievement at present through CDD activities in terms of prevention of deaths must be modest.

Unfortunately, there has been little systematic evaluation of the impact of ORT even in countries with a well established programme. The notable examples where some efforts at evaluation have been made are from Egypt and Bangladesh, there is also the experience in Lima during a recent cholera outbreak. In the former Egyptian experience, nearly 40% reduction in diarrhoea related mortality was claimed and in the 'Matlab' area of Bangladesh, no impact of the programme despite achieving 80% use rates of sugar salt solutions was seen. The Egyptian evaluation has severe methodological limitations, not having either control or baseline data on mortality in the same setting. However, careful reviews of
these studies provide useful insights into the impact of ORT on diarrhoea related mortality.

The lack of impact in the 'Matlab' area of Bangladesh is attributed to the need for intravenous fluid support close to where people live when cholera with its rapid purge rates is the main type of diarrhoea. Also, to the social and economic factors that led to delayed treatment seeking especially amongst women; to widespread malnutrition again more among women and children, as this increased the risk of death. The last important factor was the greater than hitherto recognized importance of dysentery and persistent diarrhoea in diarrhoea mortality as these two disorders experience high case fatality rate despite ORT and require good nutritional support.

In Lima during the recent cholera outbreak where ORS was readily available in the neighbourhood with intravenous fluid support the case fatality during a major cholera outbreak was less than 1 percent which is a creditable achievement. It is important to emphasize that in cholera outbreaks, dehydration is almost the universal mode of death (WHO 1991).

Interestingly, maternal literacy rates, economic conditions and nutritional status of children and women is much better in Lima than in Bangladesh. Viewed together, these experiences suggest that the impact of ORT programmes is likely to vary in different settings depending on the levels of malnutrition, social and physical constraints and rates of maternal illiteracy as these are related to early treatment seeking. This rate will also depend on
the importance of dehydration in diarrhoea related deaths and the extent to which the more severe episodes of diarrhoea, often occurring in the poorest people get ORT early and in sufficient amounts.

In Tigri, out of the 6 diarrhoea deaths reported, 4 were related to dysentery and persistent diarrhoea consistent with the findings of the larger studies. This suggests that no more than 30-40% of diarrhoeal deaths at present are likely to be prevented by the most successful ORT programmes in India. In many of these instances, these saved children may succumb to another disease eg pneumonia because ORT does not resolve the nutritional problems of these children. Further, even the current rates of ORT utilization may be difficult to sustain until maternal literacy a major determinant of health seeking behaviour becomes more widespread.

Thus, the knowledge about the need for increased fluids during diarrhoea has been introduced with considerable success into the minds of the community. This is undeniably useful as is a more ready access. For a simple, practical treatment of dehydration with ORS, the expectation of what may be accomplished with this effort must be tempered with realism, given the narrow focus of the programme.

Further, improved living conditions, maternal literacy, improved and safe weaning to reduce the existing high levels of childhood malnutrition and availability of ORT are needed together to achieve significant reduction in diarrhoeal mortality. The earlier mentioned factors, apart from their direct effects on
diarrhoeal mortality will also improve the extent and quality of ORT use and indeed its impact.