PREVALENCE OF DIARRHOEA AMONG UNDERFIVES AND ASSOCIATED FACTORS IN MBEYA DISTRICT

BY

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PUBLIC HEALTH OF THE UNIVERSITY OF DAR-ES-SALAAM

September 2000

CERTIFICATION

The undersigned certify that has read and hereby recommend for acceptance by the University of Dar es Salaam a dissertation entitled: *The Prevalence of Diarrhoea Among Underfives and Associated Factors in Mbeya District*, in partial fulfillment of the requirements for the degree of Master of Public Health (MPH) of the University of Dar-es-Salaam.



Dr. I. A. J. Semali

Date: 9/10/2000

DECLARATION

I declare solemnly that the whole or part of this dissertation has never been submitted for a degree in any other university. It is a result of my own sole effort and field work in partial fulfillment of the requirements for the degree of Master of Public Health (MPH) of University of Dar-es-Salaam.

Candidate's signature _____ Date 9/10/2000

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ABSTRACT:

The main aims of the study was to determine the 2 weeks prevalence of diarrhoea among underfives in Mbeya district, the associated factors, the perceived causes and the preventive measures known by mothers/guardians in Mbeya district. This was a prevalence study done in Mbeya district hence a cross-sectional descriptive study design was adopted. It was multistage random sampling. The first stage two divisions were randomly selected from a list of division in the district. Second stage two wards were selected. At the third stage four villages were randomly selected one from each ward. The list of underfive children was made and from it 485 children were selected at random. After selection we had to identify to which households the selected underfives are coming from.

The two weeks prevalence of diarrhoea among underfives in Mbeya district is 34.6% a high percentage compared to national average of 14%.

The factors which were found to be statistically significantly associated with diarrhoea were age and sex of the child, household size, father not living in the household, immunization status, storage of water, handwashing habits, child's place of defaecation and place of garbage disposal.

Other factors such as mother's age, mother's education, marital status, mother's major source of income, livestock ownership, source of water, water treatment, and type of toilet were not statistically significantly associated.

It was found that 52.6% of the children's mothers/guardians in Mbeya district had medium knowledge on the causes of diarrhoea and 85.6% of the children's mothers/guardians are aware of the preventive measures of underfive diarrhoea.

Recommendations

1. We recommend to the DHMT Mbeya district to utilize the results of this study because it is recent and reflects the current real picture of diarrhoea among children who are below five years of age in the district.
2. Among the problems which were identified in this study and found to have association with underfives diarrhoea are poor personal hygiene, indiscriminate disposal of child's faeces and household garbage. Thus the DHMT should focus on interventions, which aims at changing these practice. The first intervention is the use of different health education strategies to households and communities. Health providers in the nearest health facilities should be encouraged to conduct health education sessions to communities and their clients. Villages should be encouraged to establish by laws to make household maintain clean environment in their households and else where.
3. Storage of water was found to be a problem in the study area it is recommended that health officers should mobilize and educate people to use locally available means for storage of water to prevent contamination of water. Also there is a need to promote the household treatment of drinking water.

4. A study is needed to look for the discrepancy between the high knowledge of the causes and prevention measure with high prevalence of diarrhoea among the underfives.

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DEDICATION

I wish to extend my sincere and heart felt gratitude to my wife Margaret and my children George and Carthubert for their immeasurable assistance, encouragement and ultimate moral support offered to me to accomplish this work. I should remain however, saying that only a few are mentioned in the report but very many more had made appreciable contributions. I take this opportunity to acknowledge their contributions.

LIST OF ABBREVIATIONS

BCG----------Bacille callmette guerine.

CDD----------Control of diarrhoeal diseases programme.

DHMT----------District health management team.

DPT----------Diphtheria Pertussis Tetanus.

MOH----------Ministry of health.

OPV----------Oral polio vaccine.

TDHS----------Tanzania demographic and health survey.

WHO----------World health organization.

CHAPTER 1

1.0. INTRODUCTION

1.1 GENERAL.

WHO estimates that there are more than 12 million deaths in developing countries per year among children before they reach their fifth birthday. Major causes of death are malnutrition, diarrhoea, Acute Respiratory Infections, perinatal causes and malaria (WHO, 1998). Diarrhoea diseases was among the top ten diseases that causes deaths among underfive children in 1996, it accounted for 19 percents of all deaths (Murray et al. 1996). The projections on causes of underfives mortality based on 1996 analysis of the global burden of disease indicated that diarrhoea would continue to be major cause of child deaths in the year 2020, unless significant efforts are made to control them (WHO, 1998). Studies from other parts of the world reported similar findings (McNeish, 1986).

In the last several years' national diarrhoea diseases control programs and WHO have conducted a series of diarrhoea morbidity and mortality survey (WHO, 1984). The surveys which were done among children under-five years old also confirmed the high diarrhoea associated morbidity and mortality rates and further revealed that in individual countries, up to 60% of the deaths among underfives were associated with diarrhoea (Robert, 1985).

There is a marked regional variation of diarrhoea morbidity and mortality. It is reported that 750-1000 million cases of diarrhoea occurred in children bellow 5 years

of age in Asia, Africa, and Latin America every year (Mahalanabis et. al. 1981). More than 12,000 underfive children are estimated to die per day from diarrhoea in developing countries (Yoon et. al. 1997). In India, diarrhoea is the cause of almost 1.5 million child deaths each year and also exacerbates prevailing nutritional deficiencies (Ram et. al. 1997).

In Sub Saharan Africa morbidity survey in 0-4 years old children revealed that on average each child had 4.9 diarrhoeal episodes/year (Kirkwood, 1991). In Tanzania for over 30 years diarrhoea has been one of the top ten diseases of children. It is estimated that each child below 5 years of age has an average of 2-5 episodes of diarrhoea per year (CDD, 1987). Thus it can be concluded that diarrhoea disease is one of the leading causes of underfive illness and death in the Sub Sahara Africa including Tanzania.

In Tanzania the most recent TDHS (1996), reveals a very marked variation in the two weeks diarrhoea among the underfive children. The two weeks reported prevalence of diarrhoea among the underfives, ranges from 4.7 percents in Coast region to highest in Kigoma region with prevalence of 25.2% percent. This may reflect prevalence of determinants as well as methodological errors on interventions.

1.2.STATEMENT OF THE PROBLEM

Diarrhoea is one of the most important public health problems in the world and especially in the developing countries. It is oral faecal disease acquired through contamination of foods and sources of water by human excreta, animal dung and

refuse in the household (Afifi et. al. 1996). It can also be transmitted directly through contaminated hands, feeding utensils, feeding bottles and by vectors like houseflies.

Murray et. al. (1996) reported the global burden of diarrhoea to be 7.3% for all ages and for underfives in developing countries it was 14%.

In Tanzania diarrhoea is among underfives a major public health problem. At the same time in Tanzania and many developing countries data on diarrhoea diseases are not available and if found they are outdated. The Tanzania Demographic Health Survey (TDHS, 1996) reported that the under-five two-week prevalence of diarrhoea among underfive was 14%. Also it reported marked variation of two-week diarrhoea morbidity by region, ranging from 4.1% in coast region to highest 25.2% in Kigoma region. In Mbeya region the underfive two weeks prevalence of diarrhoea was reported to be 18.7%.

The 1997 MOH statistics abstract reports shows that the total underfive outpatient attendance 9.6 percents were due to diarrhoea, whereas inpatient cases was 11.9%.

Reviewed literatures have cited various contributory factors to the prevalence of diarrhoea diseases and causative agents i.e. microorganisms that causes diarrhoea. In many studies low maternal level of education has been found to be associated with higher incidence of diarrhoea disease among underfives (Singh et. al. 1992; Yagob et. al. 1995; Molbak, 1997). This is attributed to lack of knowledge on proper hygiene, feeding patterns, and poor nursing care among less educated mother.

Children's who are being weaned from breastmilk and who are bottle fed get diarrhoea more frequently through contamination of feeding utensils and foods

which occurs during preparations of milk and food by dirty hands and by flies. Studies have shown that bottle-fed and weaned children have high incidence of diarrhoea (Motarjemiy et. al. 1993; Kapil et. al. 1994; Molbak, 1997). The same studies also reported that children who were fed leftover foods reported high incidence of diarrhoea.

There is also a variation of underfives diarrhoea between the rural and urban areas. The prevalence of diarrhoea among underfive is high in the rural areas compared to those of urban areas. Lack of proper sanitation and poor excreta disposal could be the reasons for the variation of underfive diarrhoea between the urban and rural areas. Equally so are social cultural beliefs, which inhibit proper hygienic practice leading to contamination of ground, surface water and underground water (WHO, 1988).
It is also reported that many people in rural area indiscriminately dispose child's faeces. Traore (1994) observed that the poor disposal of human excreta was the reason for the abnormal high level of diarrhoea morbidity and mortality among underfives. Children while playing on the ground have the tendency of putting in the mouth any object found in the vicinity and thus get infected if it is on a contaminated soil.

The perceived causes of diarrhoea in many communities in the developing countries are quiet different to those of the health professionals, this could have negative impact during implementing intervention programs. Studies in various countries have found the perceived causes to be either evil spirits, supernatural powers, teething, bad

milk, unfaithful mothers, cold weather, eating dirt, flies or eating improper food (Zoysa, 1984; Stapleton, 1989; Green, 1985; Reitmaier, 1987; Kaltenthaler, 1995).

It is the aim of this study to obtain up to date data on magnitude of diarrhoea disease among underfive and the factors associated with diarrhoea.

1.3.OBJECTIVES

1.3.1. BROAD OBJECTIVE

To determine the magnitude of diarrhoea among children whose age is underfive years (underfives) and associated factors in Mbeya district.

1.3.2. SPECIFIC OBJECTIVES

1.3.2.1 To determine the two weeks prevalence of diarrhoea among underfive children in Mbeya district.

1.3.2.2. To determine the factors which are associated with diarrhoea among underfive children in Mbeya district.

1.3.2.3. To determine the preventive measures known by mothers/guardians in Mbeya district.

1.3.2.4. To determine the perceived causes of diarrhoea among mothers/guardians.

1.4. RATIONALE.

Lack of documented data on household prevalence of diarrhoea among the underfive children in Mbeya and associated household factors is a limitation in planning for the proper control and management of the diarrhoea diseases by DHMT. Acquired information from this study will provide baseline information for DHMT to

developing interventions to control diarrhoea disease among underfive within the district health plans.

CHAPTER 2

2 LITERATURE REVIEW.

2.1 DEFINITION

According to Walsh (1979), diarrhoea is second most important cause of death in the world. In fact it is not a disease but a symptom complex of multiple aetiology, various definitions in terms of frequency and consistency of faecal passage has been used, ultimately diarrhoea is identified by the liquid nature of the stool (Rohde, 1985). In many societies, diarrhoea is defined as 3 or more loose or watery stools in a day a definition which is also accepted by the World health Organization (WHO, 1985).

2.2 MAGNITUDE

In many countries more than one third of hospital beds for children, are occupied by patients with diarrhoea. The patients are often treated with expensive intravenous fluids and ineffective drugs (WHO, 1992). Due to insufficient data on diarrhoea diseases, the exact magnitude of diarrhoea morbidity and mortality in Sub Sahara Africa and other developing regions is unknown or uncertain (Kirkwood, 1991).

However reports and studies have been presenting marked variation on the magnitude of the problem. In Rural India it was reported that a 2 weeks prevalence of diarrhoea was 6% and in Nigeria it was reported to be 20.8% (Lal, 1996; Babaniyi, 1984). In Tanzania the underfive two weeks prevalence of diarrhoea is reported to be 14 percent (TDHS, 1996).

The outcomes of diarrhoea diseases among children underfive years are dehydration, malnutrition, and death. Mortality from diarrhoea is almost always from dehydration due to massive loss of fluids. In Vietnam, dehydration was known to be the principal cause of death in children (Reymond, 1982). Age of the child is an important factor in the outcome of diarrhoea among underfive years children.

Young infants are more susceptible to diarrhoea disease compared to older children. In infants diarrhoea of virtually any aetiology can results into dehydration and ultimate death (Myron, 1985). Also diarrhoea has been found to be the major cause of weight faltering in children, and also has been found to occur more frequently among the undernourished child (Mahmoud, 1986).

In Bangladesh Roy also report that malnutrition and infection were frequent among children with persistent diarrhoea and constitutes a vicious cycle (Roy et. al. 1989). Diarrhoea disease is also a major cause of death among children underfive years. Both in Nepal and Haiti 46 percent of deaths in children under-five years of age were due to diarrhoea (Reymond, 1982; Stapleton, 1989). In Sub Sahara Africa mortality rates due to diarrhoea among underfive years old children ranged from 1.3 to 76.8 deaths/1000/year (Kirkwood, 1991), while in Tanzania diarrhoea diseases are among the top ten diseases which causes death among the underfive (MOH, 1997).

2.3 RISK FACTORS

The risk factors for diarrhoea among children underfive years old are many and will depend on the locality. Yagob et. al. (1995) reported that the prevalence of diarrhoea

was high in the rural area than in the urban areas. The difference could be attributed to difference in sanitation i.e. urban communities having better sanitation than rural.

Excreta disposal is an important factor in determining the risk of diarrhoea in the household or community. When human or animal excreta is not properly disposed, it will lead to contamination of environment and water sources. WHO (1988) underlined the importance of open field defecation as a major means of contaminating the environments and unprotected water sources, hence propagation of microorganisms, which causes diarrhoea. Also animals excreta especially in areas were they keep livestock can contaminate unprotected water sources. Molbak (1997), who stresses that water should be boiled before drinking to avoid diarrhoea also observes the relationship of unprotected public water and diarrhoea in both children and adults. Lack of basic services such as clean water and safe sanitation means that home hygiene is difficult to keep (WHO, 1988).

Although latrine ownership may be a necessary condition for safe excreta disposal behavioural changes have to take place concomitantly with construction of latrines. Owning latrine without appropriate use and hygienic behaviour, such as hand washing after use of the latrine, covering and cleaning it will not change the risk of diarrhoea (Martens, 1992). It is also observed that insufficient sanitary materials and water are strongly correlated with diarrhoea among children in Bangladesh (Anonymous, 1993). Contaminated weaning food is a major risk factor for diarrhoea and associated malnutrition in developing countries. Weaning food is often prepared in unhygienic manner (Motarjemiy et. al. 1993; Molbak, 1997). In Haryan, Kapil

observed that commercial weaning food were highly associated with diarrhoea followed by bottle- feeding (Kapil et al. 1994).

Children are most at risk to dangerous infections including diarrhoea during infancy and childhood because their body immunity is not well developed.

Age of the child is also an important risk factor in diarrhoea among the underfive children. The risk of diarrhoea is highest in the second year of life because it is the time when children are exposed to the ground, the dirt and the contaminants in the environment. After the age of two years the risk of diarrhoea gradually gets low (Dialogue on Diarrhoea, 1988). Several studies have shown similar relationship between the age of the child and diarrhoea. Oni et. al. (1991) reported the similar finding in a study done in Nigeria.

Mother's education was found to have an association with diarrhoea incidence among underfive years children in rural area of Thailand (Prohmmo, 1989). Gorter (1998) documented that mothers with more than 3 years of primary school education and in a comparatively better economic position exhibit better general hygiene behavior. The relationship between mother's education with diarrhoea diseases in underfive children have also been reported in other parts. In household survey in rural Alwar India children, Singh found that children of illiterate mothers suffer more episode of diarrhoea than those of educated mothers (Singh et al.1992; Molbak, 1997). Togoe 1995 reported that maternal education is important factor in childhood diarrhoea in Ghana. Children of poor socio-economic conditions suffered significant

more often from diarrhoea as compared to children of higher socio-economic status (Singh et. al. 1992).

The age of head of household if less than 30 years has been associated with increased risk of diarrhoea among children under five years old. This is probably due to their lack of knowledge on hygiene behaviors; the type of food to give the child and feeding patterns (Yagob et. al. 1995). Similar if the mother is less than 20 years old the risks high.

Living arrangement of children is also an important determinant of diarrhoea. From a study done in Guinea-Bissau, it was found that children who are not cared by their mother's have high incidence of diarrhoea. Reasons advanced for this observation are that they are not fed properly, their feeding utensils are not cleaned properly, they are left to play outside without supervision hence pick and eat anything they found on ground (Molbak, 1997).

2.4 PERCEIVED CAUSES OF DIARRHOEA

In Zimbabwe 98 percent of interviewed mothers considered diarrhoea to be a problem in the community (Zoysa, 1984). Many societies in developing countries regarded teething and evil spirits as the causes of diarrhoea (Stapleton, 1989; Green, 1986). Breastfeeding during pregnancy [bad milk] is considered as a cause of diarrhoea in Swaziland and Nepal (Stapleton, 1989; Green, 1985). In Cape Verde, sexual contact with man who is not the father of the child during breastfeeding is considered to be the cause of diarrhoea (Reitmaier, 1987).

In a qualitative study in Botswana it was reported that the perceived causes of diarrhoea were sunken anterior fontanelle, child is bewitched, bad breastmilk due to unfaithfulness of mother and child met someone taking traditional medicine. Others perceived causes are teething, measles, malnutrition, flu or other illnesses, worms in the stomach, fever, abdominal pain, eating dirty, improper food or certain food (spinach or cabbage), corn soya milk with no oil added, too many different foods given in one day, and cold weather (Kaltenthaler, 1995).

2.5 CONTROL OF DIARRHOEA

Promotion and maintenance of breast-feeding is an important strategy in urban slums/rural to reduce diarrhoea incidence, malnutrition, and death during infancy. The traditional practice of only putting the child on the breast on the third day after birth should be replaced by putting the infant to the breast within half an hour of birth (Dialogue on Diarrhoea, 1987). Promotion of breast-feeding can reduce diarrhoea incidence rate by 8-20% and diarrhoea mortality rates by 24-27% among children age 0-5 months (Feachem et. al. 1983). Breast milk offers substantial protection against mortality in children (0-18 months of age) hospitalized with either acute or persistent diarrhoea (Sachdev et. al.1991; Victoria et. al. 1992).

Keeping food and water clean, promotion of food handling, preparation and proper hygienically storage practices can reduce risk of fecal contamination and hence the diarrhoea incidences among the underfives years old children (Huttly et. al.1997). Well-designed and executed projects that improve water quantity water quality and excreta disposal facilities reduce diarrhoea morbidity rates by 35%. These impacts

are especially likely if strong community education element is included. Water supply and sanitation investments also avert diarrhoea in older age –groups, reduce the incidence of other infections, and have a variety of benefits unrelated to health (Yoon et. al. 1997,Huttly et. al. 1997).

Proper disposal of excreta is as essential as safe water in preventing the spread of diseases. A latrine should be at least 15 meters from the source of water (Dialogue on Diarrhoea, 1987). Other control measures are hand washing with soap before touching food, which can reduce diarrhoea incidence by 14-48% (Feachem, 1984). Improving immunization status of children especially against measles has special impact on reduction of the prevalence of diarrhoea. Measles immunization at the age of 9-11 months, with coverage rate of 75%, may reduce diarrhoea incidence by 1-3% and diarrhoea mortality by 11-22% among children under-five years of age (Feachem et. al. 1983).

CHAPTER 3

METHODOLOGY

3.1 RESEARCH TERMS DEFINITION.

- WHO definition of diarrhoea has been applied in this study. According to WHO a child is considered to have had diarrhoea if he/she had passed 3 or more loose or watery stools in a day (WHO, 1985).

- Past two weeks prevalence of diarrhoea, all the children who had history of diarrhoea in the past 14 days, counted from the day of interview backwards were considered.

- Household: set of relations among individuals who shared the same roof and food.

- Complete (fully) immunized: all children who have had one dose of BCG, three doses of polio vaccine (excluding polio 0) and three doses of DPT and one dose of measles vaccine.

3.2 STUDY AREA

The study was done at Mbeya district in Mbeya region from 5th June to 21st June 2000. Mbeya rural district is one of the seven administrative districts in Mbeya

region in Tanzania. Other districts in Mbeya region are Kyela, Tukuyu, Mbozi, Ileje, Chunya and Mbarali districts.

The Mbeya district covers an area of 19,098sq Km., and it is divided into five divisions namely Rujewa, Ilongo, Usongwe, Isangati and Tembela. Each division is divided into wards. It has 21 wards, which in total are comprised of 158 villages. The projected total population of Mbeya district is 422,491 which is 21% of the total regional population and the population of underfives children is 78,583 (Mbeya, 1997). The proportion of underfives to the total population is 18.6% (Mbeya, 1997).

The district has mixed tribes among the tribes found in the district are Nyakyusa, Safwa, Kinga, Bena, Ndali, Wanji, Malila, Nyiha, Nyamwanga, Masai, Sukuma and Hehe. There major economic activities are farming, petty businesses and cattle rearing.

The district is well served with health facilities although they may lack medicine and other prerequisite requirements. The mean distance from household to nearest health facility is about 7 kms. (Mbeya, 1997). The district has no government hospital. It has 11 health centers of which 5 are public health centers and 6 are private. The district has 47 public dispensaries, 19 private dispensaries and 61 village health posts (Mbeya, 1997).

Communication between facilities is important to facilitate health care delivery and referral of patient. Unfortunately the health facilities in Mbeya district have no transport, this make it difficult to transport patients from health centers to the zonal hospital. Worse still the health centers have no telephones.

The district has three climates, which are dry season and two rainy seasons, the short one from December to February and long rainy season from April to June. It is just after the rainy seasons that many cases of diarrhoea occur.

The district is connected to other places in the country through roads, railways, and air. The transport industry is mostly privately operated.

3.3 STUDY DESIGN

The aim of this study is to determine the prevalence of diarrhoea among under fives and associated factor. This is a study at a point in time hence we are adopting cross-sectional descriptive design as the appropriate design.

3.4 STUDY POPULATION

The study population is the children whose age is underfive years in Mbeya district. These are children born less than five years ago from the date of interview (June 2000).

3.5 SAMPLE SIZE

The sample size has been calculated using the formula:

$n = Z^2\alpha\ p\ (1-p)/\in^2$ Where;

n is the sample size.

$Z\alpha$ is the standard normal deviate corresponding to a two-sided significance level of α.

P is the expected prevalence rate of diarrhoea disease in the target population.

$\in$ Is the margin of error on p.

Setting α at 0.05 (giving $Z^2\alpha=1.96$) p at 0.5 and $\in$ at 0.05(5%) the above formula yields a minimum sample size of about 384 which is approximently 400 underfives children. We have decided to use the proportion p = 0.5 because the last recorded two weeks prevalence was 1996. In reality the current two weeks prevalence of diarrhoea underfives is unknown. At the field data about 485 underfive children were collected.

3.6 SAMPLING.

A multistage random sampling was done. At first stage from the list of 5 divisions in Mbeya district two divisions were randomly selected. Secondly from each of the selected divisions two wards were randomly selected. The third stage was the selection of two villages from each ward randomly. The villages selected were Mbalizi, Iwalanje, Ntangano Ijombe and Nsongwi juu. In each of the selected villages, we were able to identify households with underfives. The list of underfive children was made and from it 485 underfive children were selected at random.

3.7 STUDY VARIABLES

3.7.1 Dependent variables

Two weeks prevalence of diarrhoea.

3.7.2 Independent variables

The independent variables included the socio-demographic characteristic (maternal age, level of mother/guardian education and marital status). Other independent

variables are mother/guardian major source of income. Also the immunization of the child, sex and age of the child, number of people in household, father living in household, source of water, handwashing and availability of toilet facility in the household, boiling of drinking water, leftover food use, defecation place for underfive and the disposal of faeces.

3.8 SELECTION AND TRAINING INTERVIEWERS.

Four interviewers were selected. They were all young clinical officers who completed their training within the last two years and not employed. They were interviewed and found to be able to assist in data collection.

The assistants were informed on the nature of the study and there after were trained for two days on how to administer the questionnaire. The training was done at the suburbs of Mbeya town.

3.9 PRETEST.

The pretest was conducted after the translation of the questionnaire into the Swahili language prior to printing the required number of questionnaires. The aim of the pretest was to assess the language used and the effectiveness of the questionnaire in eliciting the required information. It was also done to find out the acceptance of the instruments to the population. The pretest was of benefit as we were able to detect some questions in which the language used was confusing for lay persons. Also we manage to calculate time required to administer the questionnaire, which was found to be thirty minutes to forty-five minutes. This enabled us to plan our time use ahead.

3.10 ENTRY TO THE STUDY AREA.

An introduction letter to district authorities was sought from the institute of public health (IPH).

The letter from IPH was used to introduce us to the District medical officer, District executive director, and District commissioner for permission to do the research in their district. The nature of the study was explained to the district leaders, district medical officer, and the respondents. Subsequently the District medical officer wrote an introductory letter to the respective ward executive officers in whose research was to be conducted.

Permission was asked from the district leadership and was granted. Oral consent was obtained from both the household head and the mother. Children who were found sick were advised to visit the nearest health facility.

3.11 DATA COLLECTION.

Quantitative data collection was done using structured and open ended questions in the questionnaires (Annex), which was translated in Swahili Language by the Principal investigator with assistance of one Swahili language teacher from the same district.

In each of the selected village, authority was briefed on the aims and benefits of the study. They all agreed to participate. The selected households were informed by the village authority on when we will be there for interviewing.

On the day of interview in the village, one of the village leaders introduced the interviewer to each of the household. The leader of the household was briefed, who in all cases accepted. As we were dealing with underfive children, mothers/guardians

of the selected children were asked to be respondents in the data collection. A total of 420 mothers/guardians participated. It should be noted that some mothers/guardians provided information for more than one underfive children.

3.12 DATA HANDLING.

At the household level one made sure that a questionnaires was completed for each child. At the end of each day's work the principal investigator checked all questionnaires for completeness and consistency. The household was revisited if there was missing information in consistence. One made sure that identification for each questionnaire was in place.

All questionnaires were filed by village in a plastic cover.

3.13 STUDY LIMITATIONS.

The time for field works was too short. We had to do many things in a hurry. However we tried a lot to maintain quality by checking the responses after each days work. If any errors they were verified next day by revisiting the household.

3.14 DATA PROCESSING AND ANALYSIS.

After manual sorting of data, the quantitative data were entered in EPI INFO software to be analyzed. The prevalence of diarrhoea (2 weeks prevalence) was determined. This was followed by univariant analysis by cross tabulation to determine factors with high association using Chi-square test. A factor was considered statistically significantly associated if p-value was less than 0.05.

To have common handwashing habit determined we had to assign score to different variable that was oriented to handwashing habits. Question number 50 was used to determine the hand washing habit. A score of two was given for the yes answer and zero for those who had negative answer. Total score per respondent ranged from two scores to ten scores, a cut off point of above six was taken to grade the hand washing habit as good if the score was above six and poor for score of six or below six.

In assessing the knowledge of preventive measures (Question 55), we assigned score according to the answer given, the minimum total score was 4 and the maximum was 40 score. The mean was 23 score, thus a score less than 23 was taken to be poor knowledge. Above 23 score was considered as having good knowledge on preventive measures.

In order to assess the proportion of mothers with good knowledge of causes of diarrhoea (Question 56), scores were assigned for different perceived causes for each category of given answer. Total scores ranged from 8 to 48 with mean score of 26 thus those who scored 26 or below were considered to be with low knowledge and those who scored above 26 were considered to have a good knowledge.

CHAPTER 4

4 RESULTS

A total of 485 underfive children participated in the study. Table 4.1 shows the distribution of the study population by age and sex. It can be observed that there were more male children (51.1%) than female (48.9%). Though there were slight differences the overall age distribution for both sex was similar.

Table 4.1. Age and sex distribution of study population:

	Sex				
Child Age In months	Male	%	Female	%	Total
0-11	22	8.9%	25	10.5%	47
12-23	66	26.6%	73	30.8%	139
24-35	71	28.6%	65	27.5%	136
36-47	43	17.4%	33	13.9%	76
48 –59	46	18.5%	41	17.3%	87
Total	248	51.1%	237	48.9%	485

The mothers with children underfive years old were asked if the underfive had suffered diarrhoea in the two-week preceding the survey (a period that was counted from the day of interview backwards). Out of 485 underfive children it was reported that 168 of them they had diarrhoea in the past two weeks prior to the interview. Thus two weeks prevalence of diarrhoea in Mbeya district was found to be 34.6%.

The prevalence of diarrhoea was seen to vary by age group (Table 4.2), the most affected age group was those aged 12-23 months (50.3%) and those who were least affected was the aged group of 0-11 months (17%). The relationship between the age of the child and diarrhoea was found to be statistically significant ($p = 0.01$).

Table 4.2. Two weeks prevalence of diarrhoea by age groups.

Child age In months	Diarrhoea				Total
	Yes	%	No	%	
0-11	8	17.0%	39	83.0%	47
12-23	70	50.3%	69	49.7%	139
24-35	50	36.8%	86	63.2%	136
36-47	23	30.3%	53	69.7%	76
48 – 59	17	19.5%	70	80.5%	87
Total	168	34.6%	317	65.4%	485

χ^2 for trend was 6.773 P value 0.009

It was observed (table 4.3) that there was no much differences in the relationship between the sex of the child and having diarhhoea, but relatively male are more affected (34.7%) compared to female (34.6%). The relationship between the sex of the children and diarrhoea was found to be statistically not significant (p>0.05).

Table 4. 3. The two weeks prevalence of diarrhoea by sex among underfive children in Mbeya district.

Sex	Diarrhoea				Total
	Yes	%	No	%	
Male	86	34.7	I62	65.3	248
Female	82	34.6	155	65.4	237
Total	168		317		485

$\chi^2 = 0.00$ and P= 0.9

Analysis was done to determine the association of diarrhoea among the underfive and social demographic characteristics of the respondents (Table 4.4).

It has been found that the highest prevalence of diarrhoea was 35.5% among children whose mothers were aged 15 – 24 compared to 32.3% among the children from mothers/guardians whose age was 35 years or above. This finding indicates that as the age of the mother/guardian increases the prevalence of diarrhoea decreases. The difference in diarrhoea prevalence among underfives with the age of the mother was not statistically significant (p> 0.05).

TABLE 4.4. Relationships between socio-demographic characteristic of the respondents (mothers) and diarrhoea status.

Sociodemographic variables	Diarrhoea prevalence				
	Yes		No		
Mother's age	Frequency	%	Frequency	%	
15-24 years	66	35.5%	120	64.5%	$\chi 2=0.22$
25 – 34	81	34.9%	151	65.1%	
35+ years	21	32.3%	44	67.7%	P=0.896
Mother's education					
Less than 7 years in school	124	35.5%	225	64.5%	$\chi 2= 1.42$
7 years or more in school	20	28.2%	51	71.8%	P=0.2
Marital status					
Single	4	36.4%	7	63.6%	$\chi 2=1.42$
Married	146	34.2%	281	65.8%	df=3
Divorced	9	6.0%	16	64.0%	P=0.70
Polygamy	9	47.4%	10	52.6%	
Mother's major source of Income					
Farming	104	36.1%	184	63.9%	$\chi 2=4.02$
Spouse dependent	27	27.3%	72	72.7%	Df=2
Self-employed	37	40.7%	57	59.3%	P=0.13
Number of People in household					
<4	47	40.2%	70	59.8%	
4-6	103	35.2%	190	64.8%	$\chi 2=5.632$
7-8	15	26.3%	42	73.7%	**P=0.02**
9+	3	16.7%	15	83.3%	
Father living in Household					
Yes	153	33.8%	300	66.2%	$\chi 2=3.86$
No	15	51.7%	14	48.3%	**P=0.05**
Livestock ownership					
Yes	70	36.3%	123	63.7%	$\chi 2=0.68$
No	92	32.6%	190	67.4%	P=0.41

Marital status of the mothers was one of the variables that were studied in relation to the prevalence of diarrhoea. More than 85% of mothers were married, 5.2% were divorced, 3.9% were polygamous and 2.3% were single (table 4.4). The findings showed that diarrhoea prevalence was highest (47.4%) among the children whose mothers were living in a polygamy family. The prevalence of diarrhoea among the underfives with relation to marital status of the mothers was not statistically significant (P>0.05).

We also asked on the education of mothers a variable likely to influence the prevalence of underfives diarrhoea. We found that diarrhoea was highest (35.6%) among children whose mothers had less than seven years in school compared to 28.2 % of children whose mothers had 7 or more years in school (table 4.4). There is decrease of prevalence of diarrhoea as the level of education of mother's increases but the trend is not statistically significant (p >0.05).

We also analyzed the relationship of diarrhoea among the underfive children and the mother's major source of income. It was found that 40.7% of children who had diarrhoea are from mothers who are self employed compared to 36.1% and 27.3% whose mothers major source of income were farming and spouse dependent respectively (table 4.4). However this difference was not found to be statistically significant (p> 0.05).

The household size and its relationships with the prevalence of diarrhoea were also studied. We found that diarrhoea prevalence was highest (40.2%) among children

who lived in households with less than 4 people, and least (16.7%) was among children who lived in households with more than 9 people (Table 4.4). The prevalence of diarrhoea decreased as the number people in the household increased. The association was found to be statistically significant ($p < 0.05$).

We also analyzed relationship between father living in the household and prevalence of diarrhoea. We found that diarrhoea prevalence was highest (51.7%) among children whose fathers were not living in the households compared to 33.8% of children whose fathers were living in the households, see table 4.4. The reasons for not living in the household were, father working in another town 10.7%, father living in another place 35.7%, father divorced/separated 39.3% and 14.3% fathers were dead. The difference in diarrhoea prevalence by whether the child live with the father in the same household was found to be statistically significant ($P< 0.05$). This suggests that the presence of father is associated with lower probability of diarrhoea.

Livestock's ownership in relation with the prevalence of diarrhoea was also examined. The results show a slightly high proportion (36.3%) of the children whose households owned some kinds of livestock's had diarrhoea compared to 32.6% of the children whose households had no livestock's, see table 4.4. Livestock ownership was found not to have a statistically significant association with diarrhoea prevalence ($p>0.05$).

Information on the relationship of diarrhoea and vaccination status was collected and analyzed. We found that 51.5% of the children who were partially immunized had

diarrhoea, compared to 30.4% of the children who were fully immunized (table 4.5). The findings show a statistically significant association between immunization status and diarrhoea prevalence (P<0.01). Being fully immunized will then reduce the probability of diarrhoea.

Table 4.5 Two weeks prevalence of diarrhoea by immunization status.

Immunization status	Diarrhoea				Total
	Yes	%	No	%	
Fully immunized	118	30.4%	270	69.6%	388
Partially immunized	50	51.5%	47	48.5%	97
Total	168		317		485

$\chi^2 = 15.31$ and $P = 0.0001$.

Water sources and its relationship with prevalence of diarrhoea was also studied. We found that diarrhoea prevalence was high (37.2%) among children whose households collected water from unprotected sources (spring/river) compared to 14.3% of the children whose households collected water from protected sources (table 4.6). However this relationship between the source of water and the two weeks prevalence was found not to be statistically significant (P>0.05).

Table 4.6 Relationship between water supply and diarrhoea among underfives:

N = 485

Variable	Diarrhoea prevalence				P value
	Yes	...%	No	...%	
Source of Water					
Tap water	96	33.9%	187	66.1%	
Protected source	2	14.3%	12	85.7%	P=0.20
Unprotected source	70	37.2%	118	62.8%	
Drinking water Treatment					
Boiled	90	32.0%	191	68.0%	P= 0.10
Not boiled	78	38.6%	124	61.4%	
Storage					
In pot covered	*61*	*28.8%*	*151*	*71.1%*	**P< 0.024**
In pot not Covered	*105*	*38.6%*	*167*	*61.4%*	

Methods of treating drinking water were also studied and also its relationship with prevalence of diarrhoea was analyzed. Although the relationship between boiling drinking water and diarrhoea was found to be statistically not significant (P>0.05),

the results revealed that seventy-eight (38.6%) of the children whose households reported that they don't boil drinking water had diarrhoea, compared to only 32.0% of children, whose households boils drinking water (Table 4.6).

Respondents in the study area reported various methods of storage of drinking water and the association with prevalence of diarrhoea was analyzed. About thirty nine percent of the children whose households stored drinking water in uncovered pot had diarrhoea compared to 28.8% of children whose households stored drinking water in covered pot, see table 4.6. The difference was found to be statistically significant ($P<0.05$). Proper storage of water is important in control of diarrhoea disease among underfive years children. The results highly suggest that households, which store drinking water in covered pot, experience fewer episodes of diarrhoea among children underfive.

Respondents were asked about their habits of handwashing, the findings shows that out of 485 underfive children 463(95.5%) of them their mothers were found to have good handwashing habits like, washing hands after coming out of toilet, washing hands before preparing food, washing hands before and after meal and washing hands after nursing a child who has defaecated, while 22(4.5%) underfives their mothers were found to have bad handwashing habits (poor handwashing habits) see table 4.7. Out of the respondents who had poor habits of handwashing 54.5% of their children had diarrhoea while it was 33.7 percent for those who had good handwashing habits. The findings show a statistically significant difference between

reported to have diarrhoea compared to 28.4% of children whose households had pit latrine with drop hole cover. The type of toilet was found not to have a statistically significant association with diarrhoea prevalence (P>0.05).

Respondents were asked if they keep and use leftover foods. On the analysis of relationship with the prevalence of diarrhoea the results show that a higher percentage (37.3%) of children whose households used leftover foods had diarrhoea compared to 26.7% of children whose households did not use leftover foods, see table 4.8. Leftover food use was found to have a statistically significant association with diarrhoea prevalence (P<0.05). This result suggests that avoiding leftover food for underfives will substantially reduce the prevalence of diarrhoea among them.

The place of household garbage disposal and its relationship with the prevalence of diarrhoea was studied. The findings show households, which disposed house garbage in an unspecified space, had higher prevalence of diarrhoea 43.8% among their children, compared with households which disposed garbage in a pit 24.1% of their children had diarrhoea, see table 4.8. The findings show a statistically significant association between places of garbage disposal with diarrhoea prevalence among underfives (p=0.05). Hence disposing household garbage in pit will reduce the prevalence of diarrhoea among underfives.

Table 4.8. Relationship between excreta disposal and underfive diarrhoea: N = 485

Variable	Diarrhoea prevalence				
	Yes	%	No	%	
Place of Child's defaecation					
Pit latrine	22	19.1%	93	80.9%	$\chi 2=16.10$
Open space	95	38.9%	149	61.1%	df=2
Small pit	51	40.5%	75	59.5%	**P=0.0003**
Dug in the Ground					
Type of Household toilet					
Flush or VIP	9	45.0%	11	55.0%	$\chi 2=5.97$
No toilet	2	50.0%	2	50.0%	df=3
Pit latrine with drop hole cover	54	28.4%	136	71.6%	P=0.113
Pit latrine without drop hole cover	103	38.0%	168	62.0%	
Leftover foods					
Eat	134	37.3%	225	62.7%	$\chi 2=4.06$
Don't eat	28	26.7%	77	73.3%	**P=0.04**
Garbage disposal					
Unspecified site	14	43.8%	18	56.3%	$\chi 2=5.65$
In pit	20	24.1%	63	75.9%	df=2
Communal pit	134	36.2%	236	63.8%	**P=0.05**

Table 4.9 Preventive measures known by mothers/guardian.

(N=420)

Preventive measures	Frequency	%
Use safe and clean Water	166	39.5
Keeping environment Clean	104	24.8
Cover foods from flies	86	20.5
Use of latrine	57	13.6
Handwashing	52	12.4
Immunization	8	1.9
More medicines in Clinic	5	1.2
Breast feeding	4	0.9
Charms	1	0.2
Total	420	100

Mothers were asked about the preventive measures of diarrhoea that they knew. It has been observed that most known preventive measure was use of safe and clean water 39.5% followed by keeping environment clean 24.8% and covering food to avoid flies 20.5%. Also proper use of latrines 13.6%, handwashing 12.4%, immunization 1.9%, supply of more medicine 1.2%, breast-feeding 0.9%, and charm

were mentioned as a preventive measure 0.2% see table 4.9. The relationship of diarrhoea among underfive and mothers knowledge on diarrhoea prevention was also studied. It was observed that only 33% of the children whose mothers/guardians had good knowledge of preventive measure had diarrhoea compared to 44.3% of the other group (see table 4.10). Statistically the association was not significant (p= 0.06). Mothers with good knowledge on preventive measures of diarrhoea their children will experience low episodes of diarrhoea.

Table 4.10 Relationship between mothers knowledge of preventive measure and diarrhoea among underfive children in Mbeya district.

Knowledge category	Diarrhoea prevalence				Total
	Positive	%	Negative	%	
Good	137	33.0%	278	67.0%	415
Poor	31	44.3%	39	55.7%	70
Total	168		317		485

$\chi 2=3.36$ P=0.06

Respondents were also asked about the causes of underfives diarrhoea. It was noted that the respondents have wide knowledge of the relationship between dirty environment, flies, and diarrhoea. 41.9% identified dirty environment as the cause of diarhoea while 35.5% mentioned flies (Table 4.11).

Table 4.11 Perceived causes of diarrhoea among mothers/guardian.

(N=420)

Causes	Frequency	Percents.
Dirty environment	176	41.9
Flies	149	35.5
Change diet	34	8.1
Bad milk	16	3.8
Teething	13	3.1
Fever	10	2.4
Unfaithful mother	8	1.9
Bad wind	5	1.2
Evil spirit	5	1.2
Sunken fontanelle	4	0.9
Total	420	100

The knowledge of the causes of diarrhoea among mothers in Mbeya district was assessed. About 52.6% of all underfive children, their mothers were found to have good knowledge on the causes of diarrhoea while 47.6% of the children their mothers were found to have poor knowledge on the causes of diarrhoea see table 4.12. Further analysis revealed that among children whose mothers had poor knowledge 39.1% had suffered diarrhoea in the past two weeks compared to 30.6% whose mothers had good knowledge on the causes of diarrhoea. The results suggests

that if mothers have good knowledge on the causes of diarrhoea their underfives will experience less episodes of diarrhoea.

Table 4.12 Prevalence of underfive diarrhoea by knowledge of causes of diarrhoea among mothers in Mbeya district.

Knowledge category	Diarrhoea prevalence				Total
	Positive	%	Negative	%	
Poor	90	39.1%	140	60.9%	230
Good	78	30.6%	177	69.4%	255
Total	168		317		485

χ^2=3.90 p=0.05

CHAPTER 5

5 DISCUSSION

The aim of the study was to determine the magnitude of diarrhoea and associated factors. The study also aimed at understanding the perceived causes of diarrhoea and preventive measures known by mothers/guardians of underfives in Mbeya district. The results revealed that several factors were associated with diarrhoea prevalence among underfives.

We found a high (34.6%) two week prevalence of diarrhoea among underfive years children in Mbeya district. This is in contrasting with the national average (14 percent) reported in recent (1996) TDHS. It is also very high compared to the highest (25.2 percent) regional prevalence reported in the same TDHS for Kigoma region. This high two weeks prevalence might be due to various factors, which were present during the two weeks preceding the survey such as heavy rains or other factor, which are going to be discussed. A similar high two weeks prevalence of diarrhoea has been reported in other places in the world. Getaneh (1997) reported diarrhoea morbidity in urban area of southwest Ethiopia to be 36.5% percent.

Factors that are associated with diarrhoea among the underfive years children.

It is commonly known that without knowledge of new behaviour it is difficult to change. In our study it has been found that 52.6% of the children are from mothers/guardians whose knowledge of the cause of underfive diarrhoea was found to be good, while 47.4% were from the mothers with poor knowledge. This means that knowledge of cause has important role in the control of diarrhoea among the

underfive children. Mothers with high knowledge of cause of diarrhoea are at a better position to control the disease (Hygiene, 1995).

When we look at the sex of the children with relationship to diarrhoea, we find that there are no much differences between the two sexes but the strength of the relationship is stronger in female than in male. This finding complement the findings in others studies, Getaneh et. al. (1997) reported similar finding in Ethiopia. This suggests that they are equally both exposed to similar environment.

Oni et. al. (1991) argued that it is the age of children rather than the sex that determine the prevalence of diarrhoea among the underfive years children. In our study, we also found a strong association between the age of the child and prevalence of diarrhoea. In our study it was found that the most affected age was 12-23 months among whom the prevalence was 50.3%, compared to 17% among those 0 to 11 months old least affected ($P<0.05$). Our findings on relationship of age with diarrhoea also agrees with the findings of Root (1997) who found that risk of diarrhoea is high in children aged 12- 23 months. The high prevalence of diarrhoea among this age group might be due to exposure to intestinal pathogens through supplementary feeding and exploration of hazardous living environment (Root, 1997). In another study by Zeitlin et. al. 1995 it was also observed that the age of children has an association with diarrhoea, he noted that the incidence of diarrhoea was highest among children aged 10-12months. The prevalence was lower in children below 11 months, because at this age in rural areas the children are always with their mothers and the only food they are given is breast milk.

The influence of maternal age on the under-five diarrhoea has been studied. In our study it was found that the mothers who were 24 years and below had 35.5% children with diarrhoea, the rate decreases with increased mother's age. Mothers who are young their children experienced higher prevalence of diarrhoea probably due to their lack of knowledge on hygiene behaviour and the type of food to give their children.

These findings are similar to the findings of Yacob et. al. (1995) who found that those mothers below 20 years of age their underfive children experienced higher episodes of diarrhoea. Dikassal et. al. (1993) in the study of diarrhoea among children in the Republic of Congo had similar findings and he indicated that maternal age is a significant variable for behavior mediated mode of transmission.

Mother's education is said to be important in the control of diarrhoea among under-five children. Mothers who have more years at school are expected to contribute highly in the hygiene of the children. Our finding indicates that among mothers with less than seven years of school 35.5% of their children reported diarrhoea in the past two weeks prior to the study. Mothers having seven or more years of school only 28.2% of their children had diarrhoea. This findings indicates that those mothers with more years of school their children have less two weeks prevalence of diarrhoea.

The question of mother education with relation to dirrhoea is quite controversial Oni (1996) did a study on infant feeding practices, socio-economic conditions and

diarrhoea diseases, he found that children of mothers with secondary education had significantly higher incidence of diarrhoea compared with children of illiterates. Mother's education alone can not be an influential factoring in the incidence of diarrhoea. Gorter (1998) documented that mother's with more than 3 years of primary school education and in comparatively better economic position exhibit better general hygiene behaviour. The protective effect of maternal education in underfives diarrhoea varies according to the socio-economic environment, it protects against children diarrhoea in the communities which are economically and socially advantaged but has no effect in disadvantaged communities (Dargent-Molina et. al. 1994).

Our findings indicates that marital status has no relationship with underfive diarrhoea, but 47.4% of children who had diarrhoea they are from polygamy families. The findings in this study differs from those of Milaat et.al., (1995), in his study done in Saudi Arabia he found that the marital status was statistically significant associated with diarhhoea.

Mother major source of income was examined in relation to the incidence of diarrhoea. The results show that the prevalence of underfive children with diarrhoea is higher (40.7%) among the self-employed than those who are purely housewives (27.3%). This finding complements the finding of Adefunke et. al. 1997, who observed that women who are self-employed are forced to take their young children with them to their workplace. In these workplace children were exposed to the hazards of their work environment. Folashade et. al. 1997, also had same findings

and concluded that in their workplace the hygiene is poor, personal excreta and waste disposal practices are very poor and sometimes they are obliged to buy water and food from vendors for their children, which are unwholesome.

Overcrowding in the households predispose its inhabitants to various diseases including diarrhoea diseases, in this circumstance the young ones are highly at risk. Number of people living in the household has influence in the incidence of diarrhoea. The study found that there is relationship between the number of people in the household and underfive diarrhoea disease. 40.2% of children who had diarrhoea came from household having less that four members compared to 16.7% of those who are from household having nine or more members. This association is not a direct one it could be linked with factors like education of the mother/guardian and other factors which were found to be associated with underfive diarrhoea in our study. These findings differ from what has been observed by Stanton (1987) who reported that the prevalence of diarrhoea was higher among underfive who lives in household with 7 or more members. Also Nurul (1991) observed that in Bangladesh the prevalence of underfive with diarrhoea increases with the number of household members.

In our study we found that high proportion (51.7%) of children whose fathers were not living in household due to one reason or another had diarrhoea compared to 33.8% whose fathers were living in the household (p=0.05). This could be due to economic reasons among single parent households, the situation is worse when both parents are not present. These findings are similar to those observed by Molbak

(1997) who documented that children who are not cared by their parent were at high risk of getting diarrhoea in Guinea-Bissau.

The presence of livestock's in the household have important role in the transmission of diarrhoeal diseases, this might be due to contamination of water sources and play grounds of children. In our this study it was observed that 36.6% of children whose households have livestock's within the compound had diarrhoea compared to 32.6% of children whose households had no livestock's. These findings complement those observed by Moy et al. 1991 who reported that the presence of livestock's in the compound was associated with high prevalence of diarrhoea in Zimbabwe. Bukenya (1991) in Papua New Guinea reported similar findings.

In order to reduce the morbidity and mortality of underfives one of the measures in the National essential Health Intervention Package is to immunize all the children's against infectious diseases. This strategy has met with a lot barriers among them are poor community compliance and inaccessibility of immunization services due to distance. In our study we found that high proportion (40.1%) of children who were not or partially immunized had diarrhoea in the past two weeks while those who had completed immunization 31.4% of them had diarrhoea in the two week prior to the survey, the difference is statistically significant ($p<0.05$). Similar findings were reported by Getaneh (1997), in his study of diarrhoea morbidity in an urban area of Southwest Ethiopia it was found that about half (50.5%) of the children who did not complete immunization as compared to 34.6% of those who were up to date with their vaccines had diarrhoea.

The effects of immunization on childhood diarrhoea might be an indirect one. It is known that at the underfive clinics whereby immunization take place, mothers are given health education about underfive diseases.

Information on water sources, water treatment, and water storage in the household was collected, only the methods of water storage were found to be significantly associated with prevalence of diarrhoea (<0.05). Thirty nine percent of children whose household's stored water in uncovered pot had diarrhoea, which is high, compared to 28.8% of children whose households stored drinking water in covered pot. This finding could be due to storage of water in dirty pot or contaminating water with ones dirty hand during collection. Mulugeta (1997) surveyed on practices of water handling and level of contamination between the source and use in homes in Jimma town found that water which was free of contamination at it's source was found to be contaminated at home. Similar phenomenon may have applied in our study area.

In our study area we found that 38.8% of the households used unprotected source of water. 37.2% children from this group had diarrhoea in the two week prior to the survey while 50.4% households reported using tape water of these 33.9% of its children had diarrhoea in the two week prior to the survey. It is noted that those who used unprotected sources had high prevalence of diarrhoea than those who used tap water, however the difference is not significant statistically because tap water in Mbeya district is untreated. The importance of using safe protected water has been observed elsewhere Martens et. al. 1991 reported that children in households drawing

their drinking water from handpumps suffer 46% fewer episodes of diarrhoea than children in families using unprotected sources. In contrast, Getaneh 1997 in his study of diarrhoea morbidity in urban area of Ethiopia found that there was no association between source of water and diarrhoea.

There are various methods of treating water at community and household level, findings indicates that the method used for treating household water in Mbeya district is boiling. Sometimes cultural barriers are the reasons of not treating water Mclennan (1995). It was found that 41.7% households don't boil water, of these 38.6% of their children had diarrhoea in the past two weeks prior to the survey. While those who boil water of these 32.0% of their children had diarrhoea in the past two week prior to the survey, thus boiling of water has positive influence on minimizing the episodes of diarrhoea among underfive children. Other authors have documented the importance of safe and boiled water in control of diarrhoea diseases. Nichter (1985) underlined the importance of boiled water in Sri Lanka as public health measure in control of diarrhoea but noted that cultural barriers should be addressed. Recently Adefunke et. al. 1997 identified use of unsafe water as risk factor for diarrhoea among the underfives.

Handwashing practices reduce risk of contracting infectious gastrointestinal diseases including diarrhoea. In our study we studied handwashing habits in different occasions and its relationship to diarrhoea prevalence. In this study we found that 54.5% of children whose mothers had poor handwashing habits (not washing hands after toilet, before preparing food, before meal and after attending a defaecated child) had high diarrhoea compared to 33.7% of children whose mothers had good

handwashing habits ($P<0.05$). Our findings are similar to those of Nurul (1991). In his study about the importance of age in evaluation of effects of maternal and domestic hygiene practices on diarrhoea in rural Bangladesh. He reported that personal hygiene which includes handwashing habit has a significant relationship with the underfive children diarrhoea.

Proper disposal of human faeces has very important effect in interrupting the chain of contamination of fluids, fields and flies that are the vectors for transmission of diarrhoea disease. Proper human excreta disposal interrupt the contamination of food and water and in this way prevent spread of diarrhoeal diseases. There are associations between where the child defecates and occurrence of diarrhoea. In our study area we found that 40.5% of children who defaecated in a small pit dug on ground had diarrhoea, which was significantly high compared to 19.1% of children who used pit latrine ($p<0.05$). This could be due to the fact that after children has defaecated the stool is left long before it is buried or removed in this way contaminating the playground of the child.

There is prevailing belief in many societies in developing countries that the faeces of babies and children are less harmful than those of adults probably this could be the reason why mothers in rural areas indiscriminately dispose child's faeces. Consequently this could be the reason why the prevalence of diarrhoea is high in Mbeya district where this practice is common. The findings in this study complement that of Adefunke et. al. (1997) in Nigeria and Martens et. al. (1991) in Sri Lanka.

Proper disposal of faeces has a significant effect on the control of diarrhoea disease Stanton et. al. (1987) also emphasized that it is of public health importance to ensure that latrines are available at household level and are properly kept. In our study area 0.4percent of households had no latrine and of these 50% of their children were reported to have diarrhoea in the two week prior to the study. Households with pit latrine with drop hole cover were 55.9%, it was observed that only 28.4% of children from these households had diarrhoea in the two week prior to the survey. The findings are similar to those of Getaneh et.al. (1997) who documented that the availability of private latrine was protective from diarrhoea.

The habits of cooking more food than the need of the family or making food several hours before eating time is quiet common in many developing countries and especially at rural areas. These foods are sometimes eaten cold or insufficiently heated and hence increase the risk of diarrhoea diseases in underfives. In our study we asked the respondents if they had used leftover foods and we related it with the prevalence of diarrhoea. The results show 37.3% of children whose households used leftover foods had diarrhoea which was statistically significant high compared to 26.7% of children whose households used no leftover foods ($P<0.05$). Molbak et. al. (1997) reported similar findings in his study of risk factors for diarrhoea disease incidence in early childhood in Guinea-Bissau he had documented that eating cold leftover foods was associated with an increased incidence of diarrhoea.

Garbage disposal at proper site is very important in the prevention of spread of germs causing diarrhoea as well as creating unfavorable environment for flies to bread and

also inhibiting other scavengers to get into contact with infectious wastes and hence facilitate the spread of pathogens causing diarrhoea. Improper households' garbage disposal has strong impact in the spread of diarrhoea diseases in both children and adults.

In our study we found that 43.8% of children whose household disposed household garbage in unspecified space had diarrhoea which was statistically significant high compared to 24.1% children whose household disposed household garbage in a pit (P=0.05). The findings are also supported in the observation by Dikassa (1993) when reporting on maternal behaviour and risk factors for childhood diarrhoeal disease in Kinshasa Zaire. In this study it was observed that poor disposal of household's garbage had strongest association with the risk of diarrhoea and that covering or burning of households waste deters flies. Adefunke (1997) in his study Nigeria also affirmatively reported that improper refuse disposal practice was associated with high incidence of diarrhoea.

Preventive measures known by mothers/guardian.

One of the conditions required for success of any kind of intervention in the community is involvement of the people in identifying their problems and letting them find their solutions. Before starting intervention for prevention of diarrhoea disease one has to study the community to know what they know about prevention and what they do. This is not an easy task it needs a lot of time and money to do such a research. In our study we tried to get a picture of what the mothers in Mbeya district knew about preventive measures. In general the knowledge of preventive measure of diarrhoea was found to be good as 64.3% of the mothers/guardians

recognizes environmental sanitation and use of safe and clean water as preventive measure against diarrhoea among the underfive children. It is disappointing to note that mothers in the study area are not aware that breast-feeding and immunization of the children can prevent diarrhoea disease. Only 1.9% of the respondents mentioned immunization and 0.9% mentioned breast-feeding could prevent diarrhoea. This finding differ from the earlier one done by Mongi in 1989 in which she reported that 50% of mothers in Mbeya region are aware that immunization can prevent diarrhoea. The difference could be due to the place where the study was conducted, her study was in the health facilities, and ours was household survey.

Perceived causes of diarrhoea among mothers/guardian.

The mothers were asked to mention freely what do they perceive as causes of diarrhoea among underfive children. Different answers were given spontaneously by respondents in the study area to the question. Among the causes mentioned by majority of respondents spontaneously were dirty environment 41.9% and flies 35.5% the least mentioned was sunken fontanelle 0.9%. In contrast to the study by Kapoor (1993) in his study of maternal knowledge, attitudes and practice in diarrhoea in India he documented among the causes cited by the mothers as teething (64.3%), evil eye (46%), dirty water (15.3%), change of food (8.3%) and dirty environment (6%).

Kleinman (1978) in his study about culture, illness, and care documented that mothers' perception of causes of diarrhoea differs from that of physicians. To the lay population causes of diarrhoea disease comprise of different factors in which

infectious agents are not always identified. In many cultures the perceived causes of diarrhoea determines how the episode is managed.

CHAPTER 6

6 CONCLUTIONS AND RECOMMENDATIONS

6.1.CONCLUSIONS

The two week's prevalence of diarrhoea among underfives in Mbeya district is 34.6%, which is very high compared to most recent two weeks prevalence of diarrhoea among underfives in Tanzania reported in the TDHS.

Several factors were found to be associated with diarrhoea among underfives. Some of the factors were socio-demographic factors that can not be modified. Factors such as the age of the child, sex of the child and the presence of father in the household.

Immunization of children is important in control of underfive children diarrhoea i.e. those who were fully immunized were less affected by diarrhoea.

Household hygiene and habits that includes proper storage of drinking water, consumption of leftover foods and handwashing habits of the mothers/guardians were related to underfive children diarrhoea. Disposal of garbage, disposal of child faeces and child place of defecation are associated with prevalence of diarrhoea diseases among the underfive children. Use of treated drinking water has a positive impact in reduction of underfives diarrhoea diseases.

Among all underfive children 52.6% came from household whose mothers/guardians had good knowledge on the causes of diarrhoea. Also 85.6% of the underfive children are from mothers/ guardians with good knowledge of preventive measures of diarrhoea among the underfive. Despite of this, the prevalence of diarrhoea among the underfive children is high. This means that other factors apart of the knowledge

of the causes and preventive measures plays an important role in underfive diarhoea diseases.

6.2 RECOMENDETIONS

1. We recommend to the DHMT Mbeya district to utilize the results of this study because it is recent and reflects the current real picture of diarrhoea among children who are below five years of age in the district.
2. Among the problems which were identified in this study and found to have association with underfives diarrhoea are poor personal hygiene, indiscriminate disposal of child's faeces and household garbage. Thus the DHMT should focus on interventions, which aims at changing these practices. The first intervention is the use of different health education strategies to households and communities. Health providers in the nearest health facilities should be encouraged to conduct health education sessions to communities and their clients. Villages should be encouraged to establish by laws to make household maintain clean environment in their households and else where.
3. Storage of water was found to be a problem in the study area it is recommended that health officers should mobilize and educate people to use locally available means for storage of water to prevent contamination of water. Also there is a need to promote the household treatment of drinking water.
4. A study is needed to look for the discrepancy between the high knowledge of the causes and prevention measure with high prevalence of diarrhoea among the underfives.

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