

AN INVESTIGATION OF THE EFFECT OF SOME  
SOCIO-ECONOMIC FACTORS ON INFANT AND CHILD  
MORTALITY IN TANZANIA  
A CASE STUDY OF DODOMA REGION

BY



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ABSTRACT

This study attempted to examine the effects of some socio-economic factors on infant and child mortality at micro-level in Tanzania. It is based on the data on 2338 household members collected through a retrospective sample survey, which was carried out in Dodoma region-in both rural and urban districts between May and August, 1991.

The study was prompted by the fact that Tanzania has been largely receiving medical and health facilities/services from foreign donors but still has high CMR and IMR. Thus, the main objective of the study was to establish the relationship between some socio-economic factors on infant and child mortality in the region. Of the Socio-economic factors whose effects on child mortality were assessed were: Residence, level of education especially of the mother, average household income level, availability and accessibility to clean and safe water, toilet and housing conditions, availability and accessibility to medical facilities/services and mothers' nature of employment.

The results revealed that rural setting on average had higher mortality incidences for their children than the urban setting partially because of lower proportion of educated mothers in the area as compared to the urban district apart from other better social services that are

not found in the rural setting. Furthermore, mothers education seemed to have inverse relationship with child mortality and was highly significant at 5% level in the rural district. Low household income level in both residential settings was found to be associated with high child mortality. The effects of availability of medicine at the hospital on infant and child mortality was not determined because Chi-Square Statistic failed to show any association between the variable and MORT(a variable used to measure mortality risks for children). Mothers' nature of occupation was also found to be associated with child mortality. Mothers employed in good paying jobs in offices together with full time housewives were found to be associated with low child mortality risks for their children when compared to farmers or lowly paid wage earners. Again, families that used water from either pond, stream or wells had on average higher frequent deaths for their children than those families that relied on piped water.

Though Mbago (1975), had earlier managed to perform statistical analysis of differences in infant mortality estimates by district using 1967 Population Census; this study intended to perform a similar study but now at a local level. While Kitula(1987) and Igosha(1990) had conducted such a study in Kibaha district and Shinyanga region respectively, this researcher conducted such a study in Dodoma region where so far no similar study had been conducted. The researcher had anticipated combined effects on mortality of the socio-economic variables that he intended to investigate. Thus, he thought that apart from using only univariate results; bivariate results obtained through cross-tabulations, as well as utilization of multiple regression analysis would make the results more objective. Among the independent variables looked into are:

- (i) Parental education: Higher levels of parental education may be expected to be associated with lower Infant and Child Mortality. Exposure to diseases may be reduced by better hygienic practices and other behaviour; disease resistance may be increased by better nutrition (though countered by possible reductions in breastfeeding) and greater use of immunizations; and severity in child diseases may be reduced by appropriate use of curative or palliative measures (Hill,1989). If household income is adequately controlled for, we should probably expect mother's education to be relatively more important

than father's education, since in most societies it is the mother who has immediate involvement in child care. However, if income is not adequately controlled for father's education and household income are likely to be strongly related, and father's education may appear to be highly important. In some societies in which the possibilities for independent female action are limited, husband's education may also be of importance in determining the use or otherwise of preventive and curative health services.

- (ii) **Type of place of residence:** Urban and rural areas differ in many respects relevant to Infant and Childhood Mortality. Urban areas generally enjoy better economic conditions, and educational standards are almost universally higher. However, better economic conditions may not always imply better health (Hill, 1989). Disease transmission rates may be higher as a result of higher population density, in urban settings, and also nutrition may be worse as a result of shorter breastfeeding (for employed urban women) and reliance on market purchase rather than subsistence production (in rural setting), and a poorly run water system may be hazardous (due to industrial pollution) than a rural well. In any way, access to health services and the quality of such services, will generally be superior in urban rather than rural areas. On a bivariate basis, we would

expect Infant and Child Mortality to be lower in urban rather than rural areas, but on a multivariate basis, once education and income are controlled for, no large such differences are expected.

(iii) Household income: Household income is expected to be inversely related to child mortality through lower exposure (more hygienic living conditions), greater disease resistance due to better nutrition and use of immunization, and reduced disease severity due to better nutrition and use of curative services (Hill, 1989).

(iv) Parents' occupation: In most households the mother combines child care with various domestic tasks. If the living conditions are unfavourable these activities can be fairly exhausting and have an adverse effect on the development of the Infant and the Child.

The effect of the mothers' involvement in remunerative work on the child's survival depends on the social conditions in which her activity takes place. If the whole family has to work in order to ensure its survival (as in less developed agricultural economies) or if the mother is forced to work owing to the inadequate income of the household head or because she has no other source of maintenance, there is likely to be deterioration in the

health of the child. Additional risk factors are the absence of other family members who could take care of the child and the fact that work outside the home makes it difficult for the mother to continue breast-feeding. It is also probable that such women will be employed in unskilled jobs with low earnings which makes the matter even worse. However, if both parents- father and mother are engaged in highly paying occupations, there will be better chances for better living conditions (good housing, good accessibility to better quality health facilities/services as well as clean and safe water etc) thus high child survival.

(v) **Type of water supply:** The household's water source is expected to influence sanitation and hygienic conditions in the household and hence to provide channels for the influence of socio- economic factors on child-survival(Casterline et al 1989). In particular, lack of piped water is assumed to be associated with mortality of babies who breastfeed little or not at all. This is because such children require foods mixed with water. Now, if water is contaminated it will increase the risk of gastro-intestinal disease.

(vi) **Health services/facilities:** These are found to play a very great role in influencing Child and Infant Mortality. However, their effect as discussed earlier is influenced by parental education and household

income which determine the quality and how best to use such services and facilities for child survival.

### 1.8 Hypotheses:

In line with relationships of factors (variables) as depicted in the proposed model, the following hypotheses were suggested:

#### 1.8.1 Hypothesis one.

The lower the level of education of the mother the higher the Infant and Child Mortality.

#### Rationale:

If household income is adequately controlled for, we should probably expect mothers' education to be relatively more important than father's education, since in most societies it is the mother who has more immediate involvement in child care.

Mothers with low level of education tend to stick to traditional customs and taboos against some foods. They usually have parochial outlook towards a sick child who needs medical examination.



It is expected that mother's education past primary is hopefully favourable for child survival. This is because highly educated mothers could easily look for advices from well informed sources such as well trained doctors, nurses etc. on how to improve health of themselves and their children as well. Also, by virtue of their high education they are positively selected in the labour market and thus increase household income which in turn benefits the health of their children.

#### 1.8.2 Hypothesis two:

The Infant and Childhood Mortality rates are inversely related to income levels among couples or parents.

#### Rationale:

It is argued that income is a necessary prerequisite, though not sufficient for health condition of a family for being able to afford better medicine, nutritional food etc.

It is expected that high Infant and Childhood Mortality rates will be associated with women's work status. It is expected that high Infant and Childhood Mortality rate will be found among those households with low income levels. Again, low infant mortality levels is expected among households with high income levels, and/or among those mothers with some income earning jobs.

### 1.8.3 Hypothesis Three

The high Infant and Childhood Mortality rates are associated with poor accessibility to safe and clean water supply.

#### Rationale:

Studies in literature have shown that most of the rural population in Tanzania depend on the traditional water sources such as open rivers and streams which are on average found at relatively long distances from home areas.

It is expected that the high Infant and Childhood Mortality will be found among women who obtain water from the traditional sources, while low rates are expected to be found amongst those women who obtain their domestic water from less than a kilometre but from pipes, pump shallow and protected wells.

### 1.8.4 Hypothesis Four:

The high Infant and Childhood Mortality rates are associated with poor accessibility to health facilities.

Rationale:

Poor accessibility to health facilities/services due to either low education of the mother, poor transport to clinics, inadequate health centres/clinics relative to the population, few well trained medical personnel, inadequate drugs in health centres together with insufficient income for the majority to afford buying such drugs not found in public hospitals contribute much to the high level of Infant and Child Mortality in Tanzania. Infact, studies by Mascarenhas and Thomas (1973) found out that no region was actually served adequately by the existing medical facilities. Also, Kamuzora's (1972) study shows that the majority of the population in Tanzania on average stay more than 10 kms. away from any health facility. This leads to poor preventive and curative measures for the child.

It is therefore expected that high rates of Infant and Child Mortality will be found in those areas with shortage of medicines and/or poor transportation; in contrast to the low levels which are expected where the drugs are relatively available and where transportation is relatively efficient.

#### 1.8.5 Hypothesis Five:

Nature of maternal occupation is directly related to Infant and Child Mortality through the loss of specific elements in a desirable child care regime.

#### Rationale:

Studies so far have shown that women whose economic activities/occupation do not allow them to go along with their children tend to underbreast-feed them. They leave behind their children under the total care of housemaids.

It is therefore expected that there will be high Infant and Childhood Mortality rates among mothers whose occupations' compel them to stay away from their homes for longer periods of the day. On the other hand, low Infant and Childhood Mortality rates are expected amongst women who use most of their time to care for their' children themselves.

#### 1.8.6 Hypothesis Six:

The Infant and Child Mortality rates are higher in rural setting than in urban setting.

Rationale:

Urban areas generally enjoy better economic conditions, and educational standards are almost universally higher. Access to health services, and to the quality of such services, will generally be superior in urban rather than rural areas.

It is expected that low Infant and Child Mortality will be found among mothers who usually stay in Urban areas where better opportunities in terms of better education standards, good health facilities/services, availability of safe-clean water through pipe systems are available, while higher rates will be found among mothers residing in rural areas because of poor social facilities.

1.9 Delimitations and limitations of the study:

As a result of limited time and resources, the study was, as indicated earlier, conducted in Dodoma region. And also within the region only few areas were researched. However, for fair representations, both rural and urban areas were investigated. They included two villages from the rural setting and five wards from the urban setting.

### 1.10 Definition of terms:

The following terms are defined as they are used in the context.

1.10.1 Health: As WHO defines it, health is considered as a state of complete physical, mental and social well-being and not merely the absence of disease.

1.10.2 Infant Mortality Rate (IMR): Is defined as the number of deaths to children under one year of age during a year for every 1,000 live births during the year. This approximately refers to the probability of dying between birth and exactly age one.

1.10.3 Childhood Mortality: refers to the number of deaths to children of at least age one but less than five.

1.10.4 Under-five Mortality : refers to the number of deaths between birth and under age five.

1.10.5 Level of education: refers to formal education categorized as

:No education (Zero education)

:Primary education (up to standard seven)

:Secondary or higher education (Form one up to tertiary levels)

1.10.6 Residence: refers to those areas administratively termed rural or urban where a respondent usually resides.

#### 1.11 Summary:

As an introductory part in chapter one, we tried to highlight on the knowledge of Infant and Child Mortality rates in Tanzania. We attempted to enumerate reasons for the study of Infant and Child Mortality in the country. However, we argued that limited coverage of the study is a result of time and financial constraints.

Furthermore, the author overviewed the trend in the declining rates of Infant and Child Mortality in both developed and less developed countries (in particular Tanzania). With that trend he came up with the statement of the problem which was preceded by the purpose of the study, objectives of the study and the significance of the study in the context of the nation's needs. Before proposing the hypotheses for the study, the author found it convenient to build up first the theoretical framework for the study. The framework pinpointed interplay of about seven independent socio-economic factors which were found important in the study. The same variables were used to build up relationships with mortality in the mentioned hypotheses.

## 2.2 The theory and research literature specific to the study.

Several studies on mortality have been made in Tanzania (Thomas, 1972; Kamuzora, 1972; Sembajwe, 1973; Egero and Henin, 1973; Mbago, 1975; Sekatawa, 1976; Henin et al, 1977; Hogan and Jiwani, 1977; and Sembajwe, 1983 who used some data from Censuses and a number of demographic surveys). Recently, we have Kitula (1987) and Igosha (1990) who conducted their researches at district and regional levels respectively.

While conducting research on socio-economic factors affecting mortality in rural Tanzania, Sembajwe (1983), provided evidence that socio-economic development is more important in lowering mortality than the provision of health facilities and services. He particularly showed that the latter have a weaker relationship with expectation of life at birth than socio-economic conditions as represented by education. It is time that though the supply of health facilities and services plays an important role in reducing mortality, efforts to improve the health conditions of the people may be futile if they are not accompanied by improvements in the overall living conditions of the people.

Preston (1980); Hennes and Aveery (1982) all concur with the above arguments that socio-economic development is more vital in lessening mortality prevalences than the



provision of health facilities and services, though both are inter-related in a number of subtle ways.

Kamuzora (1972) while conducting a study on mortality differentials in Tanzania with special reference to four regions found out that mortality differentials do exist among the regions due to differential socio-economic development mainly medical and health development that prevent death, better education and higher income that enable the maintenance of good health.

Igosha (1990) while doing her research in Shinyanga region in Tanzania came up with the findings that the high Infant and Childhood Mortality rate cannot be explained by a single unrelated socio-economic factor(s), but by a function of an interaction of different socio-economic determinants. She further pointed out that there are significantly strong relationship between education, water, medicine, decision making power which influence income distribution within the household and Infant and Child Mortality. She further discovered that in Shinyanga, like any other region in Tanzania, the power to make decision within the household is in the hands of the male members of the community. This implied that, mothers who are supposed to take care of children do not possess resources and decision making power for better child upbringing. Consequently, this leads to high infant and child mortality.

Also Mbago (1975) while making statistical analysis of differences in infant mortality estimates by district using 1967 Population Census found out that factors which statistically explain differences in infant mortality among districts are linearly related and they are in the order of importance product per capita and women's education.

Furthermore, a study carried out in Kibaha district in Coast region-Tanzania by Kitula (1987), indicated that maternal age, parity, birth interval and education of mothers have an effect on infant and child deaths. However, availability of health facilities was found to have no effect while duration of breastfeeding could not be analysed. Earlier findings in Arusha, Kilimanjaro, Singida and Coast have indicated that income variations affect child survival through the quality and quantity of food consumed, medical treatment, clothing and education (Kamuzora, 1972; Mbilinyi, 1969). However, the study by Kamuzora (1972) failed to give a clear explanation on the influence of education factor on mortality in Arusha region. This was because low mortality in Kilimanjaro was explained by a higher level of education while in the case of Arusha the relationship was not very clear because there the level of education is similar to that of Singida and Mara where their mortality levels were relatively higher.

Table 3.5: Data required and source of the data.

Hypothesis	Data required	Source of Data
1. The lower the level of education of the mother the higher the infant and child mortality.	Level of education of the mothers (years spent in school) whose children are dead.	Interviews by means of questionnaire.
2. The infant and childhood mortality rates are inversely related to income levels among couples or parents.	Levels of total household income per year categorized as low (< 50,000 Tsh.), medium (50,000-150,000Tsh.) and high (above 150,000Tsh.)	"
3. The high infant and childhood mortality rates are associated with poor accessibility to safe water supply.	:Distances in kms. to the nearest available water source. :Available water system being tap, well, river, dams/ponds, springs, rainwater, etc.	"
4. The high infant and childhood mortality	:Number of clinics, health centres or	

Table (3.5 continued)

rates are associated with poor accessibility to health facilities.	hospitals in a particular location being a village or a ward.	"
	:Whether or not the available health centres have adequate drugs / medical services all the time.	
	:Types of usual transport system to the health centres.	
	:Types of roads to the health centres.	
5. Maternal occupation is directly related to infant and child mortality through the loss of specific elements in a desirable child care regime.	:Nature of occupations and Economic activities of the mother e.g. office work, farming, petty business etc. whose nature in one way or another could influence mothers care to her child.	"
6. The infant and child mortality rates are higher in rural setting than in Urban setting.	: Number of children dead, surviving and everborn from women aged 15-49 in both settings-separately.	"

fluency of the natives, variations in income levels for proper grouping of income levels etc.

- (ii) The area in which the survey is to be done should be the one where majority of the population is less busy. For instance in agricultural areas the most proper time is after the harvest period.
- (iii) Leaders of the study areas should ensure that during the time of research, frightening activities such as levy tax are not going to overlap with the research exercise to avoid suspicion among the respondents.
- (iv) Lastly, the researcher suggests contingency fund to cater for incentives to be given to helpers/volunteers for translating some questions to respondents with no education.

### 3.3 Analysis Procedures:

In the estimation of infant and childhood mortality by Brass\Trussel method, the data on Children Everborn (CEB) and Surviving (CS) were used. Consequently the following data were used:

- (i) Five year age group of mothers aged 15-49.
- (ii) Number of Children Everborn (CEB) for each woman aged 15-49 (parity) denoted by  $P(i)$ .

(iii) Number of children surviving ( $Cs_i$ ) for each woman aged 15-49.

From the data, multiplying factor given by  $P1/P2$  was calculated which was subsequently used to estimate proportion dead as  $q(x) = (1-P(s))$ , where  $P(s)$  is the proportion of children surviving. From that, probability of surviving at exact age  $x$  was calculated as  $1-q(x)$ . Thereafter an appropriate model life table was selected to get survivorship probability which led to estimation of infant and childhood mortality of the region. The choice of the mortality pattern was determined as follows: Two different sources of data on children everborn and children surviving were used. These were 1967 and 1978 Censuses. From these data estimates of  ${}_5q_0$  were obtained using the Trussel version for different family mortality patterns. By plotting  ${}_5q_0$  against reference date trend consistency was checked and hence choice of an appropriate 'family' of mortality pattern and the corresponding level. See graphs 1, 2, 3, and 4. Details are given later. With an appropriate family mortality pattern, time trend for  ${}_1q_0$  and  ${}_4q_1$  was plotted for the surveyed area of Dodoma region. (See graph 5 Appendix 7).

Furthermore, the researcher used the regression model which expresses childhood mortality as a linear function of a set of explanatory variables representing individual and contextual characteristics of the population studied.

The model provided useful guidance in the study of determinants of infant and childhood mortality. The independent variables used in this model were: Type of place of the residence, educational level i.e. number of years of schooling for mothers and fathers, socio-economic stratum (father's and mother's occupation), living conditions such as access to portable water, health services/facilities, and household income levels.

Even though the model was credited for providing useful guidance in the study of determinants of childhood mortality, potentially important factors, acting at the community, household or individual levels, were not included in the model. The form of the regression equation used was:

$$M = a + \sum_{j,k} b_{jk} x_{jk} + e$$

where M = mortality indicator

a = regression constant

$b_{jk}$  = regression coefficient of category j of variable k.

$x_{jk}$  = Independent variable, representing category j of variable k.

k = total number of variables.

M is a continuous variable with a mean of approximately one, while all independent variables are categorical. In

this study, the model was estimated using the ordinary least squares (OLS) regression technique. In the regression model each woman was weighted by the number of her children everborn; the child, and not the woman, was thus treated as the unit of analysis.

### 3.3.1. Calculation of the mortality indicator, MORT(M)

The mortality indicator, M, which is the model's dependent variable, was obtained for each woman with at least one live birth. It represented the mortality of each woman's children relative to the national mortality level, standardized by the duration of exposure to risk. Exposure was allowed for by classifying women by age group, thus making it possible to relate proportion dead to probabilities of dying in childhood. For each woman, an expected number of children dead was calculated by multiplying her parity by the standard proportion dead for her exposure group. The indicator M was then calculated as the ratio of the actual number of dead children she had reported divided by the expected number given her exposure group. Thus, for each woman  $i$ , the mortality indicator  $M_i$  was expressed as:

$$M_i = PD^o i(e) / PD^e i(e)$$

where  $PD^o i(e)$  = the observed proportion of children dead for woman  $i$ , in the exposure group  $e$ . This was obtained by dividing her number of children dead by her total number of live births.



$PD^e_i(e)$  = the expected proportion of children dead for a woman in the exposure group  $e$  if her children's mortality conformed to the national level. The expected proportion dead was obtained by applying in reverse the Brass procedure for estimating probabilities of dying from average proportions of children dead:

$$PD^e(e) = q_s(a)/K$$

where:  $q_s(a)$  = The standard probability of dying from birth until age  $a$  of a model life table selected to represent the level and structure of mortality by age of the total population studied.

$K$  = the multiplier for converting, in the Brass method, the proportion of children dead into probabilities of dying. Each  $K$  is specific to an exposure group of women and on age of the children.

The standard life tables probabilities  $q_s(a)$  were calculated as follows:

The mortality levels corresponding to a "family" of UN or Coale-Demeny model life tables were obtained for each exposure group. The mortality level for each exposure group was determined from the proportions of children dead of all women in that exposure by applying the Trussel variant of the Brass method (U.N.1983). A standard level of

mortality, assumed to represent the level of childhood mortality for the total population, was obtained by averaging the estimates obtained for the various exposure groups. The standard life table probabilities  $q_s(a)$  were determined for each exposure group of the women; each corresponded to a specific age of the children. The expected proportions dead were calculated by dividing the life table probabilities by the appropriate multiplier K.

**NOTE:** The age groups 15-19, 20-24, 25-29 and 30-34 were used. The basic reason among others was that this minimized the recall errors that could have frequently affected data obtained from older women or women married for longer periods of time (if we had used marriage groups).

## CHAPTER FOUR

### 4.0 Data Presentation and Analysis

#### Introduction:

The total number of people with records during the interview were 2338. Out of that 1057 (45.2%) were males and 1281 (54.8%) females. From this sample 986 (42.2%) were recognized as heads of the households from whom 153 (15.5%) were women; and 834 (35.7%) as assistant heads from whom 837 (99.1%) were women. Women who were heads of the households were either unmarried, divorced or widowed.

#### 4.1 Residence:

Out of the sampled population, 1189 (50.9%) resided in Dodoma urban district while 1149 (49.1%) were found in the Dodoma rural district. The distribution of both sexes in the two localities is shown in table 4.1. While urban female population constituted 51.1% of the total female population, rural female population had 48.9%.

making ice-cream for town dwellers, etc. Such incomes were on average estimated monthly. Such activities for the employed were regarded very crucial for supplementing their monthly income which was regarded quite inadequate to make them survive for the whole month. The author thinks that there was underreporting of employed people doing extra activities to sustain their living. This could be due to the fact that because of their own reasons the majority did not want to reveal out their real total income.

#### 4.5 Sanitation and health conditions:

As regards issue of source of water for domestic use, 35.5% of the sampled women population had their water from either ponds or wells (open or covered). And 31.8%, majority being urban women had personal taps. Others, about 17.0%, however, relied on neighbours tap. Generally, distances to whatever source of water are quite short as about 93.6% of the women used to walk less than 5kms. to get to the nearest possible water source.

Out of the total women (within the reproductive group) 71.9% stated that common drugs were available either at the government hospital or mission hospital (at Chamwino). As regards accessibility to such hospitals, 93.7% of such women usually had to walk on foot to get there. Infact, only 23.1% of the women stated that they had to walk more than 5kms. before they reached the nearest health centre

while the majority, 61.6% used to walk less than 5kms. Conditions of roads to such health centres are quite favourable all the year round.

On certain circumstances, when medicines were not found at the government hospitals/clinics, the majority of the women 80.4% usually acquired such medicines for their kids from private hospitals. The remaining, 19.6% however, embarked on traditional medicines (majority being rural women) because of either being unable to afford the charges or their own beliefs regarding the nature of the disease.

As regards housing conditions in which the women lived, 49.0% occupied block and iron sheet type of houses the majority being urbanites, and 36.7% occupied mud with thatched roofs, the majority being the rural ones. 65.5% of the women had their families monopolizing one or two rooms. And also, of the women interviewed 51.1% owned the houses while 42.8% were merely tenants.

Furthermore, about 64.2% of the interviewed women had either pit latrines or no latrines at all within their households. For the case of Dodoma rural district, the majority of such latrines were newly built and no signs of old abandoned ones, indicating that they normally helped themselves in the bush. About 31.4% of the women used toilets with either flush inside or flush outside their

houses. However, a big proportion of that percentage were the urbanites.

As main source of fuel, 47.2% of the women used firewood, 25.0% relied on charcoal, while 3.0% had electricity in their homes and thus used electric-gas cookers. On the other hand, 22.4% of the women used combination of firewood, kerosine, charcoal, electricity and gas as their source of fuel.

As far as employed women were concerned, about 44% of them stayed less than 5kms. from their working places. As a consequence of that, about 76% argued that they usually did not go to breastfeed during working hours because of either long distances or resistances from their bosses. This was very outstanding at DOWICO (one of the brewery industry in the urban) where majority of lactating women stated that their employer could only allow children to be brought in the working place for being breastfed and not for the women to breastfeed them at their homes during official working hours.

/activities which included professional and administrative jobs, secretarial office work, business, farming as well as domestic chores (for housewives).

Table 4.3: Distribution of women by different occupation / activities

Type of occupation/ activities	No. of women involved	Percentage
1. Professional and and administrative jobs	114	9.3
2. Technical jobs	17	1.3
3. Secretarial office work	88	6.9
4. Petty business	107	8.4
5. Farming	624	48.7
6. Domestic chores (for housewives only)	242	18.9
7. Others	36	2.8
Total	1228	

Thus, about 973 (76.0%) of the women in both rural and urban districts were either purely housewives or doing petty business or performing farming activities. The other

proportion 24% were either employed doing professional and administrative jobs (9.3%), Technical jobs (1.3%) or secretarial office work and other related jobs (9.7%).

#### 4.7 Mortality cases for children of women aged 15-49.

##### Introduction:

In this section only summaries of mortality cases for women within the childbearing age groups is given. More attention was given to such summaries with respect to residence, mother's level of education, mother's type of employment, housing conditions which included availability and type of toilets, number of rooms occupied per family, main source of fuel for cooking, water sources etc. Though the summaries are themselves inadequate because they lack children everborn component, still are good for comparison basis to start with our analysis. For each of the mentioned categories of socio-economic variables, the author used mean values of total children dead for mothers within the childbearing age groups.

##### 4.7.1 Child deaths and residence

Mean total children dead for rural was found to be 1.5971 while that of urban was 0.3829. And the overall mean for total children dead was 0.9611. Thus, rural district on that basis was seen to have on average more deaths than the urban district. This was likely so,



because generally people in urban areas enjoy better health facilities and health services e.g. safe-clean piped water, reliable transport to health centres, better accessibility to high quality medicine either in private/government hospital etc; while in rural areas the majority do not enjoy such services/facilities.

#### 4.7.2 Child deaths and mother's education.

Mothers with zero education or with only adult education were found on average to have mean children dead of 2.9461 and 1.5882 respectively; while those with secondary or tertiary education had relatively low values (0.2966 and 0.0000 respectively). In this view, therefore, women with low level of education were found on average to have more deaths for total live births they had given than those with secondary or above level of education. The same conclusion though through different approach, was reached by Bakari(1990) when doing the same study in Mbeya region.

#### 4.7.3 Child deaths and Mother's type of occupation/employment.

Mothers employed in professional / administrative jobs had on average very few children dead (0.2000); while mothers found to be engaged in shamba work had comparatively large value (1.5639). Though type of

employment/occupation is very often related to level of education and therefore income level of the mother (household income); still we cannot ignore the fact that professionally employed women had very few of their children dead as compared to farmers.

4.7.4 Child deaths and household type of toilets:

Mothers having flush toilets inside their houses on average had fewer dead children than those without. And infact, those without any latrines had the biggest value followed by those with pit latrines and flush toilets outside their houses (see table 4.4).

Table 4.4: Summaries of total children dead against type of toilets.

Type of toilets	mean total children dead
flush inside house	0.2701
flush outside house	0.6429
pit latrines	0.9753
none	2.0278

Again, it should be noted that type of toilet is in one way or another related to mother's education and therefore household income. However, when education is controlled for, there were changes in mean children dead by type of toilets as shown below:

Table 4.5: Summaries of total children dead by type of toilets for mothers who have attained at most primary education.

Type of toilet	mean total children dead
Flush inside house	1.1250
Flush outside house	0.5972
Pit latrines/others	2.9583
None	2.0278

Table 4.6: Summaries of total children dead by type of toilets for mothers who have attained at least secondary education.

Type of toilet	mean total children dead
Flush inside house	1.3059
Flush outside house	0.9167
Pit latrines/others	0.4615

From the previous two tables above, it is seen that though mothers using pit latrines at their homes had on average more of their children dead than those using flush toilets, mothers having attained at least secondary education using

pit latrines had considerable lower mean children dead than those having attained only primary or no education. This is an indication that *ceteris paribus*, mothers' education has great influence on child mortality. Again, when mothers level of income is controlled for, changes in mean children dead appeared as shown in table below:

Table 4.7: Summaries of total children dead by type of toilet for mothers whose annual income is less than 70,000Tsh.

Type of toilet	mean total children dead
Flush inside house	0.3895
Flush outside house	0.6667
Pit latrines	3.1551
none	2.0857

Table 4.8: Summaries of total children dead by type of toilet for mothers whose annual income is more than 70,000Tsh.

Type of toilets	mean total children dead
Flush inside house	1.8947
Flush outside house	0.6207
Pit latrines	0.7167
none	0.0000

From the two previous tables it is seen that mothers using pit latrines whose income per annum is more than 70,000Tshs. had on average less deaths for their children than those mothers whose annual income is less than 70,000Tshs. Again, as for education household income level for mothers had influence on child mortality. This is because high income in most cases leads to utilization of better health services/facilities and nutritional foods and therefore lowering of infant and child mortality.

#### 4.7.5 Child deaths and daily work load of the mother.

Mothers who performed manual work most of the time such as looking for firewood in forests, were found to have on average more of their children dead when compared to those doing light jobs like officework. The following table indicates the situation.

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Table 4.9: Summaries of total children dead against  
mothers'daily activities

Type of activity	Mean total chidren dead
1. cooking, cleanliness, water fetching and childcare.	0.4049
2. cooking, cleanliness, water fetching, childcare and seeking firewood.	1.1341
3. cooking, cleanliness, water fetching, childcare and petty business.	0.6638
4. cooking, cleanliness, water fetching, childcare and office work.	0.4297
5. cooking, cleanliness, water fetching, seeking firewood and business.	1.1045
6. cooking, cleanliness, water fetching,business and office work.	0.7403

From the above table it is clear that there is some association between nature of mothers'daily occupation and

child mortality in the sense that tasks like fetching firewood that make mothers get exhausted tend to make them shy away from caring of children.

#### 4.7.6 Child deaths and mothers Employment status

On average women who were employed by the time of interview were found to have less of their children dead (0.3333) when compared to women who were not employed anywhere. Such women on average had more value (1.1170) of their children dead. Anyway, employment status in any case is quite related to education level and thus income level of the mother.

#### 4.7.7 Child deaths and source of water for domestic use

Mothers who usually fetched water for domestic use from either pond, stream, wells or public tap had on the average more of their children dead as compared to those who had their own taps or used to get water from neighbours tap. This is shown in the table below:

Table 4.10: Summaries of total children dead against source of water for domestic use.

Source of water	Mean value of total children dead
Personal tap	0.3401
Public tap	1.3885
Neighbours' tap	0.4487
Well	1.1523
stream	1.0000
Pond	1.6667

It should however, be noted that types of source of water is related to types of residence. Whereas more of the public taps and personal taps were found in the urban setting; ponds, streams and wells were quite predominant in the rural setting. Furthermore, women who had to walk for less than a kilometre to fetch water, had on average fewer of their children dead (0.7784) than those who used to walk more than 5 kilometres. Nevertheless, when residence is controlled for, summaries of total children dead by source of water for domestic use tended to change as shown in the table 4.11.



Table 4.11: Summaries of total children dead by source of water for domestic use for mothers residing in the Urban district

Source of water	Mean value of total children dead
Personal tap	1.3782
Public tap	2.9796
Neighbours'tap	0.4539
Well	0.0000
Pond	0.0000

Table 4.12: Summaries of total children dead by source of water for domestic use for mothers residing in the Rural district

Source of water	mean value of total children dead
Personal tap	0.8182
Public tap	3.6989
neighbours'tap	0.2500
well	2.4636
Pond	3.5904
Stream	1.0000

From the two previous tables, mortality of children for mothers using personal tap in both urban and rural settings seems to be higher than for those using neighbours' tap. This is possibly because mothers using water outside their houses usually become suspicious of the hygienic nature of the water and thus tend to treat it through either boiling or otherwise.

Again, it is seen that mothers who used personal tap residing in urban district had on average more children dead than mothers residing in the Rural district. This may be due to some other compounded factors such as income level and education in the sense that in the rural areas people who own their water taps are most likely the highly educated ones with high income. On the otherhand, in the urban district the notion of income and education does not apply because even ordinarily paid workers with low education could have access to personal taps as long as they rent government quarters with such facilities for example families of Tambuka Reli in Dodoma town.

#### 4.7.8 Child deaths and total number of rooms available for household members.

In here, total children dead on average in relation to number of rooms occupied was infact not in line with the researcher's expectation. The summaries indicate that those women who occupied only single rooms had on average fewer dead children than those having more than three

rooms. It seems that the residence factor comes into operation in this case and it is highly influential. Women who had only single rooms were most likely those employed in urban district or married to men employed in the urban district and therefore on average had acquired enough education and consequently enough income both being necessary and sufficient conditions for favourable child upkeep.

Though the result on the mean children dead by the rooms occupied by household members were contradicting the researcher's expectation, it is also possible that the event 'death' of child had happened in the past when number of rooms were quite different from the current ones. And therefore, if the researchers had carried the study at that time, the results could have been different.

#### 4.8 Analysis of mortality cases for children using mortality indicators MORT.

Introduction: In brief, as outlined in the methodology section, mortality indicator MORT for each woman was obtained as a ratio of the actual number of dead children she reported divided by the expected number of dead children given her exposure group. Across all women, MORT should average close to unity; for an individual woman, a value above unity indicates a higher than expected number

of dead children, while a value below unity indicates a lower than expected number of dead children.

4.8.1 Details of computation of mortality indicator MORTi for any woman i.

Since 1988 Population census data on number of women, children everborn (CEB) and children dead (CD) in five year age groups of mothers 15-49 years in Tanzania Mainland were not yet out at the time of data processing, only 1967 and 1978 Census data were used.

Table 4.13: 1967 Population census on CEB,CD (Both sexes combined) and number of women in five year age groups (15-49)- Tanzania Mainland.

Age group of women	Number of women	Children Everborn (CEB)	Children dead (CD)
15-19	544533	283914	54097
20-24	513998	1012653	202890
25-29	543729	1725958	382837
30-34	378012	1570756	397660
35-39	317864	1520672	430737
40-44	219540	1105735	348975
45-49	219970	1147982	407120

Source: 1967 Population census volume 3 (Pg.74)  
Bureau of statistics. Ministry of Economic Affairs and Development Planning. Dar-es-Salaam 1971.

Table 4.14: 1978 Population census on CEB, CD (Both sexes combined) and number of women in five year age groups (15-49) Tanzania Mainland .

Age group of women	Number of women	Children Everborn (CEB)	Children dead (CD)
15-19	84037	34953	5422
20-24	79003	150557	24112
25-29	71675	248970	44453
30-34	46058	219416	45269
35-39	39118	210055	48205
40-44	27553	150479	39977
45-49	24156	131482	39200

Source: Population Census volume V (Pg.1-26).

Bureau of statistics. Ministry of Planning  
and Economic Affairs. Dar-es- Salaam 1982.

As for 1967 Population census, data on children dead (CD) were not directly given, but since data on children everborn (CEB) and children surviving (CS) were available, it was easy to obtain it.

Then by the help of Qfive United Nations Program for child mortality estimation (1990) Version 1.0, data on q(5)

i.e. probability of dying by age five and corresponding reference dates for the four families North, East, South and East in the two population census were obtained. From such results, graphs of  $q(5)$  against reference dates for the two census results for the four families were plotted. In checking for the consistency as indicated earlier we concluded that the North family is the appropriate one for Tanzania Mainland. (See graph 1 Appendix 3).

After obtaining the type of family to be used, the level was found by averaging levels for the group of women in ages 25-29, 30-34 and 35-39 (i.e. using survivorship probabilities  $l_3$ ,  $l_5$  and  $l_{10}$ ). The first two groups were dropped because young mothers in those groups on average had few children everborn while the last two groups were also not considered in order to minimize errors likely to be caused through getting wrong information on CD and CEB due to either memory lapse or reluctance of revealing such sensitive information from old women. The level was consequently found to be 12.79.

Using level 12.79 in the north family- both sexes combined,  $q_s(x)$  ( $q$  standard) for each of the seven five age groups of women in the childbearing age 15-49 was calculated by the use of linear interpolation (using Manual X- Estimation of child mortality by indirect techniques) and the results were as follows:

Table 4.15:  $q_s(x)$  (q-standard) for each of the seven five year age groups of mothers in 15-49 years.

Age group of woman	x	$q_s(x)$
15-19	1	0.11764
20-24	2	0.15053
25-29	3	0.17065
30-34	5	0.19718
35-39	10	0.22824
40-44	15	0.24442
45-49	20	0.26254

Having identified number of children ever born (CEB) and children dead (CD) for each woman in all of the seven five age groups,  $MORT_i$  for woman  $i$  for the sampled population was calculated as

$$MORT_i = OCD_i / q_s(x) \cdot CEB_i$$

where:  $OCD_i$  = Actual (observed) children dead for woman  $i$ .

$CEB_i$  = Total children everborn for woman  $i$ .

$q_s(x)$  = Is the corresponding woman's q-standard.

The product  $q_s(x) \cdot CEB_i$  gives expected number of children dead for woman  $i$ .

The following table shows findings on CEB and CD for women in age group 15-49 in the sampled population in Dodoma region as per the 1991 June Survey.

Table 4.16: Children Everborn (CEB) and Children dead (CD) for the sampled population in Dodoma region, June 1991.

Age group of mothers	CEB	CD	No. of women
15-19	54	34	96
20-24	379	66	218
25-29	610	97	238
30-34	734	130	182
35-39	761	127	143
40-44	622	164	90
45-49	526	143	68

The MORT<sub>i</sub> for each woman *i* in the reproductive group 15-49 was treated as a variable which was categorized as:

- 0.00-0.99 = 1
- 1.00-1.99 = 2
- 2.00-2.99 = 3
- 3.00-3.99 = 4
- 4.00-4.99 = 5
- 5.00-5.99 = 6
- 6.00-6.99 = 7
- 7.00\* = 8



There is a direct relationship between the MORT Values and incidence of deaths. The higher the value the higher the child mortality and vice-versa.

Table 4.17: Distribution of women (15-49) against MORT values Dodoma Region June, 1991.

Value of mortality indicator MORT	Frequency (no. of women)	Percentage
0.00-0.99	626	61.3
0.00-1.99	132	12.9
2.00-2.99	60	5.9
3.00-3.99	29	2.8
4.00-4.99	15	1.5
5.00-5.99	23	2.3
6.00-6.99	42	4.1
7.00 and above	94	9.2
Total	1021	100.0

Because  $MORT_i$  for woman  $i$  is essentially undefined when  $q_s(x)_i \cdot CEB_i$  (denominator) is zero, then the variable MORT works for only women with at least one live birth in the reproductive group. So, though in total we had 1163 in

age group 15-49 only 1021 were involved for building up MORT variable as shown in the table above.

The variable MORT as shown later was used as a dependent variable in an individual level multivariable analysis. Thus, widely available information on CEB and CD were used in individual level analysis of the factors associated with child mortality differentials. Such factors included mothers level of education, residence, health facilities, income, mother's type of occupation etc. Though MORT is highly credited for analysing child mortality differentials, it has the following shortcomings (see e.g. Hill, K., 1989).

- (i) MORT may be expected to be lower for higher status than for lower status women, not because of lower underlying mortality risks, but because of shorter exposure to such risks. Thus, regression analysis would give an exaggerated estimate of the reduction in child mortality associated with indicators of higher socio-economic status especially in this case where data are classified by age of a woman.
- (ii) In the case where child mortality has been declining steadily at the same time as socio-economic indicators have been rising, women in longer exposure groups defined by age will have above average values of MORT, because their children will have been exposed to

higher mortality risks in the past whereas women in shorter exposure groups will have below average values of MORT.

(iii) As a dependent variable in a multivariable analysis, its distribution is far from normal. The value of MORT varies from zero (no dead children) to the reciprocal of the expected proportion dead for the exposure group (all children dead)

(iv) MORT includes a large random variation component. This is because since women have a finite (and generally quite small) number of children, and since children die in units of one, most women cannot have the expected number of dead children of their actual parity.

(v) It is averaged over children of a wide range of ages, so cannot efficiently identify factors that affect child mortality at only one age range of childhood, or identify at all factors that might have effects in different directions in different age ranges.

#### 4.8.2 Mortality Indicator MORT and some of the socio-economic variables.

In this section changes in the mortality indicator variable MORT were analysed in relation to some basic

Socio-economic factors that corresponded to the stated hypotheses in chapter one. This was done through cross tabulations of MORT by the other variables.

#### 4.8.2.1 MORT and place of residence.

Using MORT values as child mortality indicator, it was observed that while 71.4% of women from Urban district were in MORT value group 0.00-0.99, we had 49.6% of women from the rural district in the same group. This is an indication that more of the urban women had very low child mortality than the rural women. In a higher MORT value group 4.00-4.99 we had 0.7% of the urban women but 2.3% of the rural women. Here, more women in the rural district had high incidences of child deaths than the urban district women. The result is in line with that of Mturi (1989) while analysing infant and child mortality in Kenya. He argues that lower infant and child mortality in the urban areas especially in the least developed countries can be attributed to higher proportions of educated and working women in urban areas than in rural areas. Furthermore, as Puffer and Serrano (1973) argue, it is the maldistribution of health resources in less developed societies which is the contributing factor of frequent higher mortality levels in the rural areas. Contrary to our results, however, is what was found in the Republic of Korea and Sri Lanka where rural mortality was slightly lower than urban mortality (Preston and Trussel, 1982). This was a result of

organized efforts by the respective governments to ensure availability of social and health services in the rural settings. The results from this simple analysis do concur with those obtained earlier using summaries of total children dead both in the rural and urban districts.

4.3.2.2: MORT and level of education of women

As the table shows below, we find that in MORT value 0.00-0.99 we had moreless an increasing proportion of women in each category of education as the level of education of the mother shifts from zero education to tertiary education.

Table 4.18: Variation in Proportion (%) of women in each education level for a fixed MORT value group 0.00-0.99 and 1.00-1.99.

Education level	% of women for fixed MORT value 0.00-0.99	% of women for fixed MORT value 1.00-1.99
Zero education	37.8	28.5
Adult education	47.2	22.6
Primary education1-4	67.8	18.4
Primary education5-8	66.9	8.6
Secondary education	78.0	5.9
Tertiary education	100.0	0.0

The two tables above show that almost all of the women with tertiary education had the least MORT value group (0.00) while only 37.3% of women having zero education had such low MORT value. On the other hand, while practically no women with tertiary education who were grouped in MORT value 1.00-1.99, about 28.5% of the women with zero education had such high value. This again, supports the earlier assertion that women with higher education had relatively fewer of their children dead than women with no or low education. The results are in line with Farah and Preston (1982) in Sudan where they found out that there exists very strong inverse relationship between mother's education and childhood mortality. Also findings of DHS (1988) conducted in Zimbabwe supports the results. Again, Lindenbaum et al. (1983) argue that mother's education may increase total family resources because they get employed in better paying jobs and also get married to wealthier men. However, a study by Diaz-Briquets, 1978 in Cuba contradicts the results in the sense that there were virtually no mortality differential by educational group. This was nevertheless, attributed to country's effort at organizing and mobilizing health services to the population regardless of the existing individual demand for them.

#### 4.8.2.3 MORT and Employment status of women

About 81.0% of employed women had MORT value group 0.00-0.99 for their children, while 57.1% of non-employed

women had such low MORT value. Again, while only 4.4% of employed women had high MORT value group 7 and above; of the non-employed women about 9.4% had high such value.

In this case it is logical to argue that there is some relationship between employment status of women and mortality of children. Possibly, most of the employed women have relatively higher level of education and mostly found in urban areas where they could effectively make use of the available better social and health services/facilities and thus decrease incidences of child deaths.

#### 4.3.2.4: MORT and type of employment of mothers

About 83.7% of women employed in professional and administrative jobs had MORT value group 0.00 to 0.99 for their children while 75.6% of full time housewives had such low MORT value. On the otherhand, only 58.4% and 51.5% of women respectively doing business and crop farming activities had the same MORT value group 0.00 to 0.99. Thus, low incidences of child deaths was mainly for women employed in high posts as well as for women who were purely housewives, not doing any other activities such as petty business or farming. This is possibly because housewives have ample time to care for their children themselves; and women employed in high paying posts fetch more income to cater for necessary social and health services of the household including better hygienic conditions as well as better nutrition for their children. The results are in

line with that of Rao, P.S and Richard, J. (1984) who in their study showed that people who are in the higher income and the higher occupation groups prefer to go to a hospital or clinic that gives them quicker relief regardless of the cost.

#### 4.8.2.5: MORT and daily work load of the mothers

About 85.8% of women who were only engaged in household activities such as cooking, general cleanliness, waterfetching together with childcare had MORT value group 0.00 to 0.99 for their children; while those who were engaged further in looking for firewood away from home as well as doing some petty business only 58.1% of them had such low MORT value. Again, about 82.6% of women doing office work had generally low MORT value. However, as the MORT value group was increased to 1.00-1.99, the percentages above tended to decrease systematically. This is an indication that as the mother gets involved more on activities that make her shy away from childcare, child mortality increases. This is possibly due to less attention by the mother given to the child. Woodbury (1925) supports the results as he argues that limited amount of time that could be devoted to breastfeeding, in addition to the more general lack of care that working mothers could give their children, may have been a factor in the higher infant mortality of children in those mothers. Mturi (1989) while conducting a study in Kenya



also found out that women involved in manual work were associated with high IMR and CDR. Nevertheless, the argument does not hold for mothers working in offices who tended to use most of their time out of their homes. This is possibly due to the fact that such women have constant and reliable income which sustained the family. And also most of such women were better educated and thus they knew what to do with a sick child, and also what type of food to prepare for their kids.

#### 4.8.2.6 MORT and Type of Toilet

About 88.8% of women whose homes had inside flushing toilets had low MORT value 0.00-0.99 while only 62.9% of women using pit latrines had such low MORT value. Again, while only 5.9% of women using inside flushing toilets had higher MORT value 1.00-1.99, 17.9% of women using pit latrines had that such higher MORT value. More women using high quality toilets had low mortality values for their children than women using only pit latrines. This shows that type of toilet which is a reflection of hygienic conditions, has an impact on child mortality. Prakash Dev Pant (1991) also supports the argument as he points out that access to a better quality toilet lowers the risks of environmental contamination. He further says that having such toilets is again an indicator of better household socio-economic status, suggesting access to better services and care for children.

#### 4.8.2.7 MORT and type of house

As for type of toilets, the majority of women (84.0%) staying in good quality houses (Block with Iron sheets) had low MORT value 0.00-0.99 for their children, while 56.3% of women staying in low quality houses (mud and thatched roofs) had such low MORT value. On the other hand, a smaller proportion of women (2.8%) staying in good quality houses had much higher MORT value 2.00-4.99 for their children as compared to a slightly higher proportion of women 9.5% staying in low quality houses who were having the same MORT value for their children. Thus, type of houses in Dodoma region seem to be associated with mortality of children. The findings are supported by Farah and Preston (1981) in Sudan who showed that living in a house made from mud raised child mortality by significant amount.

#### 4.8.2.8 MORT and Source of Water for domestic use

It was observed that the majority of women who had more access to clean and safe water had lower mortality for their children than women who used well or pond or public water sources. (See table below).

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Table 4.19: Variations of MORT Values and percentage of  
women who use different source of water  
for domestic use.

MORT Value	% of women using personal tap	% of women using well water	% of women using pond water	% of women neighbours tap
0.00-0.99	85.3	63.3	51.0	56.2
2.00-4.99	2.9	13.7	20.6	6.1

Source: The 1991 June Survey-Dodoma region.

In the table above it is noted that proportionwise more women using well water and pond water had much higher incidences of deaths for their children than women who had their own personal taps at their homes. This is because surface water in Tanzania is highly contaminated (Rimer, 1970). In the same vein of reasoning Rowland (1979) argues that the transmission of infectious diseases in Africa through polluted water-supply or unsanitary lavatory facilities contributes to the contamination of traditional weaning foods. This argument is indirectly supported by the findings of Butz et al (1982) in Malaysia, that breast-feeding has a larger protective effect on infant mortality in areas where sanitary facilities are poorer.

4.8.2.9 MORT and Household income:

On average, it was found out that families whose annual household income was less than Tshs 10,000 had higher mortality risks for their children than families with annual income exceeding Tshs 100,000. Infact, there was an inverse relationship between MORT (Mortality risks for children) and household income level as depicted in table 4.20 showing summaries of MORT by levels of household annual income.

Table 4.20: Summaries of MORT by levels of household annual income.

Levels of annual income	Average MORT
Tshs less 10,000	2.0000
Tshs 10,000 to less 30,000	1.7931
Tshs 30,000 to less 50,000	1.6022
Tshs 50,000 to less 70,000	1.5922
Tshs 70,000 to less 100,000	1.2769
Tshs 100,000 and above	1.1622

#### 4.9 Regression Analysis

Igosha (1990) who attempted to study the effects of some Socio-economic factors on infant and child mortality in Shinyanga region did not use regression in her analysis. So, the researcher decided to use this in order to estimate the relationships between a set of Socio-economic indicators and an indicator (MORT), standardized for exposure to risk of death, of the child mortality experience of the children of each woman in the childbearing age group (15-49). As indicated in the previous chapter, the regression model assumes that a linear relationship exists between the dependent variable, the standardized indicator of child mortality experience at the individual level (MORT), and a number of independent variables representing individual socio-economic characteristics of women. Thus in line with the basic form of the model indicated earlier, the regression model generally assumed the form:

$$\text{MORT} = f(\text{Socio-economic variables}).$$

Before the analysis was undertaken, the researcher first tried to check for the association of the selected independent variables (socio-economic factors) with the standardized indicator of child mortality MORT. The Chi-square statistic at 5% level of significance was applied. The theoretical Chi-square statistic at the given level was compared with the calculated (observed) one. Whenever the observed was greater than the theoretical at the given

level of significance for a particular degree of freedom (DF), then the association was regarded significant and consequently proper to include the variable in the analysis. Of the tested independent variables, the following were found to have significant association with MORT.

1. Place of residence (PR)
2. Mother's level of education (Med)
3. Type of employment/occupation of the mother (occ)
4. Source of water for domestic use (Wt)
5. Type of house (THS)
6. Type of toilet (TTL)
7. Employment Status (Es)
8. Household Annual Income (HIN)

Unfortunately, availability of medicine at the hospital was found to have no significant association with MORT at the given level. This is in line with Mturi's (1989) results when doing a study in Kenya. Infact, the majority of respondents as indicated earlier agreed that drugs were plenty in either public or private hospitals; and postnatal and antenatal clinic services were frequently provided. In the rural district there were mobile clinics where immunization exercise for the children was conducted monthly. Health education and family planning services were also provided during that time. Despite all the efforts, the rural population was more inclined to much

higher mortality risks for their children than the urban population as earlier analysis has indicated. This could possibly be due to low motivation of the people utilizing hospital facilities. For instance, as Mbago (1975) argues:

"the presence of medical facilities in an area is not a symbol for mortality defeat since the facilities can just be idle." Another study by Rosenzweig and Schultz (1982) in Colombia concurred with the argument in the sense that public health care programmes were found to be weakly related to survival of children in the rural areas.

Some people, especially the less educated parents in the rural district, would prefer treating a sick child using the local doctor to qualified medical doctor who would make scientific diagnosis for the disease. This obviously leads to high child mortality.

After identifying possible independent variables for regression, the basic form of the model assumes the form:

$$\text{MORT} = f(\text{PR}, \text{Med}, \text{Occ}, \text{Wt}, \text{THS}, \text{TTL}, \text{HIN}).$$

where  $f$  is a linear function, and PR, Med, Occ, Wt, THS, TTL, HIN are as defined before. It should be noted that employment status has been excluded in the model because it is implied in the type of employment.

It should further be noted that the so called independent variables are not only associated with the dependent variable MORT but also within the independent variables themselves there are lots of interactions. For instance place of residence, mother's level of education and type of house variables were found to be highly correlated with the rest of the variables.

Since all the above independent variables were categorical, the author was forced to introduce dummy variables that took values 0 or 1. To accomplish this the author had to pinpoint the reference category for each independent variable, and this was that category having highest proportion (frequency) of reported children everborn in the variable (Polissar et al 1982). The reference category is excluded in the regression process as an independent variable.

The following table gives definition of independent variables that were used in the regression analysis together with the referenced categories.



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Table 4.21: Definition of variables used in the regression analysis:

VARIABLE	DESCRIPTION and CATEGORIES
<u>Place of Residence</u>	Usual place of residence. 1. Dodoma Urban district 2. Dodoma Rural district*
<u>Mother's education</u>	Level of education. 1. Zero education 2. Adult education 3. Primary education 1-4 years of schooling 4. Primary education 5-8* years of schooling 5. Tertiary education
<u>Type of employment</u>	Main Income generating activity 1. Professional and administrative jobs. 2. Technical oriented skill jobs. 3. Secretarial and office work. 4. Petty business 5. Farming and livestock keeping 6. Domestic chores *

Table 4.21 (Continued)

Household Annual Income Income estimated per annum by  
using possible sources of income.

1. Less than Tshs 10,000.
2. Tshs 10,000 to less than 30,000\*
3. Tshs 30,000 to less than 50,000
4. Tshs 50,000 to less than 70,000
5. Tshs 70,000 to less than 100,000
6. Tshs 100,000 and above

Sources of water for Where do they usually obtain for domestic use.  
water for domestic use?

1. Personal tap\*
2. Public tap
3. Neighbours tap
4. Well
5. Stream
6. Pond

Type of house. Houses classified in terms of  
roofing/mud/block made

1. Block with Iron sheet roofing\*
2. Block with thatched roofing
3. Mud with iron sheet roofing

Table 4.21 (Continued)

<u>Type of toilets</u>	Toilets classified according to quality
	1. Toilets with flushing system inside the house
	2. Toilets with flushing system outside the house
	3. Pit latrines*
	4. No latrine at all

\* reference category

Table 4.22: Summary Results of Multivariable Regressions, 1991;  
Dodoma Region-Rural and Urban Combined.

1991 Survey

VARIABLE	Mean	Regression <i>Coefficient</i>	Standard Errors of coefficients
MORT	1.8002	<del>Coefficient</del>	
<u>Residence</u>			
Rural	2018(0.5505)	reference	
Urban	1648(0.4495)	3.80617-03	0.13684
<u>Mother's education</u>			
Zero education	972(0.2654)	0.18139	0.09401
adult education	323(0.0882)	0.07934	0.14819
Primary education 1-4	443(0.1209)	-0.17884	0.11657
Primary education 5-8	1578(0.4308)	reference	
Secondary education	315(0.0860)	0.03372	0.12111
Tertiary education	32(0.0087)	-0.10952	0.34037

<u>Type of employment/occupation</u>			
Professional and administration			
	351(0.0967)	-0.51405*	0.15999
Technical jobs	31(0.0085)	-0.16590	0.27854
Secretarial office work	241(0.0664)	-0.50615*	0.16278
Petty business	237(0.0790)	-0.15584	0.14421
Crop farming/animal husbandry			
	2078(0.5723)	reference	
Domestic chores	643(0.1771)	-0.57077*	0.12415

Household Annual Income.

Less Tshs 10,000	874(0.2445)	2.679086E-03	0.09317
Tshs 10,000 to less 30,000	978(0.2736)	reference	
Tshs 30,000 to less 50,000	634(0.1773)	-0.32073*	0.09435
shs 50,000 to less 70,000	336(0.0939)	-0.25605*	0.11875
Tshs 70,000 to less 100,000	484(0.1354)	-0.54072*	0.11072
Tshs 100,000 and above	269(0.0753)	-0.32946	0.19123

Source of water for domestic use:

Personal tap	991(0.2836)	reference	
Public tap	616(0.1763)	-0.24161	0.12766
Neighbour's tap	521(0.1491)	-0.56805*	0.09896
Well	662(0.1895)	-0.56193*	0.14560
stream	4(0.0011)	-0.21302	0.72738
Pond	700(0.2003)	-0.44855*	0.14336

<u>Type of house:</u>			
Block with Iron roofing	1553(0.4499)		reference
Block with thatched roofing	253(0.0747)	-0.42944*	0.17590
Mud and Iron sheet	225(0.0652)	-0.64829*	0.15181
Mud with thatched roof	1416(0.4102)	-0.69513*	0.13460

<u>Type of toilet:</u>			
Flash toilet inside house	715(0.2053)	-0.78246*	0.10442
Flash toilet outside house	296(0.0850)	-0.60016*	0.13571
Pit Latrines	2299(0.6572)		reference
None	183(0.0525)	-0.03383	0.17949

Constant: Regression coefficient(not standardized) was 2.89906 and was

significant at 5% level.

$R^2 = 0.24140$ (Adjusted).

\*Significantly different from zero at 5% level.

NOTES: 1. Number of reported births for the variables above ranged between 3452 and 3666. The variation was attributed to the unreported cases by some of the respondents.\*

2. Numbers in brackets represent proportions of the categories.

#### 4.9.1 Discussion on the Regression Results for the region as a whole.

4.9.1.1 Residence: Children born to mothers residing in Dodoma Urban district had almost the same mortality risks

as children born to mothers residing in Dodoma Rural district. The coefficient for regression in this variable (Urban) proved to be not significant at 5%. As argued by Hill(1989), it seems likely that the residence variable in the basic equation is largely a proxy for other, uncontrolled variables like education and income, rather than an important independent variable per se.

4.9.1.2 Mother's education: Children of mothers with zero education had clearly higher mortality risks than children of parents who had attended at least adult classes. However, regression coefficient for zero education was not significant at 5% level. Mortality risks of children for mothers who had acquired primary education 1-4 did not differ much from that of children for mothers who had completed primary 5-8 level. Also, there was no significant changes in mortality risks for children as mothers level of education rose to either secondary or tertiary level. Nevertheless, mothers who had acquired tertiary education seemed to be associated with quite low child mortality risks though with insignificant coefficient. The latter unexpected results could have been attributed to very small proportion of births reported in that category (See table above). In line with the above results, Bakari (1990) while conducting similar study in Mbeya region, found out that from multiple regression analysis, which besides education included children ever born, income, residence and occupation as other independent

variables, revealed mothers' education to be also insignificant.

In general therefore, there wasn't any significant difference in mortality risks for children born to mothers who had primary education 1-4 and children born to mothers who had much higher education qualifications. The findings are in line with Diaz-Briquets (1978) results in Cuba where it was found that there are virtually no mortality differential by educational group. This could possibly be attributed to education variable being proxied by the household income variable; and furthermore, by the mere fact that in most African cultures mothers have little power in household resource distribution and decision making. They could do very little as regards children welfare despite the level of their education.

4.9.1.3 Mother's Occupation: Mortality risks of children born to professional, office and administrative mothers were quite low as compared to that of children born to farmers. Furthermore, in the expected direction, mothers who had no outside home activities that is full time housewives were quite strongly related to very low child mortality risks. This last result is in line with the arguments of Da Vanzo and Lee (1978) that women who participate in the labour market outside home are believed to spend the least amount of time in maternal activities while those who do not participate are assumed to spend the



largest amount of maternal time. Though mortality risks of children of mothers doing technical/jobs and petty business were associated with low child mortality, the level was not quite different from that of mothers engaged in farming activities. In a nutshell, mothers doing administrative and office work as well as full time housewives were associated with low mortality risks for their children; while mothers from the other two occupation categories (Petty business and Technical jobs) had child mortality risks similar to that of farmers.

4.9.1.4:Household Income levels: Most of the coefficients of the income level categories were in the expected direction, that is higher income families were associated with low children mortality risks. Mortality risks for children of mothers whose annual income for their families was either less than Tshs 10,000 or greater than Tshs 100,000 were not significantly different from that of mothers coming from families earning between Tshs 10,000 and 30,000 annually. However, the strong association appeared for women whose family's annual household income is between Tshs 70,000 and 100,000. It is obviously reasonable to expect that, *ceteris paribus* a higher household income should experience lower mortality risks. This expectation presumes that children in higher income household will consume more health-enhancing goods and services per capita than children in lower income households. However, the effect of income on mortality

could be adverse if higher income is purchased at the expense of extra hours of work that have reduced time spent in child care U.N. (1985).

4.9.1.5: Source of water for domestic use

Children of mothers using water from public tap had almost similar mortality risks as women who used water from their own inside house taps. This was not strange because most of the families in the Urban district especially at Kilimani Ward obtained water from within their houses (flats) very occasionally. Women complained that the crisis had been existing for some years and no solution had been sought by the relevant authorities so far. Consequently, such families had to walk for some kilometres before they got water from public taps. On the otherhand, families that used neighbours tap water, well and pond were associated with low child mortality. Here it is noted that the signs for the coefficients for both well and pond water categories were not in line with the author's expectation. This change could have been attributed to interaction of water variable with some other more significant variables like income levels. That is, the water variable seems to act as a proxy for income, and hence it's coefficient may overstate the direct effects.

#### 4.9.1.6 Type of house

The author had in mind that, type of house in one way or another would reflect the income level of the household or the hygienic conditions of the household and therefore influence mortality risks for the children. Suprisingly, the regression showed that mortality risks for children coming from houses that were built up with either iron sheet roofing or grass roofing, and block with thatched roofing all had lower mortality risks when compared to high quality houses built with block with iron roofing. And infact their coefficients seemed to be significant at 5% level. The author thinks that the earlier assertion that income levels are associated with type of house refers to only the minority group in the sense that the majority of the respondents who stayed in the termed block with iron roofing type of houses were mere tenants in the case of Urban district. For the Rural district the majority however, resided in their own houses which were mostly mud with thatched roofing. So, no reliance can be put as regards observation deduced from type of house variable. Similar findings by Sloan (1971), using regional data from Bangladesh, Costa Rica, Mexico and Puerto Rico found that sanitation variables and other measures of the quality of housing explained very little variation in mortality rates, and thus concluded that there was little proof of a causal relationship.

#### 4.9.1.7 Type of toilets:

Luckily enough, in the toilet variable, most of the categories had the signs of the regression coefficients in line with expectation. Mothers who stayed in houses where toilets use water flush mechanisms, had lower child mortality risks than those who did not have such toilets. Furthermore, the children of households using pit latrines had the same mortality risks as the children of households having no latrine. The findings seem to agree with Meegana (1980) in Sri Lanka where he found that the lowest mortality was associated with the presence of a flush lavatory system or a water seal system and the highest with the absence of any system. Thus, it is true to argue that, type of toilets which is a reflection of the hygienic condition of the household environment, has an influence on the mortality risks of children of all mothers regardless of their education level or household income level.

As stated earlier in the discussion and in various literature as well, important interactions exist between place of residence and other variables included in our child mortality model. In order to examine this in the case of Dodoma region, the following model has been applied without the residence variable. That is, for urban and rural districts separately. Now, if important interactions exist, the author expected to see substantial differences between urban and rural coefficients (see table below).

Table 4.23: Summary Results of Multivariable Regressions.

1991: /

Dodoma Region- Rural and Urban separately.

VARIABLE	REGRESSION COEFFICIENTS	
	URBAN	RURAL
<u>Mother's education</u>		
Zero education	-0.15706(0.20133)	0.30585* (0.10752)
Adult education	-9.55300E-03(0.322582)	0.13166(0.16686)
primary education		
1-4 years	-0.10981(0.17639)	0.19501(0.15580) primary
education		
5-8 years	reference	reference
Secondary education	0.02526(0.12578)	0.63617(0.52193)
Tertiary education	-0.08002(0.34503)	missing correlations
<u>Type of employment/</u>		
<u>occupation</u>		
Professional and		
administration	-0.65787*(0.18464)	-0.35987(0.42778)
Technical jobs	0.16917(0.33225)	-0.43178(0.54388)
Secretarial office		
work	-0.60276*	missing correlations
Petty business	-0.24652(0.16549)	0.31691(0.38312)
Crop farming/		

animal husbandry	reference	reference
Domestic chores	-0.67658*(0.14168)	-1.13528*(0.40462)

Household Annual

Income

Tshs less 10,000	-0.07327(0.22323)	0.03083(0.10491)
Tshs 10,000 to less 30,000	reference	reference
Tshs 30,000 to less 50,000	-0.32256*(0.12455)	-0.24468(0.15003)
Tshs 50,000 to less 70,000	-0.27392*(0.13914)	0.03365(0.26366)
Tshs 70,000 to less 100,000	-0.52200*(0.12933)	-0.66604*(0.25666)
Tshs 100,000 and above	-0.29492(0.21240)	missing correlations

Source of water  
for domestic use

Personal tap	reference	reference
Public tap	-0.03961(0.17123)	-0.55896*(0.20729)
Neighbour's tap	-0.52152*(0.10244)	-1.44548*(0.61352)
Well	-0.32955(0.72068)	-0.73580*(0.18934)
Stream	has missing correlations	-0.23162(0.76200)
Pond	-1.79363*(0.83383)	-0.59741*(0.18347)

Type of house

Block with iron		
roofing	reference	reference
block with thatched		
roofing	-0.42946(0.51251)	-0.42014(0.22217)
Mud and iron sheet	-0.41916(0.21240)	-0.80048*(0.23572)
Mud with thatched		
roof(grass roofing)	-0.14742(0.42450)	-0.71158*(0.17651)
<u>Type of toilet</u>		
Flush toilet inside		
the house	-0.77660*(0.11210)	-0.36846(0.46781)
Flush toilet outside		
the house	-0.69730*(0.15169)	-0.04501(0.42392)
Pit latrines	reference	reference
None	-0.78753(1.01583)	-1.03373E-03(0.18042)

$R^2$  for the urban and rural model was respectively 26.0% and 20.8%

\* significantly different from zero at 5% level.

NB: Numbers in brackets represent standard errors of coefficients.

#### 4.9.2 Discussion on the regression results for urban and rural districts separately.

##### 4.9.2.1 Mother's education:

Mothers who had not attained any formal school in the rural district now remained significantly associated with high mortality risks for their children. However, the association wasn't significant in the case of urban women of the same category of education. This is possibly due to the fact that urban women though with no education tend to pick up some favourable factors associated with urbanization such as good health care, better nutrition etc. unlike the typical uneducated rural women. The influence of women who had attained highest level of education on mortality risks of children again seized to be significant even when we used the two models (rural and urban) separately.

##### 4.9.2.2 Type of employment/occupation:

As for the previous model where residence factor was not considered, urban mothers who were employed in professional and administrative posts as well as those who worked in offices like secretaries, clerks etc. together with full time housewives were associated significantly with low mortality risks of children. While full time housewives in the rural district were also significantly



associated with low child mortality; the coefficients for other categories of women were not significant. This is an indication that child mortality risks for rural mothers employed in offices and holding big posts did not differ much from the mortality risks of children belonging to farmers in the same locality (rural).

#### 4.9.2.3 Household Annual Income:

Most of the coefficients of regression in the Urban district were in line with expectations and significant at 5%. However, in the rural district it was only mothers who came from households where annual income was between Tshs 70,000 and 100,000 that were significantly associated with low mortality risks for their children. The rest of the categories of mothers in the rural district had either opposite signs (to the expectation) or the coefficients were not significant.

#### 4.9.2.4. Source of water for domestic use:

In the case of the rural district most of the coefficients seemed to be significant though with some having signs contrary to expectation. Mothers obtaining water from neighbour's tap were significantly in both localities associated with low child mortality. It seems that the significance of the 'pond' coefficient in the urban district was distorted as a result of having

extremely very few mothers who fetched water from the pond in the district.

#### 4.9.2.5. Type of house:

In the urban district, there was no significant difference in child mortality risks among mothers staying in different type of houses. However, in the rural district mothers who stayed in houses built up of mud with either iron sheet or thatched roof were significantly associated with low mortality risks for their children. Thus, as for earlier model, there seems to be no logical conclusion that can be deduced as regards current quality of houses and mortality risks for children.

#### 4.9.2.6 Type of toilet:

Coefficients for the type of toilets variable in the urban district seemed to be significant and were in the expected direction. Mothers who resided in the urban where toilets were of flushing type tended to be associated significantly with low mortality risks for their children. On the other hand, such mothers in the rural district had similar mortality risks for their children as those using pit latrines or without toilets.

Physical Observation by the author revealed that in Dodoma Urban district in particular, most rooms were used

for both day to day living and sleeping; and more than one family shared the same sanitary facilities. As argued by Benjamin (1965) this situation obviously had contributed to the incidences of infectious diseases such as diarrhoeal diseases which was rampant in the region and likely to have contributed much to infant and child deaths.

#### 4.10 Findings and discussions:

##### 4.10.1 Maternal education and Child Mortality

Recent study by Bakari (1990) done in Tanzania-case study of Mbeya region revealed that education of parents particularly that of mother is of paramount importance in influencing Infant and Child Mortality. Children of mothers having attained at least secondary education were at less mortality risks than those of mothers whose level of education was below secondary education. Another study by Igosha (1990) in Shinyanga region pinpointed that mothers education explained 96.6% of all deaths in the region. The importance of mothers education is further explained by Ware (1984) in that maternal education gives women the power and confidence to take decision making in their hands. They are likely to give birth to babies of high birth weights because they are at liberty in choosing /eating nutritious food recommended for pregnant mothers by medical officers. Their eating habits are not governed by traditional taboos (Ware, 1983). They further ensure their children access to better health services and take action

without undue delay when the children are sick. They can again monitor the hygienic condition of family's water and food. In that line mothers' education may act as health services substitute in areas where such services are inadequate (Schultz, 1981). Behm (1980); Caldwell (1979) and Conchrane (1980) all concur with the ideas given regarding maternal education as a factor in influencing child mortality.

On the otherhand, Lindenbaum et al (1983) in Bangladesh credit maternal education from a different perspective. They argue that the importance of the mothers' education as a factor in lowering child mortality is attributed to the ability of a better educated women to attract a husband who earns more, a factor that appears to operate in Bangladesh, where men have recently begun to recognize the desirability of having an educated wife.

For the case of Dodoma region it was found that on the average, many deaths of children were associated with mothers whose level of education was not beyond adult level; and mothers who had attained secondary or tertiary education had on the average few deaths for their children. Similar results were obtained when the researcher used mortality indicator MORT obtained through  $q$ -standard  $q_s(x)$  for each woman in the childbearing group(15-49). Here, all the women with tertiary education had the least MORT value group (0.00-0.99) while only 37.8% of the women having zero

education had such low MORT value. However, when multiple regression analysis was employed even when the residence factor was controlled, mothers' education showed no significant influence on the dependent variable MORT at 5% level. This unexpected result is obviously attributed to the variable being confounded with those variables which significantly influence the dependent variable MORT e.g. income as indicated in the regression model. Therefore, it should not be treated as irrelevant.

#### 4.10.2 Household income and child mortality:

Though household income variable has been the most difficult one to measure, most literature U.N. (1985) stresses that it is reasonable to expect that ceteris paribus, a higher income household should experience lower child mortality risks. Mbago (1975) found out that GDP/capita has a positive significant influence on survivorship probability  $l_2$ . O'Hara (1980) argues that because the mother is the most directly responsible for child care in most cultures, a rise in her income may have a very different effect on child survival than an equivalent rise in her husband's income. Rao et al (1984) showed that people who are in the higher income groups generally prefer to go to a hospital or clinic that gives them quicker relief-regardless of the cost. Hence they are associated with low child mortality.

In this study, the multiple regression analysis showed that the income variable was inversely related to the dependent variable mortality indicator MORT. The regression results showed very strong negative significant coefficient for family's annual household income ranging between Tshs 70,000 and 100,000. Furthermore, the researcher found out that on the average families whose annual household income was less than Tshs 10,000 had much higher mortality risks for their children than families with more than Tshs 100,000 per annum.

#### 4.10.3 Domestic Water Supply sources and child mortality:

Ponds or water holes are heavily polluted by man, livestock and insects (Anderson, 1982). Now, due to limited mothers' time and energy resources (power) together with low level of education among women, mothers in developing societies do not sterilize water even by boiling and therefore increase incidences of water born diseases like diarrhoea.

According to Igosha (1990) in Shinyanga region most rural women tend to walk on the average longer distances searching for water particularly during dry season. Generally in Tanzania, water consumption is low and water sources are contaminated causing diseases of different types (Rimer, 1970). Mosley (1983) argues that much greater proportion of child deaths is due to diseases borne

by water, the prevention of which appears responsive to improved personal hygiene.

In this study, about six categories of sources of water were identified. These were: personal taps, public taps, neighbours tap, well, stream and pond. While the majority of the urban district population of Dodoma region used piped water, rural population relied heavily on water pumped wells for the case of Buigiri village and ponds together with surface wells for Chinangali II Village. From simple analysis, it was found out that in Dodoma, high child mortality was on the average associated with mothers who usually fetched water for domestic use from either pond, streams, wells or public tap and low child mortality with mothers who obtained water from their own taps or from neighbours' tap. The question of distance to water source is out because the majority of the respondents as indicated earlier were within the walking distance.

Furthermore, when mortality indicator MORT was employed in the analysis it was found out that the majority of women who had more access to piped water had less mortality risks for their children than those who relied on open water sources (well, pond or stream). When again multiple regression analysis was used to assess the influence of each of water source categories on mortality risk of children, it was observed that families who obtained water from surface well or pond were associated

with low child mortality risk contrary to the expectation. The distortion of the direction of association could have been attributed to interaction of water with variables like income levels.

#### 4.10.4: Health facilities/services and child mortality

Contrary to the study by Kamuzora (1972), findings of my area of study indicated that though the majority of the population had no access to big hospitals, mobile clinics provided primary health care services at least once per month in the rural areas. Both antenatal and postnatal health care services for mother and child was provided in the rural setting. Furthermore, in Dodoma Rural district we had a mission hospital by the name Chamwino which was within the walking distance of the majority rural population. The hospital had most of the time essential drugs which were sold at relatively cheap prices affordable by the majority.

In the Urban district we had a regional government hospital plus several private hospitals. Thus, medical services in the urban was abundant. Therefore, it was only the degree of sophistication of medical services that distinguishes the rural and urban medical services, otherwise, the two residential settings seemed to enjoy equally the services.



However, the rural setting (Dodoma rural) as indicated in earlier analysis had on average many child deaths than the urban setting. The results are in line with that of Rosenzweig and Schultz (1982) where they found out that public health care programmes were weakly related to survival in rural areas. It is the low level of Socio-economic status in the Rural district of Dodoma region that sets a limit/boundary of the influence of exogeneously developed medical innovations on infant and child mortality (Palloni, 1981). In the same line of reasoning, Caldwell and McDonald (1981) say that

"It is wasteful to put large inputs into health services without putting equivalent inputs into education especially that of girls."

This is very true in Dodoma region especially in the rural setting where we had majority of the mothers with the least level of education. And furthermore, in Dodoma rural district housing conditions were generally poor as one could find big family of over ten people occupying two to three small rooms in a poorly ventilated thatched house. And the members of the family could at best use a poorly built pit latrine or at worse help themselves at the nearby bush surroundings. Again, such members drank unboiled water that was obtained from open wells or pond. The majority of each household members in the rural setting interviewed by the researcher complained mainly of

diarrhoeal diseases and other related gastro-intestinal diseases which all seemed to originate from drinking unboiled water from ponds or open wells. Also observations showed that in the rural areas apart from diarrhoeal diseases the majority of the children under fives suffered from skin diseases.

Consequently, as Bryant (1969) argues, it is useless to provide a well equipped and staffed dispensary to combat disease knowing that the members of the community who will be using the dispensary are living with poverty, poor ventilation, filth, flies which are the causes of the diseases.

When Chi-square statistic was used to check for association between mortality indicator MORT and availability of medicine at the hospital it was discovered that there was no significant association. The results seem to agree with that of Hogan and Jiwan (1977) when analysing the National Demographic Survey data of Tanzania-1973. They found out that availability of health facilities did not show any significant difference in Infant and Child Mortality between areas with and those without health facilities.

#### 4.10.5: Type of mother's occupation/employment and child mortality

Mother's activity status has been regarded as a

proxy for maternal time allotted to child bearing (Da Vanzo Lee, 1978). For instance in the town, the woman's work place is likely to be at such a distance from the home that she is not even available for periodic breastfeeding (Manderson, 1982). Mturi (1989) while conducting a study using Kenya data on Infant and Child Mortality found out that women during 1972/73 -1976/77 who were in "manual work" category exhibited the highest IMR (114 per 1000) and CMR (57 per 1000) while women under "office work" category had the lowest IMR(63 per 1000) and CMR (14 per 1000). Furthermore, a study in Sudan by Farah and Preston (1982) on Infant Mortality revealed that the mother's participation in the labour force raised Infant Mortality by 27% in the Capital as compared with 10% for the country as a whole, possibly because educated women employed in the Capital are more seriously disadvantaged by entrusting child care to illiterate maids or relatives.

Findings of my study in this respect showed that mothers employed in high status job in offices as administrators or professionals had on the average very few of their children dead as compared to farmers. Furthermore, when MORT variable was crosstabulated with employment status of women, the results were such that the majority of employed women (81.0%) had very low mortality risk for their children. And the risk became very small as the women got employed to professional and administrative jobs. This was because such jobs were mostly associated

with either high level of maternal education as well as high income both being major contributing factor in lowering Infant and Child Mortality as mentioned in most literature. Again, according to Census and Survey on Child Mortality Differentials in 15 selected countries from Africa, Asia and Latin America U.N. (1975), it was discovered that professional / white-collar workers almost always enjoy favourable child mortality and that agricultural and production occupations are relatively disadvantaged. Next to women who were professionals and administrators followed full time house wives in having low mortality risks for their children. This is inevitable in that such mothers had ample time to care for their children themselves and in most cases such mothers were found in the urban district and were married to employed husbands who fetched considerable income to sustain their living without the wife being engaged in the labour market.

When multiple regression analysis was used with the MORT being the dependent variable, the influence of mother's occupation/employment on the variable was noticed. Both professionally/administratively employed mothers as well as full time housewives were associated significantly with low child mortality risks at 5% level.

#### 4.10.6 Residence and Child Mortality

In most literature it is argued that there is lower

Infant and Child Mortality in the Urban setting than in the rural setting within the developing countries (Behm and Vallin, 1982). Mturi (1989) argues that this is attributed to higher proportions of educated and employed women in the urban areas than in the rural areas, an argument which applies to my area of study. A study conducted in Colombia by Rosenzweig and Schultz (1982) suggested that it was availability of medical services that tended to lower child mortality in urban areas, particularly among less educated mothers. Thus, access to health care and availability of recent medical services are reasons for the urban advantage (Davis, 1973). Consequently, the majority of people in developing countries are subject to higher risks of mortality because they live mainly in rural areas (Behm, 1980). However, in the United Republic of Tanzania, mortality at Dar-es-Salaam was estimated to be higher than in other urban areas (Hogan and Jiwani, 1973). A similar finding was reported for the City of Sao Paulo in the 1960s (Vallin, 1976). Again, Preston and Trussel (1982) found out that rural mortality was slightly lower than urban mortality in the Republic of Korea and Sri Lanka. In conclusion therefore, it is not always true that urban mortality is lower than rural mortality because some other factors such as overcrowding, air pollution, poor sewerage, economic hardships for lowly paid wage earners could overshadow urban advantage from health services/facilities.

In my analysis regarding residence variable, it was found that generally Dodoma Urban district had lower mortality risks for children than Dodoma Rural district. However, when multiple regression analysis was employed, the difference in mortality risks for children failed to be significant. This is because important interactions exist between place of residence and other variables e.g. income included in the regression model. So, though the influence of residence on MORT became insignificant at 5% level, the fact still remained that rural child mortality in Dodoma region was, according to this survey, higher than the urban one.

CHAPTER FIVE  
SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Introduction:

After analysing the data in chapter four where various statistical techniques were employed ranging from simple to slightly sophisticated ones (multiple regression analysis), this chapter provides summary of conclusions of the results from the analysis. The results are then related to the stated hypotheses to see whether or not they support the hypotheses. Thereafter, general conclusion of the results are made along which possible recommendations for government implementation are given.

5.1: Summary of conclusions:

The study was centrally based on the following six hypotheses:-

- (1) The lower the level of education of the mother the higher the infant and child mortality.
- (2) The infant and childhood mortality rates are inversely related to income levels among couples.

- (3) The high infant and childhood mortality rates are associated with poor accessibility to safe and clean water supply.
- (4) The high infant and childhood mortality rates are associated with poor accessibility to health facilities.
- (5) The nature of mothers activity / employment /occupation is associated with infant and child mortality.
- (6) The infant and child mortality rates are higher in rural setting than in urban.

On parental education, it was found out that generally, mothers whose level of education was below adult level had on average much more deaths of children under five than mothers whose level of education was post primary level. Again, when the variable MORT which measured mortality risks of children was used, it was found out that the majority of mothers with low level of education had high mortality risks for their children while at the other extreme the majority of mothers with high level of education (post primary level) had low mortality risks for their children. However, when multiple regression analysis was employed, mothers education failed to show significant influence on child mortality risk at 5% level.



Nevertheless, when the regression was run for rural and urban districts separately, mothers who had not attained any formal schooling in the rural district now became significantly associated with high mortality risks for their children. Thus to some extent, the hypothesis that the lower the level of education of the mother the higher the infant and child mortality is supported by the available data though with insignificant influence for the urban population.

As regards household annual income, when mean of MORT by levels of household income was computed, it was found out that there was an inverse relationship between the two variables in the sense that the less the income level of the family the higher the mean value of MORT (Mortality risk for children). Moreover, the multiple regression analysis showed clearly that the income variable was inversely related to mortality risks for children. The relationship was found to be stronger and more to the expected direction for the urban mothers than for rural mothers. And furthermore, the income variable were among the most significant of the independent variables in the multiple regression analysis. In this view, the expectation that the infant and childhood mortality rates are inversely related to income levels of couples is strongly supported by the data.

With respect to the domestic water supply sources,

families that used water from either pond, stream or wells had on average higher frequent deaths for their children than those families that relied on piped water. As regards accessibility to water sources, the findings showed that almost all families enjoyed short distances to any water source even in the rural settings where the majority fetched water from either open wells, pumped wells, streams or ponds. The regression analysis however, seemed to contradict the expectation as families that fetched water from well or pond were significantly associated with low child mortality risks. Thus, as far as water variable is concerned, the expectation that the high infant and childhood mortality rates are associated with poor accessibility to safe and clean water supply is supported by some of the results of the findings though the regression analysis failed to support the argument possibly because of the multicollinearity of the water variable with the rest of the independent variables.

The Chi-square statistic failed to ascertain for the association between mortality risks for children and availability of medicine at the hospital. Consequently, this variable was dropped in the regression analysis. Therefore, the influence of availability of medicine on the mortality risks of children was not determined in this case. Hence, the expectation that the high infant and childhood mortality risks are associated with poor accessibility to health facilities was not supported by the

data.

Nature of mother's activity / occupation / employment was found in many instances to be associated with child mortality. For instance, the findings revealed that wage earners, especially mothers employed in high paying jobs such as professional and administrative jobs, had on average very few of their children dead when compared to farmers or rather blue collar workers who earned little income. Again, findings showed that house wives who got engaged in other dubious time consuming activities such as selling local 'pombe', searching for firewood in the forest and thus leaving behind young kids uncared for were associated with high child mortality risks though not significant at 5% level. Full time house wives in both residential settings (rural and urban) were found to be associated significantly (5% level) with low child mortality. In this respect, the expectation that nature of mother's activity / employment / occupation is associated with infant and child mortality is supported by the findings.

On the residence variable, it was discovered that the majority of employed and fairly educated mothers were found in the Urban district. The Rural district was deprived of piped water systems, sophisticated medical services, good quality houses, better lavatories etc. As such, Dodoma Urban district had lower mortality risks for

children than Dodoma Rural district. So, though the influence of residence on MORT became insignificant at 5% level, the expectation that the infant and child mortality rates are higher in the rural setting than in urban is valid.

In a nutshell therefore, of the six hypotheses only one was rejected and the rest five were accepted on the basis of the available data.

#### 5.2: Recommendations:

In line with the above conclusions, the following recommendations are suggested for government implementation:

- (1) Since the influence of illiterate mothers on child mortality risk (MORT) was found to be significant only in the rural district, it is suggested that formal education be enforced for girls especially in the rural areas as this may act as a substitute for the disadvantaged rural setting.
- (2) The provision of medical facilities and services is just a necessary step but not a sufficient one to lessen infant and child mortality in the region. Thus it is suggested that together with such step, other measures like provision of health education e.g. building and using latrines, boiling water before use,