NUTRITIONAL STATUS AND SOCIO-ECONOMIC PROBLEMS OF ADOLESCENT PREGNANT GIRLS: A CASE STUDY OF MOROGORO, COAST AND DAR ES SALAAM REGIONS

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BY

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FOR REFERENCE ONLY

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ABSTRACT

Adolescence is a distinct and dynamic phase of development and considered to be the period between 10 and 19 years of age. It marks the onset of puberty. In some communities, it means the girl child is ready to engage in marital affairs and bear children. This dissertation presents the results of a study conducted in Temeke, Kibaha and Morogoro districts to examine the socio-economic factors and nutritional problems of adolescent pregnant girls. Specifically, the study examined prevalence of adolescent pregnancies, factors contributing to early pregnancies, problems faced by pregnant adolescent girls, pre-pregnancy nutritional status, nutritional status during pregnancy and pregnancy outcome. Primary data were collected from 180 pregnant adolescent girls and 600 non-pregnant adolescent girls. Nutritional status was assessed by anthropometric and biochemical methods. Statistical Package for Social Sciences (SPSS) was employed to analyse the data. Prevalence of adolescent pregnancy was found to be 21.5% for Temeke district, 19.5% in Kibaha district and 17.7% in Morogoro district. Factors identified to contribute to early pregnancy are: traditions and culture of initiation rites, lack of knowledge on family planning, fear of side effects associated with family planning methods and economic hardship among adolescent girls. It was further observed that adolescent girls encounter many problems such as unplanned pregnancies and marriages, dropout from school, late detection of pregnancy, late antenatal visit to detect any abnormalities, rejection by their partners after conception, and economic dependence.

The majority, (50.6%) of adolescent girls enters into pregnancy while they are undernourished. The mean weight, height, MUAC and age of non-pregnant adolescent girls were 43.2±10.5kg, 149.2±9.68cm, 21.9±2.8cm and 15.3±2.5 years respectively. For pregnant adolescent girls, mean weight, height, MUAC and age were 53.6±6.5kg, 151.3±6.0cm, 23.4±2.1cm and 17.9±1.1 years respectively. A significant difference ($P \leq 0.05$) in nutritional status was observed between respondents from urban and rural settings whereby those from urban were nutritionally better off. Nutritional status during pregnancy showed that 85.5% of all pregnant adolescent girls were anaemic. No significant difference in Hb concentration was observed between urban and rural subjects. Mean weekly weight gain during pregnancy was 317±110g. Forty eight percent of infants born to adolescent mothers were underweight. Eighty-six percent of the babies were delivered vaginally and the remaining 14% were delivered by caesarean section. There was a weak correlation between infant birth weight and weight gain of the girl during pregnancy ($r=0.36$, $p \leq 0.01$). However, a strong correlation was observed between birth weight and Hb level of adolescent girls during pregnancy ($r=0.67$, $p=0.01$). A significant negative correlation ($r=-0.37$, $p=0.007$) was observed between maternal height and method of delivery whereby more cases of caesarean delivery were performed on short girls (<151cm). The study recommends that adequate and accessible health services should be provided to adolescent girls. Programmes that will enable adolescent pregnant girls and adolescent mothers to become economically independent should be formulated. Such programmes should aim at training the affected girls on various skills that can later enable them generate income. The approach and attitude of

the tradition and custom of initiation rites and other rituals should be changed so that girls are also trained about consequences of early pregnancy, how to protect themselves from HIV infection and unwanted pregnancies. Knowledge on diet diversification (production and consumption) before and during pregnancy should be promoted, especially before pregnancy.

DECLARATION

I, Candida Philip Shirima, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work and has not been submitted for a degree award in any other University.

Signature.....

Date.....28 - 05 - 2002

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DEDICATION

This work is dedicated to my beloved parents Philip A. Shirima and Chrisanta P. Shirima in appreciation of their efforts devoted to lay the foundation for my education.

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ABBREVIATIONS AND ACRONYMS

ACC/SCN	Administrative Committee on Coordination/Sub-Committee on Nutrition
AIDS	Acquired Immune Deficiency Syndrome
BEST	Basic Statistics in Education
BMI	Body Mass Index
df	Degree of freedom
Dr	Doctor
e.g	For example
etc	et cetera
g	Gram
Hb	Haemoglobin
HIV	Human Immuno Deficiency Virus
i.e	That is
ILO	International Labour Organisation
IUCD	Intrauterine Contraceptive Device
Kg	Kilogram
Km^2	Square kilometre
MCH	Maternal and Child Health
MI	Micronutrients Initiatives
MNH	Muhimbili National Hospital
MUAC	Mid Upper Arm Circumference

PRB	Population Reference Bureau
Prof	Professor
STDs	Sexually Transmitted Diseases
SUA	Sokoine University of Agriculture
TDHS	Tanzania Demographic and Health Survey
TFNC	Tanzania Food and Nutrition Centre
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFPA	United Nations Populations Fund
UNICEF	United Nations Children's Fund
URT	United Republic of Tanzania
US	United States
USAID	United States Agency for International Development
VLIR	Flemish Inter University Council
WHO	World Health Organisation
WIC	Women Information Centre

CHAPTER ONE

INTRODUCTION

1.1 Background

Adolescence is a distinct and dynamic phase of development in the life of an individual. It is a period of transition from childhood to adulthood and is characterised by spurts of physical, mental, emotional and social development (Mehta *et al.*, 1999). World Health Organisation (WHO), (1997) considers "adolescence" to be the period between 10 and 19 years of age, which generally encompasses the time from onset of puberty to full legal adult age. The change from childhood to adulthood (Frcog, 1995) is a gradual process that occurs at different ages and rate in different people. It is marked by profound changes in physiological, biological maturation, psychological and social adjustment.

In the life cycle of the girl child, the onset of puberty is one of the critical points of transition. In some communities, when the girl moves from childhood to adulthood it means she is ready to engage in marital affairs (UNICEF, 1995). International community bases its analysis of girlhood on the idea that the girl is still growing and developing up to the end of adolescence period. On the other hand, for many ethnic groups, there is only one significant development, i.e. menarche and once the girl has reached that stage, she is already a woman. Hence, adolescence is a complex period and often not well understood by either adolescents themselves or adults (World Bank, 1994).

In Sub-Saharan Africa, adolescents make up 19% of the total population (World Bank, 1994). As this is a large percent of the population, any change in their pattern of education, behaviour, age at marriage and life style would have a significant impact on the society in which they live.

In developing countries, the health and nutrition of females throughout their entire life is affected by a complex and highly interrelated biological, social, cultural and health related factors (Nestel and Mora, 2000). The major social vulnerability of girls during adolescence is the potential for beginning reproduction too soon after maturity (UN, 1992). Despite huge cultural variations influencing the onset of sexual activity, by the age of 20 years, the level of sexual experience is high in most countries (Khanna and Van Look, 1998). This problem is common all over the world but the situation varies between regions within a country as well as between urban and rural settings. The age at which a woman bears her first child has implication for her health and her child's health as well as her education and economic opportunities in life (URT, 1997). In aggregate terms, the age at first birth is an important determinant of average family size and the rate of population growth. As reported by Khanna and Van Look (1998), these young women lack basic reproductive health information, skills in negotiating safe sexual relationship and access to affordable reproductive health services. Consequently, a substantial proportion of young people in many countries engage in unprotected premarital sex. This exposes them to the risks of unplanned and unwanted pregnancies as well as contracting sexually transmitted diseases (STDs) and Human Immuno

Deficiency Virus (HIV)/Acquired Immune Deficiency Syndrome (AIDS) (Kurz and Weich, 1994; Khanna and Van Look, 1998; UNFPA, 1999).

Across most African countries, the social organisations that traditionally provided support to young mothers are weakening [Population Reference Bureau (PRB) 1992; United Nations Population Fund (UNFPA) 1999]. As a result, peer interaction and modern influences have gained importance. The declining role of kinship groups leaves young women with less guidance on how to manage the transition to adulthood (Yeboah, 1993). Experiences during adolescence mould girls as well as boys on how they will live their future lives in the reproductive arena and in social and economic aspects (UNFPA, 1999). This study was carried out to determine social, economic and nutritional problems of adolescent pregnant girls so as to formulate strategies to improve girl adolescence life.

1.2 Problem statement

Adolescent pregnancies present a serious problem that carries with it adverse social, economic and public health consequences. Adolescents are still growing, they have greater nutritional requirements and their bodies are inadequately prepared for childbirth. The additional nutrient demand of pregnancy may affect their growth potential and increase their risks in pregnancy and delivery complications. Hurley (1980) reported that the demand to meet the nutritional needs of adolescents for growth plus foetal needs for growth put them at higher nutritional needs. Since most births to

adolescent girls are first births, this tends to expose them to a higher risk of serious medical complications during pregnancy and childbirth as well. Adolescent pregnancy is therefore believed to result in increased maternal mortality among adolescent girls and increased single parenthood (Burrow and Ferris, 1982). This situation also leads to frustration and tension among adolescent girls, which may induce them into risky sexual behaviour, resulting into prostitution and infection with STDs, HIV/AIDS. Since large proportions of adolescent pregnancies are unwanted, this may result in illegal abortions, often under unsafe conditions with a high risk of serious and long-term complications and even death. In some situations, pregnant adolescent girls may commit suicide or damp their babies. Early pregnancy and therefore motherhood prevent girls from attaining higher levels of education thus limiting their job prospects. They may become completely dependent on their parents or other relatives for their needs or engage in unplanned marriages and probably end up divorcing or other marital problems. The education deficits have negative consequences for the young females themselves and their children (Santrock, 1996). Adolescent pregnancy is therefore an important factor in the intergenerational transmission of poverty (UN, 1992) and often lead to the vicious circle of the adolescent trap (Hurley, 1980). Moreover, both low education and early child bearing are associated with high fertility and high parity. There is also poor parenting of new babies by young mothers who are still children themselves because they are inexperienced, emotionally and psychologically unprepared to care for a child. Likewise, the children of adolescent mothers are more likely to become street children and also likely to become young mothers themselves.

1.3 Justification

The issue of pregnancies among adolescent girls is vital because teenage mothers and their children are at higher risk for social and health problems. According to Khanna and Van Look (1998), globally about 12 million babies are born to adolescent mothers every year, endangering the health of both mother and infant. It is estimated that at least 25% of girls around the world will have had their first child by age of 19 years (Senderowitz, 1995). Population Reference Bureau (PRB) (1992 and 2000) reports indicate that, 10-18% of African adolescent girls give birth every year, many have unintended pregnancies that result in unsafe abortions and 10% of these girls are below 15 years of age. Baker *et al.* (1996) observed that, Sub-Saharan Africa has the highest adolescent pregnancy rate in the world. Between 15 and 20% of all births occur to adolescent girls and at least 20% of adolescent girls will have had given birth to one or more children by the age of 20 years.

The vast majority of Tanzanian women bear children at an early age and before they are physically and psychologically mature (UNICEF, 1990; Kitange, 1994; Bureau of Statistics, 1997; and PRB 2001). The Tanzania Demographic and Health Survey (TDHS) (1991-92) report showed that, 23% of the women aged 15-19 were already mothers to one or more children and 6% were pregnant primivida (Ngallaba *et al.* 1993 cited by Bureau of Statistics, 1997). A report by PRB (2001) showed that 39% of 18 years old women in Tanzania are already mothers or are pregnant with their first child. In spite of this, the reproductive health needs of adolescents in Sub-Saharan Africa have

largely been ignored (PRB, 2000). As a result, few services are designed specifically for adolescents and the incidences of STDs and unplanned pregnancies continue to increase.

The continued high rates of adolescent pregnancies indicate that there is a need for improved understanding of the extent and factors contributing to adolescent pregnancies. Although some aspects of adolescent girls have been systematically examined, like the relationship of menarche and body composition (UN, 1992) and adolescent health and nutrition (Kitange, 1994), studies linking social, cultural, economic and nutritional problems of adolescent pregnancies are scanty. The findings of this study will assist in identifying areas that need attention in order to achieve positive behavioural change in the adolescent girls. The study, therefore, intends to identify problems and strategies, which could be adopted by agencies and policy makers in planning appropriate actions of alleviating the problem of adolescent pregnancies.

1.4 Objectives

1.4.1 General objective

The overall objective of this study was to examine the socio-economic factors and nutritional problems of adolescent pregnant girls so as to improve their social and nutritional wellbeing.

1.4.2 Specific objectives

(i) To determine the prevalence of adolescent pregnancies in Morogoro, Coast and Dar es Salaam regions.

(ii) To examine social, cultural and economical factors that contribute to early pregnancies.

(iii) To identify the socio-economic problems faced by adolescent pregnant girls.

(iv) To assess pre-pregnancy nutritional status and birth weights of infants born to adolescent mothers.

(v) To identify nutritional problems of pregnant adolescent girls.

CHAPTER TWO

LITERATURE REVIEW

2.1 Adolescent pregnancy and its associated problems

Adolescents are at higher risk of unintended pregnancies and STDs. This is due to lack of or inadequate information on reproduction and sexuality and little access to family planning and reproductive health services (UNICEF, 1995; Villarreal, 1998; Khanna and Van Look, 1998; WHO, 2000) or reluctance to use the services even when they are available (Frcog, 1995). Cultural beliefs also contribute to adolescent pregnancy because in many developing countries, female status is equated with marriage and motherhood. Girls often marry early and then face immediate pressure to prove that they are fertile and therefore able to bear children (UN, 1992; UNFPA 1999).

According to Mehta *et al.* (1999), regardless of whether adolescent pregnancy takes place in or outside marriage, there is a serious biomedical problem. This is so especially in adolescents living in developing countries where health services are poor and malnutrition is common. Under such situations, adolescent pregnancies can be accompanied by very high risks to the immediate and long-term health status of the mother and child. Kitange (1994); Gupta and Leite (1999) reported that, the most frequently reported conditions regarding child health consequences are prematurity and low birth weight due to intrauterine growth retardation. Babies born to mothers younger than 16 years of age are more than twice as likely to be of low birth weight than infants

born to older mothers (Mehta *et al.*, 1999). These babies are also three times more likely to die in their first month of life, compared to infants of older mother.

Maternal health problems and deaths are common among sexually active adolescents than in women aged 20 to 35 years (Senderowitz, 1995). Physiologically and socially, adolescents are more vulnerable to:

(i) Maternal death: Girls aged 15-19 are up to twice as likely to die during pregnancy or delivery as woman aged 20-29 (Bicego, 1996).

(ii) Sexually transmitted diseases (STDs): Each year, one in 20 adolescent girls world-wide contracts STD, including HIV/AIDS (UNICEF, 1995; Khanna and Van Look, 1998).

(iii) Violence/sexual abuse: Adolescents may lack the confidence and decision-making skills to unwanted sex. Girls who are subject to sexual abuse and rape can suffer serious life long physical and emotional consequences (Bicego, 1996).

(iv) Unsafe and illegal abortion: Each year, girls aged 15-19 undergo at least five million induced abortions (Khanna and Van Look, 1998). In Tanzania, of the women who had abortion at Muhimbili gynaecological wards in 1990-91, 54% were adolescents and those with septic induced abortions, 65% were also adolescents. A study carried out during the same period in Ilala District, Dar es Salaam showed that, 15% of maternal deaths are due to septic abortions and one third of these occurred among adolescents (Chambua *et al.*, 1994). Abortion is

usually performed out of fear for not meeting societal and familial expectations. Other reasons include strict anti-abortion laws, lack of financial and health resources and strong desire not to have a baby at that material time (Radhakrishna *et al.*, 1999).

During adolescence, pubertal growth is still progressing and adolescents have neither reached mental nor full physical maturity. Pregnancy at this age means competition between the growing mother and the foetus for the scarce nutrients. This often leads to stunted growth of the woman and general malnutrition. Both maternal and infant mortality rates are high in adolescent pregnancies. In Tanzania, adolescent girls constitute 22% of women who deliver at Muhimbili National Hospital (MNH) and accounted for 17% of maternal mortality in Dar es Salaam in 1990/91 (Chambua *et al.*, 1994). It has also been observed that, of those who deliver at MNH, about 40% of adolescents were single mothers as compared to 15 percent of older women. This has implications for prenatal care, maternal nutrition, economic security and decision making on various aspects of infant and child care. Moreover, adolescent girls usually attend antenatal clinics later and their health problems are not detected early enough to institute an intervention that may help to prevent complications during delivery (Chambua *et al.*, 1994).

2.2 Physical growth, development and pregnancy outcome

At menarche a young woman's pelvis has not completed growing, therefore pregnancy and consequent delivery may result into obstructed births and damaged internal organs (UN, 1992). According to Burrow and Ferris (1982), one of the most serious causes of such complications is a cephalopelvic disproportion, a condition in which a woman's pelvis is too small to permit a child's head to pass. Because of poverty and poor nutrition during childhood and pregnancy, adolescent girls usually give birth to premature babies and babies of low birth weight. This situation is observed in most of the African countries. Kavishe (1993) observed that, stunting in adolescent girls is of particular concern, and constitutes a major impediment to safe motherhood. The prevalence of stunting is very high reaching about 70% at 13 years of age. At menarche, young women have approximately four percent more height to attain and 12 to 18% more pelvic growths. This implies that early motherhood increases risks of obstetric complications. Obstructed and prolonged labour requires treatment at a medical facility that can perform surgery (Kitange, 1994). Most of the adolescent mothers die due to lack of appropriate facilities, and others continue to become permanently disabled through complications of obstructed labour or infection.

2.3 Adolescent nutritional needs

Good nutrition is essential during adolescence, as it supports the increased rates of growth that characterise puberty. Shepherd *et al.* (1996) cited by Wabuyele *et al.* (1999) reported that, adolescence is a period of dramatic growth and development, and as a

child grows into an adult, complex physiological, as well as psychological alterations take place. These changes create special nutritional needs. Adolescents, both boys and girls require enough nutrients including energy, protein, vitamins and minerals such as iron and folic acid (Wabuyele *et al.*, 1999). In addition to the increased iron needs of the expanding red cell mass and myoglobin in newly gained muscle tissue, adolescent girls require up to 15% more iron than the boys to compensate for menstrual blood losses (Kurz and Welch, 1994; Jayatissa and Piyasena, 1999). Therefore, failure to consume an adequate diet during adolescence or a period preceding adolescence can disrupt normal growth and pubertal development.

2.4 Adolescence and Sexuality

In every culture, sexual education and communication are needed to build images of responsible sexual behaviour. In many regions of the world, sex education is already accepted as part of the response to high rates of adolescent pregnancy and threat to HIV infection (PRB, 1992). Young girls' needs in the area of sexual and reproductive health vary widely, even among those of similar age and same sex. The social situations in which adolescents find themselves in, have a strong influence on their sexual behaviour and needs. Premarital sex is common in many parts of the world (Eggleston *et al.*, 2000). It is reported to be on the increase in all regions, because young women are under strong social and peer group pressure to engage in premarital sex. Moreover, some features of modern life may increase both the desire and opportunity for premarital sexual activity. The mass media, increased migration and urbanisation, increased materialism and

relative impoverishment within societies have led to increased commercial sex (PRB, 2001).

2.5 Adolescent pregnancies and contraceptive knowledge

Many adolescents have poor knowledge about sexual matters as well as on how to protect themselves against pregnancies, leading to high risk of unintended pregnancies and STDs including HIV/AIDS (WHO, 1999). As a group, they tend to be uninformed or misinformed about sexuality and reproductive health and are less likely than older women to use family planning as they fear embarrassments or lack of confidentiality. Information or comments from peers or elders cause them to worry about contraceptives side effects and if they are not having intercourse very often, they may feel it is not worth taking the risk (Burry, 1985). In most cases, they may lack support from others to discuss their reproductive health concerns and problems (UNFPA, 1997; Khanna and Van Look, 1998). According to PRB (2001) report, less than five percent of married adolescents are using modern contraception. However, low contraception use among married adolescents may be due to the premium placed on childbearing among newly married couples.

2.6 The age at marriage

Early marriage tends to lead to early child bearing, resulting in higher fertility rates. The Bureau of Statistics (2000) report showed that that the age at which childbearing begins influences the number of children a woman bears throughout her reproductive period in

absence of any active birth control. According to UNESCO (1995), some societies in Africa like Ethiopia, adolescents are given away to men for marriage at menarche. These traditions basically assume that a woman is mature when she has had menarche (Chambua *et al.* 1994). In such societies, adolescent pregnancy is accepted if it is associated with marriage. In several countries of Sub-Saharan Africa, for example, adolescent fertility is sanctioned and valued within the adequate ritual framework (marriage), but strongly condemned when out of wedlock [Bledsoe and Cohen, (1993) cited by Villarreal, (1998)]. On average, in most African countries about 40% of the girls marry at the age of 18 years (Kitange, 1994). In few countries, however, mostly those in Central Africa Republic, South-West Sudan, Congo, Gabon and Cameroon, pregnancy constitutes a prerequisite to marriage and adolescent girls who cannot prove their ability to conceive, find no partners [Bledsoe and Cohen, (1993) cited by Villarreal, (1998)]. Early marriage is favoured in different contexts to prevent the undesired effects of premarital sexual activity, pregnancy (Villarreal, 1998) and parents' fear of loosing bride price (UNICEF, 1995). Some repercussions of early marriage can be quite traumatic, more than 2.5% of the ever-married adolescents in Tanzania have experienced divorce, separation, or death of spouse and five percent have married at least once (Chambua *et al.*, 1994).

2.7 Nutritional status

Nutritional status can be defined as the interpretation of information obtained from the methods of nutritional status assessment. The information obtained is used to determine

the health status of individuals or population groups as influenced by their intake and utilisation of nutrients (Gibson, 1990). The common categories of nutritional status assessment are dietary, biochemical, anthropometric and clinical. The raw measurements derived from each of the methods of nutritional status assessment systems are often combined to form indices. Indices are used to interpret and group the measurements. Nutritional assessment indices can be evaluated by comparison with distribution of reference values, reference limits drawn from reference distribution and predetermined cut-off points (Gibson, 1990). In this study, anthropometric and biochemical methods of assessing nutritional status were used.

2.8 Iron status during pregnancy

Assessing the iron status during pregnancy is fraught with difficulties. This is because of the profound hemodynamic changes associated with pregnancy, which affect several indexes of iron status. The disproportionate increase in plasma volume during pregnancy leads to a drop in the haemoglobin (Hb) concentration of approximately 0.1g/dL. Haemoglobin (WHO, 1997), is defined as the oxygen-carrying molecule in red blood cells while haemoglobin concentration is defined as grams of haemoglobin per volume of blood expressed as g/dL. Although the Hb concentrations of less than 11g/dL have been occasionally reported in iron depleted women, this concentration has proved to be a useful cut-off for defining anaemia in pregnancy (WHO, 1968 cited by Bothwell, 2000). Critical levels of Hb are 11 and 12g/dL for pregnant and non-pregnant women respectively. Very severe anaemia is represented by 4g/dL and significantly increases

the risk of maternal and foetal mortality because of the effects of anaemia on the cardiovascular system, which is known as high-output heart failure (MI/UNICEF, 1998; De Maeyer, 1982 cited by Yip, 2000). Mild anaemia is routinely defined as Hb values of 1g/dL below the anaemia cut-off value. WHO (1997) recommends that severe anaemia be defined as Hb concentration of less than 7g/dL. Concentrations ranging below 10g/dL to 7g/dL can be regarded as indicating moderate anaemia.

2.9 Methods of assessing anaemia

2.9.1 Clinical examination

Individuals having severe anaemia can be recognised by simple clinical examination of the eyelids, the tongue, nail beds and palms for evidence of significant pallor. This type of examination is extremely useful for identifying young children and pregnant women who are at higher risk of complications of severe anaemia. World Health Organisation suggests that examination of palmar pallor is preferred to eyelid in young children, since conjuctivitis (common in children) can cause redness even in anaemic subjects (WHO, 1997).

2.9.2 Laboratory Assessment

Iron status can be measured using haematological and biochemical indices. Each parameter of iron status reflects changes in different body iron compartments and is affected at different levels of iron depletion. Specific iron measurements include haemoglobin (Hb), mean cell volume, haematocrit, erythrocyte protoporphyrin, plasma

iron, transferrin, transferrin saturation levels, ferritin and more recently transferrin receptors and red-cell distribution width. In the present study Hb was used to measure anaemia in pregnant adolescent girls. Haemoglobin has been used for long time as an iron status parameter. It provides a quantitative measure of the severity of iron deficiency once anaemia has developed. Haemoglobin determination is a convenient and simple screening method and is especially useful when the prevalence of iron deficiency is high, as in pregnancy or infancy (MI/UNICEF, 1998). The limitations of using haemoglobin as a measure of iron status include lack of specificity (as factors such as vitamin B_{12} or folate deficiency, genetic disorders and chronic infections can limit erythropoiesis). Haemoglobin is age, sex and race dependence. The method is relative insensitivity due to the marked overlap in values between normal and iron deficient populations (Garby *et al.*, 1969 cited by Gibson, 1990).

2.10 Anaemia in pregnancy

Anaemia in pregnancy continues to be a common clinical problem in many developing countries. Bothwell (2000); Broek and Letsky (2000) reported that, this problem is compounded by the fact that many women consume diets of low iron bioavailability, poor absorption, excessive loss due to parasitic infections like malaria, HIV/AIDS infection and intestinal worms or combination of these factors. According to Gibson (1990), the quantity of iron in the body is controlled by absorption from the gut, which is in turn determined by nutritional needs of individual and the factors influencing the bioavailability of iron. Iron deficiency anaemia in pregnancy is associated with poor

pregnancy outcomes and contributes to intrauterine growth retardation, low birth weight, increased maternal mortality and low iron stores of infant at birth. Low iron stores in infants if left uncorrected, can cause adverse behavioural and cognitive development [Jayatissa and Piyasena, (1999); WHO, (1992), cited by Broek and Letsky, (2000)]. Haemoglobin distribution varies with age, sex, and different stages of pregnancy, altitude and smoking but the overall iron requirement during pregnancy is significantly greater than in the non-pregnancy state. Although iron requirements are reduced during the first trimester because of the absence of menstruation, but the requirements increase notably during the second half of pregnancy (Bothwell, 2000). This is because of the expansion of red blood cells mass and the transfer of increased amounts of iron to the growing foetus, the placental structures and other maternal tissues. The degree to which these increased amounts can be met depends on the size of iron stores at the start of pregnancy and on the amounts of dietary iron that can be absorbed during pregnancy (MI/UNICEF, 1998).

2.11 Pre-pregnancy nutritional status, pregnancy weight gain and infant birth weight

Nutrition status of women is important for the well being of both mothers and their children. The study by Roos *et al.* (1997) showed that there is a significant correlation between maternal anthropometric values before and during pregnancy and the birth weight of the offspring. Weight gain during pregnancy is also positively correlated with infant birth weight independently of pre-pregnancy weight when the mother is not

excessively overweight. Pre-pregnancy weight for height (National Academy Press, 1990) is a determinant factor of gestational weight gain. On average, women who are overweight at conception gain less weight during pregnancy than do underweight women and multigravidae gain less weight on average than primigravidae (National Academy Press, 1990). For women with normal pre-pregnancy Body Mass Index (BMI), the recommended weight gain is approximately 0.4kg per week in the second and third trimesters of pregnancy. Underweight women should gain weight at a higher rate of 0.5kg per week and overweight women have to gain at a somewhat lower rate of 0.3kg per week.

Weight gain during pregnancy in a health young woman who eats to appetite is estimated to be approximately 12.5kg at term (Pike and Brown, 1984). Weight gain in the first half of pregnancy is due to deposition of body fat as an energy reserve to enable foetal growth and to subsidise the energy coast of lactation. Weight changes in the second half of pregnancy are due to increase in mass of the foetus, placenta, amniotic fluid, mammary glands and of blood and extracellular extravascular fluid volumes (Dawes and Grudzinskas, 1991). Adolescents need to gain more weight than adults, hence total gain of 14 to 18kg may be appropriate during adolescence because adolescents seem to transfer less of the weight they gain to the growing foetus than adults do (Frisancho *et al.*, 1983).

In some situations, maternal low pregnancy weight gain (less than 7kg) occurs, and is influenced by factors such as race, young age, marital status, education level, food shortage, self imposed dietary restriction, smoking, drug and alcohol abuse, poverty, physical and emotional abuse (National Academy Press, 1990). According to Pojda and Kelley (2000), low birth weight (defined as a body weight at birth of less than 2500g) is caused by prematurity and intrauterine growth retardation. Low birth weight is one of the indicators of maternal malnutrition irrespective of the type of nutritional deficiency involved. Low birth weight (UNICEF, 1990) has important adverse consequences for subsequent somatic growth and possibly, neurobehavioral development, and it increases the risk of infant mortality.

CHAPTER THREE

METHODOLOGY

3.1 Description of the Study Areas

The study was conducted in urban and rural areas of Morogoro, Coast and Dar es Salaam regions.

3.1.1 Morogoro region

Morogoro region lies between latitude 5° 58" and 10° 0" to the South of the Equator and longitude 35° 25" and 35° 30" to the East of Greenwich meridian. Annual rainfall ranges from 600mm in law lands to 1200mm in the highland plateau. The mean annual temperatures vary with altitude from the valley bottom to the mountaintop, between 18°C on the mountains to 30°C in river valleys. In most parts of the region, the average temperatures are almost uniform at 25°C. The dominant physical features are the Uluguru Mountains and these influence weather pattern of Morogoro.

Morogoro region has a population of 1 220 564 according to 1988 population census. According to population projections the region was expected to have population of 1 671 589 by year 2000. The region occupies a total of 72 939 square kilometres which is approximately 8.2% of the total area of Tanzania Mainland. It is the third largest region in the country after Arusha and Tabora regions. Administratively, Morogoro region has five districts namely Morogoro urban, Morogoro rural, Kilosa, Kilombero and Ulanga.

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The main ethnic groups found in Morogoro are Luguru, Sagara, Kaguru, Ndamba and the Pogoro. Luguru dominate in Morogoro rural district, Sagara/Kaguru in Kilosa, Ndamba are majority in Kilombero and Pogoro in Ulanga district.

Maize and paddy are the major staple food crops. Other food crops in the region are sorghum, sweet potatoes, beans, cassava, millet, groundnuts, peas, banana, and wide range of tropical and temperate fruits and vegetables.

Social services

Education

There is one pre school for every 10 230 people, one primary school for every 2 383 people and one secondary school for every 40 642 people. Both the quality and numbers are inadequate.

Health

The region has 14 hospitals, 26 health centres, 240 dispensaries and 302 village posts. The 10 most common causes of morbidity and illness are malaria, diarrhoea, upper respiratory track infection, anaemia, eye and ear diseases, pregnancy complications, surgical complications and schistosomiasis.

Water and sanitation

Water sources include shallow wells, pipe water supply, streams and rivers, dams, springs and bore holes. The population covered with adequate supply of water is 49%

and 64% in rural and urban respectively. The majority (93.1%) of residents uses pit latrines. Only nine percent of households have no toilet facilities (URT/Planning Commission, 1997).

3.1.2 Coast region

Coast region is situated on the eastern part of Tanzania mainland along the Indian Ocean coastal belt where the weather is generally hot. It is located between latitudes 6° and 8° South of the Equator and between longitudes 37° 30' and 40° East of Greenwich Meridian line. The region experiences a typical tropical climate with average temperature and rainfall of 28°C and about 800 to 1000mm per year respectively. This region shares borders with Morogoro region to the west and on the eastern side, the region shares borders with Dar es Salaam region and Indian Ocean. Coast region is the least populated region of Tanzania Mainland with only 2.75% of total population of the country. The region covers a total of 33 539 square kilometres which is equivalent to 3.8% of total area of Tanzania Mainland.

According to the 1988 population census statistics, the region had a population of 638 015 with a population density of 19.7 people per square kilometre. According to population projections the region was expected to have a population of 798 794 by the year 2000. Administratively, the region is divided into six districts namely Bagamoyo, Kibaha, Kisarawe, Mkuranga, Rufiji and Mafia. The main indigenous ethnic groups are the Zaramo, who are dominant in all the districts of the region, Dengereko are found

mostly in Rufiji and part of Mkuranga districts, Kwere are found in Bagamoyo district and, Mbwera and Pokomu are found in Mafia district. Agriculture is the major source of income for the people of Coast region but the area under cultivation is very small compared to the vast fertile land available. The main food crops produced in the region are paddy, maize, cassava, millets, sorghum, legumes especially cowpea, fruits and vegetables.

Social services

Education

The development pace in education sector has been rather slow compared to other regions. This has been attributed mainly by parents in coastal areas giving low priority to education. The rate of school dropout is high for girls due to the following factors:

- Some parents prefer their daughters to get marriage after attaining the age of puberty.
- Some parents do not value education for girls so they just decide to discourage their daughters from attending school.
- Other parents believe that taking their children to school is waste of manpower that could be more usefully utilised in other family activities such as farming, petty business or fishing.
- School environments in terms of infrastructure are not conducive for learning.

Health

Coast region has a number of health facilities located in various parts both in the rural and urban areas. There are six hospitals, 14 health centres, 140 dispensaries and some village health posts. Hospitals are found in urban areas while few of the private ones are found in rural areas. The region does not have regional hospital, but depends on services offered by Tumbi hospital at Kibaha district. Although Tumbi hospital renders services that would have been offered by a district or regional hospital it is treated as special hospital under management of the Kibaha Education Centre. The region compares well to other regions with respect to the place of maternal delivery. More women than the national average deliver at a health facility in the Coast region.

Water supply and sanitation status

The population of Coast is served by water from rivers, deep and shallow wells, natural and man made dams, piped water and rainwater harvesting. According to the 1988 population census, 81% of the region's total population had access to toilet facilities, which include flash toilets and pit latrines and the remaining 19% had no toilet facilities at all (URT/Planning Commission, 1997).

3.1.3 Dar es Salaam region

Dar es Salaam region is situated at latitude 6° and 7° S and longitude 39° and 40° East of Greenwich meridian at an altitude of 14.3m above sea level. The region shares border with Indian Ocean on East and surrounded by Coast region on Northwest. The region

covers a total area of 1 393 km^2. Dar es Salaam region is generally very hot with temperature of 35°C during the months of January to March, which decreases to 25°C during June to August. The region receives average rainfall of 131.5mm per year. According to 1988 population census statistics, the region had a population of 1 360 850. According to population projections the region was expected to have population of 2.2 million by year 2000. Administratively, the region is divided into three municipalities namely Kinondoni, Temeke and Ilala. Being the country's commercial city, it is inhabited by people of different ethnic groups from different parts of the country who have migrated to the city. However, in the rural settings of the region, the indigenous groups are dominant.

About 945km^2 of the total area of the region comprises of rural setting which is suitable for agriculture. The main food crops are cassava, millet, sweet potatoes, maize, paddy, legumes and coconut. However, 80% of residents depend on food from other regions because the food produced within the region is not enough to meet the demand.

Social services

Health services

The region has 26 hospitals, 13 health centres, 387 dispensaries and National hospital, Muhimbili. Most of these facilities are concentrated in the urban and therefore most people from the rural areas of the region have to walk for more than 5km to reach the services.

Education

The region has 57 nursery schools, 192 primary schools and 46 secondary schools and different colleges. However, the schools have shortages of classrooms, chairs, desks, toilets, staff and staff houses. Despite these figures, the region has a problem of illiteracy, about 30% of the people in Dar es Salaam cannot read, write and count.

Water provision and sanitation

The region is served by water mainly from Ruvu and Kizinga rivers. In rural areas, the major sources of water are deep and shallow wells. Generally water supply in the region is poor due to dilapidated old and blocked pipes. It is only 40% of the residents who get clean water and the other proportion of the residents use water of which its cleanliness and safety is uncertain. Only 5% of the region is connected to sewage system hence large part of the population use pit latrines. Diseases mostly affecting the region are malaria, dysentery/cholera, air born diseases like tuberculosis, skin diseases, anaemia, eye diseases and malnutrition. Most of these diseases are dominant in squatters areas, where more than 70% of people in the region live (Tume ya jiji la Dar es Salaam, 1998).

Among the indigenous tribes in the three regions studied, there is social cultural formal system of guidance (menarche initiation ceremony) given to adolescent girls at puberty by adults mainly old women or grand mothers. These communities believe in the necessity of a rite of passage between childhood and adulthood. The menarche initiation

ceremony is suspected to having significant influence on adolescent girls' sexual behaviour. It is for this reason that the study was conducted in the three regions.

3.2 Research design

Combinations of cross-sectional and short-term longitudinal surveys were conducted. Cross-sectional survey was applied to the recruited non-pregnant adolescent girls. Short-term longitudinal survey was applied to adolescent pregnant girls whereby data were collected over a period of five months.

3.3 Sampling of survey areas

The study areas were sampled through multistage, purposive and simple random procedures as follows: From each region, one district was purposively selected basing on the convenience of easy access and on the presence of both urban and rural/rural characteristic wards. Morogoro, Kibaha and Temeke districts were respectively selected from Morogoro, Coast and Dar es Salaam regions. From each district, two divisions: urban and rural were randomly selected for comparison. Two divisions, (the first mentioned being urban and the other one being rural) from each bracketed district, were randomly selected as follows: Morogoro municipality and Mlali (Morogoro); Kibaha and Mlandizi (Kibaha) then Mbagala and Kigamboni (Temeke).

3.4 The Study population

Adolescent girls (age 10 through 19 years) were purposively included for sampling. A stratified random sampling technique was employed whereby the adolescent girls were grouped into two strata. The first strata consisted of pregnant adolescents, married or single, attending antenatal clinics within the study areas. The other strata involved non-pregnant adolescent girls recruited from schools and residential homes. Both strata were in the same living environment, either rural or urban.

3.5 Sample selection

3.5.1 Adolescent pregnant girls

From this stratum, the formula according to Arbelot (1995) was used to calculate the sample size (n) as follows:

$$n = \frac{t^2 \times p \times q}{d^2}$$

Whereby: n = Sample size

t = Parameter related to error risk, equals 1.96 for an error risk of 5%

p = Expected prevalence (14%) of adolescent pregnancy in the population expressed as fraction of 1.

q = 1-p, expressed as proportion of non-pregnant adolescent girls, expressed as a fraction of 1.

d = Absolute precision, expressed as a fraction of 1.

From each division, 30 subjects were recruited. The whole study involved six divisions, therefore, total sample size of 180 pregnant adolescents was obtained. These respondents were conveniently recruited from maternal and child health centres (MCH) after being identified by MCH worker and the researcher. Respondents were specifically recruited from MCH centres due to the fact that the communities have been sensitised on the importance of attending antenatal clinics and to deliver at hospitals. It was therefore assumed that whoever is pregnant visits antenatal clinic. The clinics involved in this study (with their setting (urban/rural) and name of district in the brackets) were Morogoro Regional hospital MCH unit, Uhuru clinic (urban) and Mlali dispensary (rural) (Morogoro); Tumbi hospital MCH unit (urban) and Mlandizi rural heath centre (rural) (Kibaha); Round Table maternity wing (urban), Chamazi and Gezaulole (rural) dispensaries (Temeke).

3.5.2 Non-pregnant adolescent girls

Simple random sampling procedures, using random numbers were applied to recruit the respondents. Sampling was done in such away that the sampling fraction (n/N) was greater than or equal to 5% (Boyd *et al.*, 1981); whereby n is the total number of sampled respondents and N was the total population of non-pregnant adolescent girls. A total of 100 subjects were selected from each of the six divisions, making a total of 600 subjects.

3.6 Data collection

3.6.1 Pre-testing

A preliminary survey was conducted to pre-test the questionnaire on eight pregnant adolescent girls in Morogoro urban to ascertain validity of the questions. Thereafter, necessary modifications and corrections were incorporated.

3.6.2 Primary and Secondary data

Primary data were collected through person to person interview. A structured questionnaire of both open and close-ended questions (Appendix 1, section B) was used. Supplemental data were obtained through focus group discussion with key informants such as MCH nurses, school teachers and selected parents by using a checklist of questions (Appendix 2). In addition, measurements of weight, height, haemoglobin concentration and birth weight were carried out.

Secondary data were obtained from various sources including Sokoine University of Agriculture (SUA) National library, Muhimbili National Hospital (MNH) and Tanzania Food and Nutrition Centre (TFNC) libraries. Other sources included Women Information Centre (WIC) at the Ministry of Community Development, Women Affairs and Children and MCH/hospitals records.

3.6.2.1 Determination of prevalence of adolescent pregnancy

Prevalence of pregnancy was determined from hospital delivery wards. Number of births occurring in a specific period were recorded and births specifically from adolescent girls were used to determine prevalence of adolescent pregnancy. Data were collected from the three hospitals namely Temeke, Tumbi and Morogoro Regional hospital.

3.6.3 Measurements of nutritional status

3.6.3.1 Haemoglobin determination

Haemoglobin concentrations were measured from all the sampled pregnant adolescents in order to assess their iron status. This was carried out using haemocue technique (Vanzetti, 1966). In this attempt, an electric/battery-operated HemoCue photometer (HemoCue AB, Ängelholm, Sweden) with disposable cuvettes was used. The technique is based on the principle that when blood is mixed with Sodium deoxycholate, the erythrocytes are haemolysed and haemoglobin is released. Sodium nitrite converts haemoglobin to methaemoglobin. Methaemoglobin reacts with sodium azide to form azide methaemoglobin, which is then measured at two wavelengths 570 and 880nm. This is necessary to compensate for turbidity.

Procedure:

The subject was sat comfortably and fingers were put straight and not tense in order to avoid stasis effect, which occurs, when the fingers are bent. The middle finger or ring finger was used to collect blood sample. The puncture site was cleaned with spirit and

allowed to dry. The site (at the side of the tip) was pricked with a sterile disposable prick and the first two drops were wiped away to stimulate spontaneous blood flow. The third drop was filled in the cuvette in one continuous process until the centre of the cuvette was completely full. Filling was done by introducing the cuvettes tip into the middle of the drop of blood. Immediately the filled cuvette was introduced into the holder of the haemocue and pushed into position for reading, which took 15-30 seconds. Haemoglobin was expressed as g/dL. Based on the results, subjects were categorised according to their haemoglobin concentration (WHO, 1997).

3.6.3.2 Anthropometric measurements

The anthropometric variables used in this study were weight, height and Mid-Upper Arm circumference (MUAC).

Procedures:

Weight

Weight was measured by using electronic SECA weighing scale (Seca Vogel & Halke Hamburg, German) with digital display. The weighing scale was placed on a smooth, level surface, and the subject was asked to remove shoes, heavy clothes and any other heavy item. The surface of the scale was gently pressed to switch on the display and waited until it showed zero. The person was asked to step onto the scale and stood upright looking straight ahead without moving, with her arms loosely at her sides. When

the scale was stable, the display was read and recorded to the nearest 0.1kg and the subject was asked to step off the scale.

Height

Height was measure by using stadiometer (England). The instrument was set against a wall. The subject was asked to remove shoes and any headgear and then stood with her back as straight as she could against the stadiometer, with her feet slightly apart with the back of the heels touching the stadiometer. The middle of the subject's shoulders, buttocks and the back of the head touched the stadiometer and the subject was asked to look straight in front of her. The headpiece of the stadiometer was lowered until it sat firmly on the top of the head, the spirit level was balanced and the reading was taken to the nearest 0.5cm and recorded. The headpiece was moved upward and the subject was asked to step off the stadiometer.

MUAC

MUAC was measured by using Talc insertion tape (Talc Ltd, St. Albans). The subject was asked to stand and uncover her left arm as far as the shoulders. The arm was bent and the lower arm placed across the stomach while the person was looked straight ahead. The tip of the bones at the elbow and top of the shoulder was located and the distance between the two marked tips was measured and divided by two to get midway point. Then the subject was asked to hang her arms at her sides. The tape was placed around the arm at the marked midway point, and care was taken to make sure that tape fitted

comfortably around the arm (i.e not too tight or too loose). Measurements were taken to the nearest 1mm and recorded.

Body Mass Index. (BMI)

BMI given by [Weight (kg)/Height (m^2)] and Mid Upper Arm Circumferences (MUAC) were calculated and used to assess nutritional status. These indices are widely used for assessment of nutritional status of adults. All the results were categorised and subjects were classified as shown on Table 1.

The nutritional status information obtained from pregnant respondents was used to present the nutritional situation of adolescents during pregnancy. The results obtained from non-pregnant/non-mother respondents were used to indicate a general baseline information on the pre-pregnancy nutritional status of adolescent girls in the study areas.

Table 1: Anaemia, BMI and MUAC classification

Nutritional variable	Classification	Remarks
Hb concentration	Above or equal to 11g/dL	Normal
	10.0-10.9 g/dL	Mild anaemia
	7.0-9.9 g/dL	Moderate anaemia
	4.0-6.9 g/dL	Severe anaemia
	Less than 4.0 g/dL	Very severe anaemia
Body Mass Index (BMI)	Less than 19	Underweight
	19-24	Normal
	24.1-29	Overweight
	> 29	Obese
MUAC	Less than 22.1cm	Severe wasting
	22.1-23cm	Moderate wasting
	23.1-24cm	Mild wasting
	>24cm	Normal

3.6.3.3 Maternal Weight gain and infant birth weights

Weight was measured two times at the interval of two weeks from 123 pregnant adolescent girls who were in their second and third trimesters. Weight gain per week was calculated by subtracting the first recorded weight from the last recorded weight and the result was divided by the total number of weeks (National Academy Press, 1990).

Weight gain = $(w_t - w_{t-1})/(GA_t - GA_{t-1})$

W is weight

Whereby GA is gestational age in weeks

t is time of most recent measurement

t-1 is time of previous measurement.

Infants birth weights, measured within few seconds after deliveries were obtained from hospital delivery records. Measurements were obtained from 50 infants whose mothers (adolescents) were followed throughout pregnancy up to delivery time.

3.7 Data processing and analysis

Data were coded, entered onto a computer and analysed using the Statistical Package for Social Sciences (SPSS) (Norusis/SPSS Inc., 1995) version 8.0 for Windows computer programme. Descriptive, regression, correlation and Student's T-test analyses were performed.

3.7.1 Descriptive analysis

Descriptive statistics were used to obtain frequencies, means, percentages, range and standard deviation of various coded responses such as background characteristics, socio-economic factors and nutritional measurements. Cross tabulations were used to get joint frequency and percentage distribution of variables. Student's T-test was performed to test for significant differences between means of selected variables (age at first

pregnancy, age at married, conception awareness, family planning knowledge) and nutritional parameters (BMI, MUAC, Hb during pregnancy) of respondents from urban and rural areas.

3.7.2 Regression and correlation analyses

Regression analysis

A linear multiple regression analysis was used to determine the factors that contribute more to early pregnancies. The following regression model was employed:-

$Y=A+\beta_1X_1+\beta_2X_2+\beta_3X_3+\ldots\beta_nX_n+e$

Where: Y=f[(Level of education(X_1), Occupation(X_2), Family planning knowledge(X_3), Conception awareness(X_4), Sex education(X_5), Age at which sex education was given(X_6)]

Y = A dependent variable representing age at first pregnancy

A = Constant term

β_1 to β_n =Regression coefficients for independent variables

X_1 to X_n = Independent variables

e = Random error term

Correlation analysis

This was carried out to determine the relationship between infant birth weight and method of delivery and selected maternal nutritional parameters such as Hb concentration, weight gain during pregnancy, maternal age, height and MUAC.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter presents the results of the study on adolescent girls under the following sub-sections: Characteristics of respondents, prevalence of adolescent pregnancies, social, cultural and economic factors contributing to early pregnancies. Others are socio-economic problems faced by adolescent pregnant girls, pre-pregnancy nutritional status and nutritional status during pregnancy and the outcome of pregnancy.

4.1 Background characteristics of pregnant adolescent girls

4.1.1 Sample size and distribution

The survey was carried out among 180 pregnant adolescents (respondents). Ninety respondents (50%) were residing in an urban setting and the other ninety respondents (50%) were from a rural setting and each region contributed one third of all the respondents (Table 2).

Table 2: Distribution of surveyed pregnant adolescent girls (n=180)

Region	Residence		
	Urban	Rural	Total
	n	n	n
Dar es Salaam	30	30	60
Coast	30	30	60
Morogoro	30	30	60
Total	90	90	180

4.1.2 Adolescents' age and pregnancy age

Table 3 shows the age distribution of the adolescent pregnant girls and the age of pregnancy. Age ranged from 15-19 years at the time of interview. About 71% of the respondents were 18 and 19 years old, 17.2% were 17 years old and 12.2% were 15 and 16 years old. Most of the respondents (66.1%) were in their third trimester of pregnancy, 31.6%, and 2.2% were in the second and first trimester, respectively.

Table 3: Chronological age of respondents and pregnancy age (n=180)

Respondents' age (years)	Pregnancy age							
	First trimester (1-3 months)		Second trimester (4-6 months)		Third trimester (7-9 months)		Total	
	n	%	n	%	n	%	n	%
15	-	-	1	0.6	6	3.3	7	3.9
16	-	-	6	3.3	9	5.0	15	8.3
17	1	0.6	8	4.4	22	12.2	31	17.2
18	3	1.6	17	9.4	39	21.7	59	32.8
19	-	-	25	13.9	43	23.9	68	37.8
Total	4	2.2	57	31.6	119	66.1	180	100.0

4.1.3 Level of education and occupation

The level of education and occupation of respondents are indicated in Table 4 and figure 1 respectively. Most of the respondents, (58.9%) have attained primary school education (standard seven), 20% did not complete primary education for various reasons and 17.2% have never been to formal school. Only 1.1% has a secondary education and 2.8% did not complete secondary education. Results on occupation (Fig. 1) show that

large proportion of the respondents (72.8%) were not engaged in any income generating activity, 22.2% were engaged in agricultural activities (of which the majority are from rural areas) and 5.0% were engaged in petty trading.

Table 4: Level of education of respondents (n=180)

Education level	Dar es Salaam		Coast		Morogoro		Total	
	n	%	n	%	n	%	n	%
Primary education	31	17.2	39	19.9	39	21.7	106	58.9
Incomplete primary education	15	8.3	11	6.1	10	5.5	36	20.0
Secondary education	1	0.6	1	0.6	-	-	2	1.1
Incomplete secondary education	1	0.6	3	1.7	1	0.6	5	2.8
Without formal education	12	6.6	9	5.0	12	5.5	31	17.2
Total	60	33.3	60	33.3	60	33.4	180	100

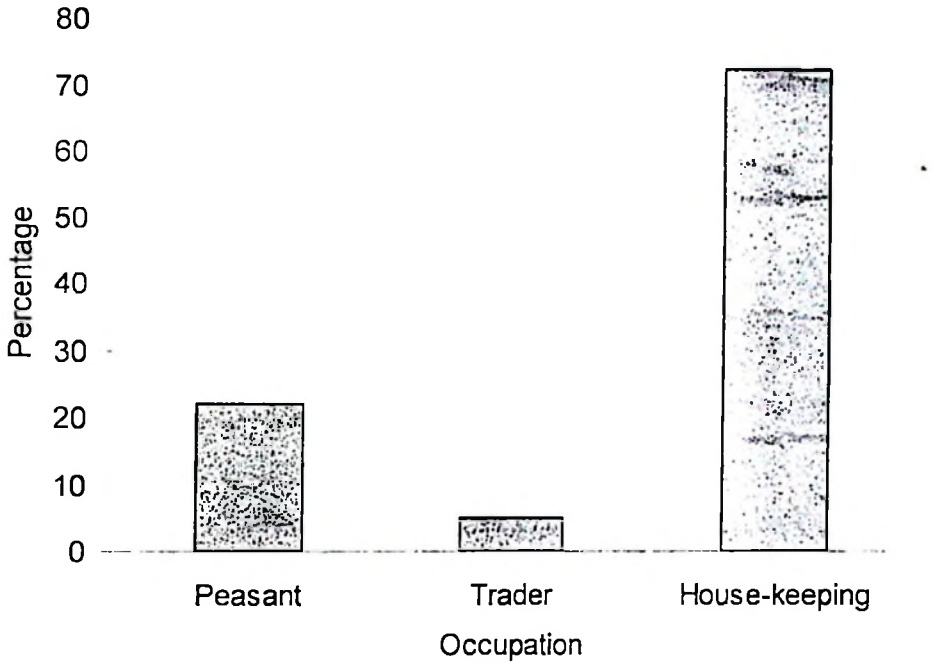

Figure 1: Respondents' occupation

4.1.4 Age at first pregnancy

The results in Table 5 show that 15% of the respondents became pregnant at the age below 16 years and the remaining 85% became pregnant at the ages between 16 to 19 years.

Table 5: Respondents' age at first pregnancy (n=180)

Age at first pregnancy	Dar es Salaam		Coast		Morogoro		Total	
	n	%	n	%	n	%	n	%
12	-	-	1	0.6	-	-	1	0.6
13	-	-	1	0.6	-	-	1	0.6
14	-	-	2	1.1	5	2.8	7	3.9
15	3	1.7	8	4.4	7	3.9	18	10.0
16	15	8.3	3	1.7	10	5.6	28	15.6
17	16	8.9	11	6.1	14	7.8	41	22.8
18	13	7.2	21	11.7	13	7.2	47	26.1
19	13	7.2	13	7.2	11	6.1	37	20.6
Total	60	33.3	60	33.3	60	33.3	180	100.0

4.1.5 Marital status

Table 6 shows the distribution of respondents according to their marital status. Results indicate that 32.3% were single, 34.4% married, 32.2% cohabiting and 1.1% divorced. Figure 2 indicates the marital status of respondents from urban and rural areas. Significant difference (p=0.039) was observed between urban and rural setting with respect to marital status and majority of married/cohabit respondents were from Coast region.

Table 6: Respondents' marital status distribution (n=180)

Marital status	Dar es Salaam		Coast		Morogoro		Total	
	n	%	n	%	n	%	n	%
Single	19	10.6	16	8.9	23	12.8	58	32.2
Married	26	14.4	17	9.4	19	10.6	62	34.4
Cohabit	13	7.2	27	15.0	18	10.0	58	32.2
Divorced	2	1.1	-	-	-	-	2	1.1
Total	60	33.3	60	33.3	60	33.3	180	100.0

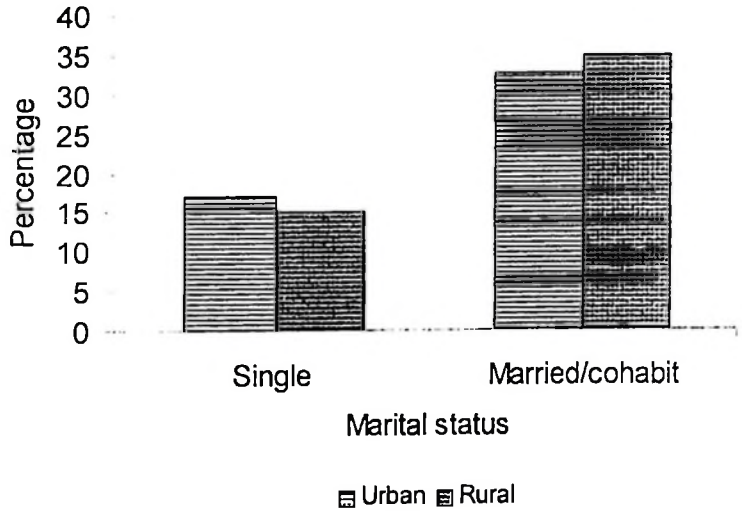

Figure 2: Marital status of respondents from urban and rural areas

4.1.6 Age at marriage

A total of 122 respondents were married/cohabiting/divorced (Table 6 above). Information on age at marriage is presented in Table 7. The results indicate that 32.8% of the respondents were married/cohabiting at the age below 17 years and the remaining

67.2% were married at 17 to 19 years old. Figure 3 indicates age at marriage for respondents from urban and rural areas. No significant difference was observed in age at marriage between respondents from urban and rural settings.

Table 7: Age at marriage/cohabited (n= 122)

Age at marriage	Dar es Salaam		Coast		Morogoro		Total	
(years)	n	%	n	%	n	%	n	%
13	1	0.8	1	0.8	1	0.8	3	2.5
14	-	-	1	0.8	1	0.8	2	1.6
15	9	7.4	6	4.9	5	4.0	20	16.4
16	5	4.1	3	2.4	7	5.7	15	12.3
17	13	10.6	16	13.2	11	9.0	40	32.8
18	11	9.0	14	11.5	9	7.4	34	27.9
19	1	0.8	4	3.2	3	2.4	8	6.5
Total	40	32.8	45	36.9	37	30.3	122	100.0

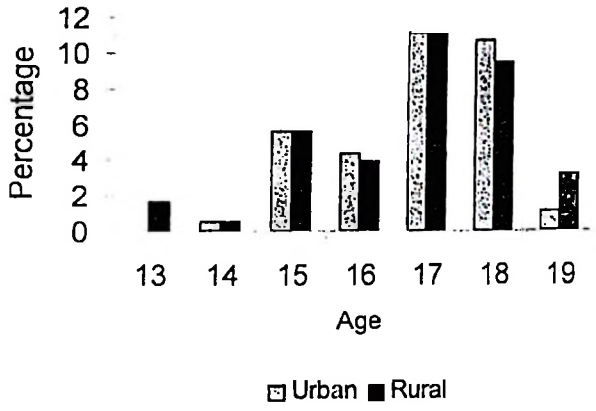

Figure 3: Age at marriage of respondents from urban and rural areas

4.1.7 Marital status of the respondents' parents and religion

Results of marital status and religion of the respondents' parents are indicated in Table 8 and figure 2 respectively. The majority, (62.2%) of the respondents were from families, with both parents, 30% were from single parent either father or mother and 7.8% were brought up by guardians. Most of the respondents (72.8%) were Muslims and only few Christians (27.2%) (Fig. 4).

Table 8: Marital status of respondents' parents (n=180)

Parents marital status	Dar es Salaam		Coast		Morogoro		Total	
	n	%	n	%	n	%	n	%
Both parents	37	20.6	45	25.0	30	16.7	112	62.2
Single parent	18	10.0	11	6.1	25	13.9	54	30.0
Guardian/s	5	2.8	4	2.2	5	2.8	14	7.8
Total	60	33.3	60	33.3	60	33.3	180	100.0

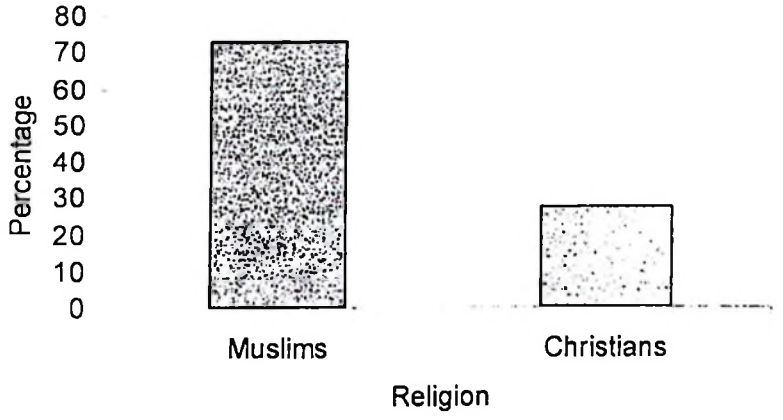

Figure 4: Religion of the respondents

4.1.8 Parents/guardians level of education and occupation

Results in Table 9 show that 55.5% of the male parents/guardians had attained primary education, 6.1% secondary education, 2.8% adult education and 35.6% had no formal education. About 46% of the parents were peasants, 30% were employed in a formal sector, 18.3% were petty traders and 5.6% were engaged in household activities. The proportion of female parents/guardian with primary education was 44.4%, secondary and adult education 4.5% and 51.1% had no formal education. About 61.1% of the female parents were engaged in agricultural activities, 2.2% were employed in a formal sector and 11.1% were petty traders and 25.6% were just engaged in household domestic activities (housewives).

Table 9: Parents/guardians level of education and occupation (n=180)

Variable	Father/male guardian		Mother/female guardian	
	n	%	n	%
Education level				
Primary education	100	55.5	80	44.4
Secondary education	11	6.1	3	1.7
Adult education	5	2.8	5	2.8
Without formal education	64	35.6	92	51.1
Total	180	100.0	180	100.0
Occupation				
Peasant	83	46.1	110	61.1
Employed	54	30.0	4	2.2
Unemployed/housewives	10	5.6	46	25.6
Trader	33	18.3	20	11.1
Total	180	100.0	180	100.0

4.1.9 Pregnant adolescents with a child/children during the survey

Among the surveyed respondents, 26.1% had one or more children during the time of interview. Table 10 indicates their age at first pregnancy. Age range at first pregnancy was 12 to 17 years. About 92% reported that were on their second pregnancy, 6.4% were in third pregnancy and 2.1% were in their fourth pregnancy (Fig. 5). Sixteen (34%) of the respondents who were pregnant with one or more children during the survey had their children either died during infancy or had abortion. Of all the respondents in this particular group, about 36% reported to having two different men responsible for their two pregnancies.

Table 10: Respondents age at first pregnancy (n=47)

Age at first pregnancy	Dar es Salaam		Coast		Morogoro		Total	
(years)	n	%	n	%	n	%	n	%
12	-	-	1	2.1	-	-	1	2.1
13	-	-	1	2.1	-	-	1	2.1
14	-	-	2	4.2	5	10.6	7	14.9
15	2	4.2	6	12.7	3	6.3	11	23.4
16	7	14.8	1	2.1	6	12.7	14	29.8
17	7	14.8	2	4.2	4	8.5	13	27.6
Total	16	34.0	13	27.6	18	48.3	47	100

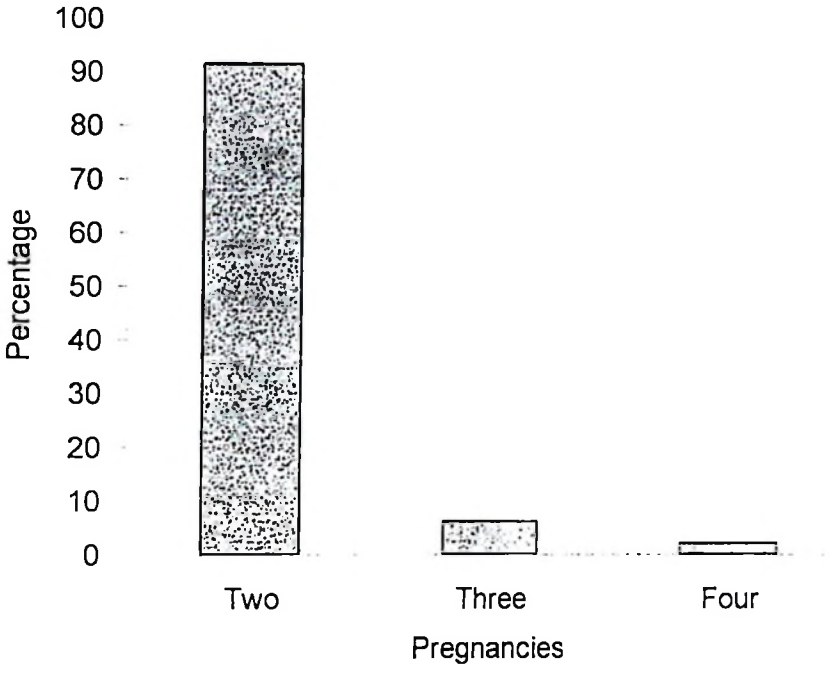

Figure 5: Respondents' parity

Respondents who were in their third and fourth pregnancies were 18 and 19 years old and most respondents who were 15 to17 years were in their first pregnancies (Fig. 6).

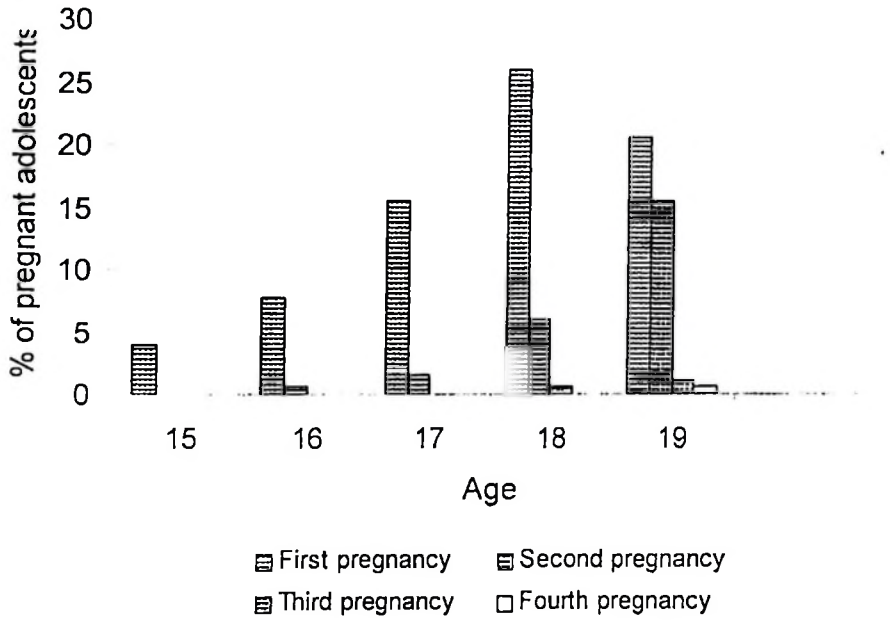

Figure 6: Respondents age and number of pregnancies

4.1.10 Conception awareness

Results on Figure 7 indicate that 58.3% of the respondents were unaware of mechanism of conception (how a woman can conceive). No significant difference (p=0.293) was observed between urban and rural respondents with regard to conception awareness.

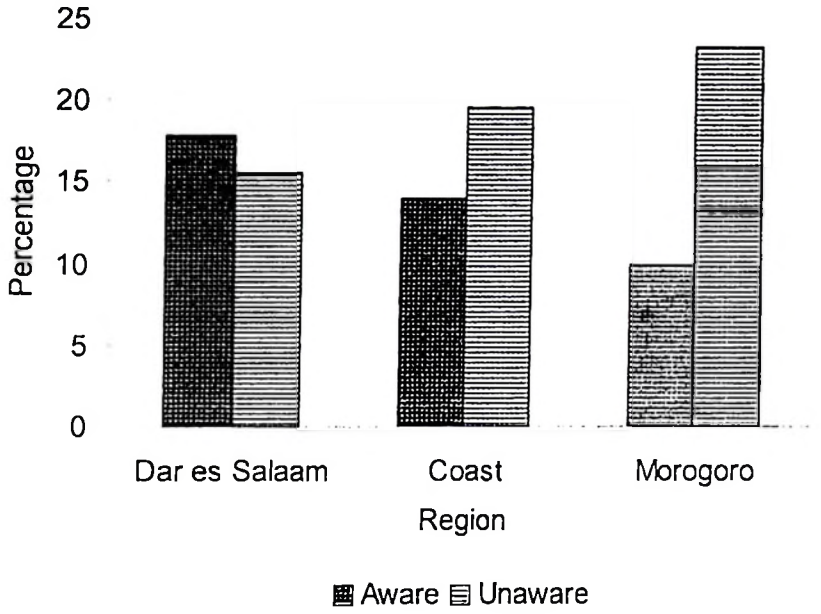

Figure 7: Conception awareness

4.1.11 Husband's/partner's age, level of education and occupation

The partners of 19% of the pregnant adolescent girls were adolescent boys below 20 years of age and about 69% were men aged 20 to 29 years and the remaining 11.7% had partners aged 30 years and above. The age of partners/husband ranged from 15 to 38 years. The level of education of the partners was primary education (80.6%), secondary (5.5%) and 13.9% had no formal education. Nearly 31% of the partners were engaged in agricultural activities, 21% employed in a formal sector, 25.5% petty traders and 22.8% were not engaged in any income generating activities or agriculture (Table 11).

Table 11: Respondents' husband/partners age, level of education and occupation

Variable	Dar es Salaam		Coast		Morogoro		Total	
	n	%	n	%	n	%	n	%
Age (years)								
Less than 20	6	3.3	16	8.9	13	7.2	35	19.4
20-29	46	25.6	39	21.7	39	21.7	124	68.9
30 and above	8	4.4	5	2.8	8	4.4	21	11.7
Total	60	33.3	60	33.3	60	33.3	180	100.0
Education level								
Primary education	50	27.8	47	26.1	48	26.7	145	80.6
Secondary education	2	1.1	6	3.3	2	1.1	10	5.6
No formal education	8	4.4	7	3.9	10	5.6	25	13.9
Total	60	33.3	60	33.3	60	33.3	180	100.0
Occupation								
Peasant	12	6.7	15	8.3	28	15.6	55	30.6
Employed	13	7.2	12	6.7	13	7.2	38	21.1
None	20	11.1	16	8.9	5	2.8	41	22.8
Trader	15	8.3	17	9.4	14	7.8	46	25.6
Total	60	33.3	60	33.3	60	33.3	180	100.0

4.1.12 Sex education and source of education

Table 12 presents results on sex education and figure 8 shows source of the education. Results indicate that most of the respondents (95%) have received information/education on sexuality. Significantly large number of respondents obtained the information from elders during cultural rite of confinement (86.7%) and only few 8.3% got the information from parents, friends, school/peers, or media.

The topics taught during the ritual ceremonies are shown in Table 12. When the respondents were asked to comment on topics and knowledge. 66.7% admitted and appreciated that the knowledge is good. Only a small proportion (6.7%) indicated that it was not good (Table 13). Others (21.6%) had mixed feelings. Figure 9 indicates the age at which sex education is given. Significantly large number of the respondents. (39%) obtained the information or knowledge when they were 15 years old.

Table 12: Kind of sex education given to the respondents (n= 180)

Topic	Dar es Salaam		Coast		Morogoro		Total	
	n	%	n	%	n	%	n	%
No sex education given	3	1.7	2	1.1	4	2.2	9	5
Care during menstruation	5	2.8	4	2.2	6	3.3	15	8.3
How to perform sexual activity, care during menstruation and to avoid sexual intercourse during menstruation	4	2.3	2	1.2	1	0.6	7	3.9
Sex during menstruation leads to conception, how to perform sexual act and care during menstruation.	26	14.4	37	20.5	19	10.5	82	45.5
After menarche if a woman has sex may become pregnant	7	3.9	6	3.3	4	2.2	17	9.4
Care after menarche during menstruation, if a woman performs sex may become pregnant	6	3.3	5	2.8	24	13.3	35	19.4
Care during menstruation, how to perform sexual activity, pregnancy, and delivery	9	5	4	2.2	2	1.1	15	8.3
Total	60	33.3	60	33.3	60	33.3	180	100

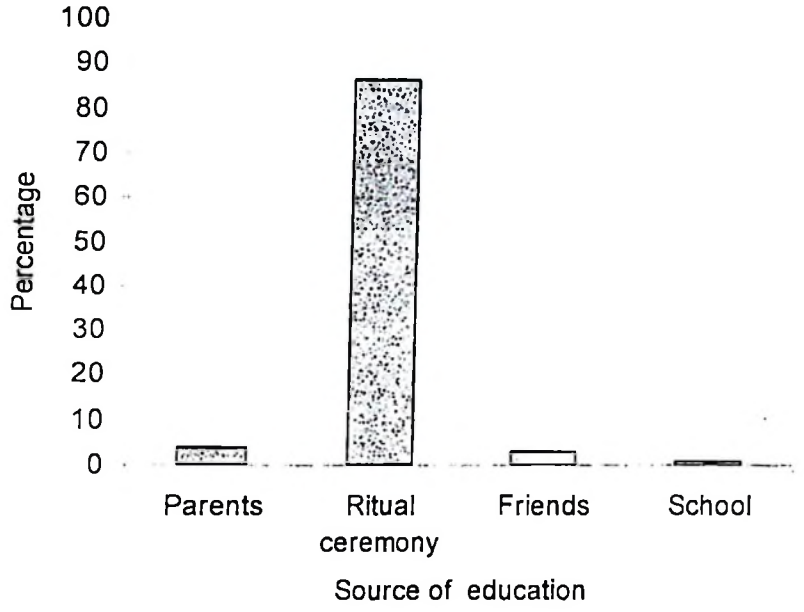

Figure 8: Source of sex education

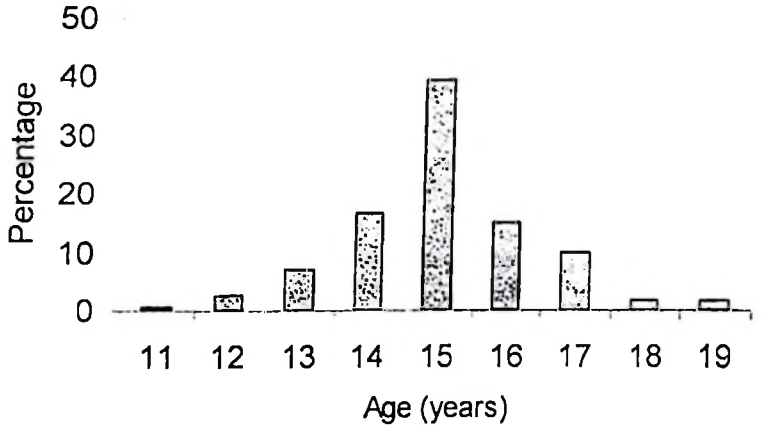

Figure 9: Age at which the respondents were given sex education

Table 13: Respondents' comments on kind of sex education

Comments	Dar es Salaam		Coast		Morogoro		Total	
	n	%	n	%	n	%	n	%
No sex education given	3	1.7	2	1.1	4	2.2	9	5.0
All Information is good	41	22.8	41	22.7	38	21.1	120	66.7
They are not good	4	2.3	2	1.1	6	3.3	12	6.7
Some are good and others are not	12	6.6	15	8.3	12	6.7	39	21.6
Total	60	33.3	60	33.3	60	33.3	180	100.0

4.1.13 Family planning knowledge and practice

Nearly 72% of the respondents have no knowledge of family planning and only about 28% had knowledge on family planning and family planning methods which included pills, injectables, condom, intrauterine contraceptive device (IUCD) or a combination of methods. The age at which they first heard about family planning methods ranged from 14 to 19 years. The majority got family planning information when they were 17 and 18 years old (Fig. 10). Most of the respondents got the information at the MCH clinics during their regular visits for antenatal services (Table 14). Others got the information from media and elders, and only about 33% were actually practising family planning. For those who were not using the methods cited fear of side effects, the desire for a child or both, as the reason for abstaining from family planning method even though they had knowledge about it.

Table 14: Family planning knowledge

	Dar es Salaam		Coast		Morogoro		Total	
Variable	n	%	n	%	n	%	n	%
Family planning knowledge								
Understand what is family planning	22	12.2	11	6.1	18	10.0	51	28.3
Do not Understand what is family planning	38	21.1	49	27.2	42	23.3	129	71.7
Total	60	33.3	60	33.3	60	33.3	180	100
Where the knowledge was obtained								
Seminars at MCH clinics	13	25.5	8	15.7	14	27.5	35	68.6
Media	1	1.9	-	-	-	-	1	1.9
Elders and friends	2	3.8	3	5.9	3	5.9	8	15.7
Seminars at MCH and media	4	7.8	2	3.8	1	1.9	7	13.7
Total	20	39.2	13	25.5	18	35.3	51	100.0

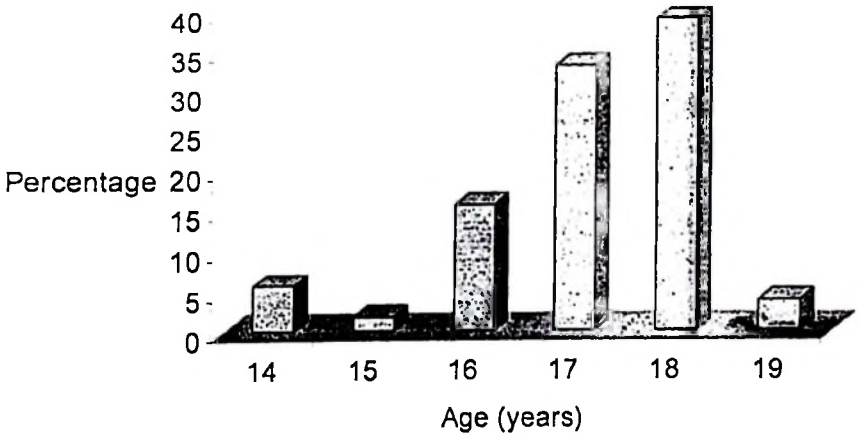

Figure 10: Age at which the respondents got family planning knowledge

4.1.14 Problems faced by adolescent girls when trying to obtain and use family planning services

Many young girls do not use fertility control methods although they engage in sexual affairs and the reasons cited (Table 15) included fear of side effects especially infertility (25%), ignorance about the existence of family planning services (15.5%) and shame of being found out by their elders (12.2%). Other reasons are negligence, inability to purchase some of devices and pills and the desire to have a child.

Table 15: Reasons causing adolescent girls not to use family planning methods (n=180)

Reasons	n	%
Unaware if family planning methods do exist	28	15.5
Fear of side effects arising from use of family planning (particularly the notion that use of methods cause infertility)	45	25.0
Ashamed of been found out by the society that they involve in sexual activities at young age because others are not married	22	12.2
Negligence	7	3.9
Ashamed of been seen and fear of side effects, Unaware of family planning methods and negligence	10	5.6
Desire for a child	1	0.6
Ashamed of been seen and fear of side effects, Unaware of family planning methods and desire for a child	27	15.0
Unable to purchase some of the methods	6	3.3
Male partners dislike family planning methods	1	0.6
Fear of side effects arising from the use of family planning and inability to purchase	3	1.6
I don't know the reason	30	16.7
Total	180	100.0

4.2 Prevalence of adolescent pregnancy

Prevalence of pregnancy was found to be 21.5% for Temeke district in Dar es Salaam region, 19.5% in Kibaha district in Coast region and 17.7% from Morogoro district, in Morogoro region (Fig. 11).

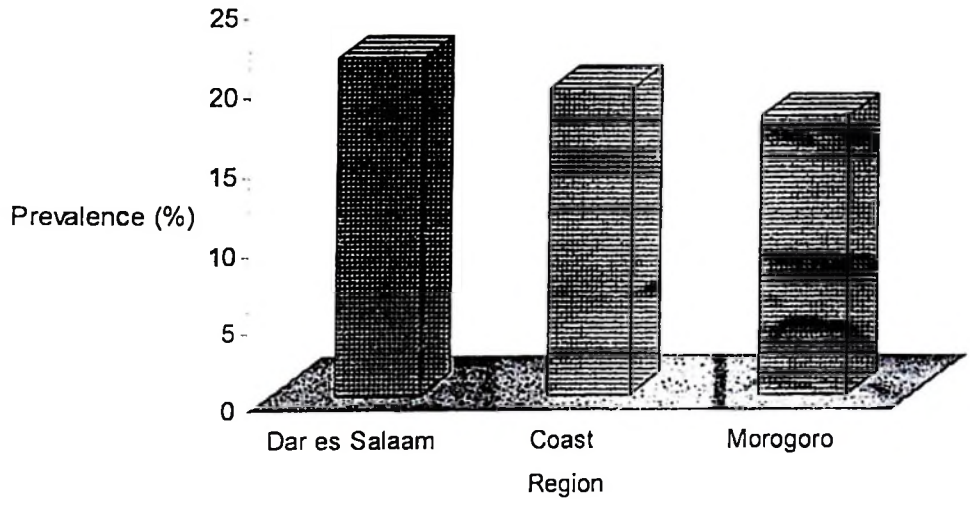

Figure 11. Prevalence of adolescent pregnancy

4.3 Regression analysis on factors contributing to early pregnancies

Table 16 presents results of regression analysis on factors contributing to early pregnancies. The results show that respondent's occupation, traditional sex education and age at which the sex education is given were significant factors contributing to early

pregnancy and the relationship was positive. Family planning knowledge was negatively and significantly related to early pregnancy.

Table 16: Results of the multiple regression analysis for selected factors that contribute to early pregnancies

Independent Variable	B	Std. Error	Beta	t-value	Significant t
Constant	5.210	1.791		2.908	0.004
Level of education	-1.132E-02	0.011	-0.068	-1.037	0.301
Respondents occupation	0.288	0.082	0.241	3.498	0.001
Family planning awareness	-0.406	0.197	-0.135	-2.062	0.041
Conception awareness	0.418	0.223	0.127	1.875	0.062
Age at marriage	7.664E-03	0.013	0.041	0.591	0.555
Traditional sex education	4.958	0.868	0.767	5.713	0.000
Age at which sex education was given	0.381	0.057	0.906	6.659	0.000

Standard Error	1.2848
R^2	0.281
Adjusted R^2	0.252
Multiple R	0.5301

Dependent Variable is age at first pregnancy

4.3.1 Reasons for early engagement in sexual relationships

Table 17 presents a list of reasons given by respondents for engaging in sexual affairs. Results show that some traditions applied to young girls immediately after menarche

(22.8%) and economic hardships (16.1%) are the major contributing factors to adolescent pregnancy, and other factors are as shown in the Table.

Table 17: Factors that cause adolescent girls to engage in sexual affairs (n=180)

Reason given	Age						
	15	16	17	18	19	Total	
	n	n	n	n	n	n	%
Sexual desire due to body physiological changes	3	-	1	1	2	7	3.9
Economic hardships	3	-	8	4	14	29	16.1
Peer pressure	-	2	1	9	3	15	8.3
Desire for a child	-	1	-	2	5	8	4.4
Promised to be married after conception	-	2	-	1	-	3	1.7
Some traditions and customs applied to young girls after menarche	-	5	7	14	15	41	22.8
Economic hardships, desire for sex and promised to be married	-	-	1	6	5	12	6.7
Economic hardship and traditions and custom	1	1	7	10	13	32	17.8
Economic hardship, sexual desire and traditions and customs	-	1	4	9	10	24	13.3
Desire for sex and child, peer pressure	-	3	2	3	1	9	5.0
Total	7	15	31	59	68	180	100.0

Comparison of rural and urban shows no significant difference regarding to factors, which cause young girls to engage into sexual affairs.

4.4 Socio-economic problems faced by pregnant adolescent girls

Table 18 indicates the socio-economic problems encountered by pregnant adolescent girls. These being termination from school, negative reaction by parents and partners/husbands, lack of economic support, partners' marital status, and unplanned pregnancies and marriages.

Table 18: Problems faced by pregnant adolescent girls.

Problem	n	%
School drop out due to pregnancy	25	13.9
Partners rejected the pregnancy and doesn't give any support	9	5.0
Respondents' cannot meet their needs by themselves	116	64.4
Unplanned pregnancies	99	55.0
Impregnated by a married man	53	29.4
Late detection of pregnancy and late visit to antenatal clinic	55	30.6

4.5 Focus group discussion

Table 19 presents the responses obtained during the focus group discussion with the key informants.

Table 19: Responses from focus group discussion

Question	Response
(i) Is early pregnancies problem in this area?	-Yes
(ii) Why do you think girls engage into sexual affairs at early age (before are 20 years old) and finally become pregnant?	-They are easily cheated and trapped, peer pressure influence, economic hardship, some of the traditions and culture of initiation, which leads to early pregnancy and marriage, desire for sex due to physiological changes, others desire to have a child, the attitude that after attaining menarche the following step is to bear a child, they don't know how to protect against pregnancy
(iii) What are problems caused by adolescence pregnancies?	-They are rejected by their partners, they drop from school, they cannot properly take care of the child, they increase dependence burden on parents, engage in unplanned marriages, they get problems during delivery, strain the relationships with their parents, abortion, dumping babies.
(iv) What are traditional counselling and guidance given to young girls with regard to:	
• Sex education	-Care during menstruation, to avoid playing sex until are married, not to play sex during menstruation, how to satisfy husband sexually, good manners, respect to elders and husband, domestic chores, pregnancy, delivery, beliefs and practices during pregnancy.
• Family plannig/pregnancy control	-There are traditional herbs, which are orally taken and strings tied around the waist. But they are not effective because most of women take them and conceive.
• At what are they trained on that?	-Right after the girl attains menarche
• Who is responsible to train them?	-In most cases is entrusted elderly woman locally known as *kungwi*. They are also trained by parents, grandparents (mothers), friends, elder sisters
• For how long are they trained?	-This varies depending on parents' economic situation. In most cases, they are confined and trained for two to four weeks. Others stay longer (three months to a year)
(v) Do the information contributes to increased or decreased incidences of early pregnancies?	-Others play part in increased incidences of early pregnancies while others are good.

4.6 Nutritional status

Nutritional status was assessed from the surveyed subject. Body Mass Index (BMI) and MUAC were calculated and used to assess the nutritional status of non-pregnant adolescent girls. Haemoglobin concentration, height, MUAC, weight gain during pregnancy and infants' birth weight were the nutritional parameters assessed from pregnant adolescent girls.

4.6.1 Nutritional status of non-pregnant adolescent girls

4.6.1.1 Body Mass Index (BMI)

Table 20 presents results of BMI of non-pregnant adolescent girls. About 51% of the respondents were found to be underweight, 43% normal, 5.4% overweight and about 1% were obese. Undernourished subjects were significantly higher in rural areas than urban areas (Fig. 12). No significant difference (p=0.59) in BMI was observed between the regions.

Table 20: BMI classification of non-pregnant adolescent girls (n= 600)

Region	BMI							
	<19 *(Underweight)*		19-24 *(Normal)*		24.1-29 *(Overweight)*		>29 *(Obese)*	
	n	%	n	%	n	%	n	%
Dar es Salaam	84	14.0	105	17.5	9	1.5	2	0.4
Coast	100	16.7	89	14.8	11	1.8	0	0.0
Morogoro	119	19.9	65	10.8	13	2.2	3	0.5
Total	303	50.6	259	43.1	33	5.4	5	0.9

BMI mean = 19.2±3.3 Range = 10.8 to 32.6

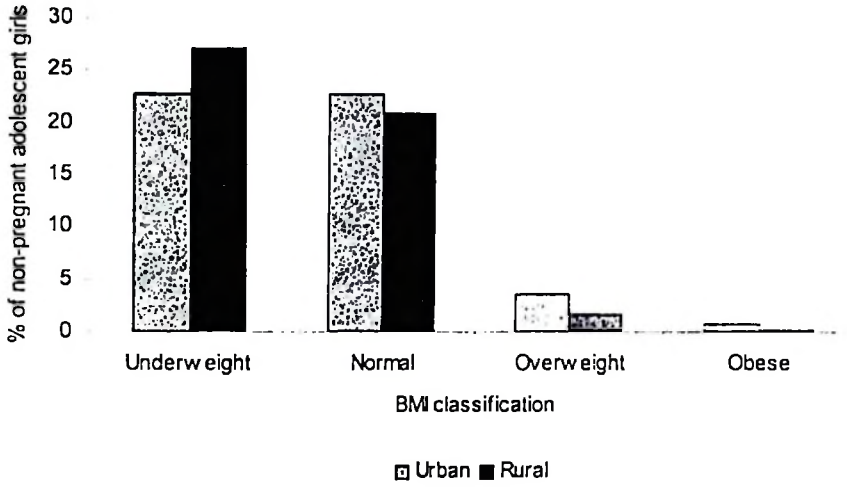

Figure 12: BMI classification of non-pregnant adolescent girls from urban and rural area of Dar es Salaam, Coast and Morogoro regions

4.6.1.2 Mid Upper Arm Circumference (MUAC)

Results on MUAC are presented in Table 21 and show that 54.8% of the girls were severely wasted, 23.2% were moderately and mildly wasted and 22% were normal. Girls in Morogoro district were slightly more wasted than those in Coast and Dar es Salaam regions.

Table 21: MUAC classification of non-pregnant adolescent girls (n= 600)

Region	MUAC (cm)							
	<22.1 *(Severely wasted)*		22.1 to 23 *(Moderately wasted)*		23.1 to 24 *(Mild wasted)*		>24 *(Normal)*	
	n	%	n	%	n	%	n	%
Dar es Salaam	102	17.0	26	4.4	27	4.5	45	7.5
Coast	106	17.7	17	4.5	21	3.5	46	7.7
Morogoro	121	20.1	23	3.8	15	2.5	41	6.8
Total	329	54.8	76	12.7	63	10.5	132	22.0

Mean = 21.9±2.8 cm Range = 15.0 to 30.6 cm

4.6.2 Nutritional status during pregnancy

4.6.2.1 Haemoglobin concentration in pregnancy

The results of haemoglobin concentrations of pregnant adolescent girls are presented in Table 22. The mean haemoglobin concentration was 9.5±1.4g/dL. About 5% of the adolescent pregnant girls were severely anaemic, with Hb concentration of less than 7g/dL, 25.5% had mild anaemia, 55% had moderate anaemia, and 14.5% had normal Hb concentration. These results indicate that nearly 85.5% of the subjects were anaemic. Haemoglobin concentrations for subjects from urban and rural areas are as shown in figure 13. The haemoglobin concentration of adolescent girls residing in rural areas was not significantly (p=0.55) different from that of girls residing in urban areas. No significance (p=0.06) inter-regional difference was observed in Hb concentration.

Table 22: Haemoglobin concentration of pregnant adolescent girls (n=180)

Region	Haemoglobin concentration							
	4 to <7g/dL *(Severe anaemia)*		7 to <10 g/dL *(Moderate anaemia)*		10 to <11 g/dL *(Mild anaemia)*		11 g/dL and above *(Normal level)*	
	n	%	n	%	n	%	n	%
Dar es Salaam	0	0.0	34	18.9	14	7.8	12	6.7
Coast	7	3.9	29	16.1	15	8.3	9	5.0
Morogoro	2	1.1	36	20.0	17	9.4	5	2.8
Total	9	5.0	99	55.0	46	25.5	26	14.5

Mean = 9.5±1.4 g/dL Range = 6.0 to 13.0 g/dL

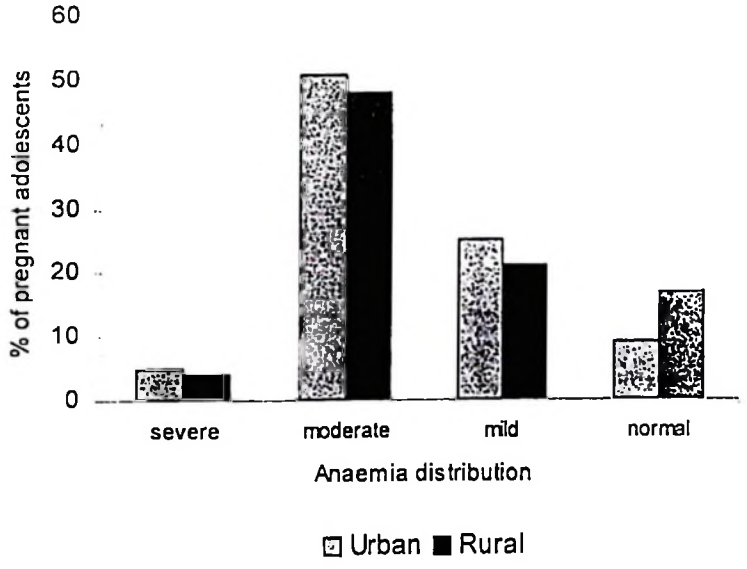

Figure 13: Haemoglobin concentration of pregnant adolescents from urban and rural areas of Dar es Salaam, Coast and Morogoro regions

4.6.2.2 Height and MUAC during pregnancy

The results of height and MUAC from the surveyed pregnant adolescent girls are presented in Table 23. The height of about 54% of the subjects was below 151cm. Mean height was 151.3±6.0 cm. About 27% of the subjects were severely wasted with MUAC values less than 22.1cm. 40.5% were moderately and mildly wasted, and 32.8% were normal. The mean MUAC was 23.4±2.1 cm.

Table 23: Height and MUAC of adolescent pregnant girls (n=180)

Measurement	Dar es Salaam		Coast		Morogoro		Total	
	n	%	n	%	n	%	n	%
Height								
Less than 151cm	30	16.6	34	18.9	33	18.4	97	53.9
Equal to and above 151cm	30	16.6	26	14.4	27	15.0	83	46.1
Total	60	33.3	60	33.3	60	33.3	180	100.0
MUAC								
Less than 22.1cm (severe wasting)	15	8.3	17	9.4	16	8.9	48	26.7
22.1 to 23cm (Moderate wasting)	12	6.6	13	7.2	11	6.1	36	20.0
23.1 to 24cm (Mild wasting)	11	6.1	12	6.6	14	7.7	37	20.5
Above 24cm (Normal)	22	12.2	18	10.0	19	10.5	59	32.8
Total	60	33.3	60	33.3	60	33.3	180	100.0

Height range = 130 to169 cm mean =151.3±6.0 cm

MUAC range = 18.6 to 29.4 cm mean = 23.4± 2.1 cm

4.6.2.3 Weight gain during pregnancy

Weekly weight gain during pregnancy was measured in 123 pregnant adolescent girls. Results (Table 24) show that, the weekly weight change ranged from –500g to 500g with

a mean of 317±110g. About 21% of the subjects gained up to 300g per week, 29.3% gained up to 400g per week and 32.5% gained more than 400g per week. About 11% of the subjects neither gained nor lost weight and 5.7% lost weight at a range of –500 to –100g per week. No significant difference (p=0.44) in weight gain was observed between subjects from urban and rural areas. No inter-regional significant difference (p=0.26) in weight gain was observed.

Table 24: Weekly weight gain during pregnancy (n=123)

Weight gain status (g/week)	n	%
Up to 300	26	21.1
Up to 400	36	29.3
More than 400	40	32.5
No change	14	11.4
Weight loss	7	5.7
Total	123	100.0

4.6.2.4 Birth weight of infants and method of delivery

Results on birth weight (Table 25) indicate that the mean infants' birth weight was 2600±480g and ranged from 1800g to 3600g. Forty eight percent of the babies weighed less than 2500g, 38% weighed between 2500g and 3000g at birth and only 14% weighed above 3000g at birth. Eighty-six percent of the babies were delivered vaginally and 14% were delivered by caesarean section. There was a significant positive correlation between infant birth weight and weight gain of the adolescent girls during pregnancy ($r=0.36$, $p\leq0.01$), similarly, between birth weight and Hb concentration during

pregnancy (r=0.67, p=0.01). A significant negative correlation (r=-0.37, p=0.007) was observed between maternal height and method of delivery, indicating that more cases of caesarean delivery were performed on shorter girls (below 151cm).

Table 25: Infants' birth weights and method of delivery (n=50)

Birth weight (g)	Method of delivery						
	Normal (vaginally)		Caesarean section		Total (birth weights)		Remarks (birth weight)
	n	%	n	%	n	%	
Less than 2500	22	44	2	4	24	48	Low birth weight
2500-3000	15	30	4	8	19	38	Normal birth weight
Above 3000	6	12	1	2	7	14	Overweight
Total	43	86	7	14	50	100	

CHAPTER FIVE

DISCUSSION

5.1 Socio-economic characteristics

Education

Pregnant adolescent girls are at higher social, economic and nutritional risks. Socially, they are at a disadvantage because their level of education is low. The highest level of education attained was primary education (standard seven) and some have never been to formal school at all. For most adolescent girls, pregnancy means termination of education and other future opportunities hence lower economic potentials. Low education/knowledge affects many aspects of human life, including demographic and health behaviour. It has consistently been shown (Bureau of Statistics, 2000) that education attainment has strong effect on reproductive behaviour, contraceptive use, fertility, infant and child mortality, morbidity and issues related to family health, nutrition and hygiene. It was observed in the present study that 58.3% of the subjects were unaware about physiological changes that occur in adolescence and mechanism or factors leading to conception. Although 42% of the subjects were aware of the mechanisms of conception, most of them became pregnant for various reasons such as peer pressure influence, desire for a child, sexual desire and promised to be married after conception.

Age

During the time of the study, about 46% of the girls were in their second and third pregnancy, suggesting that some may have had their first pregnancy when they were 12 years old. The age at first birth is an important determinant of family size and the rate of population growth. On average, when a woman starts reproducing at a younger age, she ends up with more children especially when family planning methods are not used. Urban girls were observed to have slightly higher ages at first pregnancy than their rural counterparts. The difference was not statistically significant. Observations made by other surveys (Bureau of Statistics, 2000) showed that girls in rural areas tend to marry early and therefore give birth at younger ages than those in urban areas.

5.2 Prevalence of adolescent pregnancy

Adolescent girls contributed 17.7 to 21.5% of all births in the study areas. High rates of adolescent pregnancy indicate the extent of unprotected sexual activity and therefore vulnerability to HIV/AIDS. The high prevalence of adolescent pregnancy is of concern because adolescent girls have not completed their growth especially that of height and pelvic size. This puts them at a much higher risk of pregnancy related complications like obstructed labour and infant death (PRB, 2001). A study by Urassa (1994), cited by Tumbo, Z. and LiljestrÖm, R. (1994) observed that, adolescent girls constituted 22% of all deliveries at Muhimbili National hospital in 1990/91. Another study conducted by UNESCO, (1995) in Tanzania observed that adolescent pregnancies and births constituted 15-20% of all births and pregnancies. Similarly over 20% of pregnancies in

Central Africa Republic, Congo, Guinea, Guinea-Bissau, Niger and Sierra Leone are of adolescent girls (Baker *et al.*, 1996). However, a slightly higher prevalence (21.5%) was found in Dar es Salaam region as compared to Coast (19.5%) and Morogoro (17.7%) regions. This may be due to the process of urbanisation, which expands more easily, in urban areas and in high populated areas like Dar es Salaam, compared to Coast and Morogoro towns.

5.3 Factors contributing to early pregnancies

5.3.1 Traditional sex education and other customs

Traditions and customs have been cited as one of the contributing factors to early pregnancies in adolescent girls (PRB, 1992). For the indigenous tribes of Morogoro, Coast and Dar es Salaam regions where the study was conducted, it is believed that a girl who has attained menarche has reached childbearing age. Therefore she should be given sex education to enable her fulfil her responsibility as a woman. In this regard, girls usually undergo training (pubertal rite) on sex education and on other adult female marital responsibilities. After pubertal rite, girls are considered by society to have attained the status of a reproductive adult woman and therefore are expected to behave as matured women irrespective of age at menarche.

However during the survey, the girls were not willing to reveal the type and depth of sex education or ritual ceremonies. It needed a lot of persuasion and probing to actually find out what they are usually taught during the ceremonies. This is because they are told to

strictly maintain confidentiality on what they have been trained. Nevertheless, some few girls were willing to reveal the information.

According to the traditions and culture of these tribes, once the girl reaches menarche, she has to be subjected to ritual of confinement *(kuwekwa ndani)*. During the confinement period, sex education is offered. The training involves aspects such as good manners, respect to husband and elders and how to perform domestic chores. Most of the time she will be doing household chores and will not be allowed to go out of the house or leave the compound. Sex education is usually offered by an elderly woman and the sessions are usually carried out at a distant place far from home, famously known as "*mkoleni*" During these sessions girls are taught about sexual act, its theory and practice until the girl is able to perfectly perform the sexual act. The young girl who is undergoing the training is known as "*mwali*". Usually, a respected elderly woman known by the local kiswahili name "*kungwi*" is entrusted with the task of training the girls. On the last day of the girl's confinement, there is rite of passage ceremony. This is done after making sure that the girl has been given adequate sex education and has to prove practically that she understands all what she has been trained on. The ceremony is called "*ngoma ya kumtoa mwali*". The whole practise of confining the girl, training and celebrating is called "*kunema*".

The duration of confinement varies depending on parents' economic situation because the ceremony is usually costly. Girls whose parents are economically well off are

confined for a shorter period (two to four weeks). For those whose parents have no money to conduct the ceremony stay longer (three months to a year) before the ceremony is done to give the parents ample time to raise money for the ceremony. Generally, the ceremonies are performed immediately after harvest when families have enough food. However, the period of confinement is shorter now as compared to what used to be in the past.

During the rite of passage ceremony *(ngoma)*, the girl is released from the place where she was formally confined and displayed in public along streets so that people can see her. This signifies the end of confinement and invites prospective or potential husbands. During the ceremony the girl is carried on the shoulders of an energetic man while her breasts and chest are exposed (though not in all cases). The man who carries the girl (*mwali*) is paid for that job. The man then walks along the streets carrying the girl and a big crowd of people singing and dancing follows them until they reach a place, which has been identified to be a destination. The girl then sits and is offered different presents like money and clothes. During the ceremony (*ngoma*), girls mix freely with members of the opposite sex and they spend the whole night at the place where the ceremony is performed. This kind of environment exposes them to risk of sexual affairs and abuse.

During the ceremony and other social gatherings, some parents allow their daughters to participate and spend a night at the ceremonies. It is expected that one of the outcomes of the ceremony is to get a boyfriend/fiancé. It is also the time when prospective suitors

come forward to look for suitable girls to marry. This applies to the particular girl being displayed and for those who are not engaged. Adolescent girls who have passed through such initiations are expected to get married as early as possible or immediately after the ceremonies. Parents give away their children for marriage at an early age as a matter of conforming to tradition. Population Reference Bureau (1996, 2001) observed that, 20 to 50% of women in developing countries are married by the age of 18 years and at least one third of young women are married before 18 years. It was observed in the present study that about 67% of the pregnant adolescent girls were either married or cohabiting and a girl as young as 13 years old was also found in that category. These girls are likely to have more children because they will be spending a large part of her life in marriage and therefore fully engaged in reproductive activities. Girls in rural areas were found to get married at a much younger age than their counterparts in urban areas but the difference was not significant. This is also common in most other African countries (UNESCO, 1995).

For a married woman, there is pressure from in-laws for her to conceive. During the interview, one girl narrated that, "...once you are married, you are expected to become pregnant as early as possible. If it takes longer before you can conceive, the in-laws tend to harass the daughter in law. Sometimes it may reach a point of forcing her to leave so as to give the husband another chance to marry another woman..." This clearly indicates that in these societies, a woman's value is based on fertility. This situation creates pressure on young girls to prove that they are fertile.

Sex education

The girls are trained on body changes, menstruation and how to take care of themselves during that period. These were the common answers of many of the respondents. Few were briefed about pregnancy and delivery. They are also trained on how to perform sexual act in order to please and satisfy their male partners. This suggests that women are considered as objects to satisfy men sexually. Although girls are taught other things like good manners and domestic chores, the instruction on meaning and practice of sex has bad consequences. The consequence of such rituals is that adolescent girls, because of their young age, behaviour and inquisitive minds, tend to try out things for themselves. Therefore, it is likely that they will be eager to practise sex, as a result they become pregnant. Although the girls are trained on sexual performance, they are not taught on how to protect themselves from becoming pregnant. Also, because men know what the girls have been trained on, they struggle to befriend the girls, just for sex. It is easy for their request to be accepted because other girls are advised/trained not to reject men's sex requests. For example, when one girl was asked to say what she was taught, she said... "I was told that now I am a grown up person and if a man approaches me demanding for sex, I have to accept as we (elders) did the same...."

Most of the interviewed girls and those who participated in focus group discussions admitted that generally the kind of sex education given is in most cases related to sexual activity and not on safe sex and protection against HIV/AIDS or other STDs and pregnancy. However, these women could be used to promote safe sex. It was also

observed that some mothers often feel disappointed if their daughters do not have boyfriends after attaining menarche..." One girl explained that her mother was so concerned that she (girl) does not have a boyfriend and the mother had to seek advice from a neighbour about the matter. The mother strongly believed that it is quite abnormal for a girl at such an age (i.e. fifteen years) not to have a boyfriend or any relationship/interaction with a person of the opposite sex. Some mothers put pressure on their girls/daughters to have boyfriends even if the girls are not interested. They would use all sorts of tricks so as to expose the girls. For example, a mother would send her daughter to a shop for something late evening hours so that she can be exposed to men. One girl blamed her mother for being the cause of her pregnancy, she was crying "Look, now I am pregnant, I blame my mother for being the cause of this..." lamented the girl. It was generally acknowledged that some parents (especially mothers) feel proud when they find out that their daughters have friends of the opposite sex. During ceremonies, young girls are told that their main role in society is to be a mother and wife if they are to deserve any recognition in the community.

Some girls are told not to have sexual relationships with men before they are married. However, it is not explained as to why they shouldn't do that. This indicates that they are typically poorly informed about safe sex. As a result, they engage themselves into sex affairs and unknowingly become pregnant.

"Don't do sex during menstruation because you will conceive" was another type of message given to adolescent girls. This kind of information is quite misleading because the girl will believe that conception takes place during menstruation. This is quite different from how the menstrual cycle works.

The girl who has reached menarche, but has not gone through the training and ceremony is nicknamed *kigoli* and often despised by her trained peers. This is because it is assumed that the untrained girls do not have the knowledge on adult sexual affairs. The girls are often discriminated and therefore, they often prefer to undergo such practice in order to escape embarrassments.

In the present study, the girls are exposed to such messages when they are still as young as 11years. At this age they are too young for the kind of sex education given. With the kind of information they are told, if the girl is not careful, she eventually falls to the risk of early pregnancy and contracting HIV and other STDs.

5.3.2 Lack of income due to education deficits

Economic hardship was cited as one of the reasons forcing girls to engage in sexual relationships at an early age. Economic hardship is largely caused by poverty (Hong and Wellen, 1993), leading to low attainment in education. Thus, low education level, poverty and illiteracy among many parents make them unaware of the benefits of educating their daughters. Instead, parents tend to stress on the value of marriage and

child bearing. About 73% of all pregnant girls surveyed were neither employed nor engaged in any income generating activity. This could be due to low education making girls unemployable, unable to engage in income generating activity due to lack of capital or unable to engage in agricultural activity due to cult of idleness. Among those who were not working, few (5%) reported to have been working before as housemaids, which ceased after they became pregnant.

Some girls engage in sexual relationship in exchange for basic needs like food, clothes or shelter out of desperation. These are some of the things taught during traditional sex education, that after the girls have attained menarche, they have to fend for themselves for their basic needs. They should no longer be depending on their parents for items like soap and similar amenities. This tends to encourage illicit sexual activities. This study has observed that, parents indirectly encourage their daughters to have sexual relationships with partners of the opposite sex. With no alternative activity to enable them to earn a living, girls become more dependent on their parents and or relatives who in most cases are also poor and unable to provide for their own needs, leave alone that of dependant girl. Such a situation in some cases compels adolescent girls to go into early marriage.

Likewise, class divisions in the society contribute partly to adolescent pregnancies. This usually happens when girls desire to have nice things like clothes or cosmetics in the same way as do girls from rich families or given by a friend of opposite sex. In this case

girls are pushed into prostitution in order to get money to acquire such items. Population Reference Bureau (2001) observed that, in relationships where payment is made for sex, adolescent girls may be unable to negotiate condom use due to age difference, economic disparities and gender norms.

Twenty six percent of the studied subjects were impregnated by fellow adolescent boys. Forty-one percent of the respondents reported to have husband or partners who had no regular income. This implies poor economic support of the pregnant girls in terms of food supply and other necessities, because they are all young parents and dependants. Consequently, poor feeding practices and failure to meet other needs during pregnancy results to poor pregnancy outcome.

5.3.3 Lack of family planning knowledge and practice

A significant proportion (71%) of the adolescent pregnant girls had no knowledge on family planning. Among those who had knowledge on family planning, only about 9% were actually using the methods. The reasons for not using protective family planning methods included ignorance about the existence of the services, fear of the side effects, desire for a child, negligence, inability to purchase, shame if found out and partner dislike. In general, the majority had the notion that use of family planning methods may cause infertility making the woman unable to conceive for the rest of her life. They further insisted that may be it is worth using the method after the girl has at least one child. Likewise, it has been reported (PRB, 2001) that low contraceptive use among

married adolescent girls may be partly due to premium placed on childbearing and more desire for a child than single adolescents. However, there are traditional methods of fertility regulation. These methods include herbs taken orally and strings tied around the waist, but most people are not sure of their effectiveness. There was no respondent who reported to have used any of the traditional methods to prevent conception or for family planning.

5.4 Problems faced by pregnant adolescent girls

5.4.1 School dropout

Pregnancy at young age is always associated with many problems. This study found out that nearly 14% of the adolescent girls became pregnant whilst still at school and pregnancy was the cause for school dropout. These results are slightly higher than the national average reported by The Ministry of Education (BEST) (1996), which is 11%. According to Njau and Wamahiu (1994) cited by Al- Azar (1999), it is estimated that between 10 to 20% of girls in Sub-Saharan Africa drop out of school each year due to pregnancy related causes. The high level of dropouts could be due to the study being carried in regions with ethnic groups which their traditions and customs encourage young girls to engage in sexual relationships and therefore contributes to adolescent pregnancies. According to PRB (2001) report, common reasons for leaving school include inability to pay school fees, poor school quality, the need to provide financial support for family members, sexual harassment at school, pregnancy and marriage.

5.4.2 Late detection of pregnancy and late antenatal visit

Most respondents had their pregnancies discovered during the second and third trimesters by either themselves, parents, or in hospital. This means that the respondent may visit antenatal clinic at that time or latter. Reasons for visiting late to antenatal clinics include fear of being detected thus late identification of any health problem, subjecting the pregnant girls to other health problems like severe anaemia and abortions that could have been prevented or solved. Chambua *et al.* (1994) observed that, adolescents usually attend antenatal clinics late and in some cases, their pregnancies may not be revealed until the girls suffer from other complications. Some girls usually are unaware if they are pregnant until when pregnancy is six months old. A 15 years old girl pointed out that she was surprised that she was growing fatter and wouldn't know if she was pregnant because she did not experience any complication. She was discovered to be pregnant by her mother. Significant proportion of girls reported to have their pregnancies spotted by either their mothers, sisters, or in hospitals because girls themselves were not aware of signs of pregnancy. Hickey (2000) observed that women who plan to have children and therefore intend to conceive are more likely to recognise early signs of pregnancy and to seek early prenatal care than women who do not intend to conceive or young adolescent girls. This was also observed in the present study that many respondents reported to have had unplanned pregnancies.

5.4.3 Partner rejected the pregnancy

Five percent of the respondents reported to have been rejected by their partners after they became pregnant. In this case they were not getting any kind of support from their partners and were totally dependent on their parents. Generally, the reaction by adolescent pregnant girls themselves, their parents and partners/husband towards the pregnancy varied. For the majority of married adolescent girls, pregnancy was considered as a success, for the single expectant adolescent girls, pregnancy was the beginning of miserable life because of rejection by their partners. The reasons for rejection are not clear but often times the boyfriends would accept the child only if the baby will resemble him. Other partners just disappear after being informed of the pregnancy.

The risk of exposure to STDs (UNFPA, 1998) is especially great for younger people who become sexually active early in life and therefore more likely to change sexual partners. In addition, the relationships with the girls' parents become severely strained because of the pregnancy. However, few single pregnant adolescents were happy for being pregnant. Others said that so long as the girl had reached menarche, she is no longer young to be a mother and there is nothing else that she should wait rather than bearing children. About 9% reported to have had stillbirths or miscarriages or both. Adolescent girls encountering such difficulties at young age causes social stress that may be carried over for the rest of their life. This is unfortunate considering that some parents put so much pressure on the girls to engage in sexual relationships but when they

become pregnant out of wedlock, parents often get disappointed and do not support the girls.

5.4.4 Inability to support themselves

Many of the pregnant adolescent girls were totally depending on parents, husband/partner or both for meeting the daily needs for themselves and the pregnancy. They had no economic means to meet the needs for the expected new-borns. The support from their parents or husband/partner sometimes was not sufficient to meet their needs and they were not sure of the sustainability of the support. About one third (32.2%), of the adolescent girls were single or unmarried. This has implications for pre-natal care and maternal nutrition in terms of adequacy of nutrient intake for the mother and support for breastfeeding.

5.4.5 Unplanned pregnancies and unplanned marriages

Adolescent girls are faced with the problem of unplanned pregnancies. Many initiate sex early (PRB, 2001), do not use contraception and have little access to reproductive health information and services. It was observed in the present study that 55% of the pregnancies were unplanned/unintended. Studies conducted in North-eastern Brazil, (Gupta and Leite, 1999) and in Sub Saharan Africa observed that 10-58% adolescent girls had unplanned/unintended pregnancies (UNFPA, 1998). Unplanned pregnancy at young age abruptly interferes with education attainment and future plans thereby imposing a shock and disappointment to the girls and their relatives.

Most of the married/cohabiting respondents reported to have entered into marriage after they found out that they were pregnant. This indicates that they got married/cohabited just because of the pregnancy otherwise they were not prepared to get marriage. In most cases girls who are cohabiting are not committed to marriage and therefore live under loose marital ties. Consequently, they have higher chances of experiencing marital problems leading to separation than those who are married. Unplanned pregnancy for unmarried woman often results in societal disapproval, economic hardship for the woman and may lead to unwanted or ill-timed marriages (UNFPA, 1998) and late separation. In the present study, about 9.5% of the respondents were on the second and third marriages.

5.4.6 Types of relationship

About 29.4% of the respondents reported to have been impregnated by married men. This could be attributed to immaturity on the part of the adolescent girls and inability to negotiate for sex thus they are easily seduced and trapped. Under such circumstances, girls are subjected to social conflicts and uncertainties in economic support. About 26% of the adolescent girls were pregnant with one child or more during the survey, meaning that they were in the second or third pregnancy. About 12% of the pregnant adolescent girls reported to have been married to or impregnated by men aged 30 to 38 years. An adolescent girl married or cohabiting with a much older husband/spouse (UNESCO, 1995 and PRB, 2001) is much more likely to be sexually exploited and physically mistreated. She is less likely to be able to negotiate on the use of birth control (UNFPA,

1998). This results into low self-esteem and to compensate for that deficit, they tend to bear many children (Frcog, 1995), hoping that by doing so it will make their contribution recognised.

5. 5 Nutritional status

5.5.1 Pre-pregnancy nutritional status

Adolescent girls (pregnant and non-pregnant) go through significant changes in their life cycle: physiologically, emotionally and psychologically. In addition, they are bombarded with a lot of information from their peers as well as from adults as it was observed in this study. Pre-pregnancy nutritional status is an important determinant of pregnancy outcome (Kurz and Welch, 1994). About 51% of all the non-pregnant adolescent girls who participated in this study were underweight and about 78% were wasted. This suggests that the majority of the adolescent girls get into pregnancy whilst undernourished and wasted. This study showed that the nutritional status of adolescent girls from urban areas was significantly better than that of girls from rural areas. This observation is similar to that made by Moller *et al.* (1989) in Iringa, Tanzania whereby urban women were found to have higher average BMI compared to rural women.

Poor pre-pregnancy nutritional status is associated with poor pregnancy outcomes, in particular low birth weight, which is a major contributing factor to infant mortality. Underweight among adolescents has been reported in a similar study by Musaiger (1994), which observed that about 25% of the adolescent girls were underweight.

Kavishe (1994) observed that 30% of non-pregnant, non-lactating mothers had undesirable BMI. Results on the present study indicated that more adolescents were underweight and wasted, which are signs of acute undernutrition. It could be due to poor food habits, diseases and gross inadequate food intake to cope with the increased demand for growth and pregnancy. However, even for girls who are healthy and well nourished, pregnancy during adolescent is often correlated with many health complications and maternal mortality. The younger the girl, the higher the risks associated with pregnancy like anaemia, abortion, pre-eclampsia, obstructed and prolonged labour, pre-mature birth, low weight gain and low birth weight (Frcog, 1995 and Santrock, 1996).

5.5.2 Nutritional status during pregnancy

Nutrition status during pregnancy was assessed by determining the following:-

Haemoglobin concentration

It was observed in the present study that 85.5% of all pregnant adolescents were anaemic. These results indicate that there is high prevalence of anaemia among adolescent girls. Therefore anaemia is still a serious public health problem during pregnancy in adolescent girls. In Tanzania, it has been observed that more than 80% of all pregnant women are anaemic (Massawe, 1994; Msolla and Kinabo, 1997). This could be attributed to pregnancy and inadequate intake of iron rich foods and probably diseases such as worm infestation and malaria (although not screened because Coast,

Dar es Salaam and Morogoro are endemic areas). The major causes of anaemia are inadequate dietary sources of iron, malaria attacks, intestinal parasites and other infections. The problem of anaemia in pregnant adolescent girls is further aggravated by high iron demand for both the mother and the foetus.

Maternal height

The present study showed that about 54% the pregnant adolescent girls were less than 151cm tall with mean height of 151.3±6.0cm. The risk cut off level is height of below 151cm therefore, girls who are below that level have greater chances of facing complications during delivery. This indicates that pregnant adolescent girls are at greater risks because short stature/height is often associated with obstructed labour and is a major cause of surgical intervention during delivery. In the present study, 14% of the pregnant adolescent girls gave birth through caesarean section and the majority (86%) delivered normally (vaginal delivery). There was a significant negative correlation between maternal stature and method of delivery, whereby more shorter girls delivered by caesarean section, an observation, which is similar to the one made by Kurz and Welch, (1994). Poor nutrition in adolescent girls leads to stunting, which is associated with underdeveloped pelvic bones, leading to contracted pelvis. This situation leads to obstructive complications such as cephalopelvic disproportion whereby young girl's pelvis is too small to permit child's head to pass during childbirth. Such complications may lead to death, damage of internal organs or necessitating surgical interventions during delivery.

Weight gain during pregnancy

The mean weekly weight gain was found to be 317±110g for the second and third trimesters. Some neither gained nor lost weight and few even lost weight. The recommended weekly weight gain for adolescent pregnant girls during the last two trimesters of pregnancy varies depending on pre-pregnancy BMI. Weekly weight gain of 300g, 410g and 490g is recommended for pre-pregnancy BMI of 26.1-29.0, 19.8-26.0 and less than 19.8 respectively (National Academy Press, 1990). It was observed that there was a significant correlation between maternal height and weight gain during pregnancy ($p \leq 0.001$) and method of delivery ($p=0.007$). Abrams *et al.* (2000) observed that, pregnant women with low weight gains are more likely to be of young age, short, thin, less educated and black race, the situation which is as well applicable to the present study. However, in some cases girls are advised not to eat a lot of food during pregnancy for fear of complications during delivery. In this case, low weight gain could also be due to low dietary energy intake. Physical abuse, poor financial support, poor diet and poor compliance with prenatal care are associated with low weight gain in pregnancy. Maternal weight gain is generally unsatisfactory in Tanzania (Kavishe, 1993).

Infants birth weights

The prevalence of low birth weight defined as body weight at birth of less than 2500g was 48%. Mean birth weight was 2600±480g. Kavishe and Materu, (1994) observed mean birth weight of about 3000g with 13% of births falling below 2500g in Tanzania and Sub-Saharan Africa in general. Results of the present study imply that infants born

specifically to adolescent mothers have about four times higher risk of low birth weight as compared to those born to adult women.

It was also observed that infants' birth weight correlates significantly with Hb concentration ($P \leq 0.001$) and pregnancy weight gain ($p=0.01$). This observation is similar to that of Roos *et al* (1997) and Amani (2000). Low birth weight is associated with factors like poor maternal nutritional status at conception, low gestational weight gain due to inadequate dietary intake, presence of anaemia and short maternal stature due to the mothers' childhood undernutrition and or infection. The consequences of low birth weight to the infant are impaired immune function, poor cognitive development, limited chance of reaching full growth potential and high risks of developing acute diarrhoea or pneumonia (Pojda and Kelley, 2000).

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

This study observed that adolescent pregnancy is a problem, which was found in all study areas. Dar es Salaam region was found to have the highest prevalence of adolescent pregnancy, followed by Coast and Morogoro regions. Factors such as traditions and customs, which encourage girls to engage in sex relationships with opposite sex right after menarche and early marriages, were found to contribute to early pregnancies. Other factors observed were economic constraints due to lack of employment caused by low level of education. Unemployment drives adolescent young girls to engage into sexual affairs in expectation of being supported financially so that they are able to meet their basic needs and sometimes that of the whole family. Inadequate knowledge on reproductive health and particularly family planning knowledge plays a role in contributing to early pregnancies. Most of the pregnant adolescent girls were unaware of fertility control methods before they conceived. Even those who were aware hardly used them due to reasons such as fear of side effects or fear of being discovered by parents or partners.

Pregnant adolescent girls were found to face several problems including unplanned pregnancies and marriages, school dropout, inability to meet their needs and that of the pregnancy, late detection of the pregnancy thus late antenatal visit. Others include

rejection by partner responsible for the pregnancy and getting into relations with married adult men who easily seduce and trap them for sex because adult men have financial and economic power.

Pre-pregnancy nutritional status was found to be unsatisfactory in all study areas and especially in rural areas. Majority of the non-pregnant adolescent girls were underweight and wasted. As adolescent girls are still growing, therefore they enter into pregnancy while they have not attained their full growth and their bodies are inadequately prepared for childbirth. This situation is also accompanied by poor nutritional status due to low dietary energy intake.

Anaemia was observed to be a serious problem in the study areas. Most of the girls were anaemic and about half of the infant were born with low birth weight. In addition to anaemia, weight gain during pregnancy has a significant influence on infant birth weight and this was found to be low.

6.2 Recommendations

Based on the results, discussion and conclusions, the present study recommends the following:-

(i) Reproductive health services and information should be made adequately accessible to adolescents. These services should be provided in such a way that

privacy and confidentiality is maintained so that adolescents can freely seek and utilise them. Emphasis should be on promoting effective use of contraceptives.

(ii) Programmes should be formulated to assist the adolescent pregnant girls and adolescent mothers to involve themselves in activities that will enable them to generate income so as to become economically independent.

(iii) Traditions and cultural initiation rites and other rituals that teach and prepare young girls to be able to fulfil sexual responsibilities should not be eliminated. But instead, the approach and attitude of the traditional trainers (*kungwi*) should be changed. The *kungwi* should be trained so that in addition to what they teach their girls, they should also be teaching them about the consequences of early pregnancy, how to avoid sex and to protect themselves from HIV/AIDS infections and also on how to be economically independent.

(iv) Primary school curriculum should incorporate reproductive health education and clearly address on use of contraceptives, the risks of early pregnancy and risks of poor pre-pregnancy nutritional status.

(v) Anaemia, low birth weight, short stature and low pregnancy weight gain were the greatest nutritional problem that pregnant adolescent girls face. Emphasis should be placed on promotion of production and consumption of iron rich foods and diversity of foods. To prevent and treat/cure diseases or infections that causes iron loss like malaria and other parasitic infestations.

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APPENDICES

TITLE: NUTRITIONAL STATUS AND SOCIO-ECONOMIC PROBLEMS OF ADOLESCENT PREGNANT GIRLS: A CASE STUDY OF MOROGORO, COAST AND DAR ES SALAAM REGIONS

Appendix 1

MEASUREMENTS OF NUTRITIONAL STATUS AND QUESTIONNAIRE FOR ADOLESCENT PREGNANT GIRLS

GENERAL INFORMATION

Respondent serial number..... Name.....

Region	
District	
Division	
MCH centre	
Date	

SECTION A: NUTRITIONAL STATUS

Haemoglobin concentration (g/dL)	
Weight (kg)	
Height (cm)	
MUAC (mm)	
Infant birth weight (g)	
Method of delivery	

SECTION B: QUESTIONNAIRE:

Please give the correct answers to the following questions.

Background characteristics

1. Age_____ years

2. Marital status

1= Single

2= Married

3= Divorced/separated

4= Cohabiting

5= Widow

6= Others (specify)

3. At what age were you married/cohabited? (*for married/cohabiting/separated respondents)*

4. What is your religion?

1= Moslem

2= Christian

3= Pagan

4= Others (specify)

5. Where do you live/stay?

1 = Urban

2 = Rural

6. What is your level of education?

1= Without formal education

2= Primary (up to standard ...)

3= Secondary (up to form .....)

4= Other (specify)

7. What is your occupation?

1= Student

2= Peasant

3= Employed (specify.....)

4= Trader

5 = None

6= Other (specify)

Parents'/Guardians' marital status, level of education and occupation

8. What is the marital status of the household you were brought up?

1= Had both parents

2= Single parent

3= Guardian

4= Others (specify)

9. What is your father's/ male guardian's level of education?

1= Without formal education

2= Primary

3= Secondary

4= University

5=Adult education

6= Other (specify)

10. What is his occupation?

1= Peasant

2= Employed

3= None

4= Trader

5= Other (specify)

11. What is your mother's/female guardian's level of education?

1= Without formal education

2= Primary

3= Secondary

4= University

5= Adult education

6= Other (specify)

12. What is her occupation?

1= Peasant

2= Employed

3= None

4= Trader

5= Other (specify)

Husband/partner socio-economic status

13(a). What is the marital status of the man responsible for your pregnancy? (*Question (13a) is for single/unmarried respondents)*

1= Single

2= Married

3= Divorced/separated

4= Widower

5= Others (specify)

(b). What is the occupation of the man responsible for your pregnancy?

1= Peasant

2= Employed

3= None

4= Trader

5= Student

6= Other (specify)

(c). What is his level of education?

1= Without formal education

2= Primary

3= Secondary

4= University

5= Adult education

6= Other (specify)

(d). What is his age? ..... (years)

Information on pregnancy

14. Were you aware of how a woman can conceive before you fall pregnant?

1 = Yes

2 = No

15. What is the age/stage of your pregnancy?

1= 1-3 months (First trimester)

2= 4-6 months (Second trimester)

3= 7-9 months (Third trimester)

16(a). When did you discover that you were pregnant?

1= 1-3 months

2= 4-6 months

3= 7-9 months

(b). Did you discover the pregnancy by yourself?

1= Yes

2= No

(c). If answered No to (b) above, who discovered it?

1= Husband/partner

2= Parents/guardian/relatives

3= Hospital

(d). When did you first visit antenatal clinic for this pregnancy? (*Obtained from her MCH card)*

1= 1-3 months pregnancy

2= 4-6 months pregnancy

3= 7-9 months pregnancy

17(a). Is this your first pregnancy?

1=Yes

2=No

(b). If no to (a) above, at what age did you get your first pregnancy? ..... years

(c). Is the father of your other child/children also responsible for this pregnancy?

1 = Yes

2 = No

(d). How many other children do you have?

1= one child

2= Two children

3= Three children

(e). Are all the children alive?

1= Yes

2= No (abortion/dead) .....

18. Whom were you staying with when you fall pregnant?

1= Husband/partner

2= Parents

3= Guardian

4= Employer

19. Under which circumstances did you got pregnant?

1= Raped

2= Forced

3= Voluntary

20. What factors do you think can lead to girls engage in sexual relationships and finally becoming pregnant?

Family planning knowledge and perception

21(a). Do you understand what does it mean by family planning? (*If answered No go direct to 21(f)*

1 = Yes

2 = No

(b). What methods of family planning were you aware of before you became pregnant?.....

(c). Where did you get the information on family planning?

1= Seminars at MCH centres

2= Media

3= Elders

4= Friends

5= School

6= Seminars and media

7= Others (specify)

(d). Did you use any family planning devices before you became pregnant?

1= Yes

2= No

(e). If no to (d) above, give reason/s.....

(f). Do you think that it is good for young girls to use family planning devices? *(to be asked to all respondents. The researcher should have explained those who answered NO to 21(a) what is family planning)*

1 = Yes .....

2 = No, (give reasons).....

3= I don't know

(g). Do you think that young girls are willing/free/able to obtain family planning services?

1= Yes

2= No (Please give reasons).....

Knowledge about sex

22(a). Were you given information about sexuality before you became pregnant?

1=Yes

2=No

(b). If yes, what kind of information were you told?.....

(c). Where did you get that information?

1= Parents

2= School

3= Media

4= Elders during ritual ceremonies

5= Friends

6= Others (specify)

(d). For how long were you trained on that?_____

(e). At what age did you get this information? _____ years.

(f). Do you think that the information is useful to you at this young age?

1= Yes (give reason/s) .....

4=No (give reasons).....

3= Some of them are good while others are not good

Support for pregnant adolescent girls

23(a). Are you adequately prepared for yourself and for baby's basic requirements?

1= Yes

2= No

(b). If no to (a) above, what is/are the problem/s? .....

24(a). Is there any person/s (apart from your partner/husband) who assist/s you during this time of pregnancy?

1= Yes

2= No

(b). If yes to (a) above, who provide/s the support?

1= Parent/s

2= Guardian/s

3= Friend/s

4= Social welfare

5= Others (explain)

(c). What does the support involve?.....

(d). Is the support satisfactory?

1= Yes

2= No

25(a). Do you get support from the man responsible for your pregnancy? *If answered YES, go to 25(c)*

1=Yes

2=No

(b). Do you think that he will support you in the future?

1=Yes

2=No

3=I am not sure

(c). What does the support involve? .....

(d). Is the support satisfactory?

1= Yes 2= No

(e). Do you think that he will continue to support you?

1= Yes

2= No

3= I am not sure

Consequences due to pregnancy

26. When did you fall pregnant? (*For respondents who have been to school*)

1= Whilst at school

2= After leaving school

27. Did you plan to get the pregnancy?

1= Yes (explain).....

2= No (Explain).....

28. What were you doing before you became pregnant?

1=Schooling

2=Employed (specify).....

3=Trading

4= None

5= Peasant

29. What is your parents reactions toward the pregnancy?.....

30. What was your partner's reaction when he knew that you are pregnant?.....

31. Do you think that you have gained or lost by becoming pregnant at this young age?

If gained, explain briefly.....

If lost, explain briefly.....

I don't know

32(a). What are the difficult things for you during this time of pregnancy?.....

(b). How do you cope with them?.....

33. Would you like to go through the same experience again?

    1 = Yes

    2 = No

34. On your own opinions, how do you comment on this issue of pregnancy at young age?

    1= It is good (explain)

    2 = It is not good (explain)

    3= It is good if you are married

    4= I don't know

35. What advice can you give in order to avoid early pregnancies?

    Advice to girls.....

    Advice to parents.....

Thank you very much for your time and co-operation.

Appendix 2

CHECKLIST QUESTIONS FOR DISCUSSION WITH FOCUS GROUP

Region	
District	
Division	
Number of participants	
Date	

1. Is early pregnancies problem in your area?

2. Why do you think girls in this area get pregnancies at adolescence/early age?

3. What are problems caused by adolescence pregnancies at your area?

4. What are traditional/local counselling and guidance services available to young girls in this area regarding sex education and pregnancy control/family planning?

   (i) What kind of information are they given?

   (ii) When are the services provided? (Age/period)

   (iii) Who provides the information?

   (iv) For how long is the information provided?

5. Do you think that the information provided contribute to the increased/decreased incidences of early pregnancies?

6. If contributes to increase incidences how do you think these services can be improved/what should be done to avoid early pregnancies?

Appendix 3

Results of the Student's T test analysis

Variable	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
BMI (non-pregnant girls)	4.329	0.038	2.932	598	0.003	0.7700	0.2626
MUAC (non-pregnant girls)	0.001	0.973	2.794	598	0.005	0.6447	0.2307
Age at first pregnancy	1.259	0.263	0.350	178	0.726	7.778E-02	0.2220
Hb during pregnancy	0.354	0.553	-1.464	178	0.145	-0.3078	0.2102
Age at married	1.587	0.209	-0.594	178	0.553	-0.70	1.18
Conception awareness	3.738	0.055	-1.056	178	0.293	-7.78E-02	7.37E-02
Family planning knowledge	0.975	0.325	0.494	178	0.622	3.33E-02	6.75E-02

Appendix 4

Results of correlation analysis

		Hb during pregnancy	Infant birth weight	Pregnancy weight gain	Maternal height	Maternal MUAC	Method of delivery
Hb during pregnancy	Pearson Correlation	1.000	0.672**	0.228	0.104	0.170	0.154
	Sig. (2-tailed)	.	0.000	0.111	0.473	0.237	0.286
	N	50	50	50	50	50	50
Infant birth weight	Pearson Correlation	0.672**	1.000	0.363**	0.226	0.071	0.066
	Sig. (2-tailed)	0.000	.	0.010	0.114	0.623	0.648
	N	50	50	50	50	50	50
Pregnancy weight gain	Pearson Correlation	0.228	0.363**	1.000	0.497**	0.159	-0.167
	Sig. (2-tailed)	0.111	0.010	.	0.000	0.271	0.246
	N	50	50	50	50	50	50
Maternal height	Pearson Correlation	0.104	0.226	0.497**	1.000	0.237	-0.374**
	Sig. (2-tailed)	0.473	0.114	0.000	.	0.098	0.007
	N	50	50	50	50	50	50
Maternal MUAC	Pearson Correlation	0.170	0.071	0.159	0.237	1.000	-0.251
	Sig. (2-tailed)	0.237	0.623	0.271	0.098	.	0.078
	N	50	50	50	50	50	50
Method of delivery	Pearson Correlation	0.154	0.066	-0.167	-0.374**	-0.251	1.000
	Sig. (2-tailed)	0.286	0.648	0.246	0.007	0.078	.
	N	50	50	50	50	50	50

** Correlation is significant at the 0.01 level (2-tailed).