OBSTETRIC OUTCOME AMONG ADOLESCENT PRIMIGRAVIDAE DELIVERING TA MUHIMBILI NATIONAL HOSPITAL DAR ES SALAAM, TANZANIA

By

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A dissertation submitted in partial fulfilment of the requirements for the degree of Master of Medicine (Obstetrics and Gynaecology) of the University of Dar es Salaam

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DEDICATION

THIS BOOK IS DEDICATED TO MY HUSBAND

Eng. GILLEARD MARO, MY SON GILBERT AND

MY DAUGHTER JULIETH

DR. LYAMUYA R. E.

ABSTRACT

Background: The number of adolescent pregnancies has increased throughout the world, and these pregnancies are reported in association with a higher rate of maternal and fetal complications.

Objectives: The aim of this study was to compare obstetric outcome among adolescents and none- adolescents primigravidae.

Methods: A prospective study was carried out during mid September to mid December 2001 at Muhimbili National Hospital to compare obstetric outcome of the first pregnancies of 190 adolescents with that of 20-34years old primigravidae who delivered at the same period of the study.

Results: Poor antenatal supervision and low frequency of antenatal check up were observed in adolescents. Adverse fetal outcome, like prematurity, low birth weight and perinatal mortality were significantly high in adolescents. Prolonged labor and premature rupture of membranes were also significantly higher in adolescents. Observed maternal complications in adolescents were anaemia, preeclampsia and eclampsia.

Conclusion: The study findings show that young maternal age is associated with an increased risk of unfavourable fetal and maternal outcome. Thus adolescent pregnant mothers need improved prenatal care and close monitoring and care during labor.

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LIST OF ABBREVIATIONS

1. WHO - World Health Organization
2. MNH – Muhimbili National Hospital
3. APH – Antepartum haemorrhage
4. PPH – Postpartum haemorrhage
5. PROM – Premature rupture of membranes
6. Hb – Haemoglobin
7. VDRL – Venereal Disease Research Laboratory
8. MCH – Maternal and Child Health

INTRODUCTION AND LITERATURE REVIEW

Maternal age has been indicated to be an important factor in determination of obstetric outcome. Adolescent mothers especially those15 years and below appear to be at high risk during childbearing with poor obstetric outcome [1,2,6,25,26].

WHO, defines adolescence as the period ranging from 10 to 19 years of age in which;

- An individual progresses from point of initial appearance of secondary sexual characteristics to that of fully sexual maturity,
- The individual psychological processes and patterns of identification develop from those of a child to those of an adult,
- A transition which is made from the state of total social economic dependence to one of relative independence [3].

Adolescents comprise almost one fifth of the world's population, which is over one billion. In the developing world more than one third of the population is under the age of 15 years. In sub-Saharan Africa, about half of the population is under 15 years of age [4].

The incidence of adolescent pregnancy is growing and has become a subject of concern world wide. Among the developed countries the United States of America (USA) has the highest adolescent pregnancy

rate which is 19% [5]. In great majority of Latin American and Caribbean countries, between 15% and 26% of births occur in adolescents [6]. In Canada adolescent pregnancy rate is increasing and is 67 per1000 population in the age group 18-19 years followed by 22 per 1000 in the age group15-17 years [7]. In the year1990, 239 children were born to girls under age 15 [7].

In sub-Saharan Africa, adolescents account for 20-25% of all women of reproductive age [8,9,10,11]. Studies in sub-Saharan Regions have shown that, by the age of 19 years, about 55% or more women have started child bearing [8,12]. In a study done in Nigeria 15.1% of 4649 pregnant mothers were found to be adolescents [13]. In Tanzania 26% of adolescents have already begun childbearing. Of these, 21% having had a child already and the remaining 5% carrying their first pregnancy [14]. Adolescent childbearing in Mainland Tanzania has been reported to be higher among rural women (27%) than their urban counterpart (24%) [14]. At Muhimbili National Hospital, 19.3% of women who delivered in the year 2000 were adolescents. Of these, 92% was their first pregnancy, 6.9% had already given birth once and 1% had already given birth twice [15].

The increase in the incidence of adolescent pregnancy has been attributed to multiple factors including lack of sex education,

inadequate access to reliable contraception, poverty, limited education and substance abuse. Adolescent sexual and reproductive problems have been associated with early puberty, economic hardship, urbanization, schooling and weakening of traditional structures that informed on and regulated young people's sexual behavior [16,17].

Studies indicate that young people frequently engage in sexual activities and have multiple sexual partners, resulting in high incidence of early pregnancy, school dropout rate, abortion and risk of infection with STIs and the deadly HIV/AIDS [10,16,17]. In many cases early pregnancy has negative implication to a young mother's chance of continuing education and for her personal development in general [18]. Almost half of the girls who do not finish primary education are adolescent mothers and only 7% of adolescent mothers finish secondary education [6]. Reports from UNICEF suggest that adolescent mothers are more often obliged to abandon school thus reducing their chance of achieving a reasonable standard of living for themselves and their children [6].

The life style of an adolescent girl may be detrimental to the pregnancy. Many come from low social economic backgrounds, having poor education, poor general health and inadequate nutrition [19]. Adolescents particularly the very young (below 16 years) are physically immature

and are still growing children themselves. There is increasing evidence of competition for nutrients between the growing pregnant adolescent and her fetus [5,20]. Apart from physical immaturity, adolescents are psychologically and socially immature, thus making them less ready than the older women to have healthy babies [21]. Many have poor eating habits, poor quality diet and poor knowledge of appropriate nutrition and these habits may not change during pregnancy [5,21,22].

Lack of antenatal care or poor prenatal care is also the major cause of increased rate of complications in adolescents. Despite all the risks, they are least likely to get early and regular care. In U.S.A it was found that approximately 70% of all pregnant adolescents do not receive adequate antenatal care when in reality this is the group that need the most care and nutrition counseling [7,23,24].

The health risks associated with adolescent pregnancy and childbearing include higher risks of maternal and infant morbidity and mortality [9]. In developed countries, although there are adequate obstetrical and gynecological facilities, complications of adolescent pregnancy are still encountered. Studies have shown that maternal death rate for mothers 15 years or younger is 60% greater than women in their 20`s [6,16]. Their infants are 2 to 6 times likely to have low birth weight [6,16,25,32]. These babies have also been reported to be more than twenty times likely to

die in their first year of life than normal weight babies [22]. Other documented complications of adolescent pregnancy were increased risks of preterm labour, maternal anaemia, chest infections, urinary tract infection, and perinatal deaths [25,27,28].

In developing countries where there are limited obstetric and gynaecological facilities, adolescent pregnancies have become a serious public health problem. Adolescent pregnancy remains among the top three causes of adolescent deaths [10,21]. Most deaths are due to eclampsia, puerperal infection and haemorrhage. More over in nearly every country where abortion is illegal, criminal abortion represents a major cause of adolescent maternal mortality from both sepsis and haemorrhage [21]. Infants born to adolescent mothers face greater risks of low birth weight, prematurity, birth injuries, stillbirths and mortality than do babies born to older women (WHO 1989). In Zambia Wadhawans and others demonstrated poor obstetric performance in adolescent primigravidae [1]. The obstetric complications were cephalopelvic disproportion, increased rate of caesarean section and operative vaginal deliveries, premature deliveries, and increased perinatal mortality [1].

. In Nigeria, Ethiopia and other parts of developing countries, the highest frequency of low birth weight babies, anaemia, delayed second

stage of labour, and low apgar score were found among adolescent mothers [21,29,30,31].

In a study done in 1987 in Tanzania, a comparison of obstetric performance and outcome among under16 years old and 20-29 years old primigravidae was made. It was observed that antenatal clinic attendance, were satisfactory in 80% of the adolescents but they booked late and received the lowest level of care. Anaemia and premature rupture of membrane were significantly more common in the adolescents group [33]. A retrospective study done in Tanzania in1978 involving primigravidae aged less than 16 years and those aged 21-25 years revealed that adolescents were from low social economic back ground [34]. In this study, anaemia and preterm labour were common in adolescents [34].

RATIONALE OF THE STUDY:

Adolescent pregnancy is a risk pregnancy associated with increased perinatal and maternal morbidity and mortality and is a subject of worldwide concern. In Tanzania 26% of adolescents have already begun childbearing. Recent reports from Muhimbili National Hospital, show that up to 19.3% of deliveries occur among adolescent women and of these 92% are primigravidae[15].

Studies done worldwide have shown that adolescent pregnancy is associated with maternal and fetal complications. Few studies have been done in Tanzania concerning the outcome of adolescent pregnancy but these studies are very old and the information therein does not reflect the present situation. The few old studies failed to include all adolescents among their cases, apparently much emphasis was directed to the physical factors rather than other aspects of adolescence such as psychosocial maturity and social interactions which could affect obstetric outcome. One of earlier studies conducted was a retrospective design based on hospital records which are known to be unreliable. The problems which were elicited during those days, may have improved over time with the improved antenatal services. Many studies have compared adolescents and non-adolescents of different parity while primigravidae form a special group. The present study is improved methodologically to address what was not done in the previous studies. In so doing it may reveal more information about obstetric outcome in adolescents. It will also help to show the magnitude of the problem and suggest intervention strategies for prevention of those complications. The information obtained may also be used by National Programmes in educating the community on the dangers involved in adolescent pregnancies.

This study will also help me to write my dissertation in partial fulfilment

of the requirements for the University of DSM for Degree of masters in Medicine.

RESEARCH QUESTION

Is there any difference in obstetric outcome between adolescent and non-adolescent primigravidae?

HYPOTHESIS

Ho:

There is no difference in obstetric outcome between adolescent and non-adolescent primigravivae.

OBJECTIVES

BROAD OBJECTIVE

To compare obstetric outcome among adolescents and non-adolescent primigravidae delivering at Muhimbili National Hospital, Dar-es-Salaam.

SPECIFIC OBJECTIVES

1. To determine and compare the frequency of maternal complications in terms of preeclampsia, eclampsia, PROM, APH, PPH, pre-term delivery, anaemia, obstructed labour, duration of labour , and duration of hospital stay among adolescent and non-adolescent primigravidae.

2. To determine and compare fetal outcome in terms of birth weights, APGAR scores and deaths among adolescent and non-adolescent primigravidae.

3. To compare the mode of delivery among adolescent and non-adolescent primigravidae.

4. To compare antenatal clinic attendance and booking status among adolescent and non-adolescent primigravidae.

5. To assess the quality of antenatal care among adolescents and non-adolescent primigravidae.

MATERIAL AND METHODS

Study setting

The study was done at the labour ward of MNH.

MNH is the largest consultant and University teaching hospital in Tanzania. It is a tertiary referral hospital for the country but in practice, it functions as a second and sometimes even as a first referral level. Patients are attended to without restrictions whether they are referrals from health center or not. It is located in Dar es Salaam, which is the largest city in Tanzania. This hospital has Obstetrics and Gynaecology department in which in the obstetrics part there is a high risk antenatal clinic where high risk pregnant mothers from different hospitals are attended. It consists of seven wards. Two wards are used as labour wards for high risk pregnant mothers, complicated labours and deliveries. Since there are no restrictions, low risk mothers are also attended. On average 15000 to 15500 deliveries are conducted annually at MNH. Within the labour wards, there is a room for intensive care where mothers with eclampsia, severe PIH as well as very sick mothers are admitted. One ward serves as a Neonatal Unit where premature as well as sick neonates from this hospital as well as referrals from other hospitals are admitted. The remaining four wards each having about 60 beds serve for mothers with antenatal, postpartum and puerperal complications as well as nursing mothers. It has one theatre where

about 15-20 operative deliveries both emergencies and elective are performed each day. There is one common blood bank for all departments. The staffs in the department include consultants, specialists, residents, registrars, intern doctors as well as nursing staffs. Every day there are four doctors on call in the labour ward each one representing a different cadre.

Study design

This was an unmatched prospective case control study.

Patients selection

Inclusion criteria

- All primigravidae who delivered at the MNH labour ward during the study period and their infants.

Exclusion criteria

- Primigravidae 35 years and above,
- Those with multiple pregnancy
- Patient's refusal.

Sampling technique

A non-probability sampling technique.

During the period of the study all adolescent primigravidae women who delivered at the MNH labour ward were cases for the study. Non-adolescent primigravidae who delivered in the same period with the adolescent primigravidae were included in the study as control. These women were recruited on arrival in the labour ward and then followed up until the time of discharge from the hospital.

Study variables

Maternal data

The maternal data were obtained regarding social-demographic characteristics in terms of age, level of education, marital status, and occupation. Complications of pregnancy prior to admission such as malaria, low haemoglobin, high blood pressure, and premature rupture of membranes were asked and recorded. Gestational age at delivery was calculated from the last normal menstrual period. For those mothers who were not sure of their dates, extrapolation from the antenatal card, gestational age at quickening and fundal height estimation at booking were done. The condition of the mother on admission was assessed including pallor, pitting pedal oedema and temperature. Blood pressure was measured on the right arm while the mother was in the sitting

position. Urine was tested for albumin in all mothers with raised blood pressure. The antenatal card was reviewed, antenatal clinic attendance and number of visits were recorded. Four antenatal visits were regarded as the minimum requirement. Gestational age of 28 weeks and more at booking was regarded as late booking.

In Tanzania MCH card number four is used as a tool to assess pregnant women in antenatal clinics. If all the requirements in this card are properly assessed and recorded it provides important information about the health progress of both the mother and her fetus during antenatal period. During antenatal visits the following are done routinely to every mother attending for antenatal care and recorded in the card. These includes, taking measurements (maternal weight, height, blood pressure, fundal height estimation and fetal heart rate), doing investigations (VDRL, Hb, blood group and Rh factor and urine albumin), prophylaxis (anti-malaria, oral haematenics, and tetanus toxoid immunization) are given free of charge, risk assessment and plan of management or referral to a high risk clinic.

In this study, quality of antenatal care was assessed by looking at whether the parameters in the antenatal card were checked and action was taken such as

- taking measurements (maternal height and blood pressure),
- requesting investigations (Hb, VDRL, Rh factor)

- giving prophylaxis (hematenics, anti malarial, tetanus toxoid)
- recording obstetric risk factor (age<15, big baby, malpresentation, height<150 cm)
- indicating management plan or referral.

For convenience the author designed a numerical decision matrix table whereby each parameter was given a weight according to its significance. The total sum of the weights was termed as score and grouped into 3. The highest score was 12. Score 9-12 was regarded as a good quality antenatal care, score 6-8.9 and below 6 as moderately good and poor quality antenatal care respectively. This table was written in a separate paper and involved those mothers who booked for antenatal care. The heights (in centimeter) of all mothers who were included in the study were recorded. For those with no antenatal records the height was measured on admission. Intrapartum and postpartum assessments were done by using the partogram. Any complications like antepartum haemorrhage, raised blood pressure, eclampsia, preterm delivery, obstructed labour, and postpartum haemorrhage were recorded. The partogram was also used to assess the duration of labour and mode of delivery. The condition of the mother after delivery was recorded, follow up was done until the time of discharge from the hospital. Duration of hospital stay was also recorded.

Data on the fetus

On admission fetal presentation was assessed by Leopards Maneuver and confirmed during vaginal examination and delivery. Fetal heart rate and regularity were assessed using a fetal stethoscope. Birth weight of the babies was measured in grams using standard neonatal weighing scale. Fetal condition including apgar score at five minutes, fetal deaths (stillbirth fresh, stillbirth macerated, neonatal deaths) were recorded. The fetal apgar scores were classified according to severity into normal score (score 7-10), moderate (score 4-6) and severe (score1-3) low apgar score. Follow up was done until the time of discharge from the hospital. The duration of hospital stay and the condition at discharge were recorded.

Laboratory tests

Urine was tested for albumin from every preeclamptic mother included in the study. Each preeclamptic mother was given a container to collect urine. A dipstick method by using albustix was used and recorded as negative, trace, 1+, 2+, 3+& 4+. The tests were done by the research assistants and the investigator.

Outcome measures

- Maternal complications including anaemia, pre-eclampsia, eclampsia, premature rupture of membranes, premature labour, APH, duration of labour and duration of hospital stay and maternal deaths.
- Fetal outcome including birth weights, apgar scores, and fetal deaths.
- Mode of delivery
- Booking status and quality of antenatal care.

Definition of terms

Adolescence – A period in which an individual progresses from a point of initial appearance of secondary sexual characteristics to that of sexual maturity. The age limit recommended is ten to nineteen years (WHO Definition)

Cases – primigravidae aged 19 years and below.

Control – primigravidae aged 20 to 34 years.

Low birth weight baby – baby born with birth weight < 2500g.

Anaemia – haemoglobin below 60% (8.7g/dl).

Preeclampsia

- Blood pressure of 140/90mmHg or above on more than two

occasions in association with either peripheral edema other than dependent edema or proteinuria not due to underlying renal disease.

- For those unbooked mothers, blood pressure of 140/90mmHg and above in two readings taken 6 hours apart.

Eclampsia – pre-eclampsia with fits which cannot be explained by other known causes.

Preterm labour – Labour before 37 complete weeks of gestational age.

Good, moderate and poor quality antenatal care – according to the given numerical decision matrix score 9 – 12 was regarded as good quality antenatal care, score 6- 8.9 as moderate and below 6 as poor quality antenatal care.

DATA HANDLING, MANAGEMENT AND STATISTICS

Sample size calculation:

$$n = \frac{P_1 (1- P_1) + P_2 (1- P_2)}{(P_1 - P_2)^2} (Z_\alpha + Z_\beta)^2$$

Where P_1 was the proportion of cases exposed (low birth weight babies), estimated to be = 25%

P_2 was the proportional of controls exposed (low birth weight) = 13%

Z_α is the significance level of 5% corresponding to confidence interval which is 1.96

Z_β is 0.84, which corresponds to the power of 80%

Therefore the sample size was 163.74. Hence the sample size was 164 cases and 164 controls.

The prevalence of low birth weight was used in calculating the sample size because this was the most frequent documented in such studies in our setting.

Data collection

Data was collected by interview by using structured questionnaire. The questionnaire was structured in English and then translated into Swahili. Four Nurse midwives were trained on the questionnaire and they conducted the interview under supervision by the investigator. Two were taken from permanent night shift to cover from 19.30hours to 07.00hours. The other two covered from 07.00hours to 19.30hours. The Nurse in charge of the labour ward was requested to arrange the duty roster accordingly.

Quality control

Two days training of the research assistants, was conducted by the

investigator. Four experienced nurse midwives were trained on:

- The purpose of the study
- Proper examination of the mother on arrival
- How to ask the questions
- How to fill in the questionnaire
- Confidentiality issues
- Intrapartum and postpartum follow up
- How to collect and test urine albumin

DATA ANALYSIS

All questionnaires were coded and the data entered into the computer using EPI Info 6 software. Data cleaning was done before data analysis. The data were summarized in two-way tables. Chi-square test was used to compare and assess the statistical association of the variables investigated between adolescent and non-adolescent primigravidae.

PILOT STUDY

A pilot study was conducted prior to data collection so as to test the questionnaire and the sampling technique.

ETHICAL CLEARANCE

The proposal was presented in the department and ethical clearance was requested from the MUCHS Higher degrees and Publication Committee. There were no major ethical issues in this study. Eligible subjects were recruited into the study after an informed concert. Ethical clearance to conduct the study was obtained from MUCHS Higher degree and Publication committee.

RESULTS

There were 354 pregnant women recruited in the study. One hundred and ninety (190) adolescents and 164 non-adolescents. The adolescents were classified into three age groups.

- 15 years and below (14/190, 7.4%)
- 16 to 17 years (58/190, 30.5%)
- 18 to19 years (118/190, 62.1%)

Mean age was 17.64 ± 1.27(SD) for adolescents and 22.96 ± 2.74(SD) for the non-adolescents.

Table 1: Socio-demographic characteristic among adolescents and non adolescent primigravidae

CHARACTERISTIC	ADOLESCENTS AGE GROUPS YRS			**TOTAL**		P
	≤ 15	**16-17**	**18-19**	**(CASES)**	**CONTROL**	VALUE
RESIDENCE						
Temeke	5(35.7%)	14(24.1%)	35(29.7%)	54(28.2%)	32(19.5%)	
Ilala	3(21.4%)	8(13.8%)	15(12.7%)	26(13.7%)	35(21.3%)	
Kinondoni	6(42.9%)	36(62.1%)	68(57.6%)	110(57.9%)	97(59.2%)	
TOTAL	14	58	118	190	164	0.053
MARITAL STATUS						
Single	12(85.7%)	38(65.5%)	49(41.5%)	99(52.1%)	40(24.4%)	
Married	1(7.1%)	14(24.1)	55(46.6)	70(36.8%)	112(68.3%)	
Cohabiting	1(7.1%)	6(10.3%)	14(11.9%)	21(11.1%)	12(7.3%)	
TOTAL	14	58	118	190	164	<0.001
OCCUPATION						
Employed	0(0.0%)	2(3.4%)	1(0.8%)	3(1.6%)	23(14.0%)	
Unemployed	8(57.1%)	49(84.5%)	109(92.4%)	166(87.4%)	116(70.7%)	
Petty trader	2(14.3%)	2(3.4%)	3(2.5%)	7(3.7%)	21(12.8%)	
Peasant	0(0.0%)	0(0.0%)	3(2.5%)	3(1.6%)	3(1.8%)	
Student	4(28.6%)	5(8.6%)	2(1.7%)	11(5.8%)	1(0.6%)	
TOTAL	14	58	118	190	164	<0.001
EDUCATION LEVEL						
No formal education	4(28.6%)	9(15.5%)	13(11.0%)	26(13.7%)	4(2.4%)	
Primary education	6(42.9%)	39(67.2%)	86(72.9%)	131(69.0%)	109(66.5%)	
Secondary education & above	0(0.0%)	1(1.7%)	4(3.4%)	5(2.6%)	42(25.6%)	
School dropouts	4(28.6%)	9(15.5%)	15(12.7%)	28(14.7%)	9(5.3%%)	
TOTAL	14	58	118	190	164	0.00

The socio-demographic profile of the study population is summarized in table 1.

- The majority of the pregnant women (adolescents and non-adolescents), came from Kinondoni district.
- There was no statistical significant difference between the two groups in terms of pattern of place of residence.
- Most adolescents (118/190, 62.1%) were in the age group 18-19years.
- Ninety nine (99/190,52.1%) of adolescents were single compared to 40/164,24.4% for control and cohabiting was 11.1% compared to 7.3% for control.
- In contrast, majority 112/164,68.2% of the women in the control group were married.
- Of the young adolescents (15 years and below), all 12/14,85.7%) except 2 were single.
- Majority 55/190,46.6%) of adolescents in 18-19 years age group were married.
- There was a strong statistically significant association between adolescent pregnancy and marital status ($p<0.001$).
- Eighty seven percent (87.4%) of adolescents were not employed compared to 70.7% for the control.

- 28/190,14.7% of the adolescents had incomplete education compared to 9/164,5.3% for control.
- Some (11/190,5.8%) were students who were discontinued from their studies due to pregnancy as compared to 1/164,0.6% for control.
- Statistically there was a strong association between adolescent pregnancy and unemployment ($p<0.001$).
- There was a higher percentage (13.7%) of adolescents with no formal education compared to 2.4% for control.
- Of those who went to school the majority (69.0%) had primary education only.
- The highest proportion of those with no formal education and incomplete education were from the younger adolescents (15 years and below).
- There was a statistically significant difference between the two groups in terms of education level ($p<0.001$).

Table 2: association between adolescent pregnancy and pregnancy planing

PREGNANCY PLAN	ADOLESCENTS AGE GROUPS YEARS ≤ 15	16-17	18-19	TOTAL (CASES)	CONTROL	P VALUE
Yes	2(14.3%)	15(25.9%)	62(52.5%)	79(41.6%)	127(77.4%)	
No	12(85.7%)	43(74.1%)	56(47.5%)	111(58.4%)	37(22.6%)	
TOTAL	14	58	118	190	164	0.00
Last menstrual period						
Known	4(28.6%)	27(46.6%)	78(66.1%)	109(57.4%)	138(84.1%)	
Unknown	10(71.4%)	31(53.4%)	40(33.9%)	81(42.6%)	26(15.9%)	
TOTAL	14	58	118	190	164	0.00

The distribution of study population according to weather they plan their pregnancies is summarized in table 2.

- More than half (111/190,58.4%) of the adolescents did not plan their pregnancies compared to 37/164,22.6% for control.
- The highest proportion (85.7%) of those adolescents who did not plan their pregnancies, were from the young adolescents (≤ 15 years).
- This was also true for the awareness of their last normal menstrual period.

Table 3: Antenatal clinic attendance, booking status and quality of antenatal care

NUMBER OF VISITS	ADOLESCENTS AGE GROUPS – YRS ≤ 15	16-17	18-19	TOTAL (CASES)	CONTROL	P VALUE
0	0(0.0%)	1(1.7%)	3(2.5%)	4(2.1%)	2(1.2%)	
1 - 3	8(57.1%)	18(31.0%)	21(17.8%)	47(24.7%)	19(11.6%)	
≥4	6(42.9%)	39(67.2%)	94(79.7%)	139(73.2%)	143(87.2%)	
TOTAL	14	58	118	190	164	<0.001
GESTATION AGE AT BOOKING						
≤12 weeks	1(7.1%)	3(5.3%)	15(13.0%)	19(10.2%)	25(15.4%)	
13 – 24	8(57.1%)	43(75.4%)	92(80.0%)	143(76.9%)	116(71.6%)	
25-27	1(7.1%)	3(5.3%)	0(0.0%)	4(2.2%)	2(1.2%)	
≥ 28	4(28.6%)	8(14.0%)	8(7.0%)	20(10.8%)	19(11.7%)	
TOTAL	14	57	115	186	162	0.019
QUALITY OF CARE						
Good	10(71.4%)	14(24.6%)	48(41.7%)	72(38.7%)	87(53.7%)	
Moderate	2(14.3%)	38(66.7%)	54(47.0%)	94(50.5%)	66(40.7%)	
Poor	2(14.3%)	5(8.8%)	13(11.3%)	20(10.8%)	9(5.6%)	
TOTAL	14	57	115	186	162	0.008

The antenatal clinic attendance, booking status and the quality of antenatal care are summarized in table 3.

- Antenatal care was received by 186/190,97.9% and 162/164,98.8% women in adolescents and control groups respectively.

- The overall frequency of antenatal check up was poor among the adolescents (24.7%) as compared to11.6% for control especially the youngest adolescents (15 years and below).
- 73.2% of adolescents had four or more visits to antenatal clinic compared to control group which was 87.2%.
- Statistically, there was a significant difference between the two groups in terms of the frequency of antenatal check up ($p<0.001$)
- About ten percent (10.2%) of adolescent pregnant women had registered in the first trimester compared to 15.4% for control.
- Most of the study participants, both cases and controls, booked in the second trimester between 13-24 weeks of gestation.
- Mean duration of gestation at the time of registration was 19.80 ± 5.03(SD) weeks for the adolescents and 19.61 ±5.77(SD) weeks for the control group.
- There was a higher proportion (28.6%) of those who booked late (28 weeks and more) in the younger adolescents (15 years and below) than others.
- There was statistically significant difference between the two groups in terms of gestation age at booking ($p<0.05$).
- A higher proportion (20/186,10.8%) of adolescents received poor quality antenatal care compared to 9/162,5.56% for control group.

- Majority of the control (87/162,53.7%) received good quality care while the majority of the adolescents (94/186,50.5%) received moderate quality care.
- There was a statistical significant difference between the two groups in terms of quality of antenatal care with a tendency for the control receiving better quality care compared to adolescents ($p<0.01$).

Table 4: Complications during pregnancy

COMPLICATION	ADOLESCENTS AGE GROUPS–YRS			**TOTAL**		P
	≤ 15	**16-17**	**18-19**	**(CASES)**	**CONTROL**	VALUE
Anemia	0(0.0%)	2(3.4%)	9(7.6%)	11(5.8%)	7(4.3%)	0.306
Pre-eclampsia	0(0.0%)	3(5.2%)	7(5.9%)	10(5.3%)	10(6.1%)	0.186
Malaria	3(21.4%)	2(3.4%)	26(22.0%)	31(16.3%)	39(23.8%)	0.645
APH	0(0.0%)	0(0.0%)	1(0.8%)	1(0.5%)	0(0.0%)	0.341
Others	1(7.1%)	0(0.0%)	2(1.7%)	3(1.6%)	1(0.6%)	0.113
TOTAL	7(50.0%)	15(25.9%)	35(29.7%)	56(29.5%)	57(35.0%)	

Complications during antenatal period as presented by the mothers as well as antenatal records are summarized in table 4.

- Anaemia occurred at higher frequency among adolescents compared to control.

- Pre-eclampsia appeared at an almost equal frequency among the cases and controls.
- Malaria occurred at higher frequency (23.8%) among control in comparison to 16.3% for adolescents.

Table 5: Maternal height in centimeters

HEIGHT (CM)	ADOLESCENTS AGE GROUPS - YRS ≤ 15	16-17	18-19	**TOTAL (CASES)**	**CONTROL**	P VALUE
<145	1(7.1%)	5(8.6%)	9(7.6%)	15(7.9%)	11(6.7%)	
145-149.9	4(28.6%)	15(25.9%)	27(22.9%)	46(24.2%)	23(14.0%)	
150+	9(64.3%)	38(65.5%)	82(69.5%)	129(67.9%)	130(79.3%)	
TOTAL	14	58	118	190	164	0.040

The distribution of maternal heights of the study population is shown in table 5.

- Sixty-one (32.1%) women among the adolescent group had height below 150cm compared to the control group 34/164(20.7%) and proportion of those with height below 145cm was also higher in the adolescents (7.9%) than control group (6.7%).
- Mean height was 152.05 ± 5.79(SD) for adolescents group and 153.82 ± 6.32(SD) for the control group.
- These differences were statistically significant.

Table 6: Gestational age at delivery

GESTATION AGE (WEEKS)	ADOLESCENTS AGE GROUPS – YRS ≤ 15	16-17	18-19	**TOTAL (CASES)**	**CONTROL**	P VALUE
≤ 28	0(0.0%)	1(1.7%)	4(3.4%)	5(2.6%)	1(0.6%)	
29 –32	1(7.1%)	5(8.6%)	7(5.9%)	13(6.8%)	2(1.2%)	
33 – 36	4(28.6%)	11(19.0%)	19(16.1%)	34(17.9%)	10(6.1%)	
≥ 37	9(64.3%)	41(70.7%)	88(74.6%)	138(72.6%)	150(92.0%)	
TOTAL	14	58	118	190	163	<0.001

The distribution of the study population according to their gestation age at delivery is shown in table 6.

- About twenty seven percent (27.4%) of adolescents had premature delivery compared to the control group, which was only eight percent (8.0%).
- Most premature deliveries occurred at gestational age between 33 and 36 weeks.
- Premature delivery in the adolescents decreased with age in a linear fashion.
- Mean gestational age at delivery was 37.08 ± 2.99(SD) in the adolescents and 38.37 ± 2.09(SD) for the control.
- There was statistically significant association between adolescent pregnancy and premature delivery ($p<0.001$).

Table 7: Association between adolescent pregnancy and intra-partum and postpartum complications

COMPLICATIONS	ADOLESCENTS AGE GROUPS –YRS			**TOTAL**		P
	≤ 15	**16-17**	**18-19**	**(CASES)**	**CONTROL**	VALUE
Anaemia	3(21.4%)	9(15.5%)	17(14.4%)	29(15.3%)	19(11.6%)	0.67
Preeclampsia	0(0.0%)	4(6.9%)	5(4.2%)	9(4.7%)	10(6.1%)	0.68
Eclampsia	2(14.3%)	2(13.3%)	6(15.0%)	10(5.3%)	6(3.7%)	0.35
PROM	6(42.9%)	8(13.8%)	19(16.1%)	33(17.4%)	13(7.9%)	0.001
APH	0(0.0%)	2(3.4%)	1(0.8%)	3(1.6%)	0(0.0%)	0.14
Obstructed labor	1(7.1%)	5(8.6%)	17(14.4%)	23(12.1%)	14(8.5%)	0.51
Others (prolonged labor)	6(0.4%)	11(19.0%)	12(10.2%)	29(15.3%)	10(6.1%)	0.02
PPH	1(7.1%)	2(3.4%)	4(3.4%)	7(3.7%)	2(1.2%)	0.41
MATERNAL DEATHS	0(0.0%)	0(0.0%)	1(0.8%)	1(0.5%)	2(1.2%)	

The table 7 shows maternal complications during and after delivery.

- Premature rupture of membranes and prolonged labor occurred significantly (P<0.05) more in the adolescents 33(17.4%) in comparison to 13(7.9%) for the control and were more in the younger adolescents.
- Other complications were obstructed labor, preeclampsia, eclampsia and post-partum hemorrhage.
- The result showed that, there is statistical significant difference in terms of duration of labor and premature rupture of membranes

between the two groups.

- The rest of the complications were more prevalent in the index group but were not significant.
- There was one maternal death among the adolescents and two in the control group. The causes of deaths were obstructed labor and eclampsia respectively.

Table 8: Association between Adolescent pregnancy and mode of delivery

MODE OF DELIVERY	ADOLESCENTS AGE GROUPS-YRS ≤ 15	16-17	18-19	**TOTAL (CASES)**	**CONTROL**	P VALUE
Spontaneous Vaginal delivery	14(100%)	54(93.1%)	97(82.2%)	165(86.8%)	144(88.3%)	
Interventional Deliveries	0(0.0%)	4(6.9%)	21(17.8%)	25(13.2%)	19(11.7%)	
TOTAL	14	58	118	190	163	0.791

The distribution of mode of delivery of the study population is shown in table 8.

- There was no much difference in terms of mode of delivery between the two groups.
- All 14(100%) very young adolescents had spontaneous vaginal delivery.
- There was only a slight increase in the proportions of operative deliveries and assisted breech deliveries in the adolescent group but

this was not statistically significant.

Table 9: Fetal outcome

SCORE AT FIVE MINUTES	ADOLESCENTS AGE GROUPS-YRS ≤ 15	16-17	18-19	TOTAL (CASES)	CONTROL	P VALUE
0	1(7.1%)	4(6.9%)	5(4.2%)	10(5.3%)	13(8.0%)	
≤ 3	0(0.0%)	0(0.0%)	1(0.8%)	1(0.5%)	2(1.2%)	
4 – 6	1(7.1%)	4(6.9%)	7(5.9%)	12(6.3%)	9(5.5%)	
≥ 7	12(85.7%)	50(86.2%)	105(89.0%)	167(87.9%)	139(85.3%)	
TOTAL	14	58	118	190	163	0.98
NEONATAL ADMISSION						
Pre-maturity	2(14.3%)	4(6.9%)	5(4.2%)	11(5.8%)	2(1.2%)	0.112
Severe birth asphyxia	1(7.1%)	1(1.7%)	3(2.5%)	5(2.6%)	2(1.2%)	0.709
Moderate asphyxia	0(0.0%)	6(10.3%)	13(11.0%)	19(10.0%)	11(6.7%)	0.297
Congenital anomaly	0(0.0%)	1(1.7%)	0(0.0%)	1(0.5%)	0(0.0%)	0.244
Aspiration	0(0.0%)	2(3.4%)	4(3.4%)	6(3.2%)	3(1.8%)	0.731
others	0(0.0%)	0(0.0%)	1(0.8%)	1(0.5%)	1(0.6%)	0.86
TOTAL	3(21.4%)	14(24.1%)	26(22.0%)	43(22.6%)	19(11.7%)	
Overall deaths						
Stillbirth fresh	0(0.0%)	0(0.0%)	4(3.4%)	4(2.1%)	7(4.3%)	
Stillbirth macerated	1(7.1%)	4(6.9%)	1(0.8%)	6(3.2%)	4(2.5%)	
Neonatal deaths	1(7.1%)	4(6.9%)	9(7.6%)	14(7.4%)	3(1.8%)	
TOTAL	2(14.3%)	8(13.8%)	14(11.9%)	24(12.6%)	14(8.6%)	0.047

The outcome of babies of the study population is summarized in table 9.

- The outcome of babies of the adolescent mothers was poor.
- The percentage of babies who were born with low apgar score was similar in the two groups.
- A slight increased percentage of normal apgar score in the adolescents was also observed.
- The frequency of complications in babies born to adolescents was higher (22.6%) compared to 11.7% for control.
- The most common complications were birth asphyxia pre-maturity and meconium aspiration.
- Although stillbirths were more (13/163,8.0%) in control group but many babies from the adolescent died in neonatal ward before discharge from the hospital probably because of pre-maturity.

Table 10: Fetal birth weight

WEIGHT (gms)	ADOLESCENTS AGE GROUPS-YRS ≤ 15	16-17	18-19	**TOTAL (CASES)**	**CONTROL**	P VALUE
< 2500	9(64.3%)	15(25.9%)	22(18.6%)	46(24.2%)	24(14.7%)	
2500 – 2999	2(14.3%)	25(43.1%)	46(39.0%)	73(38.4%)	48(29.5%)	
3000 – 3499	1(7.1%)	14(24.1%)	29(24.6%)	44(23.2%)	66(40.5%)	
≥ 3500	2(14.3%)	4(6.9%)	21(17.8%)	27(13.7%)	25(14.1%)	
TOTAL	14	58	118	190	163	<0.001

The distribution of weight of the foetuses of the study population is shown in table 10.

- A higher proportion 46/190,24.2% of the babies born to adolescents had low birth weight compared to 24/163,14.7% for the control group and this occurred more 9/14,64.3% in the young group (≤ 15 years of age).
- Most (73/190,38.4%) of those infants who were more than 2500gs were between 2500gs and 2999gs.
- No distinction was made on whether the babies were small for date or simply premature.
- However 71/190,37.4% of adolescents as against 91/163,55.8% of control weighed 3000gm and over.
- Mean fetal birth weight was 2752.63 ± 590.84(SD) in adolescents and 2946.63 ± 540.87(SD) for the control.
- The results showed that there is statistical significant association between adolescent pregnancy and low birth weight.

Table 11: Duration of Hospital stay.

DURATION IN (HOURS)	ADOLESCENTS AGE GROUPS-YRS ≤ 15	16-17	18-19	TOTAL (CASES)	CONTROL	P VALUE
< 24	9(64.3%)	27(46.6%)	60(50.8%)	96(50.5%)	108(65.9%)	
24 – 72	2(14.3%)	26(44.8%)	41(34.7%)	69(36.3%)	44(26.8%)	
> 72	3(21.4%)	5(8.6%)	17(14.4%)	25(13.2%)	12(7.3%)	
TOTAL	14	58	118	190	164	0.011

The duration of hospital stay in hours is summarized in table 11.

- Twenty-five (25/190,13.2%) of adolescents stayed in hospital for more than 72 hours compared to 12/164,7.3% for control.
- Majority 108/164,65.5% of control group stayed shorter (< 24 hours) in hospital.
- There was a statistically significant difference between the two groups in terms of duration stayed in hospital before discharge.
- Mean duration was 40.21 ± 39.99(SD) and 33.80 ± 47.49 (SD) for control.

DISCUSSION

Pregnancy in adolescents, remain to be a threat to the life of both the mother as well as that of the child. The present study aimed at elucidating the potential obstetric risk factors among adolescent primigravidae and older primigravidae in Dar es Salaam Tanzania. The socio demographic profile of the study population was largely similar in terms of distribution pattern of place of residence. However a significant higher proportion of pregnant women seen, came from Kinondoni district. The closer proximity of Kinondoni to Muhimbili National Hospital partly explains this observation.

The percentage of births to unmarried adolescents is high, and this can be contributed by the fact that, adolescents today are growing up in a culture where peers, televisions and motion pictures, music and magazine often transmit either covert or overt messages that, unmarried sexual relationships are common, accepted and at time expected behaviors. Marriage in young age, has also been shown to be associated with increased rate of adolescent pregnancy. In the present study a significant association between adolescent pregnancy and marital status was observed, whereby most of the adolescents were unmarried and few were cohabiting. Similar observations have been reported in other studies [6,16,17,35]

Young women with low level of education and economic attainment often experience restricted ability and motivation to regulate their fertility thus resulting in high rates of early pregnancy. Those who are in school are forced to discontinue their education when they become pregnant. Because of their low level of education, they are less likely to postpone marriage and child bearing. They are also less aware of utilization of family planing. In this study 26/190,13.7% of the adolescents had no formal education, 28/190,14.7% could not finish their education of which 11/190,5.8% of them were discontinued from school due to pregnancy and 87.4% were unemployed. In contrast, among the control only 4/164,2.4% had no formal education, 9/164,5.4% had incomplete education. These results were strongly statistically significant and therefore in general many adolescent pregnant mothers are uneducated, unmarried, unemployed and they suffer high rate of school dropouts. These results were also reported by other studies [6,16,17].

As expected, majority of the adolescents did not plan their pregnancies. However it is interesting to note that, some adolescents aged 16-17 years of age reported to have planned their pregnancies. It is difficult to imagine that this group which is below the legal age of consent could really plan a first pregnancy in the socio-cultural setting

of Tanzania. Further studies are needed to verify this observation.

The rate of booking was high in both groups 186/190,97.6% and 162/164,98.8% respectively, but the frequency of antenatal check up was less among the pregnant adolescent women. Although there were no special indicated antenatal clinic for these groups, the overall antenatal supervision was poor among the adolescent pregnant mothers. According to the table (appendix 2) used by the author to assess the quality of antenatal care, there was a significant higher proportion (20/186,10.8%) of adolescents who received poor quality antenatal care in comparison with 9/162,5.6% for control. This was contributed by the fact that important measurements and investigations as well as risk assessment and referral as recommended in the MCH card number four were not done. This indicates that adolescents were less careful about their pregnancies probably because of immaturity and low level of education. Lack of antenatal supervision and care among adolescent pregnant women, has also been reported by others [7,23,24,29].

Maternal height and weight and the rate and amount of weight gain during pregnancy, are important in fetal development. Women who are under weight or short stature, tend to have small babies especially if low weight is the result of long standing nutritional inadequacy. Increase in

height and weight continues among adolescents, up to six years post menarche. Thus total weight gain should include the weight gain for pregnancy plus the weight gain for growth expected during the time of pregnancy. In this study a significant difference in maternal height was observed among the two groups whereby the control had an overall higher height compared to the cases. The author did not assess and compare the weight gained by these groups during pregnancy (an important area for study). Although it was observed that 9/14,64.3% of the very young adolescents (15 years and below) delivered at term (≥ 37 weeks) but a high proportion 9/14,64.3% of them had low birth weight babies. This was probably attributed to intrauterine growth retardation leading to small for gestation age babies. Poor weight gain and small for gestational age babies, was also reported by others [6,16,25,28,29,32,36].

Adolescent pregnant mothers do suffer from difficult deliveries due to physical immaturity of their bodies. Prolonged labor was a significant finding among the adolescents. Failure to elicit any significant difference in the mode of delivery between the two groups in the present study could be attributed to the higher number of low birth weight babies observed in the study group. There was a slightly, higher proportion (11.1%) of adolescents who had caesarean section in comparison to controls (10.4%) but this difference was not statistically significant.

Similar findings have been reported in other studies [34,37]. Mbaruku (1987) [33] in his study he observed a significant high proportion of operative deliveries in under 16 years old primigravidae. The difference observed in the present study could probably be explained by the presence in high proportions of the disease HIV/AIDS among pregnant women which is also known to be associated with low birth weight babies and pre-term deliveries.

Prolonged labor and pre-term/pre-labour rupture of membranes were significantly more common among the adolescents than among the controls and this was observed more in the young adolescents. This could be probably due occurrence of this condition in large proportional among unemployed women. These findings compare very well with those reported by others [33,38].

Generally, anaemia in pregnancy, eclampsia, antepartum and postpartum haemorrhage were more frequent in adolescents than control but this difference was not statistically significant. This could be partly explained by the low frequency of antenatal check up, late booking and poor quality care observed in this group. Since it was observed in this study that, majority of adolescents were not prepared for pregnancies, probably they were less motivated to take interest in

antenatal follow up. Psychosocial immaturity of the adolescents could also have contributed because they were probably less likely to ask for some investigations / measurements, as well as poor medication compliance. Malaria and preeclampsia were observed more in the control group probably due to frequent antenatal check up and increased awareness about their pregnancies.

The younger the mother, the greater the risk of complications for the mother and her child. The fact that these mothers are still growing and have poor nutrition intake, make them give birth to low birth weight babies. Preterm labour, prolonged obstructed labour, prolonged pre-labour rupture of membranes and increase maternal complications in adolescents, are the contributing factors to adverse fetal outcome. In this study a significant low birth weight was observed. Other significant poor fetal outcome, were prematurity (5.8%), and perinatal deaths (12.6%). The increased fetal death observed in this study can be explained by high rates of pre-maturity, low birth weight, birth asphyxia and neonatal infection as a result of prolong labor and prolonged premature rupture of membranes, and respiratory distress syndrome as a result of pre-maturity. Poor fetal outcome in the adolescents was also observed by other researchers [33,34,35,36,37,38,39].

Since maternal and fetal complications were significantly higher in the adolescents the duration of hospital stay was also high with the most contribution from eclampsia and premature babies.

CONCLUSION

- The frequency of antenatal check up, and quality of care are poor in adolescents.
- The majority of adolescents deliver by spontaneous vaginal delivery.
- No much difference in terms of fetal apgar score between adolescents and non-adolescents primigravidae.
- Adolescent pregnancy is associated with premature labour, premature rupture of membranes and prolonged labour.
- Adolescent pregnancy is associated with low level of education and an increased school drop outs.
- Adolescent pregnancy is a high risk condition as it is associated with adverse fetal outcome as well as maternal complications.

RECOMENDATIONS

1. Adolescents should be given proper sex education, kept aware with and use of contraceptives and encouraged to continue with education.
2. For those that fall victims, proper antenatal care and increased observation during labor should be encouraged in order to improve the outcome of their babies.
3. Quality of antenatal care should be improved especially in our peripheral clinics by frequent follow up and supervision and good quality antenatal care should be offered to pregnant adolescents.
4. Medical and educational services with comprehensive prenatal care for adolescents should be instituted in order to improve the outcome of their pregnancies.
5. Adolescent pregnancy should be regarded as a high risk pregnancy, therefore should be supervised in high risk clinics.
6. A bigger study is suggested.

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