FACTORS ASSOCIATED WITH FIRST PREGNANCY AMONG ADOLESCENT AND POST ADOLESCENT WOMEN AT BANADIR HOSPITAL, MOGADISHU, SOMALIA

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REGISTRATION NUMBER: H58/68378/2013

A DISSERTATION SUBMITED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE MASTER OF MEDICINE IN OBSTETRICS AND GYNAECOLOGY

UNIVERSITY OF NAIROBI

DECLARATION

I declare that this dissertation is my original work and has not been presented for the award of a degree in any other university.

DR. KHADIJA MOHAMUD HASSAN.

SIGNED…….. DATE…….

SUPERVISORS APPROVAL

This dissertation has been submitted for examination with our approval as the University Supervisors.

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CERTIFICATE OF AUTHENTICITY

This is to certify that this dissertation is the original work of Dr. Khadija Mohamud Hassan, an MMed student in the Department of Obstetrics and Gynaecology, College of Health Sciences, University of Nairobi, under the guidance and supervision of Prof. Eunice Cheserem and Dr. Michoma Peter. This dissertation has not been presented in any other university for award of a degree.

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DEDICATION

This book is dedicated to my loving husband Musa Kahiye for his unconditional love and support, to our lovely daughter Arwa. To my parents for their sincere sacrifice and continued support to ensure that I got the best education. They are truly blessing and May Allah (SWT) bless them all.

ACKNOWLEDGEMENTS

First and above all, I praise the Almighty God for giving me the strength, attitude and zeal to pursue this course. I wish to express my profound gratitude to my supervisors: Prof. Eunice Chesemrem and Dr. Michoma Peter for their support, guidance and mentorship in the undertaking of this research. This work would not have been possible without their support and moral throughout this process. I want to express my sincere gratitude to all of you who made this thesis possible.

I am also grateful to Mr. Philip Ayieko for patiently guiding me through the data analysis, Miss Aisha and Naima for their great work as investigator assistants. I would like to also acknowledge Banadir Hospital for allowing us to conduct this research in their department of obstetrics and gynecology. Thanks to also all the patients who attended BH department of obstetrics and gynecology during the period of our data collection, this work would not have been feasible if they did not consent.

The most special thank goes to my partner and friend, my husband. Musa, you gave me your unconditional support and love through all this long process.

LIST OF ABBREVIATION

AHRQ-PSRCC: Agency for Healthcare Research Quality's Patient Safety Research Coordinating Centre

ANC: Antenatal clinic.

ERC: Ethics and research committee.

HIV: Human immune deficiency virus.

KNH: Kenyatta national hospital.

NGO: Nongovernmental organizations.

PESS: Population estimation survey of Somalia.

UNFPA: United Nations fund for population activities.

UNICEF: United Nations international children's emergency fund.

UON: University of Nairobi.

US: United States

STI: Sexually transmitted infection.

WHO: World health organization.

DEFINITION OF TERMS

Adolescent: is a transitional period from childhood to adulthood characterized by significant physiological, psychological and social changes.

Primigravida: is defined as women who conceive for the first time and they are high risk group.

Menarche: is the first menstrual cycle or bleeding in female, it is usually between ages 11 and 14, and can happen as early as 9 years or as late as 15.

Reproductive health: is defined as complete physical, mental and social well-being in all matters of related to reproductive system.

Contraceptives: is a method or device that prevents women from getting pregnant.

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ABSTRACT

Background Adolescent pregnancy is defined as, pregnancy occurring in young female aged10 to 19 years. It is a complex issue and challenge to families, health care professionals, educators, government authorities and the youth themselves. Several studies report that adolescent pregnancy is associated with adverse maternal and perinatal outcomes and is a contributing factor to maternal and neonatal mortality.

Objective To compare factors associated with first pregnancy among adolescent versus post-adolescent women.

Methodology A case control study was conducted at Banadir hospital, Mogadishu, Somalia, using structured questionnaires. Information was obtained through participants' interview. The inclusion criteria were adolescent women aged 10 to 19 years with first pregnancy and post-adolescent women more than 20 years who become pregnant. The study period was between March 2016 and June 2016. Data analysis was done using SPSS version 18.0.

Results: A total of 348 participants were recruited including 174 adolescent and 174 post-adolescent mothers. The mean ages of adolescent and post-adolescent mothers were 17.5 (SD ± 1.5) years and 23.2 (SD ± 3.1) years, respectively. There were no significant differences in terms of marital status ($p = 0.466$) and residence ($p = 0.541$) of adolescent and post-adolescent women. There was a significant association between first pregnancy among adolescent and post-adolescent mothers and the mothers' contraceptive use ($p = 0.001$), contraceptive knowledge ($p = 0.01$), type of marriage ($p < 0.001$). Adolescent first time mothers were less likely to have ever used contraceptives, OR = 0.21, 95% CI 0.08-0.51, and were also less likely to know a method that protects from both pregnancy and STI, OR 0.46, 0.26-0.83. Forced marriages were more likely among adolescent first time mothers, OR = 2.38, 1.51-3.76. In the adjusted analysis never having used contraceptive was the factor that showed significant association with first time adolescent pregnancy.

Conclusion Among the three group of factors that were explored for association with first time adolescent pregnancy namely demographic risk factors, socio-economic risk factors and reproductive health and knowledge it was evident that reproductive health and knowledge showed the strongest association with adolescent pregnancy. This study is a necessary first step in addressing the public health problem faced by adolescent mothers in Somalia, a country with limited access to high quality obstetrical care and a setting in which most deliveries occur at home.

INTRODUCTION AND LITERATURE REVIEW

World Health Organization defines adolescent pregnancy as pregnancy of girls aged 10 to 19 years, it is a common public health problem in both developed and developing countries (1), (2). Adolescent is a transitional period from childhood to adulthood characterized by significant physiological, psychological and social changes. It is estimated that more than 50,000 adolescent girls die each year because they become pregnant before they are physically mature enough for parenthood (3).

About 16million women aged 15-19 years give birth each year, roughly 11% of all births worldwide and almost 95% of these births occur in developing countries(2)(4). Although there is decline in adolescent pregnancy rate in developed countries, teenage pregnancy is a significant problem worldwide(5). However, the highest levels of adolescent pregnancy are in Sub Saharan Africa where every second women give birth to a child before the age of 20yrs(6)(5).

In 2010, the US rates of teen pregnancy, births and abortions have declined by almost 51% since their peak in early 1990s(7). Although a recent meta-analysis study examined pregnancy rates and outcomes in all countries showed that adolescent pregnancy remains high in many countries, in developed countries the highest rate was United States which was 57 pregnancies per 1000 in 2010, followed New Zealand 51/1000, England 47/1000, and the lowest teen Pregnancy rate was Switzerland 8/1000. Among developing countries, the highest teen pregnancy rates were found in Mexico and sub Saharan Africa countries ranging 121/1000 in Ethiopia and 187/1000 in Burkina Faso(8). In Kenya adolescent fertility rate is 92/1000(9).

It has been reported in different studies that adolescent pregnancy is associated with high risk for both mother and foetus (4). Each year adolescent girls who are delivering have a much higher

risk of dying from maternal complications compared to women in their 20s and 30s (1)(10). These risks increase as maternal age decrease with adolescent under 16 facing four times the risk of maternal death as women over 20, also babies delivered by adolescents face significantly higher risk of death compared to babies delivered by older women(10). Thus, adolescent pregnancy is a complex issue and poses challenges to families, health care professionals, educators, government authorities and the youth themselves, worsening the situation when there is a lack of adequate antenatal care and safe delivery seen in most settings of developing countries(2)(4)(11).

A crucial step for designing an intervention strategy to reduce adolescent pregnancy investigating the factors associated with this problem.

Some of the factors that contribute to increase adolescent pregnancy include:

Socio-cultural and economic factors, Individual factors, educational level, access of family planning health services.

Over all it is considered that early physical maturation and early menarche is associated with adolescent pregnancy because they appear older than their age and are more likely to initiate sex at earlier age(12)(13)(14), In addition, adolescent sexual behaviors such as early dating(15), inadequate knowledge about safe sex, low contraceptive use can expose adolescent to sexually transmitted disease and unintended pregnancy (16). Sexual violence, sexual abuse in both childhood and adolescent and alcohol use increases risk of HIV infection, other STIs and adolescent pregnancy(17)(18)(19).

Globally, different studies are collected to investigate the association between adolescent pregnancy and individual, socio-economic, educational and cultural factors. We will highlight some of these studies;

In 2013, analysis of collected data that examined adolescent sexual behaviors from Kenya, Senegal, and Nigeria was done and showed that in the three countries, youth males are more likely to initiate sex than the females; data also showed that youth with higher level of education were less likely to have early sexual activity. In Nigeria and Senegal poor female youth have early sexual debut than richer female youth. And Kenya richer female youth are more likely to have premarital first sex and high rate of contraceptive use/condom then poorer female youth, and youth with older age at first sex associated with high rate of contraceptive use(20).

Most of the studies showed that low socio economic status was an important cause for adolescent pregnancies, and deprivation of education, and low educational level was a significant influencing factor for increased adolescent pregnancy followed by peer pressure and social environmental factors(21), Also it is stated in literature that adolescents with single parent families and having low parental monitoring are associated with early sexual initiation and adolescent pregnancy(22), On the other hand, adolescents who have parents with higher educational level and higher income they are less likely to have early sexual activity and early or unwanted pregnancies(23) .

However; adolescent pregnancy outcome is not only a risk for increased maternal mortality and morbidity but they are associated with adverse perinatal outcomes and negative outcomes in later life of new-borns(24), such as mental and behavioural disorder(25)(26), especially those born by

mothers younger than 15 years. On the other hand, higher educational level in adolescent female was associated with early sexual activity and contraceptive use(20).

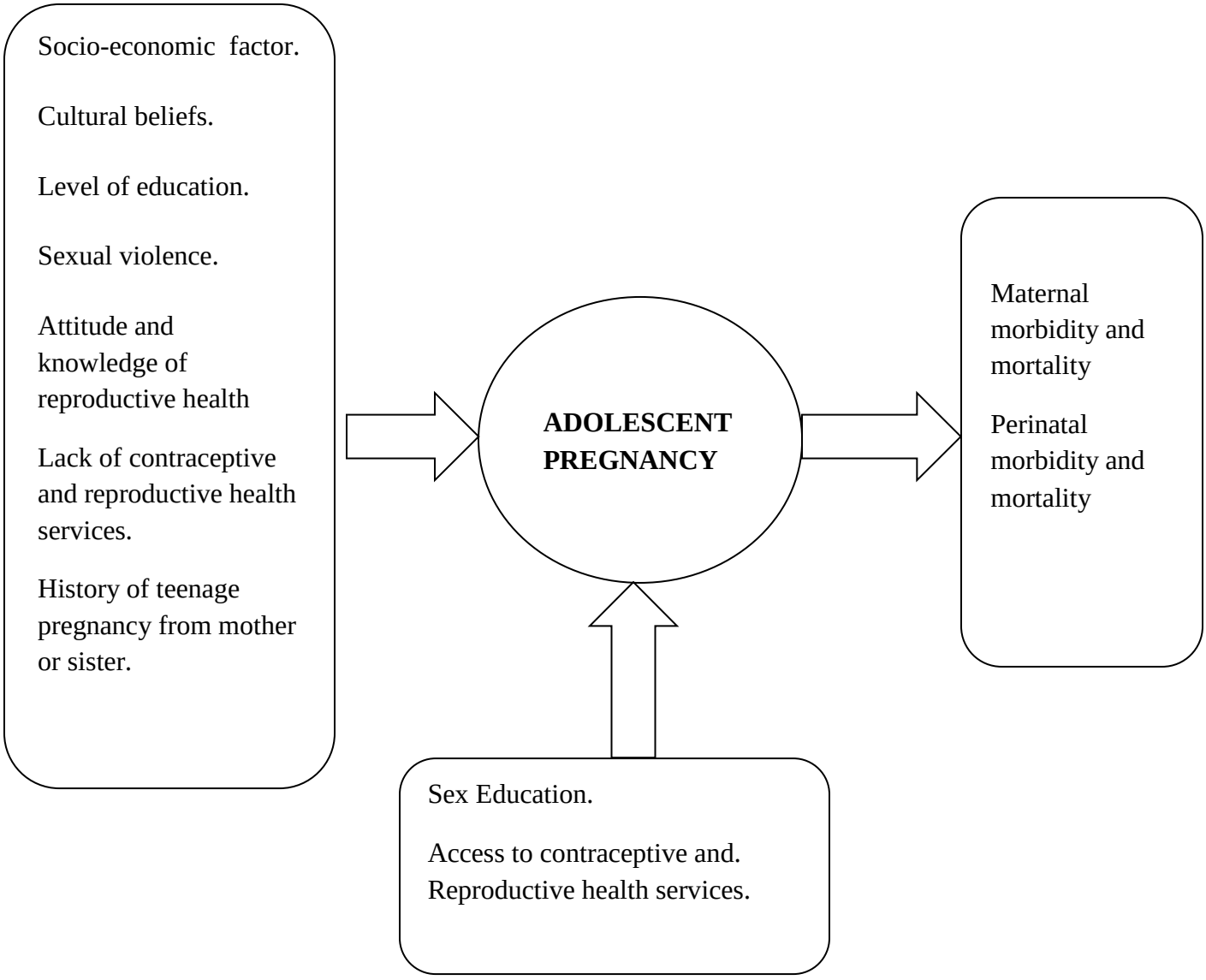
Some of the obstetrical problem associated with teenage pregnancy include higher preterm delivery, higher risk of eclampsia or pregnancy induced hypertension, puerperal endometritis, systemic infection, low birth weight, stillbirth and low birth weight babies, neonatal deaths, also anaemia, urinary tract infection, malaria(27), vasico-vaginal fistula are more common compared with adult mothers(28)(29)(30).

As it is not mentioned in the literature, there is a huge research gap in Somalia, from 1991 when the civil war started, since that time the government has collapsed, health system and education and many other systems are totally destroyed, an estimated one million people have died and nearly 50percent of the population has been displaced and the overall vulnerability of the population is increased, as a result of humanitarian crisis. All the factors associated with adolescent pregnancy are very high for more than 2 decades and reliable data is not available while the only information source is surveys conducted by NGO's which face a high challenge due to the conflict issues in the country and also the religious and cultural beliefs.

Reducing the rate of adolescent pregnancy is one of the agenda of action for meeting most of the millennium development goals(31). Educating and empowerment of adolescent girls reduces the incidence of adolescent pregnancy and complications associated with it(32) and Family planning is considered as a pillar in reducing adolescent pregnancy rate.

CONCEPTUAL FRAMEWORK

Figure 1: C**onceptual framework**



CONCEPTUAL FRAMEWORK NARRATIVE

Adolescent pregnancy is very common among people who have low educational level, in addition being pregnant and having a baby also leads to discontinuing formal education.

As a result of lower educational attainment, teenage mothers have fewer opportunities for employment impacting on their socio-economic status.

Early sexual activity, irregular or ineffective use of contraceptive, sexual violence and mental health problem are also contributing factor for adolescent pregnancy.

Being a daughter of teenage mother, family conflict or violence, frequent movies can predispose girls to early pregnancy.

Early marriage is also a factor in adolescent pregnancy, many poor families marrying their daughter at an early age through bride price to reduce dependent persons.

In unsafe regions the parents believe that marrying their daughter is the best way to protect them from danger.

Adolescent pregnant are less likely to receive perinatal care and insufficient perinatal care can lead to premature births and low birth weight.

Early pregnancy is associated with complications during childbirth like obstructed labour, obstetric fistula, and tears in birth canal if cesarean section is not available because of under developed pelvis.

Prevention of early pregnancy, increase use of contraception, and increase antenatal care can prevent poor maternal and perinatal outcomes.

PROBLEM STATEMENT

Approximately half of the world's population is adolescent and about 85% of them live in developing countries. Adolescent pregnancy is a widespread at the global level (4).

In Sub Saharan Africa more than 50% of women give birth before the age of 20, Adolescent pregnancy is a contributing factor to maternal mortality and it is the second leading cause of adolescent death aged 15 to 19 years and causes morbidities accounting 15% of the global burden of disease, and 13% of all maternal deaths(4).

In Sub Saharan Africa the average rates of births per 1000 females 15-19 years of age is 143 varying from 45 in Mauritius to 229 in Guinea. These rates are very high compared to the world average of 65(5).In Somalia the adolescent fertility rate is 123 per 1000(33). According to Somalia, population estimation survey (PESS) of 2014 half of the population is younger than 20 years(34).

These statistics coupled with the high adolescent fertility rate in Somalia makes adolescent pregnancy an urgent concern for reproductive health services in the country. Yet there are no studies addressing the issue of adolescent pregnancy particularly the factors predisposing adolescent to early pregnancy. Studies from other region in Sub Saharan Africa are not easily generalize to Somalia because of its unique cultural practices that promote early marriage and practices that impact of adolescent reproductive health for example FGM, school dropout rates versus pregnancies.

JUSTIFICATION AND STUDY RATIONALE

Current global estimates indicate that approximately 16 million adolescent deliver every years and that most of these pregnancies occur in middle- and low-income countries, Complications that occur during pregnancy and childbirth are the second most common cause of death in adolescent girls between 15 and 19 years of age(4), yet teenage pregnancy has not received as much attention as other health problems that afflict adolescent girls. Adolescent pregnancy is

common in Somalia, a country in which issues of adolescent reproductive health receive even less attention due to the instability that has characterized the country's political arena for at least two decades now. To our knowledge no studies have explored factors associated with adolescent pregnancy since 1991 when the country started experiencing political turmoil.

This study compared the factors predisposing adolescent in Somalia to pregnancy. The findings will help in planning adolescent reproductive health services and promote adolescent health. Apart from aiding planning and decision making the findings will also help in designing interventions that will mitigate adolescent pregnancy.

Investigating the knowledge of reproductive health and family planning among adolescent will help in formulating future policies used to improve adolescent health and reduce maternal and neonatal mortality.

The outcome of this study find direct application among policy makers, Ministry of Health Somalia and NGOs whose operation are intended to improve adolescent reproductive health status and reduce the incidence of early pregnancies.

RESEARCH QUESTION

Is low knowledge of reproductive health and contraceptive associated with risk of first pregnancy among adolescent women at Banadir Hospital, Somalia?

NULL HYPOTHESIS

Low knowledge of reproductive health and contraceptive is not associated with the risk of first pregnancy among adolescent women at Banadir Hospital.

RESEARCH OBJECTIVES

BROAD OBJECTIVE

To compare factors associated with first pregnancy among adolescent versus post-adolescent women at Banadir hospital.

SPECIFIC OBJECTIVE

- To determine socio-demographic characteristic associated with first pregnancy among adolescent and post-adolescent women at Banadir hospital
- To determine socio-economic and cultural factors associated with first pregnancy among adolescent and post-adolescent women at Banadir hospital.
- To assess knowledge of reproductive health and contraceptive characteristics among adolescent and post-adolescent women at Banadir hospital.

METHODOLOGY

Study Design

This study was a case control study. The case control design was selected because the aim of the analysis was to assess the risk factors for first pregnancy according to maternal age group and including adolescent and post-adolescent mothers.

Study period

The study was conducted the period between during a four-month period between March 2016 and June 2016

Study site and setting

This study was conducted at Banadir hospital, Mogadishu, Somalia, which is located at wadajir districts. It is the referral hospital for the whole country, and also acts as the university teaching hospital.

The hospital offers many services including antenatal clinics, postnatal clinics family planning and has labour ward and theatre, and conducts more than 300 deliveries per month.

Study population

The study population was adolescent pregnant women aged 10 to 19 years with first pregnancy and post-adolescent women who became pregnant after 19 years at Banadir hospital

Inclusion criteria

- Adolescent mothers aged 10 to 19 years with first pregnancy.
- Post-adolescent women aged > 19 years with first pregnancy.

Exclusion criteria

- Multiparty
- Very sick patient with chronic disease.
- Declined consent

Sample size and sampling procedure

Sample Size Determination

The following assumptions were used in calculating sample size using the formula for comparison of two proportions:

$$n = \frac{2(Z_\beta + Z_{\alpha/2})^2(\bar{p})(1-\bar{p})}{(p_1 - p_2)^2}$$

- For 80% power, Z_β=0.84
- For 0.05 significance level, Z_α=1.96
- p_1 = The proportion of adolescent first time mothers with a known risk factor for early pregnancy (low socioeconomic status among adolescent mothers in Tanzania was reported in 57% of adolescents, Nyakubega)(35).
- p_2 = The proportion of adult first time mothers with a known risk factor for early pregnancy (estimated at 40%)
- $\bar{p}$ = average of p_1 and p_2 (49.5%)

$$n = \frac{2 \times (0.84 + 1.96)^2 \times (0.495)(1 - 0.495)}{(0.57 - 0.42)^2}$$

n = 174 per group

Total sample size = 2 ×174 = 348

Sampling procedure

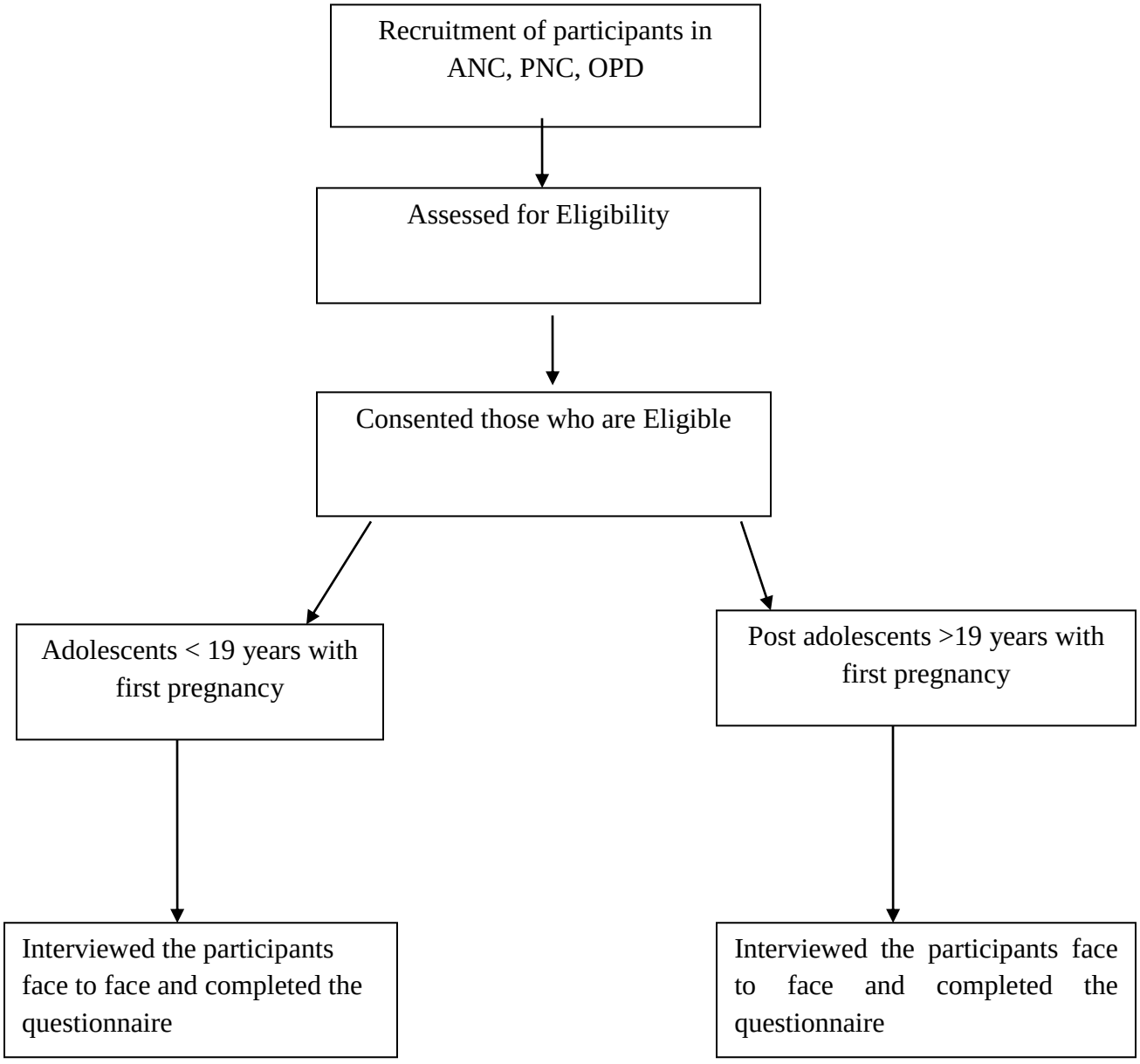
Consecutive sampling of all eligible women who attended ANC, PNC, and OPD, with first pregnancy was done and the women were enrolled in the study until desired sample size achieved.

Study procedure

Before recruitment of the study participants, one day training was conducted for research assistants. During the training the assistants were briefed on study methodology with a focus on purpose of the study, selection of study participants, administration of informed consent, and administration of questionnaire form.

Participants were recruited in antenatal clinic, (ANC) postnatal ward, (PNW) outpatient department, (OPD) after assessment for eligibility. Adolescent (< 19 years of age) and post-adolescent (> 19 years) mothers with first pregnancies were consented. Face to face interview and structured questionnaires were then administered by the principal investigator and research assistants for all eligible patients until the desired sample size is achieved. (Figure 2)

Figure 2 Study Procedure



Data variables

Dependent variables:

- Adolescent pregnancy

Independent variables:

- Socio-demographic factors
  - ✓ Age
  - ✓ Marital status
  - ✓ Residence
  - ✓ Educational level
  - ✓ Occupation
- Socio-economic status
  - ✓ Husbands educational level
  - ✓ Husbands occupation
  - ✓ Mothers educational level
  - ✓ Mothers occupation
  - ✓ Fathers educational level
  - ✓ Fathers occupation
  - ✓ Monthly income of the family
- Knowledge of reproductive and Family planning
  - ✓ Contraceptive knowledge
  - ✓ Accessibility
  - ✓ Age of menarche

- ✓ Age of first marriage
- ✓ Family history of teenage pregnancy

Data collection and management

Data were collected using structured questionnaires, used to obtain information from patients file records and from the participants through an interview by researcher.

The gathered data were confirmed for completeness, coded and then entered into computer databases designed using SPSS version 18. The databases were protected using passwords.

Quality assurance

The questionnaire had four sections. The sections collected data on: sociodemographic, socioeconomic and cultural status, maternal knowledge of reproductive health and contraception. To ensure validity of the questionnaire items the tool was piloted prior to the main study and each item was assessed for clarity and coherence. The tool was revised based on the findings of the pilot. The questionnaire was also translated into Somali language and translated back into English to ensure accuracy of the obtained information.

Research assistants were trained on research methods that are relevant to case control study design. The training also outlined the aim of the present study and introduced the research assistants to the study questionnaire and techniques for conducting an effective interview with patients, particularly new mothers. Role play and piloting were used during training to help trainees internalize the information provided. In addition, the assistants were provided with data

collection manuals containing standard operative procedures to be used during participant recruitment and data collection.

The principal investigator also provided direct supervision during data collection, and all data collection forms were inspected for completion and validity of responses by the principal investigator prior to data entry.

Data analysis

All data were inspected for completeness, coded then entered into computer using SPSS software version 18.0, which was also used for analysis.

a) Univariable analysis

The data were first analyzed using univariate statistics for each of the two maternal age groups. Mean and standard deviation were used to summarize the age of mothers and reported along with the age range. The categorical variables were described using frequency distributions. For each group of categorical factors including demographics, health care seeking and access the percentage of mothers with each level of the specific factors was calculated and presented using frequency distribution tables or figures. The main outcome was determined by calculating the percentage of adolescent mothers with each of the factors known to be associated with early pregnancy. Similar percentages were calculated for each factor among adult mothers.

b) Bivariable analysis

The distribution of these factors in adolescent and post adolescent mothers were then compared in bivariate analysis using chi square test. For age students t-test was used to compare mean of adolescent to post-adolescent mothers. Odds rations and corresponding 95% confidence intervals

derived from simple logistic regression were presented to show the measures of effect of the risk factors on first time adolescent pregnancy. Statistical significance was based on an alpha (Type I error rate) of 0.05.

c) Multivariable analysis

The primary outcome in the model i.e. first time adolescent pregnancy (coded as No = 0 and Yes = 1) was included in a multivariable logistic regression model. The independent variables were the factors that showed significant association with adolescent pregnancy in the bivariable analysis based on a p value cutoff of 0.05. and included: participant's level of formal education, participant's occupation, spouse's occupation, reporting ever having used contraceptives, knowledge of contraceptive method that protects user from pregnancy and STI, age at marriage and type of marriage.

Study limitations

A possible limitation of the study arises from the requirement that participating mothers provide information about events that occurred during their first pregnancy. The potential for recall bias in responses obtained from women who cannot recall some distant events was minimized through defining a short recall period.

In the Somali context, it was anticipated that some patients would withhold information about sexual issue because of cultural and religious considerations. To overcome these threats the data collectors were trained on effective interviewing techniques, participants were interviewed in privacy and female chaperons was available during interviews in case participants requested for them.

Dissemination plan

The current project will contribute to development of resources for enriched good medical practices in the context of ANC services through integrating insights from public health, epidemiology and ethics. Implementation of a dissemination plan is a complex process, involving many disciplines and there is no one approach or strategy that universally applies in every situation, therefore, there was need to use multiple methods and tools to navigate the dissemination course. Members of the AHRQ-PSRCC and the steering committee developed a conceptual framework that gives context for the patient safety researchers' dissemination plans.

The dissemination actions can be useful and effective tools in designing strategies that aim to develop patient-centred care and to improve medical practices in the context of ANC and PNW services.

Ethical consideration

Ethical approval was sought from institutional Ethics and Review Boards prior to commencement of the study. The proposal was submitted to the University of Nairobi (UON), KNH ethics and research committee for approval and permission was also sought from Banadir hospital.

Informed written consent was obtained from each participant prior to enrollment. The details provided to potential subjects during the consenting process included:

- The purpose of the study
- The participation is purely voluntary
- This study carries no extra risk or cost to the participant
- The participant is free for withdrawal

- There is no benefit or compensation to the patient for this study and participant will receive the same standard care as any other patient delivering in the hospital.
- Strict confidentiality of the study participation and results will be observed.

During interview if any participant needed further reproductive health consultation or counseling like (HIV positive) the appropriate procedure was implemented like referring patient for further consultations and with the respect of autonomy and patient confidentiality.

Minors for the purposes of protection of vulnerable populations were defined as individuals under the age of 18, the legal age of consent for research procedures in Kenya. The inclusion of minors was justified by the fact that the research topic to be studied was specifically relevant to adolescent mothers. The study applied the specific ethical provision for legal emancipation and informed consent for minors who are married, pregnant or a parent that allows such minors to provide informed consent for care impaction on their health and that of their babies. Counselling provided to minors prior to assenting included reproductive health information and impact of early pregnancy on a minors physical, social, emotional and functional wellbeing.

RESULTS

The study recruited the targeted sample size of 348 participants including 174 adolescents and 174 post-adolescent mothers. The demographic characteristics of participants are presented in table 1.

Table 1: Socio-demographic characteristics of adolescent and post-adolescent women at Banadir Hospital.

	Adolescent mothers	**Post-adolescent mothers**	**P**
Mean age (± SD)	17.5 (± 1.5)	23.2 (± 3.1)	NA
Marital status			
Married	134(77.0)	141(81.0)	0.466
Single	0(0.0)	1(0.6)	
Divorced	28(16.1)	20(11.5)	
Widowed	12(6.9)	11(6.3)	
Residence			
Urban	136(78.2)	139(79.9)	0.541
Rural	38(21.8)	33(19.0)	

The mean age (± SD) of adolescent mothers with first pregnancy was 17.5 (± 1.5) years and that of post- adolescent mothers was 23.2 (± 3.1) years. The age range of participants was 13 to 36 years, with 21/ 174 (7.5%) adolescents aged 15 years or less. Most adolescent (77%; 134/174) and post-adolescent (81%; 141/174) women were married and resident in urban areas: adolescent (78.2%; 136/174) and post-adolescent (79.9%, 139/174). There were no significant differences in terms of marital status (p = 0.466) and residence (p = 0.541) among adolescent and post-adolescent women.

Table 2: Expectant mother and spousal characteristics and occurrence of first time pregnancy in adolescence and post adolescence

	Adolescent mothers	**Post-adolescent mothers**	**OR (95% CI)**	**P**
Participant's level of formal education				
No formal education	41(23.6)	33(19.0)	1.00	
Madarasa	48(27.6)	47(27.0)	0.82(0.45-1.51)	0.529
Primary	46(26.4)	14(8.0)	2.64(1.24-5.62)	0.011
Secondary	35(20.1)	49(28.2)	0.57(0.31-1.08)	0.086
Higher education/university or college	4(2.3)	30(17.2)	0.11(0.03-0.34)	<0.001
Participant's occupation				
Employed	7(4.0)	23(13.2)	0.30(0.12-0.73)	0.008
House wife	109(62.6)	107(61.5)	1.00	
Self employed	4(2.3)	17(9.8)	0.23(0.08-0.71)	0.01
Student	44(25.3)	20(11.5)	2.16(1.19-3.90)	0.011
Unemployed	10(5.7)	7(4.0)	1.40(0.51-3.82)	0.508
Spouse's education level				
No formal education	22(12.6)	19(10.9)	1.00	
Madarasa	37(21.3)	32(18.4)	1.00(0.46-2.17)	0.997
Primary	12(6.9)	14(8.0)	0.74(0.28-1.98)	0.55
Secondary	53(30.5)	41(23.6)	1.12(0.53-2.33)	0.77
University or college	50(28.7)	67(38.5)	0.64(0.32-1.32)	0.228
Spouse's occupation				
Employed	72(41.4)	94(54.0)	1.00	
Self employed	81(46.6)	57(32.8)	1.86(1.17-2.93)	0.008
Unemployed	20(11.5)	21(12.1)	1.24(0.63-2.47)	0.533

As shown in table 2, spouses of adolescent mothers with first pregnancy were most commonly self-employed (81/173; 46.6%) while those of post-adolescent mothers were formally employed (94/172; 52%), $p = 0.008$, Spousal level of formal education did not differ significantly between adolescent and post-adolescent first time mothers ($p > 0.05$).

Parental characteristics, household characteristics, and sexual violence were not significantly associated with the risk of first pregnancy in adolescence. The fathers of most mothers in both adolescent and post-adolescent groups were self-employed (46 and 40.2% for adolescent and post adolescents) and most mothers were housewives (62.1 and 63.2%). Most adolescent (55.7%; 97/174) and post-adolescent (55.2%; 96/174) mothers reported that they lived in households with two persons, with an approximate income of $200 per month (46%; 80/174 and 48.3%; 84/174, respectively). Five mothers reported that they had experienced sexual violence/ victimization (2/170; 1.1% and 3/172; 1.7%) and 8 reported poor communication with parents (5/171; 2.9% and 3/172; 1.7%). There was no association between adolescent and post-adolescent first time pregnancy and status of parent-child communication ($p = 0.474$), experience of sexual victimization/ assault ($p = 0.664$), living with parent ($p = 0.396$)

Table 3: Cultural issues, reproductive health and family planning among adolescent and post-adolescent first time mothers

	Adolescent mothers	Post-adolescent mothers	OR (95% CI)	p
Ever used contraceptives				
Yes	6(3.4)	26(14.9)	0.21(0.08-0.51)	0.001
No	165(94.8)	147(84.5)	1.0	
Knows contraceptive method that protects user from pregnancy and STI				
Yes	20(11.5)	38(21.8)	0.46(0.26-0.83)	0.01
No	152(87.4)	133(76.4)	1.0	
Are contraceptives easy to access?				
Yes	9(5.2)	10(5.7)	0.89(0.35-2.25)	0.803
No	163(93.7)	161(92.5)	1.0	
Age at marriage				
<13 years	5(2.9)	3(1.7)	0.44(0.08-3.03)	0.271
13 to 17	113(64.9)	30(17.2)	1.0	
>17	55(31.6)	141(81.0)	0.10(0.06-0.18)	<0.001
Type of marriage				
Forced/arranged	77(44.3)	43(24.7)	2.38(1.51-3.76)	<0.001
Voluntary	97(55.7)	129(74.1)	1.0	
Daughter or sister to a teen mother				
Yes	101(58.0)	83(47.7)	1.49(0.97-2.29)	0.067
No	71(40.8)	87(50.0)	1.0	
Undergone FGM/ circumcision				
Yes	163(93.7)	168(96.6)	0.65(0.23-1.86)	0.418
No	9(5.2)	6(3.4)	1.0	

Table 3 shows that there was a significant association between first pregnancy among adolescent and post-adolescent mothers and the mothers' contraceptive use ($p = 0.001$), contraceptive knowledge ($p = 0.01$), type of marriage ($p < 0.001$). Adolescent first time mothers were less likely to have ever used contraceptives (3.4%; 6/171) compared to post-adolescent mothers (14.9%; 26/173), OR = 0.21, 95% CI 0.08-0.51, and were also less likely to know a method that protects from both pregnancy and STI (11.5%; 20/ 172) compared to post-adolescent (21.8%; 38/171) mothers, OR 0.46, 0.26-0.83.

Forced marriages were more likely among adolescent first time mothers (44.3%, 77/174) compared to post-adolescent (24.7%; 43/174) mothers, OR = 2.38, 1.51-3.76. The first time adolescent mothers were mostly married between 13 and 17 years (113/172; 64.9%) compared to post-adolescent first time mothers who mostly (141/172; 81%) married after 17 years of age ($p < 0.001$).

Table 4: Multivariable logistic regression analysis of independent predictors of first pregnancy in adolescent and post-adolescent mothers

	Adolescent mothers	Post-adolescent mothers	Odds Ratio	95% Confidence Interval		P
Participant's level of formal education						
No formal education	41(23.6)	33(19.0)	1.0			
Madarasa	48(27.6)	47(27.0)	0.78	0.35	1.77	0.557
Primary	46(26.4)	14(8.0)	1.99	0.73	5.41	0.178
Secondary	35(20.1)	49(28.2)	0.48	0.19	1.20	0.118
Higher education/university or college	4(2.3)	30(17.2)	0.06	0.01	0.36	0.002
Participant's occupation						
Employed			1.0			
House wife	7(4.0)	23(13.2)	1.67	0.57	4.92	0.35
Self employed	109(62.6)	107(61.5)	0.98	0.14	7.15	0.987
Student	4(2.3)	17(9.8)	10.91	2.83	42.10	0.001
Unemployed	44(25.3)	20(11.5)	2.85	0.62	13.03	0.177
Spouse's occupation						
Employed	72(41.4)	94(54.0)	1.0			
Self employed	81(46.6)	57(32.8)	1.71	0.90	3.27	0.102
Unemployed	20(11.5)	21(12.1)	0.88	0.36	2.16	0.777
Ever used contraceptives						
Yes	6(3.4)	26(14.9)	1.0			
No	165(94.8)	147(84.5)	6.62	1.69	25.99	0.007
Knows contraceptive method that protects user from pregnancy and STI						
Yes	20(11.5)	38(21.8)	1.0			
No	152(87.4)	133(76.4)	0.64	0.20	1.99	0.438
Age at marriage						
<13 years	5(2.9)	3(1.7)	1.0			
13 to 17	113(64.9)	30(17.2)	1.19	0.13	10.79	0.876
>17	55(31.6)	141(81.0)	0.14	0.02	1.31	0.085
Type of marriage						
Forced/arranged	77(44.3)	43(24.7)	1.0			
Voluntary	97(55.7)	129(74.1)	0.75	0.40	1.42	0.385

Table 4 presents the findings of the logistic regression model of independent predictors of first pregnancy in adolescent mothers. There was a statistically significant difference in first adolescent pregnancy between mothers who had ever used contraception and those who had not ($p = 0.007$) after adjusting for level of formal education, participant's and spousal occupation, age at first pregnancy, type of marriage. Adolescent mothers who had never used contraceptive methods were six times more likely to have first time adolescent pregnancy (OR = 6.62, 95% CI 1.69 – 25.99) compared to post-adolescent mothers. In addition, women with tertiary education had a 94% reduction in the odds of first time adolescent pregnancy (OR = 0.06, 95% CI 0.01-0.36) compared to those with no formal education. The odds of first time adolescent pregnancy among students was significantly higher than that among mothers who reported that they were currently employed (OR = 10.91, 95% CI 2.82 – 42.10).

DISCUSSION, CONCLUSSION AND RECOMMENDATIONS

Pregnancy among adolescents remains an issue of significant public health concern due to the high risk to both mother and fetus especially in settings with poorly functioning health systems. This study conducted in Mogadishu, Somalia a country whose health system has been ravaged by conflict and political instability, and also inhabited by populations with known strong cultural practices that impact on adolescent reproductive health established that: the women who have the first pregnancy during adolescence differ in education and socio-economic status from the post-adolescent first time mothers; cultural issues had a stronger association with adolescent pregnancy as opposed to parental characteristics, household characteristics, drug use or violence; and that knowledge of reproductive health and family planning was lower among adolescent mothers and strongly associated with first time pregnancy.

The age range of the adolescent mothers is noteworthy because at least 7% were aged 15 years or below. WHO estimates that around 14% of women in low income countries marry before they attain 15 years of age(36). This finding can be explained by cultural practices including arranged and forced marriages in the study population where 44% of married adolescents reported that they were in forced or arranged marriages. Studies conducted in Somalia confirm that these practices are widespread, culturally rooted and are continuing unchecked(37).This observation further explains the finding that there were no major differences in basic demographic characteristics including marital status and urban/ rural residence in adolescent and post-adolescent first time mothers in Somali. Studies conducted in African communities with lower rates of forced and arranged marriages reported that early marriage was a significant risk factor for adolescent pregnancy increasing the likelihood of first time adolescent pregnancy by up to nine times(38).

Household socio-economic status assessed using monthly income in this study was low with majority of household earning USD 200 or less per month a finding that resonates with household income surveys in Somali that report income levels for many respondents fall below the poverty line established internationally (one dollar a day)(39).

Studies in literature show that adolescent pregnancies are more likely in poor, uneducated and rural communities. Unlike in other studies participant's education level was not associated with first time adolescent pregnancies in Somalia(35)(21). Low educational attainment has been demonstrated to increase the vulnerability of adolescent mothers to pregnancy. The findings in Somalia could be explained by the fact that at present the educational level in the country are

generally low and this is due to the political instability that has impacted on the educational system and pursuit of educational attainments by the citizenry.

The WHO report on the influence of cultural norms on adolescent pregnancy highlighted that approximately one in every three women in Sub Saharan Africa deliver before 20 years and this was attributable to cultural norms that promote early marriages(4). The cultural norm regarding marriage in Somali include forced or arranged marriages both of which have been identified as contributing to early pregnancies in several studies. The analysis showed that these practices are culturally entrenched in the population residing in this study area. In the current analysis these types of marriages were twice as common among first time adolescent mothers compared to first time post-adolescent mothers.

Out of the three sets of analysis in this study namely demographic, socio-economic and knowledge on reproductive health and family planning the latter showed the strongest association with first time adolescent pregnancy. Specifically, knowledge and use of contraceptive methods was lower in adolescent compared to post-adolescent first time mothers. The results agree with earlier studies.

It is possible that the adolescent girls in this study considering the age range which was as low as 13 years did not know how to avoid getting pregnant, or were too stigmatized to seek contraception. There could also issues with accessing contraception for this group considered legally as minors.

Study strengths

The main utility of this study is the significant addition of its findings to the literature describing reproductive health concerns among women in conflict zones and especially the vulnerability of adolescents in such areas to first time pregnancy. The findings are useful for public health planning and for decision making in reproductive health. The case control design allowed for the exploration of the multiple risk factors that are thought to be associated with first time adolescent pregnancy. Additionally, it explores women's knowledge on reproductive health and family planning issues and the contribution of these factors to adolescent pregnancies. The case control design is not susceptible to drop out after recruitment hence reducing the potential risk of bias associated with designs that are prone to high loss to follow up rates.

Conclusion

This study has documented the factors that are associated with first time adolescent pregnancy among women who reside in Somalia. Among the three group of factors that were explored for association with first time adolescent pregnancy namely demographic risk factors, socio-economic risk factors and reproductive health and knowledge it was evident that reproductive health and knowledge showed the strongest association with adolescent pregnancy. Low levels of reproductive health knowledge made the greatest contribution to adolescent pregnancies. First time adolescent pregnancies were equally likely among mothers in the various demographic and socio-economic groups in Somalia possibly pointing to the role of political conflict and homogeneous cultural practices.

This study is a necessary first step in addressing the public health problem faced by adolescent mothers in a country with limited access to high quality obstetrical care and a setting in which most deliveries occur at home.

Recommendations

Based on the finding of the analysis presented in the preceding chapter and the discussion and interpretation these findings the study recommends that:

- Adolescents should be provided with reproductive health education to reduce the incidence of adolescent pregnancies in Somalia.
- Sensitization should be conducted within communities on the impact of harmful cultural practices like forced or arranged marriages.
- The adolescent groups that are at high risk of first time pregnancies including those in low socioeconomic status should be targeted with reproductive health information and interventions designed to address the problem of adolescent pregnancy

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APPENDICES:

TITILE: FACTORS ASSOCIATED WITH FIRST PREGNANCY AMONG ADOLESCENT AND POST ADOLESCENT WOMEN AT BANADIR HOSPITAL MOGADISHU, SOMALIA.

DATE: February 2016 **STUDY ID: P671/10/2015**

APPENDIX I: QUESTIONNAIRE

Table 5: Questionnaire

QUESTIONNAIRE	
Fill in the blank spaces and tick the appropriate response given	
Is the participant: a) adolescent or b) post-adolescent **Section A: Socio demographic information**	
QUESTIONS	RESPONSE AND CODING
1.Patient number	
2. Age of patient in completed years	
3. Marital status	( ) Married ()Single ( )Divorced ( )Widowed
4. Residence	( ) Urban ( ) Rural
5. Level of education	( )No formal education ( )Madarasa ( ) Primary ( ) Secondary ( ) Higher education/ university or college
SECTIONB: socio-economic and cultural status	
6. What is your occupation	( ) Employed

	( ) House wife ( ) Self employed ( ) Student ( ) unemployed
7. What is your husband's occupation?	( ) Employed ( ) Self Employed ( ) Unemployed
8. What is your husband's educational level?	( ) No formal education ( ) Madarasa ( ) Primary ( ) Secondary ( ) Higher education/ university or college
9. What is your father's educational level?	( ) No formal education ( ) Madarasa ( ) Primary ( ) Secondary ( ) Higher education/ university or college
10. What is your mother's educational level?	( ) No formal education ( ) Madarasa ( ) Primary ( ) Secondary ( ) Higher education/ university or college
11. What is your father's occupation?	( ) Employed ( ) Self Employed ( ) Unemployed
12. What is your mother's occupation?	( ) Employed ( ) housewife ( ) Self Employed ( ) Unemployed
13. How many people are living in your	( ) 1

house?	( ) 2 ( ) 3 ( ) 4 ( ) 5 and more
14. What is the total monthly income of your family?	( ) $100 ( ) $200 ( ) $ 300 and more
15. What is the source of drinking water?	( ) Tap ( ) Well ( ) Ponds
16. Are you living apart from your parents?	( ) Yes ( ) No
17. Have you ever used of illicit drugs or alcohol?	( ) Yes ( ) No
18. Do you have confidence about job/ future prospects?	( ) Yes ( ) No
19. Have you ever met sexual victimization/ assault?	( ) Yes ( ) No
20. How is the communication between you and your parents?	( ) Good ( ) Poor
SECTION F: KNOWLEDGE OF REPRODUCTIVE HEALTH AND CONTRACEPTIVE	
21. List the different types of contraceptive you know?	( )Oral contraceptive ( )injectable ( )Intra uterine device ( )Natural method (counting save days, withdrawal) ( )barrier method

	( )permanent method
22. Have you ever used any contraceptive?	( )Yes ( )No
23. Do you know the method that can protect both pregnant and STI?	( )Yes ( )No
24. Is it easy for you to access contraceptives?	( )Yes ( )No
25. What was your age of marriage?	( )<13 years ( ) 13 to 17 ( ) > 17
26. What was that marriage?	( ) Forced/ arranged ( ) Voluntary
27. Are you a daughter of teenage mother or sister?	( )Yes ( )No
28. Age of menarche?	
29. Are you circumcised?	( ) Yes ( ) No
30. How old you were during the circumcision?	( ) < 5 years ( ) 5-10 years ( ) above 10 years.

APPENDIX II: STUDY TIMELINE

Table 6: Timeline

	2015					2016										
	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov
Proposal writing and Presentation																
Submission for ethical approval																
Proposal Corrections																
Data Collection																
Data Analysis																
Dissertation writing and Submission																

APPENDIX III: STUDY BUDGET

Table 7: Budget

ITEMS	**TOTAL COST KSH**
Printing, photocopies and internet expenses	15,000
Statistician	30,000
Research assistant	20,000
Training cost	10,000
Travelling expenses for data collection	50,000
ERC	2,000
Study findings dissemination	
Peer review journal publication costs	30,000
Hospital dissemination meeting	25,000
Scientific conference registration costs	15,000
Total costs	**197,000**

APPENDIX IV: INFORMED CONSENT-ENGLISH

INFORMED CONSENT.

I am Dr Khadija M. Hassan, a postgraduate student in the department of obstetrics and gynecology in the University of Nairobi. I am carrying out a study as part of the requirement for Master of Medicine in Obstetrics and Gynecology.

Study Title: **FACTORS ASSOCIATED WITH FIRST PREGNANCY AMONG ADOLESCENT AND POST ADOLESCENT WOMEN AT BANADIR HOSPITAL MOGADISHU, SOMALIA**

Principal Investigator: Dr. Khadija M. Hassan Tel: 0716515198 and +252615528786.

Supervisors: 1- Prof. Eunice Cheserem.

2-Dr. Michoma Peter

Purpose of Study: To determine factors associated with adolescent pregnancy and post adolescent.

Study Procedure: The information will be collected using a structured questionnaire that will be administered by the principal investigator (Dr khadija) or research assitant to the study participant.

The data will then be analysed to determine the objectives of the study.

Study approval has been given by the Kenyatta National Hospital/University of Nairobi ethics committee {KNH/UON-ERC}.

I am requesting your participation in this study. I would like to bring to your attention the following ethical considerations which will guide your participation.

1. Participation in this study is purely voluntary.
2. This study carries no extra risk or cost to you.
3. You may withdraw at any point of the questionnaire filling and there won't be any consequences for your decision to withdraw.
4. Any information you provide including details on your demographic characteristics will be treated as confidential.
5. There is no compensation or benefits for participating in this study; you will receive the same standard of care as any other person attending this hospital.

   Signing the consent form indicates that you have read the consent form, that your questions have been answered to your satisfaction, and that you voluntarily agree to participate in this research study. You will receive a copy of the signed consent form.

For further information please contact:

Dr Khadija M. Hassan.

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Email: khadijamx@hotmail.com.

Kenyatta National Hospital / UoN Ethics

Committee

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CONSENT FORM

I, the undersigned, do hereby consent to participate in this study whose nature, purpose and objectives have been fully explained to me. I am aware that participation is voluntary and that there are no consequences to withdrawal from the study. I have been informed that all data provided will be used for the purposes of study only.

Signed…… Date……..……

I,……....declare that I have adequately explained to participant the purpose of the of the study and the procedures. I have given the participant time to ask questions and seek clarification regarding the study.

Signed…… Date……..……

APPENDIX V: INFORMED CONSENT-SOMALI

Oggalaasho la Wargeliyey

Waxaan ahay Dr. Khadija M. Xasan, arday sare eedhigta jaamacada Nairobi waaxda dhalmada iyo dumarka. Hadda waxaan wadaa cilmi baaris oo qayb ka ah waxyabah looga bahanyahay jaamacadda.

Mawduuca cilmi barista:

Arrimo la xiriira waxyaabaha keena uurka hore ee da'dayarta iyo kuwa wawayn

Maamulaha Baadhaha: Dr Khadija M. Xasan Tel: 0716515198 iyo +252615528786.
Kormeerayaasha: 1. Prof. Eunice Cheserem

2. Dr. Michoma Peter

Ujeedada barista: si loo go'amiyo Arrimo la xiriira waxyaabaha keena uurka hore ee da'dayarta iyo kuwa wawayn

Habka baarista: Macluumaadka waxaa loo qaadi doonaa iyadoo la isticmaalayo su'aalaha habaysan oo uu qaadi doona baaraha maamulaha (Dr Khadiijo) ama caawiyaha ka qaybgalaya baarista.

Xogta ayaa intaas ka dib la baari doona si loo ogaado ujeedada daraasadda. Waxa ansixiyay baaritaankaan isbitaalka Kenyatta /jaamacadda Nairobi, guddiga anshaxa {KNH / UON-ERC}.

Waxaan codsanayaa ka qayb qaadashada daraasaddan. Waxaan jeclaan lahaa inaan keeno inaad fiiriso waxyaabaha soo socda ee ku saabsan anshaxa taas oo hagi doonta kaqayb qaadashadaada.

1. Ka qayb qaadashada daraasaddan waa mid aan qasab ahayn.

2. Daraasaddan wax halis ah ay keenaysaa majiro ama faaiido ah.

3. Bartaaddoonto ayaa uga bixi kartaa mana jiro wax cawaaqib ah.

4. xog kastoo aad bixisid oo ay ku jiraan faahfaahin ku saabsan sifooyinka waxa ay ahaan doonaan qarsoodi.

5. Ma jiro magdhow ama gunnad aad ku helaysid kaqayb noqoshada daraasaddan; waxaad heli doontaa heerka daryeel oo qof kasta isbitaalka yimado helayo.

Saxiixa foomka ogolaanshaha waxay muujinaysaa in aad akhrisay foomka ogolaanshaha, in su'aalahaadi lagaaga jawaabay si aad ku qanacsan tahay,aadna ogolaatay in aad qayb ka noqoto cilmi barista. Waxaad heli doontaa nuqul ka mid ah foomka oggolaanshaha.

Wixii macluumaad dheeraad ah fadlan la xiriir:

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Ama: Kenyatta National Hospital / UoN Ethics

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FOOMKAOGOLAANSHAHA

Waxaan, SAXIIXAY, in aan raali ka ahay ka qayb qaadashada daraasaddan oo nooca, ujeeddada iyo hadafkaba si buuxda la iigu sharxay. Waan ogahay in ka qaybgalka uu yahay mid ikhtiyaari ah iyo in ay jirin wax cawaaqib ah ka bixitaanka daraasadda. Waxaana laigu wargeliyay in dhammaan xogta la bixiyey loo adeegsan doonaa ujeeddooyinka daraasaddan oo kaliya.

Saxiixay ..... Taariikhda .....

Waxaan, ...cadaynayaa in aan si ku filan ugu sharxay ka qaybgalaha ujeedada waxbarasho iyo nidaamka. Waxaana lasiiye waqti kufilan ka qaybgalaha oo ku waydiin karo su'aalo ku saabsan daraasadda.

APPENDIX VI: APPROVAL FROM KNH/OUN-ERC

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Ref: KNH-ERC/ Mod&SAE/289

December 4, 2017

Dr. Khadija Mohamud Hassan
Reg. No.H58/68378/2013
Dept.of Obs/Gynae
School of Medicine
College of Health Sciences
University of Nairobi

Dear Dr. Hassan

Re: Approval of change of study title – study titled "Factors associated with first pregnancy among adolescent and Post Adolescent women at Banadir Hospital Mogadishu, Somalia (P671/10/2015)

Your communication received on 24th November 2017.

The KNH-UoN ERC has reviewed and approved change of study titled from 'Factors associated with First pregnancy among Adolescent and Post Adolescent women at Banadir Hospital, Mogadishu, Somalia: A comparative cross sectional study" to '**Factors associated with First Pregnancy among Adolescent and Post Adolescent women at Banadir Hospital Mogadishu, Somalia**"

These changes are reflected in the revised proposal.

Yours sincerely,

PROF. M. L. CHINDIA
SECRETARY, KNH- UoN ERC

c.c. The Principal, College of Health Sciences, UoN
The Deputy Director, CS, KNH
The Chair, KNH- UoN ERC
The Dean, School of Medicine, UoN
The Chair, Dept. of Obs/Gynae, UoN
Supervisors: Prof. Eunice Cheserem, Dr. Michoma Peter

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APPENDIX VII:APPROVAL FROM KNH/OUN-ERC

KENYATTA NATIONAL HOSPITAL APPROVED 29 FEB 2016 KNH/UoN-ERC P.O. Box 20723-00202 NRB.

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Ref: KNH-ERC/A/81

29 February, 2016

Dr. Khadija Mohamud Hassan
H58/68378/2013
Dept. of Obs/Gynae
School of Medicine
College of Health Sciences
University of Nairobi

Dear Dr. Hassan

Revised research proposal: Factors associated with First pregnancy among Adolescent and Post Adolescent Women at Banadir Hospital, Mogadishu,Somalia: A comparative cross sectional study (P671/10/2015)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH-UoN ERC) has reviewed and **approved** your above proposal. The approval period is from 29th February 2016 – 28th February 2017.

This approval is subject to compliance with the following requirements:

a) Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
b) All changes (amendments, deviations, violations etc) are submitted for review and approval by KNH-UoN ERC before implementation.
c) Death and life threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH-UoN ERC within 72 hours of notification.
d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH- UoN ERC within 72 hours.
e) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
f) Clearance for export of biological specimens must be obtained from KNH- UoN ERC for each batch of shipment.
g) Submission of an *executive summary* report within 90 days upon completion of the study.
This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/ or plagiarism.

For more details consult the KNH- UoN ERC website **http://www.erc.uonbi.ac.ke**

Yours sincerely,

PROF. M.L. CHINDIA
SECRETARY, KNH-UoN ERC

c.c. The Principal, College of Health Sciences, UoN
The Deputy Director, CS, KNH
The Chair, KNH-UoN ERC
The Assistant Director, Health Information, KNH
The Dean, School of Medicine, UoN
The Chair, Dept.of Obs/Gynae,UoN
Supervisors: Prof. Eunice Cheserem, Dr. Michoma Peter