DETERMINANTS OF LONG ACTING REVERSIBLE CONTRACEPTIVE USE AMONG FEMALE UNDERGRADUATE STUDENTS AT MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES, DAR ES SALAAM.

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By

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A Dissertation Submitted in (Partial) Fulfillment of the Requirements for the Degree of Master of Public Health of

Muhimbili University of Health and Allied Sciences
October, 2021

CERTIFICATION

The undersigned certifies that she has read and hereby recommend for acceptance by the Muhimbili University of Health and Allied Sciences a dissertation entitled *"**Determinants of Long Acting Reversible Contraceptive Use among Female Undergraduate Students at Muhimbili University of Health and Allied Sciences, Dar Es Salaam",*** In (Partial) fulfillment of the requirements for the degree of Master of Public Health of the Muhimbili University of Health and Allied Sciences.

……..
Prof. Anna Tengia-Kessy

(Supervisor)

Date: ……

DECLARATION AND COPYRIGHT

I, **Mwangota Tuganigwe Augustine,** declare that this dissertation is my own original work and that it has not been presented and it will not be presented to any other university for a similar or any other degree award.

Signature: …… Date……..…

ACKNOWLEDGMENTS

With the divine grace of the Almighty God, I must say this journey has been worth the while. I glorify my Mighty God for granting me good health, sound mind and capacity to the completion of this research.

It is a genuine pleasure to express my deep sense of gratitude and appreciation to my mentor, supervisor and guide, Prof. Anna Tengia–Kessy. Her dedication, keen interest and above all, her concern to help her students has been solely and mainly responsible for completing my dissertation. Her timely and scholarly advice, meticulous scrutiny, and scientific approach have helped me to a very great extent to accomplish this task.

I thank all the staff of MUHAS School of Public Health and Social Sciences as well as the Directorate of Postgraduate Studies for their kind help and cooperation throughout my study period.

Lastly, I owe a deep sense of gratitude to my parents for their constant encouragement throughout my study period. No words can ever describe their value in my life nor sum up the gratitude that I owe them for raising me into the being that I am today. With regards to their numerous concerns and questions about my future academic endeavors and medical career, I shall answer in the words of Sir Winston Churchill: “Now, this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning.”

DEDICATION

I dedicate my dissertation work to my loving parents, Mr. Augustine Mwangota and Mrs. Joyce Sojo–Mwangota whose words of encouragement and push for tenacity ring in my ears. They have been my source of inspiration, and gave me strength when I thought of giving up. I love you dearly Baba and Mama.

I also dedicate my work to my stubborn siblings Ully, Tuse, Eze and Nkundwe. Their thirst and strive for success have served me a constant reminder to push harder, do more and never disappoint.

Lastly, I dedicate this to all young girls and women whose sexual reproductive health and rights are amongst their unmet needs. I hope this research sheds some light to them in regards to their reproductive choices.

ABSTRACT

Background: Use of modern contraceptive methods in Tanzania is low despite high knowledge of the methods. The consequences accompanying low use of contraceptives include unexpected pregnancies among university students. In order to understand the existing barriers, it is important to find out reasons affecting contraceptive method use. The objective of this study is to assess long acting contraceptive method use among female medical students studying at Muhimbili University of Health and Allied Sciences.

Objective: The main objective was to determine utilization of long acting reversible contraceptives and associated factors among female undergraduate students of Muhimbili University of Health and Allied Sciences, Dar es Salaam.

Methodology: A descriptive cross sectional study was conducted at Muhimbili University of Health and Allied Sciences among undergraduate female students. Self-administered questionnaires were given to students who consented to participate in the study. A total of 585 were recruited. Dependent variable of this study was use of long acting reversible contraceptives (LARCs) whereas social demographics and students' related attributes were independent variables. Ethical clearance was obtained from the University Ethical Review Board. Data analysis was done using SPSS version 25 computer software. Continuous and categorical data were summarized using measures of central tendencies and proportions respectively whereas correlative analysis were done using binary logistic regression (univariate and multivariate) analysis whereby p value <0.05 were considered statistically significant.

Results: This study recruited 585 undergraduate female students, which is equal to a recruitment rate of 97.8%. The mean age of the study participants was 26.1 years (standard deviation 3.4). The utilization of LARCs was found to be 19.5%. Of these, 15.4% were using implants and 4.1% were using IUCD. The most commonly reported reasons were use of short term contraceptives 89.1%, fear of side effects 37.4%, followed by fear that LARC use is not suitable for their age. The level of knowledge on LARCs was found to be moderate, 52.6%.

Conclusion and recommendations: Use of LARCs among female undergraduate students at MUHAS is low despite their knowledge on the methods. Education should be provided to the students, particularly on side effects of LARCs, suitability of age at which they can start using LARCs as well as easing access of LARCs. It is also important for future researchers to investigate male opinion regarding use of LARCs among female university students; in addition to assessing the role of partner approval with regard to contraceptive uptake by women.

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LIST OF ABBREVIATIONS

AOR	Adjusted Odds Ratio
CI	Confidence Interval
IBM	International Business Management
IRB	Institutional Review Board
IUD	Intra Uterine Device
LARCs	Long Acting Reversible Contraceptives
MUHAS	Muhimbili University of Health and Allied Sciences.
NSHAP	The National Social Life, Health and Aging Project
ODK	Open Data Kit
RCOG	Royal College of Obstetricians and Gynecologists
SA	South Africa
SPSS	Statistical Package of Social Sciences
SSA	Sub Saharan Africa
UK	United Kingdom
WHO	World Health Organization

DEFINITIONS OF KEY TERMS

Long Acting Reversible Contraceptives In this study, are referred to contraceptive methods that require administration less than once per cycle or month. Included in the category of LARC in our setting and in this research are: The intrauterine device and implants (1).

Contraceptive Prevalence Rate: the proportion of women of reproductive age who are using (or whose partners are using) a contraceptive method at a given point in time (2).

Unmet Contraceptive Need: In the context of this study, unmet need of contraceptives refers to female undergraduate students who could not access long acting reversible contraceptive methods despite their demand of using them (3).

Sexually Active: A state of being mutually and voluntarily engaged in sexual activity or relations with the last incidence being within 12 months prior to the study(4).

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

College life tend to provide supportive conditions for students to participate in unsafe sexual conducts due to lack of parental control and development of unsafe lifestyles such as alcohol intake and peer pressure to unworthy preserving behaviors (5). Practicing unprotected sex unquestionably leads to possibility of accidental pregnancies and spread of sexually transmitted infections/diseases. Research has revealed that regardless of these dangers, 30% of the individual could genuinely interact in unprotected sex (6). The challenges accompanying unexpected pregnancies may include poor economic and educational achievement (7) while 74.7% (8)university students in Tanzania engage in sex whereas 10% of them get unplanned pregnancy at teenage (9). Contraceptive use can therefore be deemed an issue of student welfare and thus the promotion of positive sexual and contraceptive behaviors should be maximized within the student population.

Studies show that unintended pregnancies among students are a problem due to the fact that these female students fail to balance academic progress and pregnancies. Also most university support structures are, to a large extent, failing to take care of those who give birth while still enrolled as students. At the core of the problem are tensions between different norms and expectations concerning students' sexual behavior, and underlying gender inequities implied in these norms. Students increasingly see it as being modern and cool to be involved in relationships, and there is considerable peer pressure on female students to have sexual relationships (30). At the same time societal norms, founded in religious beliefs and communicated in families, are still very strict when it comes to female premarital sex. Young unmarried women may experience condemnation when they transgress these norms, in particular when their norm transgression becomes evident to the public eye in the form of a growing belly.

In a normal scenario, it is difficult for most students to bring home news about an untimely pregnancy. Some are unable to do so for fear of the consequences, while others experience rejection when the news are disclosed to their parents. The shame-silence nexus operates forcefully in the lives of many young female students

A contraceptive enable prevention of unintended pregnancies, alleviate number of abortions, and helps lower the incidence of maternal death or disabilities related to complications of pregnancy and childbirth. It is estimated that 38 million young women in developing countries are sexually active, among these only 40% are using modern contraceptive methods which leaves the remaining 60% with an unmet need for family planning and at risk of unwanted pregnancies and unsafe abortions (10)

Long Acting Reversible Contraceptive (LARCs) methods (LARCs) such as the intrauterine device (IUD) and the implant – are highly effective, convenient and cost-effective (11,12) with efficacy of up to >99.9 % (13) and provide further benefits through the removal of user error (14). Basically LARCs are formed by three major groups of contraceptives namely implants, injections and intrauterine devices whereas as the later could be copper hormonal or hormonal intrauterine devices (15)

Uptake of LARCs is lower than that of short term contraceptives such as oral contraceptives, sterilization, and barrier (16). Although the use of LARCs was supposed to increase due to continued effort done by government and non-government organizations but studies have highlighted that women in the SSA including Tanzania are relying on less effective methods of contraception due to challenges such as lack of information, accessibility and availability of LARCs.

Lack of LARC knowledge demonstrated by both contraceptive users (17–19) and healthcare professionals (19,20) poses as one of the barriers to uptake. Previous research conducted both in health and educational settings identified that women associate these methods with unpleasant side effects and the process of insertion/removal (21).Previous student based research found that contraceptive choice within this population is based upon contraceptive efficacy (95% of students said this was most important) and STI protection (22,23).

Steps therefore need to be taken in order to make best use of effective contraceptive uptake. The aim of the study was to determine prevalence of utilization, knowledge and predictive factors associated with utilization of LARCs among undergraduate female students at Muhimbili (MUHAS) in Dar es Salaam Tanzania.

1.2 Problem statement

In Tanzania, constant fast growth of the population is one of the main challenges contributing to the achievement of the Sustainable Development Goals (SDGs). One of the key ways of controlling population increase is through functional and well organized family planning methods applied to a most fertile population, aged below 25 years (24) . Of the most effective and suitable family planning methods are LARCs. LARCs use among university students prevents them from unpredicted pregnancies hence contributing to a controlled population increase (25).

In Tanzania, the fertility rate is high (5.2 births per woman), contraceptive prevalence is low (26%) and maternal mortality is however high (556/100,000)(26,27). These reproductive health problems are partly a result of ineffectiveness of the family planning program due to, among other reasons, insufficient knowledge on the use of effective methods, in particular LARCs (25). If a female student lacks the knowledge of LARCs, she then puts herself in danger of unintended pregnancy and hence falls into the entire sequelae associated with it including induced unsafe abortions (28).

Also, despite huge effort applied by government and non-government organizations on providing education on family planning methods and promoting youth friendly services still the uptake of LARCs among different groups of women in particular university students is unidentified. Therefore, this study was intended to determine prevalence of LARCs utilization, knowledge of LARCs and ascertain the factors associated with the uptake of LARCs among female students at Muhimbili University of Health and Allied Sciences, Dar es Salaam Tanzania.

1.3 Conceptual framework

The conceptual framework of this study was based on the theory of family planning (29), which designed the models that explain how practice and behavior change happen while providing a skeleton for profound insights of women's motivations in using contraceptives. Social demographics, social economic and intervening variables are the important keys in determining the trend of use of contraceptives, LARCs in particular. The figure below summarizes how these three variables influence the utilization of LARCs.

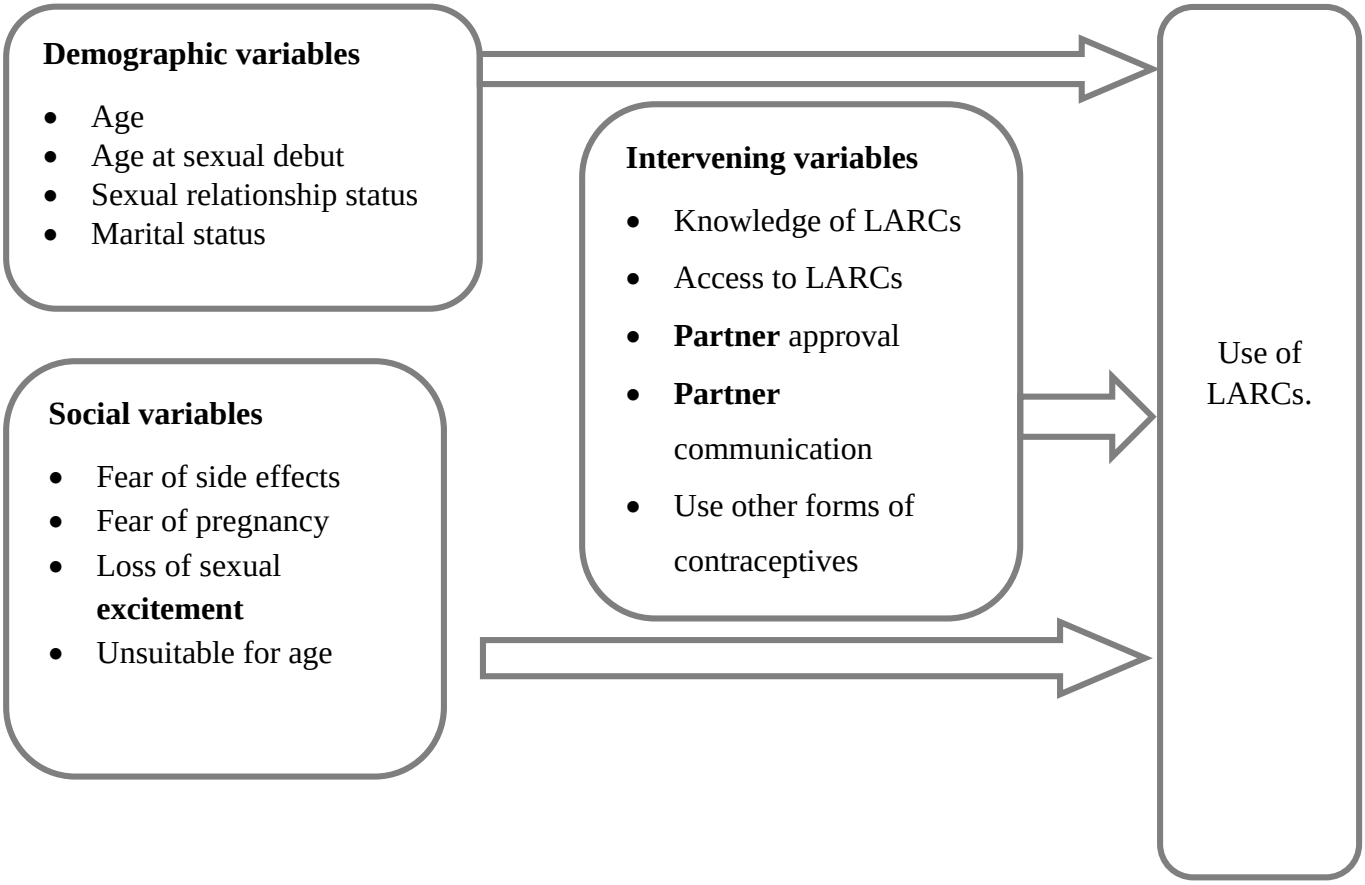

Figure 1: Conceptual Framework for determinants of LARC use among female undergraduate students of MUHAS.

1.4 Rationale of the study

Contraceptive use, LARCs in particular, is an imperative factor in fertility regulation and henceforth contributes to reduction of death and illnesses related to reproduction. Although LARCs have been widely articulated in literature to have reproductive health improving advantage, however in Tanzania, there is scarcity of studies on the utilization and associated factors of LARCs. The results of this study will enable us to understand LARCs needs and associated barriers. The findings will be used to convince the responsible authority on areas of intervention that will increase LARCs coverage among university students to enable them to achieve their academic, individual family planning and reproductive goals.

1.5 Research questions

1. What proportion of undergraduate female students at MUHAS use LARCs?
2. What are the determinants of LARCs use among undergraduate female students at MUHAS?

1.7 Research objectives

1.7.1 Broad objective

To determine use of long acting reversible contraceptives and its associated factors among female undergraduate students of Muhimbili University of Health and Allied Sciences in Dar es Salaam, Tanzania.

1.7.2 Specific objectives

1. To determine the proportion of female undergraduate students of Muhimbili University of Health and Allied Sciences using long acting and reversible contraceptives
2. To assess knowledge on long acting and reversible contraceptives among female undergraduate students of Muhimbili University of Health and Allied Sciences.
3. To identify factors associated with the use of long acting reversible contraceptives among female undergraduate students of Muhimbili University of Health and Allied Science.
4. To identify reasons for not using LARCs among sexually active female undergraduate students of Muhimbili University of Health and Allied Sciences.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Utilization of long acting reversible contraceptives.

Long active reversible contraceptives comprised of two major technic namely intrauterine contraception's and subdermal implant's which have long known for affirmative safety and no effects on long term fertility (30,31). The utilization rate of these LARC depends on women's personal characteristics and childbearing goals, sexual relationship characteristics and partner influences, social and economic characteristics, community, family and peer relationship, service access and provision and method specific experiences and attitudes (32)-

A global review of women's utilization of LARC and pregnancy contraception in general on fertility regulating devices established that, beyond safety and freedom from side effects, the only factor that consistently predict uptake and continued use of a contraceptive method are direct involvement of the users in the choice of method, advance information on potential side effects and support from spouse (17,33). Prevalence of LARC utilization varies across the different group of women.

A cross sectional designed study done among women getting family planning service in Gondar, Ethiopia (2015) on LARC utilization and factors associated found that prevalence of LARC utilization was 33.7% with highest prevalence noted among old age group. Large proportion of participants were found to have been using implants (22.3%) while 11.4% were reported to commonly used IUD (34). This finding of the Gondar study is somewhat similar the study done in Harar city, southern Ethiopia among mothers of reproductive age which reported LARC prevalence of 38% (35). This prevalence of LARC utilization among women of reproductive age relatively high compared to what had been reported by other studies such as study in Nepal and Kenya which reported the low prevalence of LARC utilizations of 6.4% (36) and 4.7% (37) respectively despite the nature of the sample being fairly similar.

However, a systematic study done in sub Saharan Africa reported a prevalence of 5.6%. As it could be seen that it is evident that the prevalence of LARC among group of reproductive and married women varies from one place to another but systematic study sums a composite study that likely represent an extrapolatable overall prevalence of LARC use which is generally interpreted as poor. Furthermore, a cross sectional study done in Zambia which enrolled 18052 participants from the national DHS reported low usage rate of LARC with 4.8% of the participants used implants and 0.65% used IUD (38).

On other hand, looking on college women whose majority of them are in reproductive age, the prevalence rate is low but relatively high compared to married women. A cross sectional study done among female college students in Gondar town in Ethiopia (2018) on utilization of long acting reversible contraceptives and associated factors have reported 20.4% of the sampled students used LARC with 96.5% used implants while 3.5% used intra-uterine contraceptive devices (10). Also, recent study done in Ghana on the usage of modern contraceptives among female of reproductive age found an overall prevalence of use of current modern contraceptive of 21%.

Additionally, a cross sectional study done on knowledge and attitudes towards use of long acting reversible contraceptives among women of reproductive age in Lubaga division, Kampala district, Uganda reported proportion of use of 31.7% of LARC(39) while Mexico, a retrospective study done among adolescents on Long-Acting Reversible Contraception use, reported gentle increase in proportion of adolescents who use LARC from 21 % in 1992 to 23 % in 2014 (40). Correspondingly, Bharadwaj P, et al 2017 conducted a study on determinants of LARC use by adolescent girls and young women where they reported 28% utilization of LARC which they interpreted as low utilization. This study included 188 participants with mean age of the cohort was 17 years (range 14 – 21 years) (41). LARC supply–demand services increased the proportion of family planning initiators choosing LARC to 17%. Challenges included inconsistent funding, irregular supplies, and staff turnover (32).

As could be comprehended from the above review that adolescent female, particularly university students are at high risk of an unplanned pregnancies and unsafe abortions, LARCs could be a factual response to these **challenges**. However, regardless of this understanding, there is insufficient information about use of LARCs among university girls in Tanzania. This underlines the demand to understand utilization rate of LARCs among these university girls, their knowledge on LARCs as well as predictive factors of the utilization of these LARCs.

Therefore, the aim of this study is to determine the utilization, knowledge and predictive factors associated with LARCs among female undergraduates' students of Muhimbili University in Tanzania.

2.2 Factors associated with uptake of LARC

An early review of the literature and modeling of existing data on the relationship between increasing the number of methods and the demographic impact indicated that enhancing choice of contraceptive methods increased contraceptive practice, resulting in fertility reduction. Even in poor countries, increasing the choice of methods available can lead to increased contraceptive prevalence.

However recent studies have further detailed on important factors when choosing a contraceptive method where by efficacy, protection from sexually transmitted infections, non-interference with sex, and partner's satisfaction were added on the queue while possibility of altering the menstrual pattern was cited as the least important factor (41). Although LARCs are convenient for users and effectively prevent pregnancy, cost-effective for programs over time, can result in substantial cost savings but there are other individual factors that drive an unpredictable pattern of LARC use (42,43)

Cumulatively, factors that have been identified as affecting utilization of LARC include age, marital status, education level, religions, being visited by family planning team, having given birth and economic level. Furthermore, spouse's approval for choice of contraceptive, sociocultural norms (especially the husband's role as primary decision maker and the desire for a large family), fear of side-effects and a lack of knowledge were often articulated as the replenishing factors that influence utilization of LARC (44–46).

A wide range of cross-sectional studies have quite often revealed a statistical correlation between age and utilization of contraceptives particularly LARCs. A nationwide cross-sectional study done in Zambia reported that older women (>40 years) were less likely to use LARC than those with age <19 years (38).

A study in Kenya has reported that contraceptive use is highest among young women (15–39 years) and declines with increasing age (40–49 years).The possible explanation could be that most women approaching their menopausal stage are less sexually active and hence less likely to use contraceptives (47–49). In addition, in the same study, older women were less likely to use short-term methods than their younger counterparts (36).

Education level of the women has been reported to have association with the use of LARCs. Habtamu et al. revealed that married women who could not read and write were seven times less likely to utilize long-acting family planning method as compared to those who completed their primary level of educational [AOR = 6.99, 95% CI 3.7–13.3] (50). Moreover, a study done in Zambia similarly found out that female with advanced in level of education were more likely to use LARC compared to those who were lower in the hierarchy of education level (38). A study in Ethiopia further emphasized that women who attended university and college were about four times more likely to use LARC than women with no education (34).

Generally, as the knowledge about LARCs increases, the likelihood of utilizing the methods also increases (40). LARCs control fertility in timely and effective manner therefore knowledge about LARCs promotes the usage. Study done in Ghana among women of reproductive age reported that knowledge of implant administration site positively influence their contraceptive choices (39). A multivariate analysis of results of a study in Gondar, north part of Ethiopia showed that women who had high knowledge were about three times to use long acting contraceptive methods than women with poor knowledge (34).

In the light of previous findings from Nigeria (51) and Uganda (52), marital status of women strongly predicts use of LARCs ($p < 0.001$). It was previously established that most married women who used modern contraception (about 70%) did so for purposes of spacing births, and women who did not have children were least likely to use contraceptives (17). However, other findings suggest that unmarried individuals use LARCs to prevent pregnancies (10,53)

Poor partner communication, sociocultural norms (especially the husband's role as primary decision maker and the desire for a large family), fear of side-effects have been shown in literature to have impact on the use of LARCs (54,55). A systematic review study in sub Saharan Africa showed that 15.8% of women would depend on their spouses for choice of contraceptive methods and 52.7% would discontinue family planning if their spouses objected (54,56)

Islamic religion and Christian denomination have also been found to influence contraceptive use and source of purchase. Catholics and Muslims are more likely to patronize patent medicine shops

2.3 Knowledge of LARCs

Acquiring knowledge about LARCs is an important step toward uptake besides accessibility and affordability. Understanding its effectiveness, possible risks and side effects, plan for future pregnancies and considerations of medical conditions is imperative among female students who are at reproductive age so as to avoid unwanted pregnancy as well reduce unnecessary inconveniences of regular checking on short term contraceptives. However, the preferences of health care providers and family planning educators directly influence the information provided to clients, thus swaying women's decisions concerning method adoption.

LARC knowledge among university students vary across regions, and it ranges from the proportion of 17.9% in China for implants as published in the year 2012 to an average of 83% in the UK in the similar year. In the subsequent years, this proportion seems to drop in the developed countries compared to the developing countries such as Nigeria 70% as knowledge of implants improves among undergraduate students as published in 2020 and Tanzania 85% as published in 2017

In a study among female undergraduate university students in Kilimanjaro region in Tanzania, the majority (64.8%) of the respondents were sexually active and started sexual activity at over 18 years of age (62). However, in this study, most of the participants had knowledge of both traditional and modern contraception. Nevertheless, the rate of contraceptive use was low (38%)

Knowledge of LARCs is imperative as it might influence the high usage rate. In literature most of articles have spoken jointly on all sorts of contraceptive. Therefore, this study explicitly determined the knowledge on LARCs among female undergraduates' students of Muhimbili University of Health and Allied Science in Tanzania.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study design

A descriptive cross sectional study design was used to gather information from female undergraduate students from Muhimbili University of Health and Allied Sciences. The foundation for using this study design was based on gathering data from the students at one time since the research seeks to obtain the descriptive profile of the students who use LARCs at MUHAS.

3.2 Study area

This study was conducted at Muhimbili University of Health and Allied Science (MUHAS). MUHAS is located at Upanga West in Ilala Municipal in the business city, Dar es Salaam. In the academic year 2019/2020, MUHAS enrolled a total of 1,538 students. Out of these, 793 (51.6%) are undergraduate students in the different programs which include medicine, dentistry, pharmacy, nursing, medical laboratory, radiation therapy and environmental health. Among all undergraduate students enrolled in 2019/2020, 187 (23.4%) were female.

3.3 Study population

The study involved female undergraduate students studying at MUHAS.

3.4 Sample size calculation.

The minimum sample size for this study was calculated from Fischer's formula (63) widely known for cross sectional design studies at 95% confidence interval as shown below

N=estimated sample size

Z score for 95% confidence interval = 1.96.

p= prevalence 32.1% of use of LARCs from study done in Ethiopia (57).

d = acceptable margin of error in estimating the true population proportion (tolerable error) 10%.

$$N = \frac{Z^2 x P(1-P)}{d^2}$$

$$N = \frac{1.96^2 x 0.204(1-0.204)}{0.05^2}$$

N=498

Adjusting for non-response at 10% and 10% for finite population

498*20%=598

Therefore, the total projected sample size was 598

3.5 Sampling procedure

3.5.1 Sample selection

This study employed cluster sampling technique. The first groups of clusters in this study were the five Schools at the University. Second clusters were programs under each School. Third cluster group were years of study under each academic program whereas some have three years, some four years and some five years. For each academic program, year of study was the lowest unit from which samples were taken. All study years from all programs under each School were included, therefore the appropriate way of obtaining sample from each unit was via simple random sampling technique where by students in each study year were visited in their respective training scene and questionnaires were distributed.

3.5.2 Inclusion criteria

All female undergraduate students at MUHAS who were available on the day of data collection

3.5.3 Exclusion criteria

Students who were not present at the time of data collection and those who refused to give consent for participation.

3.6 Study variables

The dependent variable was use of long acting revisable contraceptives (LARCs). On the other hand, the independent variables included age, year of study, study program, marital status, religion, age at sexual debut, sexual experience, parity, history of abortion, partner discussion about LARC, service delivery related variables, fear of side effects; and knowledge of LARCs.

3.7. Data collection tool

Data were collected using a self-administered questionnaire. This questionnaire comprised of three parts. The first part consisted of social demographic information; second part consisted of knowledge questions and the third and last part comprised of uptake of LARCs related attributes. The questions were adopted from studies that examined knowledge and use of LARCs. The social demographic section was developed basing on the social and geographical background of the participants. LARCs utilization questions were adopted from the previous study done in Ethiopia. Questions on knowledge on LARCs were also constituted from various literatures. The questionnaire was developed in English and administered in the same form since English is the medium of training and communication at the University.

3.8 Reliability and validity of the tool.

This study adopted most of the questions from a previous study among female college students in Gondar town Northwest Ethiopia (10). This questionnaire was cross checked by two experts in family planning matters at Engender Health who have been working on family planning programs in Tanzania. They have also been involved in providing technical assistance to the

Ministry of Health, Community worked with the Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) in developing policies and guidelines around family planning. The validity and reliability were ensured by finally subjecting the questionnaire to pilot of 30 participants at Kairuki University of Health and Allied Sciences and a Cronbach's alpha value of above 0.6 was considered reliable.

3.9 Data collection procedure

3.9.1 Recruitment and training of research assistants

Before data collection, five research assistants were recruited to assist in distributing and collecting the questionnaires from the respondents. These research assistants had previously studied at MUHAS and were currently working on family planning matters. They were trained to familiarize with the study protocol and aim of the study. The emphasis was on the importance of signing consent while respecting participant's freedom to participate or not participating.

3.9.2 Data collection process

Data was collected from students from each of the aforementioned clusters by research assistants. Research assistants for data collection were graduate students from the University of Dar es Salaam who had previous experience in conducting field interviews. They were trained on study objectives, study methodology, data collection tool, interviewing techniques, confidentiality and ethical procedures before embarking on data collection exercise. The research assistants made an effort to find the students in bigger numbers after lecture sessions in liaison with respective class representatives**.** Before recruiting the participants, they requested them to thoroughly read and sign consent and then proceed with answering the questions in the questionnaire. After completely filling the questionnaire, the participant returned the questionnaire to the research assistant. Gladly this method worked best as most students were easily accessed after class before dispersing to meal breaks, wards or the hostels/home.

3.10 Data management and statistical analysis

3.10.1 Data management

All the filled questionnaires were kept in a locker with a key. After completion of all questionnaires being filled, the research assistants together with the principle investigator begun filling in data into the SPSS data file. The SPSS data file were password protected which was known to principle investigator and the supervisor necessitating entry each time the SPSS file was to be accessed. After all data was fed into SPSS, analysis preceded based on the responses and findings from the questionnaires

3.11 Data analysis

Data were cleaned and analyzed using SPSS version 25 computer software. All continuous variables were summarized using parametric and/or non-parametric measures such as mean/Standard deviation and median/range. All categorical variables were summarized into frequencies and percentages.

Utilization of LARCs was assessed using a question that required the respondents to respond on whether they currently used or they did not use any type of LARCs. The responses were "yes" and "no". Therefore, the prevalence was obtained from the formula below:

$$Prevalnce\ (given\ as\ \%) = \frac{Number\ of\ female\ students\ who\ will\ respond\ "yes"}{Total\ sumple\ size} * 100$$

LARCs knowledge questions were made inform of dichotomous response (yes or no). Participants who got the right answer were scored 1 and those got the wrong answer were scored 0. Since knowledge of LARCs consisted of 10 questions, the raw scores (RS) were obtained as a mean of the scores by the following formula.

$$RS = \frac{I_1 + I_2 + \cdots + I_a}{a}$$

The raw scores were then transformed into a linear score of 0-100 which were obtained by the following formula

$$S=\frac{RS-1}{Range} \text{ x}100$$

Range was the difference between the maximum possible value of RS and the minimum possible value which in this case was 1. In this study, the score of <50 is regarded non knowledgeable and score >50 is knowledgeable (N=585).

Predictive factors associated with use of LARCs were obtained statistically. Univariate and multivariate analysis were done to check the statistical association between social demographics, social economics and intervening variables with prevalence of uptake of LARCs whereby p value <0.05 was considered statistically significant.

3.12 Ethical Considerations

The ethical approval for this study was obtained from the MUHAS Research and Ethics Committee. Permission to conduct the study was requested from MUHAS administration. A written informed consent was sought and obtained from all participants. The participants' information was kept strictly confidential. To further maintain confidentiality, no identifiers were in the questionnaire. Participation was fully voluntary, and the participants were informed of the freedom to withdraw from the study at any stage if they so desired without any penalty.

CHAPTER FOUR

4.0 RESULTS

Characteristics of study participants

Five hundred and eighty-five (585) female undergraduate students at MUHAS were reached out for this study. Their mean (SD) age was 26.1 (3.4) years. As seen in Table 1, close to a half of study participants reported to be single 279 (47.7%) and resided off-campus 340 (58.1%).

Of the 585 participants, 471 (80.5%) reported to have never used any form of a long-acting reversible contraceptive. However, 91% of those who have never used LARC reported to be sexually active. With regard to marital status, a majority 52.3% were either married or living with a partner (cohabiting).

Table 1: Distribution of the study participants by their sociodemographic characteristics (N=585).

Socio-demographic characteristics	Frequency	Percent
Age		
≤20	28	4.8
21-25	252	43.1
26-30	228	39.0
31-35	65	11.1
≥36	12	2.1
Marital		
Single	279	47.7
Married	134	22.9
Cohabiting	172	29.4
Residency		
In campus	245	41.9
Off campus	340	58.1
School		
Dentistry	78	13.3
Medicine	160	27.4
Public health	96	16.4
Pharmacy	163	27.9
Nursing	88	15.0
Year of study		
1	60	10.3
2	157	26.8
3	236	40.3
4	119	20.3
5	13	2.2
Use of LARCs		
Ever used	114	19.5
Never used	471	80.5
Ever had sexual intercourse		
Yes	411	29.7
No	174	70.3

Table 2 displays the most commonly reported reasons for not using LARCs. The most reported reason was use of short term contraceptives 383 (89.1%), followed by fear of side effects 161 (37.4%) and the belief that the methods were not suitable for their age 64 (14.9%). Lack of partner approval for use of LARCs was reported by 53 (12.3%) respondents whereas a few participants 12 (2.8%) did not know where to access LARCS.

Table 2: Reasons for not using LARCs among those who reported sexual debut but not using LARCs (N=430)

Reason	**Yes (%)**
Use short term contraceptives	383 (89.1)
Fear of side effects	161 (37.4)
Not suitable for my age	64 (14.9)
Partner approval	53 (12.3)
Difficult access	18 (4.2)
Loss of sexual **excitement**	15 (3.5)
Don't know access point	12 (2.8)

More than a third of the respondents (34.9%) reported to have heard about LARC from schools, followed by families and friends (34.0%) and the least mentioned source of information was the radio (17.8%) as shown on Fig 2.

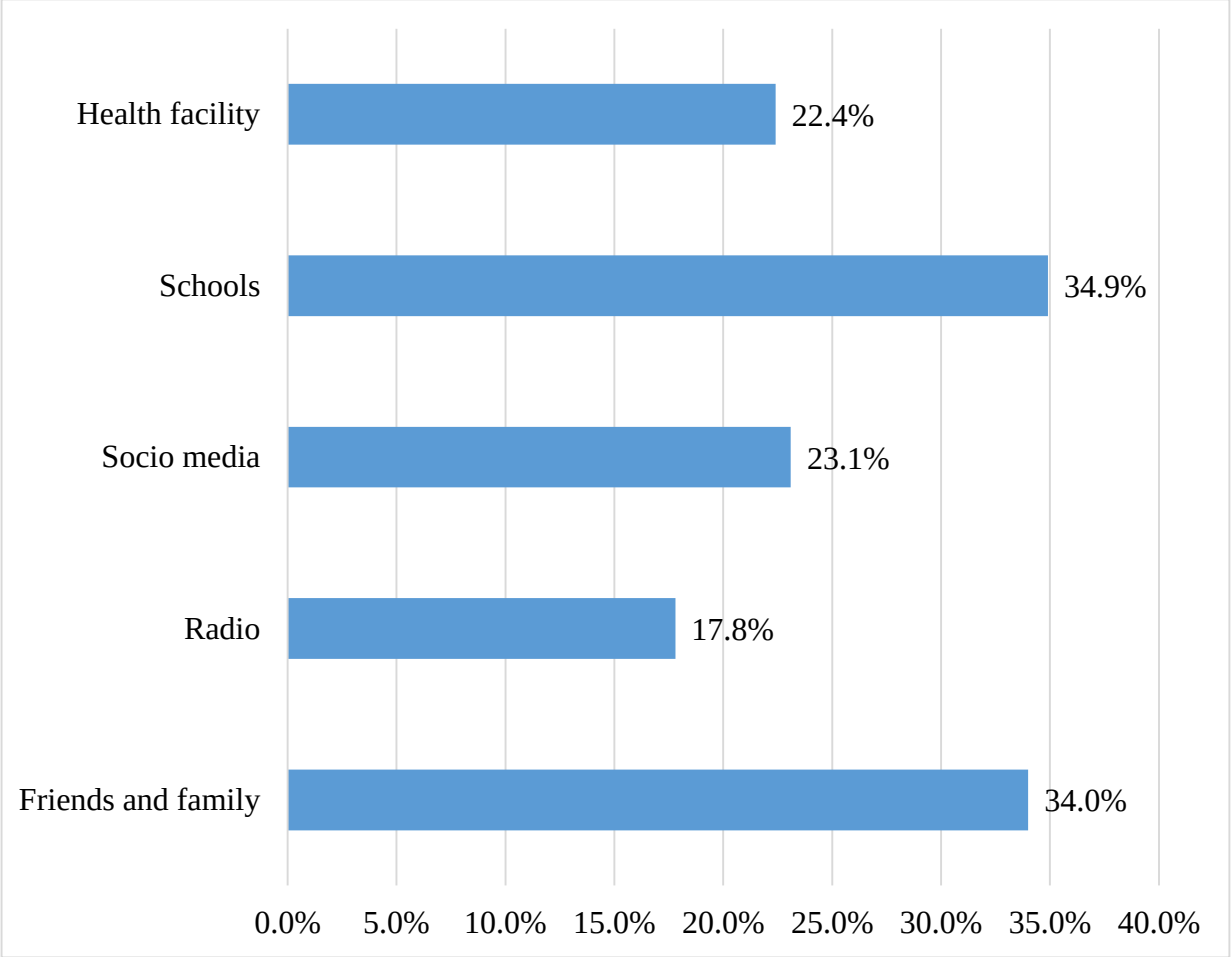

Figure 2: Source of information about LARCs among female undergraduate students at MUHAS

Most of female students at MUHAS had knowledge concerning LARCs. The mean and standard deviation of the students score on knowledge was 53±24. However, it was found out that the number of students less knowledgeable on LARCs was approaching the number of those that are knowledgeable, apart by a small difference.

Knowledge on long acting and reversible contraceptives

As per knowledge assessment on use of LARCs among female undergraduate students of Muhimbili University of Health and Allied Sciences, 52.6% were regarded knowledgeable on LARCs while 47.4% were unknowledgeable. This was analyzed by being above and below the 50 knowledge score respectively. In this case, those who were knowledgeable on LARCs are fairly more than students who were unknowledgeable.

Table 3 shows the association between selected variables (marital status, year of study and sexual debut) and the use of LARCs and the findings are as displayed. Most of the socio-demographic characteristics of the female undergraduate students were statistically significantly associated with use of LARCs ($p < 0.05$). These included age ($X^2 = 48.235$, $p = 0.000$); marital status ($X^2 = 52.029$, $p = 0.0001$); year of study ($X^2 = 25.085$, $p = 0.0001$); and age at sexual debut ($X^2 = 8.625$, $p = 0.003$)

Table 3: Association between use of LARCs and socio-demographic characteristics of female undergraduate students at MUHAS.

Variables	Use of LARCs		
	Yes N (%)	No N (%)	X^2; *p value*
Age			48.235; 0.000
≤20	0(0)	28 (100)	
21-25	25 (9.9)	227 (90.1))	
26-30	58 (25.4)	170 (74.6)	
31-35	27 (41.5)	38 (58.5)	
>36	4 (33.3)	8 (66.7)	
Marital			52.029; 0.000
Single	25 (9)	254 (91)	
Married	52 (38.8)	82 (61.2)	
Cohabiting	37 (32.5)	135 (28.7)	
School			2.831; 0.587
Dentistry	19 (24.4)	59 (75.6)	
Medicine	29 (18.1)	131 (81.9)	
Public health	22 (23.2)	73 (76.8)	
Pharmacy	28 (17.2)	135 (82.8)	
Nursing	16 (18.2)	72 (81.8)	
Year of study			25.085; 0.000
1st & 2nd	24 (11.1)	193 (88.9)	
3rd	47 (19.9)	189 (80.1)	
4th & 5th	43 (33.1)	87 (66.9)	
Sexual debut			8.625; 0.004
≤18	26 (17.8)	120 (82.2)	
19+	82 (30.9)	183 (69.1)	

X^2=Chi square

Table 4 depicts uni**v**ariate analysis of factors associated with use of LARCs among the study respondents. Study participants were asked on reasons for not using LARCs. Variables which were factored in this model included access to LARCs, fear of side effects, partner approval and unsuitability of the methods for their age. It was found out that there was a significant relationship between LARC use and LARC accessibility [X^2 (1, N=585) = 4.607, p=0.032], fear of side effects [X^2 (1, N=585) = 23.961, p=0.0001], spouse approval [X^2 (1, N=585) = 7.518, p=0.006] and suitability for age [X^2 (1, N=585) = 16.289, p=0.0001.]. Those who said no difficult in access, no fear of side effect, no partner approval required and those who found LARCs being suitable for their age, were more likely to use LARCs.

Table 4: Bivariate analysis table of predictive factors associated with the use of long acting reversible contraceptives among female undergraduate students at Muhimbili University of Health and Allied Sciences (N=585).

Variable	Use of LARCs		
	Yes	No	
	N (%)	N (%)	*X^2; p value*
Use short term contraceptives			0.026, 0.872
Use	102 (26.6)	281 (73.4)	
Don't use	12 (25.5)	35 (74.5)	
Occasional sex would not easily lead to pregnancy			0.018; 0.892
Yes	8 (27.6)	21 (72.4)	
No	106 (26.4)	295 (73.6)	
Difficult access			4.607; 0.032
Yes	1 (5.3)	18 (94.7)	
No	113 (27.5)	298 (72.5)	
Fear of side effects			23.961; 0.000
Yes	21 (13.0)	140 (87.0)	
No	93(34.6)	176(65.4)	
Partner approval			7.518; 0.006
Yes	6 (11.1)	48 (88.9)	
No	108 (28.7)	268 (71.3)	
Loss of sexual excitement			3.502; 0.061
Yes	6 (11.1)	48 (88.9)	
No	108 (28.7)	268 (71.3)	
Don't know access point			2.437; 0.119
Yes	1 (7.7)	12 (92.3)	
No	113 (27.1)	304 (72.9)	
Not suitable for my age			16.289; 0.000
Yes	4 (6.2)	61 (93.8)	
No	110 (30.1)	255 (69.9)	

X^2=Chi squar

Table 5 shows that multiple variables had significant association with LARC use by female undergraduate students of Muhimbili University of Health and Allied Sciences.

Those students who were married and cohabiting were nearly 4 times than those who are single [Adjusted Odds Ratio, AOR= 3.885; 95% CI (2.064, 7.313)]. Likewise, those students who were cohabiting were nearly 3 times those who are single (AOR = 2.659; 95% CI 1.394, 5.073)

The odds of third year students and $4^{th}/5^{th}$ years students to utilize LARCs were higher by almost 2 times and 4 times respectively than those students in $1^{st}/2^{nd}$ year. (AOR= 1.952; 95% CI 1.051, 3.626) and (AOR =3.587; CI 95% 1.813, 7.099) respectively.

The difficulty to access LARCs and fear of side effects were also among the variables that influenced the utilization of the LARCs among female medical students at MUHAS. Those students who didn't find difficulty accessing LARCs neither had fear of side effects had more chance to LARC use by 15 times (AOR= 15, 95% CI 1.854, 121.350) and 5 times respectively. (AOR = 5.405, 95% CI 3.012, 9.699)

In addition, the odds of LARC use was higher amongst students who had their spouse approval by 4 folds than those who didn't. (AOR 4.280, 95% CI 1.669, 10.975). Likewise, students who thought LARCs were not suitable for their age had less odds to utilization of LARCs by almost 10 folds than students who though it's quite fine to use LARCs at their age. (AOR 9.564, 95% CI 3.243, 28.206)

Table 5: Multivariable analysis of factors associated with the use long acting reversible contraceptives among female undergraduate students at Muhimbili University of Health and Allied Science.

Variables (N=585)	P value	AOR	95% CI	
			Lower	Upper
Marital status				
Single				Reference
Married	0.000	3.885	2.064	7.313
Cohabiting	0.003	2.659	1.394	5.073
School				
Dentistry				Reference
Medicine	0.317	0.657	0.289	1.495
Public health	0.655	0.813	0.329	2.011
Pharmacy	0.125	0.521	0.226	1.199
Nursing	0.295	0.608	0.239	1.544
Year of study				
1 & 2				Reference
3	0.034	1.952	1.051	3.626
4 & 5	0.000	3.587	1.813	7.099
Knowledge				
≤50	0.676	1.117	0.664	1.878
>50				Reference
Difficult access				
Yes	0.011	15.000	1.854	121.350
No				Reference
Fear of side effect				
Yes	0.000	5.405	3.012	9.699
No				Reference
Partner approval				
Yes	0.002	4.280	1.669	10.975
No				Reference
Not suitable for my age				
Yes	0.000	9.564	3.243	28.206
No				Reference

CHAPTER FIVE

5.0 DISCUSSION

Unprotected sex poses an important public health challenge in female students among universities particularly in developing countries, including Tanzania. The purpose of this study was to determine the prevalence of utilization of LARCs and associated factors among female undergraduate students at MUHAS, Dar es Salaam.

The study revealed that the utilization rate of LARCs was 19.5% of which 15.1% were using implants and 4.1% were using IUCD. The result of this study is comparatively lower than in other studies such as in Ethiopian (34) and (35) which found 33.7% (22.3% implant and 11.4% IUCD) and 38% uptake rate, however this could be explained from the view that these studies were conducted among women getting family planning service. Studies in Nepal and Kenya reported utilization rate of 6.4% (36) and 4.7% (37) respectively whereby they had larger sample sizes, over 1000 participants, which might have reduced types I and II error rates, accounting for the low prevalence. Additionally, these studies were conducted in an area of extreme high prevalence of risky sexual behaviors and poor sexual and reproductive health outcomes. However, a study done in Gondar town in Ethiopia (2018) reported higher LARCs utilization with 96.5% using intra-uterine contraceptive devices (10). A recent study in Ghana on the usage of modern contraceptives among female of reproductive age found an overall prevalence of use of current modern contraceptive of 21%. In the light of these two studies (Ghanaian and Ethiopian) their results are relatively similar with the results of this study because of similar settings and nature of the study population (female students). According to these findings, it is obvious that uptake of LARC in the region is low which is attributed by laxity in the pursuit of family planning education at early age.

The knowledge of contraception in this study was found to be 52.6% contrary to the 96% reported in TDHS 2004/05. Although it could have been expected by 2020/21 knowledge to be above that reported in 2004/05 but major difference was brought by the fact that this study included female undergraduate medical students at MUHAS and it considered only LARCs but

in TDHS, the indicator was women knowing at least one modern method of contraception. Similar findings have been documented in studies done in other parts of the world. In this study, and other studies such as in Nigeria (51,53), Uganda (39) and United Kingdom (41), the knowledge of modern family planning methods were over 50%. This finding is however relatively high compared to the findings in a study done in Ethiopia and China where knowledge score was 32.1%(57) and 17.9% (60) respectively. According to these findings, it is clear that knowledge on modern contraceptive is somewhat good in some places and somewhat bad in some places due to religious beliefs as Muslims and Catholics tend to have a higher disapproval rate for contraceptive use than other religions (64,65).

Despite the encouraging level of LARCs knowledge and often practice of short term contraceptives such as condom, pills, and calendar, still there are about 80 million women in the world experiencing unintended pregnancy which increases the risk of abortion-related morbidity and mortality (66). The gap between the knowledge of LARCs and the use rate indicates that there are other reasons in association with use rate which are crucial for determining increase rate of use.

Marital status has been found significantly influencing the use rate of LARCs among female student in this study where it has shown that unmarried (single) female students have more tendencies to utilize LARCs than those who are in sexual relationships. The results of this study are supported by other findings (10,53) which suggested that unmarried individuals use LARCs to prevent pregnancies. Furthermore, a multivariate analysis showed a strong association between use rate and year of study where participants who were in fourth and fifth year of their studies were approximately four times likely to use contraceptives than those in their first and second year of study. Data from a study done in Zambia revealed that female who were in advanced level of education were most likely to use LARCs compared to those who were lower in the hierarchy of education level with respect to those who were uneducated (38). Study in Ethiopia further statistically emphasized that women who attended university and college were about four times likely to use LARC than women with no education (34). The implication of this is that as women advance in level of education, they increase self-consciousness and more

understanding of the benefit of using the LARCs than depending on short term contraceptives. Additionally, in support of this, as also age advances with level of classes helps in making female students more aware of LARCs. Although this has not been confirmed in multivariate analysis of this study but the univariate analysis has shown statistical significance.

Access to LARCs, partner communication and fear of side-effects have been shown in literature to have impact on the use of LARCs (54,55). A systematic review study in sub Saharan Africa showed that 15.8% of women would depend on their spouses for choice of contraceptive methods and 52.7% would discontinue family planning if their spouses objected (54,56). In this study, those who reported to "not depend on their spouses" for taking any form of contraceptive were had more than five times more chances of taking LARCs than those who depend on their spouses. This difference between the result of this study and the other findings could be explained by the fact that this study included students who majority of them are not in legal marriage therefore their spouses often times might have less influence on their reproductive health choices.

Use of contraception is quite beneficial. It enables women to avoid unwanted pregnancies, enables child spacing and most importantly to schooling women, prevent unintended pregnancy, unsafe abortions, all of which benefit the health of the mother and child. In Tanzania, the percentage of female deaths that are maternal related have the highest proportion in 20-29 age groups, which are the peak childbearing years and also college years for students. Related to this study which gives special attention to youths, it is crucial to increase use of long acting and reversible contraceptives in efforts to reduce unplanned pregnancies, abortions and maternal deaths.

5.2 Study limitations

1. This was a single-gender based study. Since male have influence on their sexual partners regarding utilization of contraceptives including LARCs, therefore their views and perceptions were not obtained in this study. However, most of the questions that were supposed to be asked to male students were reshaped in such a way that, information could be drawn from the female students.
2. Conducting this study in only one medical university out of eleven universities within Dar es Salaam city also limited generalization of the findings. However, the selection of the study site was done randomly, using the lottery method. Consequently, the potential bias was eliminated.
3. The number of fifth year participants were fewer, hence fewer responses from year fives comparatively. This might have somewhat limited comparison of findings. However, from a random sampling technique of the students by course and year, made the study inclusive.

CHAPTER SIX

6.0 CONCLUSION RECOMMENDATION AND LIMITATION OF THE STUDY

6.1 Conclusion

The proportion of LARCs utilization among female undergraduate students at MUHAS was low compared to the Tanzanian Government target which is 60% at national level for all women in their reproductive age. The level of knowledge was fairly adequate. Marital status, year of study, difficulty in accessing LARCS, fear of side effects, partner approval and the belief that the methods are not suitable for their age are the factors that hinder utilization of LARCs among female undergraduate students at MUHAS. Although knowledge was fair, much emphasis needs to be done in promoting use of LARCs since most of the students use short term contraceptives which are not as effective.

6.2 Recommendations

1. More efforts and investment need to be made by the Government through the reproductive and child health unit of the MoHCDGEC **o**n modern contraceptive method promotion. Also, education and advocacy is needed to increase awareness of utilization of LARCs among undergraduate female students in Tanzania so that they could avoid unplanned pregnancies which in turn could improve their academic performance, and reduce their risks of maternal mortalities or morbidities.
2. Providing sufficient knowledge which will **raise** awareness on side effects which will help in eluding misconceptions on side effects which occasionally are not real. This could be achieved by launching regular seminars.
3. The need to ensure the availability of LARCs within and nearby university campus health facilities so that contraceptives could be easily accessible.
4. There is a need of promoting and maximizing partner involvement and particularly male involvement with regard to contraceptive use. Sexual partners are seen to have an influence in determining contraception acceptance and use.

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APPENDICES

Appendix I: Questionnaire

DETERMINANTS OF LONG ACTING REVERSIBLE CONTRACEPTIVE (LARCs) USE AMONG FEMALE UNDERGRADUATE STUDENTS AT MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES, DAR ES SALAAM.

SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. What is your age_____? (Complete years)
2. Where do you reside?
    a) In Campus
    b) Off Campus
3. What is your marital status?
    a) Single
    b) Married
    c) Cohabiting
    d) Divorced
4. Under which school is your academic course?
    a) School of Dentistry
    b) School of Medicine
    c) School of Public Health and Social Sciences
    d) School of Pharmacy
    e) School of Nursing
5. In what year are you currently?
    a) 1st year
    b) 2nd Year
    c) 3rd Year
    d) 4th Year
    e) 5th Year

Questions	Yes	No
You have to remember to take an IUD or Nexplanon implant everyday		
IUDs and implants are two of the most effective forms of reversible birth control available for women		
Having an IUD insertion or implant placed underarm involves a simple procedure in a health clinic		
IUDs and Nexplanon implants have to be removed by a health care provider		
You can have an IUD or Nexplanon implant if you have never had a baby		
IUDs and Nexplanon implants hurt your ability to get pregnant in the future		
IUDs and Nexplanon implants protect against STDs including HIV		
A Nexplanon implant can be in place for 3 years before you have to replace it		
A Mirena IUD can be in place for 5 to 7 years		
IUDs and Nexplanon implants are birth control methods that you need to remember to insert before each sex act		

A) KNOWLEDGE OF LARC INCLUDE INSTRUCTIONS FOR FILLING THIS

B. REPRODUCTIVE, SEXUAL HISTORY AND LARC USAGE

6. Have you ever had sex?
    a) Yes
    b) No
7. At was your age during your 1st sexual intercourse_____
8. Have you ever gotten pregnant?
    a) Yes
    b) No
9. At what age was your first pregnancy? _____
10. Did you plan your first pregnancy?
    a) Yes
    b) No

11. Have you ever had an abortion?
    a) Yes
    b) No
12. If yes in question 12 above, how often_____

13. Do you have children?
    a) Yes
    b) No
14. Have you ever used LARCs?
    a) Yes
    b) No
15. Are you currently using LARCs?
    a) Yes
    b) No
16. Which type of contraception ever used
    a) Male condom
    b) Female condom
    c) Periodic abstinence
    d) Withdrawal
    e) Pills
    f) Injection
    g) Implants
    h) IUCD
17. What are your reasons for not using LARCs?
    a) I use LARC
    b) Thought the occasional sex could not easily lead to pregnancy
    c) Health delivery points were not favorable
    d) Fear of side effects
    e) Partner did not want me to use such method
    f) Thought the sexual pleasure would be affected
    g) Did not know where to access the methods
    h) Did not think LARCs are suitable for my age

18. Where do you access LARCs while at your institution?
    a.) At MUHAS – RCH and maternity department
    b.) At the nearby health service facility around Upanga
    c.) I am a medical professional; we do the LARCs insertion procedures amongst colleagues by ourselves in the wards or hostels
    d.) At a health facility distant from Upanga

19. Does your boyfriend/husband/sexual partner approve your use of LARCs?
    a.) Yes
    b.) No

21.) Do you freely discuss your sexual reproductive choices including use of LARCs with your boyfriend/Husband/ Sexual partner?

a) Yes
b) No

22.) Have you ever used short term family planning methods?

a) Yes
b) No

23.) If yes, which ones?

a) Condoms
b) Pills
c) Injectable (DEPO)

C. AWARNESS OF LARCs

24.) Ever heard of long acting reversible contraceptives?

a) YES
b) NO

25.) Source of Information? (Which ways do you obtain the sex and contraception knowledge)

a) Friends & Family
b) Radio
c) Television
d) Socio-media
e) Schools
f) Health facility

25.) Types of LARCs you know

a) Implants
b) IUCD

Appendix I: Informed consent Form-English version

Greetings! My name is **Tuganigwe Mwangota,** a student from Muhimbili University of Health and Allied Sciences Pursuing Master degree of Public Health. The purpose of this consent form is to request your permission to collect data that will enable successfully completion of my study titled: **"Determinants of long acting reversible contraceptive use among female undergraduate students of Muhimbili University of Health and Allied Sciences, Dar es salaam."**

Purpose of the study: To determine long acting reversible contraceptive use among female undergraduate students at Muhimbili University of Health and Allied Sciences, Dar es Salaam

Study procedures: This study will require you to answer the question that you will be asked by principal investigator or research assistant. Research assistant will ask you to sign consent and then give you questionnaire for you to respond. Choosing not to participate will not affect your studies.

Risks: No risk is expected for your participation in this study. You may decline to answer any or all questions and you may terminate your involvement at any time if you choose.

Benefits: The information you will provide will help to estimate the prevalence rate of LARCs use. The result extrapolation will help to represent other medical student across the country. We are also hoping that the information obtained from this study may improve dissemination of knowledge regarding to use of LARCs.

Confidentiality: Your responses to this study will be anonymous. Participant data will be kept confidential except in cases where the researcher is legally obligated to report specific incidents.

Contact information: If you have questions at any time about this study, or you experience adverse effects because of participating in this study, you may contact the researcher whose contact information is provided on the first page. If you have questions regarding your rights as a research participant, or if problems arise which you do not feel you can discuss with the Primary Investigator, please contact.

Dr. Bruno Sunguya: Director of research and publication, Muhimbili University of health and allied sciences or further to P.O. BOX 65001, Dar es Salaam, Tanzania, Tel 255222-150-302-6/252489.

Voluntary participation: Your participation in this study is voluntary. It is up to you to decide whether to take part in this study. If you decide to take part in this study, you will be asked to sign a consent form. After you sign the consent form, you are still free to withdraw at any time and without giving a reason. Withdrawing from this study will not affect the relationship you have, if any, with the researcher. If you withdraw from the study before data collection is completed, your data will be destroyed.

Consent to take part in research.

1. I voluntarily agree to participate in this research study.
2. I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.
3. I understand that I can withdraw permission to use data from my interview within two weeks after the interview, in which case the material will be deleted.
4. I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.
5. I understand that I will not benefit directly from participating in this research.
6. I understand that all information I provide for this study will be treated confidentially.

7. I understand that in any report on the results of this research my identity will remain anonymous. This will be done by changing my name and disguising any details of my interview which may reveal my identity or the identity of people I speak about.
8. I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

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Signature of participant Date

I believe the participant is giving informed consent to participate in this study

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Signature of researcher Date

Appendix IV: Ethical clearance approval

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

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Ref. No.DA.282/298/01.C/ Date: 22/04/2021

MUHAS-REC-04-2021-571
Tuganigwe Augustine Mwangota
Shool of Public Health and Social Sciences
MUHAS

RE: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED: DETERMINANTS OF LONG ACTING REVERSIBLE CONTRACEPTIVE USE AMONG FEMALE UNDERGRADUATE STUDENTS AT MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES, DAR ES SALAAM.

Reference is made to the above heading.

I am pleased to inform you that the Chairman has on behalf of the University Senate, approved ethical clearance of the above-mentioned study, on recommendations of the Senate Research and Publications Committee meeting accordance with MUHAS research policy and Tanzania regulations governing human and animal subjects research.

APPROVAL DATE: 22/04/2021
EXPIRATION DATE OF APPROVAL: 22/04/2022

STUDY DESCRIPTION:
Purpose:
The purpose of this study is intended to determine prevalence of LARCs utilization, knowledge of LARCs and ascertain the factors associated with the uptake of LARCs among female students at Muhimbili University of Health and Allied Sciences, Dar es Salaam Tanzania.

The approved protocol and procedures for this study is attached and stamped with this letter, and can be found in the link provided:
https://irb.muhas.ac.tz/storage/Certificates/Certificate%20-%20474.pdf and in the MUHAS archives.

The PI is required to:

1. Submit bi-annual progress reports and final report upon completion of the study.
2. Report to the IRB any unanticipated problem involving risks to subjects or others including adverse events where applicable.
3. Apply for renewal of approval of ethical clearance one (1) month prior its expiration if the study is not completed at the end of this ethical approval. You may not continue with any research activity beyond the expiration date without the approval of the IRB. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.
4. Obtain IRB amendment (s) approval for any changes to any aspect of this study before they can be implemented.
5. Data security is ultimately the responsibility of the investigator.
6. Apply for and obtain data transfer agreement (DTA) from NIMR if data will be transferred to a foreign country.
7. Apply for and obtain data transfer agreement (DTA) from NIMR if data will be transferred to a foreign country.
8. Apply for and obtain material transfer agreement (MTA) from NIMR, if research materials (samples) will be shipped to a foreign country.
9. Any researcher, who contravenes or fail to comply with these conditions, shall be guilty of an offence and shall be liable on conviction to a fine as per NIMR Act No. 23 of 1979, PART III section 10 (2)
10. The PI is required to ensure that the findings of the study are disseminated to relevant stake holders.
11. PI is required to be versed with necessary laws and regulatory policies that govern research in Tanzania. Some guidance is available on our website https://drp.muhas.ac.tz/.

Dr. Bruno Sunguya
Chairman, MUHAS Research and Ethics Committee