FACTORS ASSOCIATED WITH SHORT INTER-PREGNANCY INTERVAL AMONG WOMEN ATTENDING ANTENATAL CAREAT MNAZI MMOJA HOSPITAL, DAR ES SALAAM TANZANIA

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FACTORS ASSOCIATED WITH SHORT INTER-PREGNANCY INTERVAL AMONG WOMEN RECEIVING ANTENATAL CAREAT MNAZI MMOJA HOSPITAL, DAR ES SALAAM TANZANIA

By

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A Dissertation Submitted in (Partial) Fulfilment of the Requirements for the Degree of Master Medicine (Obstetrics and Gynaecology) of

Muhimbili University of Health and Allied Sciences
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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by Muhimbili University of Health and Allied Sciencesa dissertation entitled: **‘‘Factors associated with short inter-pregnancy interval among women receiving antenatal care at Mnazi Mmoja Hospital, Dar es salaam Tanzania’’,**in (partial) fulfillment of the requirements for the degree of Master of Medicine (Obstetrics and Gynaecology) of Muhimbili University of Health and Allied Sciences.

_____

Prof. Andrea B. Pembe

(Supervisor)

_____

Date

DECLARATION AND COPYRIGHT

I, **Dr. Amani Kikula,** declare that this **dissertation** is my own original work and that has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature…….. **Date**……..

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DEDICATION

To my mother (Mrs. Suzan Kikula), a symbol of hard work from whom is reflected through this work.

ABSTRACT

Background: Tanzania is among countries with a high fertility rate of 5.2. For the past decade, there has been a rising trend of women with short inter-pregnancy interval (16% to 19%). Short inter-pregnancy interval is associated with poor maternal and neonatal outcomes. The objective of this study was to determine the magnitude and factors associated with short inter-pregnancy interval will help improve maternal and neonatal health.

Methods: A cross-sectional study was conducted at Mnazi Mmoja hospital, Dar es salaam among women receiving ante-natal care. Data was collected from 3rd September to 1st October 2018. Information on inter-pregnancy interval, social demographic, obstetric and individual factors were collected. Data were analyzed using SPSS, statistical software version 23. Bivariate and multivariable logistic regression were done to identify factors associated with short inter-pregnancy interval with a p-value <0.05 considered statistically significant.

Results: A total of 524women attending ante-natal clinic were recruited for the study. The mean age of women studied was 29.80(±4.94), withover half of the women being para 1.Twenty-two percent of the women had short inter-pregnancy interval. Short inter-pregnancy interval was significantly associated with young maternal age (AOR=2.67, 95% CI=1.23 - 5.79); non-use of contraceptive method (AOR=2.05, 95% CI=1.22 - 3.45); breastfeeding for less than 6 months (AOR=3.45,95% CI=1.17 – 10.13) and having an antecedent dead child at time of index conception (AOR=3.38,95% CI=1.15 – 9.93).

Conclusion: Short inter-pregnancy interval is still a problem in our community. Shorter periods of breastfeeding was strongly associated with increased likelihood for having short inter-pregnancy interval.

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LIST OF ABBREVIATIONS

AIDS	–	Acquired Immune Deficiency Syndrome
HIV	–	Human Immunodeficiency Virus
IPI	–	Inter Pregnancy Interval
LNMP	–	Last Normal Menstrual Period
MUHAS	–	Muhimbili University of Health and Allied Sciences
PPH	–	Postpartum Hemorrhage
PROM	–	Premature Rapture of Membrane
WHO	–	World Health Organization

DEFINITION OF TERMS

Inter-pregnancy interval - Time spent not pregnant prior to the index pregnancy**.** For this study, it will be time in month from delivery of previous pregnancy that lasted at least 28 weeks to the last normal menstrual period of the index pregnancy.

Short inter-pregnancy interval – Is defined as, less than 24 completedmonths from live birth of previous pregnancy to the last normal menstrual period of the index pregnancy.

Normal inter-pregnancy interval – Is defined as, after a live birth at least 24 completed months interval beforethe last normal menstrual period of the index pregnancy.

1.0.INTRODUCTION

1.1. Background

There are four spacing terminologies proposed by World Health Organization (WHO) namely, Inter-pregnancy interval (IPI), inter outcome interval, birth to conception interval and birth to birth interval. Inter-pregnancy interval meaning "time spent not pregnant prior to the index pregnancy". Then there is inter outcome interval, meaning the time between two consecutive pregnancy outcomes (live or non-live birth outcome). While birth to conception interval detailing the time between the index pregnancy conception and the previous live birth. Lastly is the birth to birth interval describing the period between the index live birth and the preceding live birth(1).

The WHO inter-pregnancy interval recommendations differ based on the outcome of antecedent pregnancy.In the event of an abortion, it is recommending at least a 6 months' IPI while a longer interval in the event of a live birth of at least two years but under any circumstance, the interval should not go beyond 59 months (1,2).

Maternal and fetal (or newborn) outcomes resulting from short IPI have been documented in the literature. Premature rupture of membrane (PROM) is more associated with short IPI inthe United States of America (USA), Turkey and Tanzania(3–6). While maternal mortality is increased by more than twice among South Americanwomen with short IPI(7). This could be due to the increased odds for maternal anemia, postpartum hemorrhage (PPH) and preeclampsia to women with short IPIas documented in Tanzania(4). Low birth weight is closely linked with short IPI(8,9). Not only that, low 5^{th} minute APGAR score is another poor outcome resulting from a short IPI (4,9,10). Lastly, higher perinatal mortality rates are associated with short IPI in Tanzania (8).

Two hypotheses have explained the reasons for the outcomes of short IPI. First, the continued succession of nutritional drainage with short IPI diminish maternal nutrients to start using maternal reserves. This is termed as the "maternal nutritional depletion hypothesis" (11). Parallel to this, with the shortened recovery time to the mother through pregnancy and lactation episodes which worsens the status (body nutrient reserve) even more, mostly

recovery of folate reserves “folate depletion hypothesis” (12).The two states act as a continuous vicious cycle of maternal ill-health among those with short IPI. Thus, both of the above situations subjects a woman to a compromised pre-conception nutritional state to support the index pregnancy to term (13).

Tanzania has a high total fertility rate of 5.2 which is contributed partly by a significant proportion of women having short IPI. For the past ten years, the proportion of women with short IPI has risen from 16%to 19% (14). Local studies show an even higher magnitude of the problem, ranging from 19% to 48% (4,8,15). Studying the factors associated with short IPI among Tanzanian women is warranted to improve maternal and neonatal health.

1.2. Literature review

The proportion of women with short IPI varies globally. In developed nations, it ranges from12-35% (10,16). The picture is not far different in Africa. In Ethiopian population studied, about half have short IPI (17). On the other hand, one-third of West African women studiedhave short IPI (18). Meanwhile, in Tanzania, the proportion is 19% (14).

Maternal age is documented to interact variably with IPI. Among Danish women studied, increasing maternal age is associated with short IPI(19) more so, a higher age (among American women) at first conception hasa significant effect (20). Contrary to that, in the developing nations, low maternal age is more related to short IPI(15,21,22). However, others have documented no significant relationship of age and IPI in Iran and Nigeria(18,23).Having a substantial number of working-class women in the developed nations who want to attain their career goals' first, explains the late onset of childbearing with resultant short IPI.

Knowledge of contraceptive methods with its effect on IPI has varying results. In India and Malaysia, women's knowledge on contraception is shown not to be associated with IPI(24,25). Similarly, knowledge on the correct use of contraceptives does not improve spacing practice in Malaysia (25).Meanwhile, in Ghana, women without in-depthknowledge on contraception hadshort IPI compared with those empowered with sufficient knowledge(26). Findings are different in rural India, where knowledge on contraceptives improves spacing only after attaining an adequate family size(27).

The usage of any mode of contraception promotesthe chances of having a normalIPI (17,28–30). Meanwhile, theuse of any of the short-actingmethods increases the risk for short IPI (31).Furthermore, those with a missed opportunity for family planning are more prone to short IPI than ones who got family planning services(32). Inversely to this, use of modern contraceptive methods has been shown not to be protective against short IPI(33). The inconsistency and lack of correct usage of any contraceptive method could confound on the conflicting results detailed above.

Effects of marriage on IPI have been studied in different setups without a clear conclusion. Being married at the time of first pregnancy predisposes American women to shorter IPI(16). Similarly, being married or cohabiting is more associated with short IPI in Mozambique and Tanzania(15,21). However, a differing relationship is documented through a systematic review, with unmarried women having shorter IPI (34). Elsewhere, marital status is shown not to influenceIPI(22). Factoring in the fertility potential of the couple could explain the varying relationships detailed above.

Maternal education level may have an influence on IPI. In Bangladesh, having more than primary level education is protective against short IPI (35). Similar results are found in Nigeria, Uganda and Tanzania (15,18,22). However, in Mozambique, rural residentswho can read and write are protected from short IPI while educated urban residents are prone to short IPI (21). Still, in the developed nations,a college graduate or higher education status is linked to a short interval (16,23)while in Denmark, finding a weak association is described(19). Thus providing basic primary education is expected to empower our significant rural settlers towards proper spacing.

Parity has been documented to affect IPI in different ways. Higher order parity women in Bangladesh is related toan increased interval (35) with the effect becoming more significant with parity of three or more (36). Meanwhile, others (in Nigeria) went further to detail not only increased IPI with increased parity, but adherence to recommended IPI was observed with higher parity (18).Further stressing, Mozambicans delivering twice to four times showed better adherence to normal IPI(21). Opposing to the later, others have documented no association (22,29). While in rural Tanzania, higher parity is linked with short IPI (15). The cultural differences in the desired number of children in different setups influence how parity affects IPI.

The period spent breastfeeding has its own influence on IPI. Traditionally breastfeeding has been used by societies as a mode for birth spacing and has proved effective (37).This is due to the physiological inhibitory influence of lactation to the release of gonadotrophes (38). It has been demonstratedin Nigeria, breastfeeding beyond six months is protective against short IPI

(18). Elsewhere, the protective effect of breastfeeding is more pronounced when done for at least 24 months (39). Conflicting to this, the protective effect is shown only in the first six months of Mozambicans with no added benefit beyond it (21). Others going further to show an inverse relationship of breastfeeding period beyond six months and IPI (17). An understanding of the relationship of breastfeeding practice and IPI will help towards making relevant recommendations.

Mode of delivery of previous pregnancy affects IPI variably. Caesarean delivery in the previous pregnancy is documented through a systematic review and a study done in Nigeria, to prolong IPI (18,40). While vacuum delivery has more influence (prolonging) on IPI than caesarean delivery in Sweden(41). However, among Ugandan womenstudied no association between mode of delivery of previous pregnancy with IPI (22) or even number of future children in the Netherlands(42).

Among other factors, children sex preference affects IPI (43). A preceding female child is associated with a shorter IPI in Ethiopia and India(44,45). Furthermore, having an equal number of male to female children has a similar effect in Saudi Arabia(46). Whereas in Nigeria even not reaching the desired number of preferred child-sex, results in short IPI (47). Disagreeing to all that, others have depicted no relationship of the sex of the children to IPI (48,49).

Religion status has its own relationship with subsequent IPI. Being a Muslim is documented to be associated with short IPI in Bangladesh (43). Within group analysis of Ethiopian Christians, orthodox are more associated with short IPI relatively to protestants (29). However, in other areas in Africa (Ethiopia and Nigeria), religion is not associated with IPI(17,18). The interaction of different religions with acceptance and use of contraceptive methods could be the reason for the findings stated above.

Unintended index pregnancies are associated with short IPI in the United States of America (USA)(16,50). Furthermore, short IPI is a result of either mistimed or non-intended pregnancy in USA(51). Not only that but discordance of the intention of the partners with regards to the intent of being pregnant especially with father wanting it and mother wanting to prolong

results to short IPI (52). This stresses further the significance of empowering the couple towards family planning.

The outcome of the previous pregnancy may predetermine the IPI. Death during delivery or in the first year of birth is associated with short IPI in Bangladesh(53,54). A similar finding is illustrated in Uganda and Nigeria(18,22). Others going further in Bangladesh to depict the protective effect against short IPI when the previous child is alive at the time of subsequent conception (35) or if there is a live son in a Korean family (36).

In the Netherlands, self-employed women are more associated with short IPI (49). Similarly, among Chinese women studied, government employees were more protected from short IPI during the one-child policy era (55). Disagreeing to this relationship, In England having employment in the formal sector with stable income predisposes to short IPI (56). While in Ethiopia, no relationship between occupation and IPI (44). However, an overall lack of profession to the French mother increases the risk for short IPI (57). While having a short IPI has been linked to women being unemployed in Africa(58) due to more time spent caring for the newborns frequently with competing employment market. This differing relationship may be due to differing social roles of women in different setup even though throughout, family planning would empower women towards improved social and health status.

The proportion of women in Tanzania with short IPI is still rising. This rise is occurring despite all the interventions available for promotion of adequate birth spacing led by the government of Tanzania. Various factors may influence it including social demographic and obstetric factors, among others through family planning adherence. Understanding how the interaction of these factors with the IPI within this particular group of women (those who had a previous live birth from a pregnancy that lasted at-least 28 weeks' gestation age) will help towards improving maternal and perinatal health, through making relevant interventional recommendations from the findings of this study.

1.3. Conceptual framework

Short IPI is associated with a number of factors. Within this study, factors considered will includematernal age, maternal marital status, maternal religion, maternal occupation status,maternal education level, parity status of the mother, mode of delivery of previous pregnancy,time (in months) used to breastfeed the previous child, child sex preference, intention of index pregnancy, survival status of previous child, contraceptive use before conception of the index pregnancy and maternal contraceptive knowledge.

This study intends to describe the association of the factors with short IPI. The diagram below illustrates the relationship of the independent variables [maternal age, maternal marital status, maternal education level, maternal occupation status,parity status of the mother, mode of delivery of previous pregnancy,time (in months) used to breastfeed the previous child, intention of index pregnancy,contraceptive use before conception of the index pregnancy and maternal contraceptive knowledge] with the dependent variable, (IPI).

From figure 1, social demographic factors, obstetric factors and individual factors will be independent variables of which some social demographic factors will influence the individual factors. Yet, there is a to and fro relationship of obstetrical and individual factors. Eventually, all the independent variables will act through family planning to influence IPI.

The dependent variable will be dichotomized to have short IPI and normal IPI. While the independent variables are expected to influence short IPI.

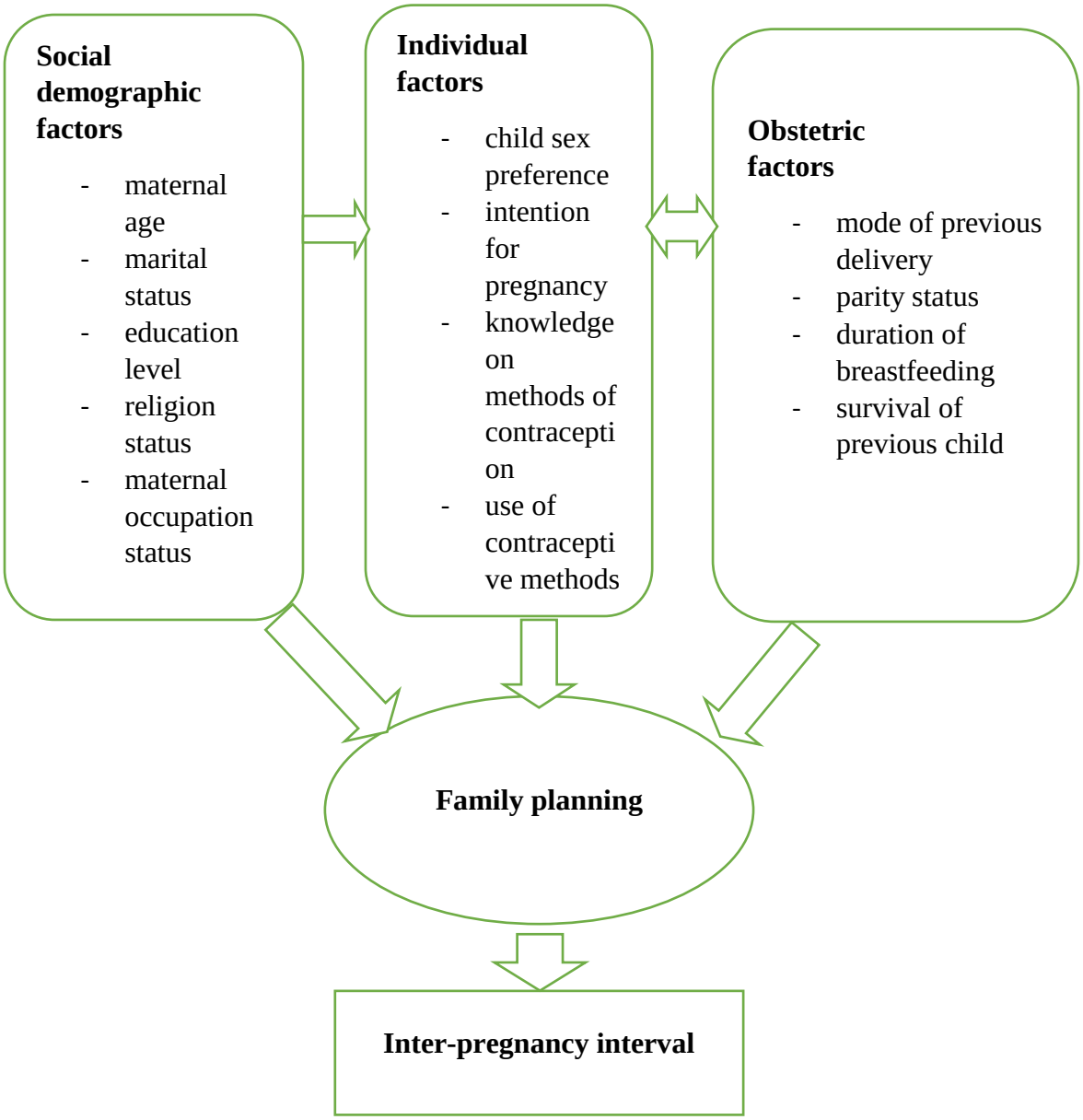


Figure 1: Conceptual framework

1.4. Problem statement

The Tanzanian Government is striving to increase the availability and accessibility of family planning services in order for the couple to decide when to start having children and when to have another childin order to avoid short IPI. This is through its commitment to increase the availability of modern contraceptives at all levels of health care and improving its financial contribution from the national budget (59).

A short IPIis associated with several adverse outcomes to the mother including PPH, PROM, hypertensive disorders of pregnancy, preterm labor and ultimately maternal mortality (3,4,6,7) and to the newborns including low birth weight and perinatal death (8,15,60).Furthermore, short IPI may result in the increase in the number of children a woman may have thus increased total fertility rate.

Despite the efforts by the Government of Tanzania the proportion of women with short IPI has increased from 16% to 19% in Tanzania for the past 10 years (14). The rise of the short IPI is alarming thus warranting a determination of the factors contributing to its raise. This study intends to determine the factors associated with short IPI to help improve maternal and newborn health.

1.5. Rationale

The rising trend of pregnancies with short IPI in the past decade necessitates understanding the contributing factors. Thefinding of this study may be used by the policy makers to design appropriate programmatic interventions and by family planning service providers to focus on identified factors towards improving birth spacingto promote better maternal and newborn health.

1.6. Research questions

1. What is the proportionof women with short IPI among those attending antenatal care at Mnazi Mmoja hospital?
2. What are the factors that influence short IPI among women attending antenatal care at Mnazi Mmoja Hospital?

1.7. Broad objective

To determine the proportionof short IPI and its associated factors amongwomen receiving antenatal care services at Mnazi Mmoja Hospital.

1.8. Specific objectives

1. To determine the proportionof short IPI among women receiving antenatal care at Mnazi Mmoja Hospital.
2. To determine factors associated with short IPI among women receiving antenatal care of Mnazi Mmoja Hospital.

2.0. METHODOLOGY

2.1. Study design

It was a facility based analytical cross-sectional study design. The design was chosen to show the magnitudeof short IPI and its associated factors.

2.2. Study setting

The study was done at Mnazi mmoja hospital, ante-natal clinic.It is located in Ilala Municipal, Mchafukoge ward. It serves women from variable locations in Dar es salaam region. The maternal and child health unit is called Amtullabhai Karemji Maternal and child health unit which offers family planning, routine antenatal and postnatal clinic care, HIV testing and counseling in pregnancy and vaccinations for both mother and child.

The hospital has a bed capacity of 34; 8 neonatal beds, 2 delivery beds, 12 postnatal beds, 6 post operation beds and 6 observation beds.

The antenatal clinic has four rooms forantenatal clinic services which are done 5 days a week, Monday to Friday. Women attending for the first time for the current pregnancy are seen on Mondays and Fridays, while follow-up visits are done on Tuesday, Wednesday and Thursday. The clinic has on average 4 nurses for routine antenatal care per day, while other services includingprevention of mother to child transmission (PMTCT), family planning, health education and laboratory services are conducted by respective health personnel. Daily, antenatal clinic services commence at 0800 hours, beginning with a health talk from a pre-scheduled topic facilitated by on duty nursesfor that week, usually three (nurses) per week, continued with the education session, that lasted about 30 minutes. After its completion, the principle investigator gave a talk on the study and family planning for 10 – 15 minutes.

2.3. Study population

All women visiting Mnazi Mmoja hospital for antenatal care.

2.4. Study sample

All women visiting Mnazi Mmoja Hospital for antenatal care with at least one previous pregnancy.

2.5. Sample size

From the Tanzania demographic and health survey of 2015-2016, the prevalence of women with short IPI is 19%, using the same prevalence, sample size was calculated as follows;

$$n = D\frac{Z^2P(100-P)}{\varepsilon^2}$$

Where n=the minimum sample size required, z=level of confidence (and this is 95%) therefore zis 1.96, Ɛ=maximum likely error which is 5%, D= design effect and P=prevalence of short IPI in Tanzania which is 19%.

$$= D\frac{1.96^2 \times 19(100-19)}{5^2}$$

$= 236\text{D}$

Adjusting for non-response rate

$$= 236 \times \frac{(100)}{100 - f\%}$$

Where f% is non response percentage = 10%

$$= 236 \times \frac{100}{90}$$

$= 262\text{D}$

accounting for the non-randomization type of study design while assuming the population attending Mnazi mmoja clinic is from a variety of clusters (Kinondoni, Ilala, Ubungo, Temeke and Kigamboni), a designer effect (deff) of 2was considered

$= sample\ size \times deff(\text{D})$

$$= 262 \times 2$$

$$= 524$$

Minimum required sample size was 524.

2.6. Sampling technique

Convenient sampling technique was used, involving recruiting all women attendingfor antenatal care until the minimum required sample size was reached.

2.7. Inclusion criteria

All women in their booking and subsequent visit at the antenatal clinic who had a previous livebirth from a pregnancy that lasted at least 28 weeks of gestation age.

2.8. Exclusion criteria

- Women with communication impairment.
- Women with severe systemic illness at the day of clinic visit.

2.9. Training of research assistants and Pretesting of the questionnaire

The questionnaire was initially translated (following compilation of the questions) then back translated to English to retain its meaning. Then itwas pretested at the same facility (10 women attending antenatal clinic care were used) before the initiation of data collection from which no changes to the questionnaire was deemed necessary. Research assistants (3)were recruited, recent doctor of medicine graduates from MUHAS, trained on the purpose of the study, meaning of every question in the questionnaire and professional conduct in approaching women to be recruited for the study.

2.10. Data collection

Data was collected from 3rd September to 1st October.Following a daily health education conducted by on-duty nurses (3 nurses each week), a short talk onmeaning of family planning and its benefits was done daily for about 15 minutes, by the principle investigator, which followed with the introduction of the research team to the attending women and informing them on the research and its aim. Collected antenatal cards (for followup women, upon arrival they collected their cards for numbering and registration to ensure they are attended as in order

of their arrival) were sorted by the principle investigator as per inclusion criteria and labeled them with a blue marker dot (to avoid re-recruitment on subsequent visits). Attending nurses were instructed on the labeling on the cards, so as to direct women with the markedcards to the research team for obtaining informed written consent and interview. For those who came late, similarly, identification and labeling of the cards and interview after obtaining a written informed consent was done following being seen by the attending nurse. For women in their first visit, after the morning health talk, they were also informed on the purpose and benefits of the study. Attending nurses were asked to direct the ones who fit the criteria to the research team for obtaining written informed consent and interview. The principle investigator randomly asked women after they were seen by the attending health care worker for ante natal services to ensure all eligible clients were included. Those who consented, data was collected using a structured Swahili questionnaire by the principal investigator and trained research assistants.Information on IPI (using the last normal menstrual period or date of an early ultrasound and birth date of the antecedent pregnancy) was collected.Parameters including age, marital status, religion, education level, occupation status, parity, mode of delivery of previous pregnancy, the survival of the previous child, the intention of the index pregnancy, duration of breastfeeding, child sex preference, contraceptive use and knowledge were also obtained from the woman.

A total of 530 women were included in the study.

2.12. Data analysis

Using SPSS version 23, coded data were entered daily. Data cleaning was done sequentiallyvia manual checking entered data and cross tabulating the entered variables prior analysis until the completion of data entry. The dependent variable was recoded to a binary variable of short and normal IPI represented as 1 and 0 respectively. Independent variables were recoded as follows before analysis, marital status to married/living with someone and not married/not living with someone; maternal age had four categories namely <25, 25-29, 30-34 and >34;religion status recoded to Christian and Muslim; parity status had the parity numbers as whole numbers and then further categorized into twocategories, para 1 and multipara; child

sex preference had two groups, male and female child;education level had three categories; no formal education, at least primary school level and at least secondary school level;mode of previous delivery was recoded into vaginal delivery and operative delivery; knowledge on contraception was dichotomized, adequate knowledge and inadequate knowledge. A composite score was used, grouped the knowledge level into percentages of 37.5%, 50% and 62.5% to represent 3, 4 and 5 questions correct respectively as the knowledgeable group, while those with two or less questions correct (<37.5%) had inadequate knowledge. The tool, validated,was adopted from the handbook of sexuality-related measures (61); outcome of the previous pregnancy was recoded into alive and well and dead (at time of conception of index pregnancy);

Intention to get pregnant had two groups; 1. Intended means the pregnancy occurred at about the time the mother wanted to become pregnant. 2. Unintended. Scoring of the variables was as follows; If the woman stopped using contraception or had not used contraception because she wanted to become pregnant and the pregnancy occurred at about the right time in her life, then the pregnancy was intended (with a score of 3). This modal was adopted from the national health of statistics report, and modified to suit this study(62).

The above-stated variables were considered for women who had a live birth in the previous pregnancy that lasted at least 28 weeks of gestation, to ensure homogeneity of the study population and confining to the healthy timing and spacing recommendation(2).

After data cleaning, it was then analyzed. Frequency distribution tables to present demographic and other variables were used. Bivariate analysis was done to show the association of the dependent and independent variables using chi-square value and a p-value. Those with P-value of <0.2were put formultiple logistic regression analysis to determine the level of effect (crude and adjusted odds ratio) of the independent variables to the dependent variable with a P-value less than 0.05 considered statistically significant.

2.13. Ethical consideration

The ethical clearance for the study was obtained from the Senate Research and PublicationCommittee of Muhimbili University of Health and Allied Sciences (MUHAS). Permission toconduct the study was obtained from the Ilala district medical officer, director of hospital services and the nurse in charge of the RCH unit of Mnazi Mmoja Hospital.

Written informed consent was obtained from the women, where they were informedon the purpose of the study and the benefits obtained from the study findings. Womenhadthe right to withdraw from the study any time they wished and withdrawal from the study did not affect their subsequent antenatal and postnatal care or other services. Women's information was kept confidential. The research data obtained will be kept for 5 years after the study dissemination and publication, and thereafter destroyed.

Other ante-natal care services were performed as per institution protocol.

3.0. RESULTS

There were 1,397 women attending antenatal care during the study period of whom 873 were not included (103 – refused participation, 512 – primigravida, 101 –had second or more visit and 151 – had an abortion in a previous pregnancy). A total of 530 women were included in the study. Among 530,6 were excluded due to incorrectly filled questionnaires (inclusion of women with abortion and with no date of birth of the antecedent child), thus remaining with 524 in the study. The proportion of women with short IPI was 22.14%.

Table 1: Social demographic and obstetric characteristics of women included in the study (N=524).

Characteristic	n	%
Maternal age		
<25	86	16.41
25 - 29	167	31.87
30 - 34	177	33.78
≥35	94	17.94
Marital Status		
Married/Living together	483	92.18
Not Married/Not living together	41	7.82
Education Level		
No formal education	8	1.53
Atleast primary education	283	54.01
Atleast secondary education	233	44.46
Religion		
Muslim	218	41.60
Christian	306	58.40
Occupation		
No job	141	26.91
Self employed	329	62.79
Formal employment (government/private)	54	10.31
Child sex preference[a]		
Male	96	18.32
Female	123	23.47

Intention for pregnancy		
Yes	30	5.27
No	494	94.27
Knowledge of contraceptive methods		
Adequate knowledge	166	31.68
Inadequate knowledge	358	68.32
Use of contraceptive methods		
Used at-least one contraceptive method	388	25.95
Did not use any contraceptive method	136	74.05
Obstetric factors		
Mode of Delivery		
Vaginal delivery	401	76.53
Caesarean section	123	23.47
Parity Status		
Para 1	274	52.29
Multipara	250	47.71
Duration of Breastfeeding		
<6 months	78	14.89
≥6 months	446	85.11
Status of antecedent child at period of index conception		
Alive	444	84.73
Died	80	15.27

a – 305 had no preference for the sex of the child.

The mean age of women studied is 29.80(±4.94). A significant number (94.27%) of women, their pregnancies were unintended while only about one-third of the women had adequate knowledge on contraceptive methods.

Table 2: Bivariate logistic regression analysis of social demographic and obstetric characteristics with Inter-Pregnancy interval (N=524).

	Total	Inter-pregnancy interval		COR	95% CI	p-value
		Short	Normal			
		N=116 n(%)	N=408 n(%)			
Maternal Age						
<25	86	32(37.21)	54(62.79)	**3.15**	1.74 - 5.72	**0.000***
25 - 29	167	40(23.95)	127(76.05)	1.68	0.98 - 2.87	0.060
30 - 34	177	28(15.82)	149(84.18)	1		
≥35	94	16(17.02)	78(82.98)	1.09	0.56 - 2.13	0.798
Marital Status						
Married/Living together	483	106(21.95)	377(78.05)	1		
Not Married/Not living together	41	10(24.39)	31(75.61)	1.15	0.54 - 2.41	0.717
Education Level						
No formal education	8	2(25.00)	6(75.00)	1.12	0.22 - 5.67	0.893
Atleast primary education	283	65(22.97)	218(77.03)	1		
Atleast secondary education	233	49(48.27)	184(51.73)	0.89	0.59 - 1.36	0.598
Religion						
Muslim	218	54 (24.77)	164 (75.23)	1.30	0.86 - 1.96	0.221
Christian	306	62 (20.26)	244(79.74)	1		
Occupation						
No employment	141	30(21.28)	111(78.72)	1.19	0.54 - 2.64	0.670
Self employment	329	76(23.10)	253(76.90)	1.32	0.64 - 2.75	0.750
Formal employment (gov/private)	54	10(18.52)	44(81.48)	1		

Child Sex Preference						
Yes	219	43(19.63)	176(80.37)	1		
No	305	73(23.93)	232(76.07)	1.29	0.84 - 1.97	0.243
Intention For Pregnancy						
Yes	30	4(13.33)	26(86.67)	1		
No	494	112(22.67)	382(77.33)	1.91	0.65 - 5.58	0.239
Knowledge on Contraceptive methods						
Adequate knowledge	166	38(22.89)	128(77.11)	1.07	0.69 - 1.66	0.777
Inadequateknowledge	358	78(21.79)	280(78.21)	1		
Contraceptive useprior to index pregnancy						
Used	388	61(15.72)	327(84.28)	1		
Did not use	136	55(40.44)	81(59.56)	**3.64**	2.35 - 5.64	**0.000***
Mode of Delivery						
Vaginal delivery	401	91(22.69)	310(77.31)	1.15	0.69 - 1.89	0.580
Caesarean section	123	25(20.33)	98(79.67)	1		
Parity Status						
Para 1	274	69(25.18)	205(74.82)	**1.45**	0.96 - 2.21	**0.080***
Multipara	250	47(18.80)	203(81.20)	1		
Duration of Breastfeeding						
<6 months	78	53(67.95)	25(32.05)	**12.89**	7.47-22.23	**0.000***
≥6 months	446	63(14.13)	383(85.87)	1		
Status of antecedent child at period of index conception						
Alive	444	62(13.96)	382(86.04)	1		**0.000***
Dead	80	54(67.50)	26(32.50)	**12.80**	7.46–21.94	

*– variables put for multivariablelogistic regression, p-value<0.20.

Bivariate logistic regression is presented in Table 2. One hundred and sixteen(22.14%)women had short IPI. The variables which had a p-value of <0.2 were maternal age; contraceptive use prior conception of index pregnancy; duration of breastfeeding of the antecedent pregnancy, parity and status of the antecedent child at the period of index conception.

Table 3: Multivariable logistic regression analysis for the odds of short inter-pregnancy interval

	Short IPI	**Bivariate analysis**		**Multivariable Analysis**	
Characteristic	n (%)	**COR**	**95% CI**	**AOR**	**95% CI**
Maternal Age					
<25	86(16.41)	3.15	1.74 - 5.72	2.67*	1.23 - 5.79
25 - 29	167(31.87)	1.68	0.98 - 2.87	1.63	0.86 - 3.09
30 - 34	177(33.78)	1			
≥35	94(17.94)	1.09	0.56 - 2.13	1.02	0.49 - 2.14
Use of contraceptive method					
Used at-least one method	388(74.05)	1			
Did not used any method	136(25.95)	3.64	2.35 - 5.64	2.05*	1.22 - 3.45
Parity status					
Para 1	274(52.29)	1.45	0.96 - 2.21	0.77	0.44 - 1.37
Multipara	250(47.71)	1			
Duration of Breastfeeding					
<6 months	78(14.89)	12.89	7.47-22.23	3.45*	1.17 - 10.13
≥6 months	446(85.11)	1			
Status of antecedent child at period of index conception					
Alive and well	444(84.73)	1			
Died	80(15.27)	12.80	7.46–21.94	3.38*	1.15 - 9.93

*– statistically significant at p<0.05

Multivariable logistic analysis

Women aged less than 25 years are more than twice likely to haveshort IPI than those in the 30 – 34 years' age category. The likelihood of having short IPI was twiceamong those who did not use a contraceptive method as compared to those who used at least one prior to index pregnancy. Those who breastfed for less than 6 months are 3 times more likely of having short IPI than those who breastfed for at least 6 months. Having a dead child from antecedent pregnancy at the time of index conception increases the chancesof having short IPI by 3.

4.0. DISCUSSION

Among the women included in the study, about one-fifth of them had a short IPI. The occurrence of short IPI was independently associated with young maternal age (age less than 25 years), non-use of a contraceptive method prior index pregnancy, short duration of breastfeeding and having a dead preceding child (of antecedent pregnancy) at a period of index conception.

This study shows almost one in five participants had short IPI which does not differ much from the national figure (19%) (14).This could be justified by the existing tradition of considering every child comes with its own blessing from God necessitating having as many children during the reproductive period(63).In Nigeria, with a similar methodological approach, the magnitude of short IPI was three timeshigher compared to our finding(64). The difference observed could be due to the study being done at a referral facility accommodating mostly high-risk women. Elsewhere in developed nations, the proportion of short IPI is higher than the findings of this study, ranging from 48% to 60%(65,66). A difference in demographic characteristics of the women included in this studyto those in developed countries could be the reason. Meanwhile, for community-based methodological approach, the magnitude was also still higher than the observed findings from this study(15,17). Despite the variations, the magnitude of short IPI is still high in the study population, which warrants intervention.

Younger aged women are more likely to have short IPI than their older counterparts. In this study, women aged less than 25 years are almost 3 times more likely, than those aged 30 to 34 years, to have short IPI. This could be explained by the practice of early marriage with reaching an adequate family size earlier to eventually result intoadequate or longer spacing with advanced age. This stresses the need to intervene to this vulnerable group to improve the overall reproductive health. Which is similar to studies done elsewhere in Africa (15,21,22). However, this is contrary to studies done in developed countries (19,20), where probably the culture of women attaining their career goals before starting a family is in place to eventually give older women a shorter IPI.

The use of any contraceptive method prior to conception protects women against short IPI. Women who did not use a contraceptive method were twice as much likely to have short IPI than users. This is magnified by also having over two-thirds of the study population having inadequate knowledge of contraceptive methods. Furthermore, being compounded by the male-centered practice which requires male partner approval for use of a contraceptive method (67). The contraceptive use protective effect towards short IPI is similarly demonstrated in other studies (17,28–30). This illustrates the need to address not only the provision of contraceptives but educational and cultural circumstances surrounding contraceptive use to reap its benefits towards short IPI.

Among other factors, parity was expected to influence the duration of IPI. With parity increase, it is expected for a woman to have normal IPI. The woman ismost likely expected to have achieved the desired family size and also the multiple exposure to family planning counselling through the post-natal clinic packages would have helped towards proper spacing. This relationship has been shown in Korea, Bangladesh and in Nigeria (18,35,36). However, with this study, the association was not statistically significant. This could perhaps be due to majority of the women studied had inadequate knowledge on contraception despite a significant proportion of them using (more likely incorrect usage was the case) a method of contraception.

Breastfeeding forms a protective shield from short IPI. As depicted in this study, where breastfeeding less than 6 months increases chances for short IPI by multiples of 3.This could be due to the early return of fertility from loss of the physiological inhibitory influence of lactationtowards the hypothalamus (38). But also possibly due to, over three-quarters of women studied did not use a contraceptive method prior conception leading to a short IPI, necessitating them to possibly stop breastfeeding after knowing they are pregnant. A number of other works of literature depict a similar picture (37,44). This effect is not as efficient beyond 6 months post-partum towards preventing short IPI (17,18,21), though breastfeeding beyond six months still proves a beneficial tool for having adequate spacing, among other advantages.

Those having a dead child (from the antecedent pregnancy) at time of conception have triple the chancefor having short IPI than those having a live one. This could be due to the desire by the couple to replace the lost child after the mortality event. This is further multiplied by the absence of the contraceptive effect of lactational amenorrhea in a non-breastfeeding woman who lost her infant.This picture is similar to other studies done in developed and developing countries (18,22,35,36,53). This qualifies the high-risk status towards short IPI for those with a dead antecedent child to warrant adequate healthy-spacing-counselling.

Despite the reported results, this study had some limitations. There is a possibility of social desirability bias while interviewing the study participants, this was mitigated partly by using validated tools especially on the knowledge of contraceptive and intention for pregnancy variables and assuring anonymity of the information provided. And it being a hospital based study, it possibly took fairly more at-risk representative population, a community based, qualitative study design to explore the whys of the factors observed will bring more light into this. However, the results are valid and form a stepping stone towards further understanding of how to overcome the high short IPI magnitudein our community.

5.0. CONCLUSION

Short IPI is still a problem of significance in our community. Shorter periods of breastfeeding was strongly associated with increased likelihood for having short IPI.

6.0. RECOMMENDATION

Programs aimed at curbing the rising trend of short IPI should be directed towards all reproductive-aged women but with a particular emphasis on younger aged (less than 25 years) women. This can be through empowering young women economically and ensuring attainment higher level of education to help delay age at first pregnancy. Initiatives in the informed use of contraceptive methods should be strengthened particularly towards immediate postpartum (mothers) period to empower them to avoid short IPI. Furthermore, encouraging breastfeeding for at least 6 months duration will improve the winning chancesover short IPI. Lastly, empowering women, with a preceding dead child, with proper knowledge and skills for proper spacing will improve their chances of avoiding short IPI. However, a community-based study which will also accommodate the male factors influencing short IPIusing a qualitative design to explore the factors related and perception on short IPI will strengthen the fight towards elimination of short IPI.

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APPENDICES

Appendix 1: consent form (English version)

Introduction: Greetings! My name is Dr. Amani I Kikula, a postgraduate student in Obstetrics and Gynaecology department at Muhimbili University of Health and Allied Sciences. I cordially invite you to participate in a study on factors associated with short inter-pregnancy interval.

Aim: To determine the proportion and factors associated with short inter-pregnancy interval

Participation: I am going to ask you questions focusing on your social-demographic and obstetrical experience.

Benefits and risks: Your participating in this study will contribute to our understanding of the factors that are associated with short inter-pregnancy interval to help intervene to eventually improve maternal and newborn health. There is no health or economic risk expected to result from your participation.

Confidentiality: All information collected from you will be kept confidential. Only the research team will have access to your collected data. Identifiable information will be removed prior to reporting and/or publication of findings from this study.

Right to withdrawal: Your participation in this study is voluntary. You have the right to terminate your participation in the study at any time even after you have signed the consent form. Your entitled health rights and appropriate clinical care will not be affected by choosing to participate or terminating your participation.

Whom to contact: Should you have any questions regarding this study, you should contact themfollowing: Dr. Amani Kikula (Principal Investigator) Department of Obstetrics and

gynaecology, Muhimbili University of Health and Allied Sciences, P. O. Box 65001, Dar es Salaam, mobile phone: 0714753852, e-mail amanikikula@gmail.com.
In case of questions about your rights as a participant, you may contact Dr. Joyce Masalu,

Chairperson of the Senate Research and Publications Committee, Muhimbili University of Health and Allied Sciences, P. O. Box 65001, Dar es Salaam. Tel: 2150302-6.

II: CERTIFICATE OF CONSENT

I have read the above information (has been read for me). I have asked (had the opportunity to ask) questions and have been answered. I have understood the aim of the study. I understand the benefits, risks and my rights to withdraw from the study. I hereby consent voluntarily to participate in this study.

Signature of participant…….

Date (DD/MM/YY)……...

Signature of researcher……..

Date (DD/MM/YY)……...

Appendix 2:Consent Form (Swahili Version)

Fomu ya idhini ya kushiriki

I: TAARIFA

Utangulizi: Habari, Naitwa Amani I Kikula, ni daktari katika Chuo Kikuu cha Afya na Sayansi shirikishi Muhimbili. Ninakukaribisha kushiriki katika utafiti unaohusiana afya ya mama baada ya kujifungua, hususani muda wa kupumzika kabla ya mimba nyingine

Dhumuni: Kutambua idadi ya wanawake ambao hawakupumzika muda unaoshauriwa kitabibu na visababishi vyake kwa ajili ya kujua jinsi ya kuwasaidia wana jamii wengine.

Ushiriki: Nitakuuliza maswali yahusianayo na maisha yako ya kijamii na yahusuyo uzazi.

Faida na hatari: Ushiriki wako katika utafiti huu utatusaidia kufahamu zaidi kuhusiana na visababishi vya muda mfupi wa kupumzika baada ya mama kujifungua na jinsi ya kuepukana navyo. Tunategemea matokeo ya utafiti huu yatasaidia kuboresha huduma zitolewazo kwa wajawazito wote kwa ujumla. Hakuna madhara ya kiafya au tozo zozote za fedha utakazopata kutokana na kushiriki kwako.

Usiri: Taarifa zote utakazotoa katika utafiti huu zitatunzwa kwa siri. Wahusika wa utafiti ndio pekee watakaoweza kuona taarifa hizi. Jina lako halitaorodheshwa katika ukusanyaji wa taarifa na matokeo ya utafiti huu yatakapochapishwa hakuna taarifa zozote ziwezazo kukutambulisha wewe zitakazojumuishwa.

Haki ya kujitoa: Ushiriki wako katika utafiti huu ni wa hiari. Una haki ya kujitoa wakati wowote ukibadili mawazo hata kama ni baada ya kusaini fomu ya idhini ya kushiriki. Hautopoteza haki zozote kwa tiba stahiki unayopaswa kupata utakapoamua kujitoa kushiriki katika utafiti huu.

Madhara: Hakuna madhara yoyote kwako yanayotegemewa kutokea kutokana na ushiriki wako katika utafiti huu.

Kwa mawasiliano: Endapo utakua na swali lolote kuhusiana na utafiti huu, wasiliana na wafuatao: Dr. Amani I Kikula (Mtafiti mkuu) idara ya magonjwa ya akina mama na uzazi, Chuo Kikuu cha Afya na Sayansi Shirikishi Muhimbili, S. L. P 65001, Dares Salaam. Simu 0714753852, barua pepe: amanikikula@gmail.com.
Kwa maswali kuhusu haki zako kama mshiriki, unaweza kuwasiliana na Dr. Joyce Masalu, Mwenyekiti wa kamati ya Seneti ya utafiti na machapisho, Chuo Kikuu cha Afya na Sayansi shirikishi - Muhimbili, S. L. P65001, Dar es salaam. Simu: 2150302-6.

II: IDHINI YA KUSHIRIKI

Nimesoma (nimesomewa) taarifa hii kama ilivyoelezwa hapo juu. Nimepata nafasi ya kuuliza na kupata ufafanuzi kwa maswali niliyokua nayo. Nimeelewa dhumuni la utafiti huu, faida, athari na haki yangu ya kujitoa katika utafiti wakati wowote. Ninakubali kwa hiari yangu kushiriki katika utafiti huu.

Sahihi ya mshiriki……

Sahihi ya Ndugu(Kama mshiriki hawezi kuridhia)…….

Tarehe……...

Sahihi ya mtafiti……

Tarehe……

Appendix 3: Data collection tool (English version)

IDENTIFICATION AND DEMOGRAPHIC CHARACTERISTICS		
1. Serial number		
2. Age		
3. Marital status	1. married/living together 2. divorced/separated 3. widowed 4. never married and never lived together	
4. What is the highest level of formal education have you attained?	1. no formal education 2. at least primary school 3. at least secondary school 4. at least college education	
5. When did you have your last normal menstrual period? (date, month and year)	(Date/month/year)……/……/…….	
6. What is your occupation? That is, what kind of work do you mainly do?	1. Employed government/private sector 2. Not employed 3. Self employed	
7. What is your religion?	1. Muslim 2. Christian 3. other…….. (mention)	

8. a. Have you done a first-trimester ultrasound?	1. Yes 2. No	
b. If YES, what was the gestation age? (in weeks)		
c. When was it done	(Date/ Month / Year)…../…../…..	
9. a. How many pregnancies/cy have you ever had before?		
b. How many living children/ child do you have?		
10. In your last pregnancy, what was the outcome?	1. alive and well 2. died in first monthof life 3. died in first yearof life 4. died afterfirst year of life	
11. When did the last such pregnancy end? (year and month)	(Date/ Month/ Year)…./…../…..	
12. How many deliveries have you had before this pregnancy		
13. What is the sex of your last child?	1. male 2. female	

14. What is the sex of your other children (if present in numbers)?	(number) female	male	
15. Is there a particular sex of the child you prefer?	1. yes 2. no		
16. If YES, which one?	1. male 2. female		
17. What was the mode of delivery in your last pregnancy?	1. caesarean delivery 2. spontaneous vaginal delivery 3. assisted breech delivery 4. with episiotomy 5. vacuum delivery		
18. Did you breastfeed in the previous pregnancy?	1. yes 2. no		
19. For how long did you breastfeed (in months)			
20. What contraceptive method/s do you know? (let her mention	1. female condom 2. male condom 3. male sterilization 4. female sterilization 5. withdrawal		

them)		6. abstinence 7. Depo 8. implant 9. pills 10. IUCD 11. calender/rhythm 12. emergency contraception 13. lactational amenorrhea 14. others, specify 15. I don't know	
21. Have you ever used anything or tried in any way to delay or avoid getting pregnant?	1. yes 2. no		
22. What contraceptive method have you ever used (let her mention them)		1. female condom 2. male condom 3. male sterilization 4. female sterilization 5. withdrawal 6. abstinence 7. injectables 8. implant 9. pills 10. IUCD 11. calender/rhythm 12. emergency contraception 13. lactational amenorrhea 14. others, specify	

23. What contraceptive method did you use after your last pregnancy? (let her mention them)	1. female condom 2. male condom 3. male sterilization 4. female sterilization 5. withdrawal 6. abstinence 7. Depo 8. implant 9. pills 10. IUCD 11. calender/rhythm 12. emergency contraception 13. lactational amenorrhea 14. others, specify	
24. Before you became pregnant...had you stopped using all methods of birth control?	1. yes 2. no	
25. Was the reason you (did not use/ stopped using) all methods of birth control because you yourself wanted to become pregnant?	1. yes 2. no	

26. Right before you became pregnant... did you yourself want to have a(nother) baby at any time in the future?	1. yes 2. no 3. do not know	
27. So would you say that you became pregnant too soon, at about the right time, or later than you wanted?	1. Too soon 2. Right time 3. Later 4. Didn't care	
28. How much sooner than you wanted did you become pregnant? (Months/years)		
29. The pill	1. prevents ovulation 2. keeps cervical mucus very thin 3. changes the lining of the uterus to make implantation unlikely 4. both a & c 5. all of the above	
30. According to the most accepted current thought, the IUD's effectiveness is due to:	1. changing levels of hormones 2. changed functioning of the fallopian tubes 3. preventing implantation of the fertilized egg 4. preventing ovulation 5. all of the above	

31. The use of a condom when having sexual intercourse is recommended because:	1. if used right, it usually prevents getting or giving gonorrhea 2. it can be bought in a drug store by both men and women 184 Handbook of Sexuality-Related Measures 3. it does not have dangerous side effects 4. all of the above	
32. A woman can get pregnant:	1. a few minutes after sexual intercourse 2. a few hours after sexual intercourse 3. a few days after sexual intercourse 4. all of the above 5. a and b	
33. Over a one year period, what is the likelihood that a sexually active woman who uses no birth control will become pregnant?	1. 1 in 10 2. 5 in 10 3. 7 in 10 4. 9 in 10	
34. A woman is most likely to become pregnant (no matter how long or short her menstrual cycle) if she has sexual intercourse about:	1. 1 week before menstruation begins 2. 2 weeks after menstruation begins 3. 2 weeks before menstruation begins 4. 1 week after menstruation begins	
35. Which of the following is FALSE	1. It is administered every 3 months 2. Gradual weight gain is possible	

about Depo-Provera (the “shot”)?	3. It might take a few months after stopping tobecome pregnant 4. It cannot be used while breastfeeding 5. I don't know	
36. Which birth control method guarantees you will not become pregnant?	1. None 2. Using a condom everytime you have sex 3. Douching, showering, or bathing immediately 4. after sex 5. “Pulling out” before ejaculation 6. I don't know	

Appendix 4: Data collection tool (swahili version)

UTAMBULISHO		
1. Namba tambulishi		
2. Umri		
3. Hali ya ndoa	1. nimeolewa/naishi na mwenza 2. talikiwa/tengana 3. mjane 4. kapela/sijwahi kuolewa/sijawahi kuishi na mtu	
4. Kiwango chako cha juu cha elimu ni kipi?	1. sijapata elimu rasmi 2. angalau shule ya msingi 3. angalau shule ya sekondari 4. angalau chuo	
5. NI lini ulipata/uliona siku zako (damu ya hedhi) mara ya mwisho?	Tarehe/ Mwezi/ Mwaka…../…../…….	
6. Unafanya kazi gani ya kukuingizia kipato?	1. Nimeajiriwa serikalini/ sekta binafsi 2. Nimejiajiri 3. Nimejiajiri	
7. Wewe ni muumini wa dini gani?	1. Mkristo 2. Mwislam 3. Nyingine (taja……)	
8. a. Je umefanya “ultrasound” ya kipindi cha miezi mitatu ya mwazo wa ujauzito?	1. Ndiyo 2. Hapana	

b. Kama ndiyo, mimba ilikuwa na umri gani?(kwa wiki)		
c. Ilifanyika lini?	/ /	
9. a. Umeshawahi kua na mimba ngapi kabla ya hii?		
b. Je, una mtoto/watoto walio hai wangapi?		
10. Je, matokeo ya mimba yako iliyopita ilikuaje?	1. mtoto yupo hai na hana shida yoyote 2. mtoto alizaliwa hai ila alifariki ndani ya mwezi mmoja 3. mtoto alizaliwa hai ila alifariki ndani ya mwaka mmoja 4. mtoto alizaliwa hai ila alifariki baada ya waka mmoja	
11. Je, ni lini ulijifungua katika mimba yako ya mwisho?	/ /	
12. Je, ni mara ngapi umewahi kujifungua mtoto mwenye kilo moja au Zaidi kabla ya mimba hii?		
13. Je, mtoto wako wa mwisho ana jinsia gani ?	1. Me 2. Ke	
14. Je, watoto wako wengine (walio hai) ni jinsia gani?(kwa idadi) 1. Ke 2. Me	(namba)	

15. Je, kuna mtoto mwenye jinsia fulani ungependelea kupata zaidi ya jinsia nyingine?	1. Ndiyo 2. Hapana	
16. kama NDIYO, ipi?	1. Me 2. Ke	
17. Je, ulijifungua kwa njia gani mimba yako ya mwisho?	1. kwa upasuaji 2. kwa njia ya kawaida 3. kwa kusaidiwa mtoto aliyetanguliza matako 4. kwa kuongezwa njia 5. kwa mtoto kuvutwa kichwa kwa machine (vacuum)	
18. Je, ulimnyonyesha mtoto wako wa mwisho (kabla ya ujauzito huu)?	1. Ndiyo 2. Hapana	
19. je ni kwa muda gani ulinyonyesha? (miezi)		
20. Je, ni njia gani za uzazi wa mpango (vizibiti mimba) unazozijua? (azitaje mwenyewe)	1. kondomu za kike 2. kondomu za kiume 3. kufunga mirija ya mwanaume 4. kufunga mirija ya mwanamke 5. kukojoa nje ya uke wa mwanamke 6. kutokujamiiana 7. sindano 8. kipandikizi 9. vidonge vya majira 10. lupu 11. kalenda (kuhesabu siku)	

	12. vidonge vya dharura 13. kunyonyesha 14. nyinginezo, taja……	
21. Umeshawahi kutumia njia au kitu chochote ili kuchelewesha au kuzuia kupata mimba?	1. Ndiyo 2. Hapana	
22. Ni njia ipi umeshawahi kutumia maishani mwako? (zungushia jibu/majibu atakayo taja)	1. kondomu za kike 2. kondomu za kiume 3. kufunga mirija ya mwanaume 4. kufunga mirija ya mwanamke 5. kukojoa nje ya uke wa mwanamke 6. kutokujamiiana 7. sindano 8. kipandikizi 9. vidonge vya majira 10. lupu 11. kalenda (kuhesabu siku) 12. vidonge vya dharura 13. kunyonyesha 14. nyinginezo, taja….	
23. Je, ni njia gani ulitumia kabla ya mimba hii? (ataje mwenyewe)	1. kondomu za kike 2. kondomu za kiume 3. kufunga mirija ya mwanaume	

	4. kufunga mirija ya mwanamke 5. kukojoa nje ya uke wa mwanamke 6. kutokujamiiana 7. sindano 8. kipandikizi 9. vidonge vya majira 10. lupu 11. kalenda (kuhesabu siku) 12. vidonge vya dharura 13. kunyonyesha nyinginezo, taja…….	
24. Kabla ya kupata mimba hii, je, uliacha kutumia njia hiyo (hizo) ya kuzuia mimba	1. Ndiyo 2. Hapana	
25. Je, sababu ya kutotumia au kuacha kutumia njia za uzazi wa mpango/kizibiti mimba ni ili upate mimba?	1. Ndiyo 2. Hapana	
26. Je, ni wewe mwenyewe ulitamani/taka kuwa na mtoto mwingine mbeleni?	1. Ndiyo 2. Hapana 3. Sijui/Sina uhakika	
27. Hivyo basi unaweza kusema umepata mimba mapema mno, katika muda muafaka au umechelewa kuliko ulivyotaka?	1. mapema mno 2. muda muafaka 3. umechelewa 4. sijali	
28. Umepata ujauzito mapema kiasi gani kuliko ulivyotaka?	Miezi/miaka	

29. Kidonge cha majira	1. huzuia kupevusha yai 2. hufanya malendalenda katika shingo ya kizazi kuwa nyembamba sana 3. hubadilisha mazingira ya mji wa uzazi ili kuzuia kupata mimba 4. yote a na c ni sahihi 5. yote hapo juu.	
30. Je, kwa uelewa wako, lupu inafanyaje kazi kama kifaa cha uzazi wa mpango?	1. kubadilisha kiwango cha vichocheo mwiilini 2. kubadilisha ufanyaji kazi wa mirija ya uzazi 3. kuzuia upandikizi wa kijusi kwenye ukuta wa mji wa uzazi 4. kuzuia kupevuka kwa yai 5. yote hapo juu ni sahihi	
31. Wakati wa kujamiiana inashauriwa kutumia kondomu kwasababu…	1. inakinga kupata kisonono kama ikitumika kwa njia sahihi 2. yeyote anaweza kununua (mwanaume au mwanamke) 3. haina madhara hatarishi 4. yote hapo juu ni sahihi	
32. Mwanamke anaweza kupata mimba…	1. dakika chacha baada ya kujamiiana 2. masaa machache baada ya kujamiiana 3. siku chache baada ya kujamiiana 4. yote hapo juu ni sahihi	

33. Je, katika kipindi cha mwaka mmoja, mwanamke ambae hatumii njia yeyote ya kuzuia mimba ana uwezekano gani wa kupata mimba?	1. asilimia 10 2. asilimia 50 3. asilimia 70 4. asilimia 90	
34. Mwanamke anaweza kupata ujauzito (bila kujali ufupi au urefu wa mzunguko wa hedhi) ikiwa atajamiiana mda gani?	1. wiki moja kabla ya kuanza hedhi 2. wiki mbili baada ya kuanza hedhi 3. wiki mbili kabla ya kuanza hedhi 4. wiki moja baada ya hedhi kuanza	
35. Kuhusu sindano za majira, kipi ambacho si sahihi?	1. inatolewa kila miezi mitatu 2. kuna uwezekano wa kuongezeka uzito kwa mtumiaji 3. Inaweza kuchukua miezi kadhaa baada ya kuacha ili kupata ujauzito 4. haiwezi kutumika wakati wa kunyonyesha	
36. Je, kati ya njia zote za uzazi wa mpango, ni ipi kati yao inakuhakikishia kutoweza kupata mimba?	1. hakuna 2. kutumia kondomu wakati wote wa kujamiiana 3. kuoga au kusafisha uke baada ya kujamiiana 4. “kumwaga” mbegu za kiume nje ya uke	