UPTAKE OF PRENATAL ULTRASOUND AMONG WOMEN WHO DELIVERED AT AMANA REGIONAL REFERRAL HOSPITAL.

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UPTAKE OF PRENATAL ULTRASOUND AMONG WOMEN WHO DELIVERED AT AMANA REGIONAL REFERRAL HOSPITAL.

By

Hudson August Manyanga, MD

A Dissertation submitted in partial fulfillment of the Requirement for the Degree of Master of Medicine in Obstetrics and Gynaecology of the

Muhimbili University of Health and Allied Sciences

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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance of dissertation entitled: **Uptake of prenatal ultrasound among women who delivered at Amana Regional Referral Hospital,** In partial fulfillment of the requirements for the degree of Master of Medicine in Obstetrics and Gynaecology of the Muhimbili University of Health and Allied Sciences**.**

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Professor in Obstetrics and Gynaecology

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Date……..

DECLARATION AND COPYRIGHT

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

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Lastly with humbleness I thank the Almighty God for giving me good health and ability to do the study.

DEDICATION

This dissertation is dedicated to my beloved parents, Dr and Mrs August Manyanga, for their unending love and support throughout my life.

To my beloved wife Mrs. Rebecca Mollel and our children Careen and Collins, you are the reason behind my hardworking and success.

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LIST OF ABBREVIATIONS

ANC	Antenatal Care.
ARRH	Amana Regional Referral Hospital.
CRL	Crown Rump Length.
EDD	Expected Date of Delivery.
GA	Gestational Age.
Uss	Ultrasound.
WHO	World Health Organization.

DEFINITION OF TERMS;

Prenatal ultrasound; is a prenatal investigation offered to most pregnant women. It uses sound waves to show a picture of the fetus in the uterus. Also helps health care provider check on fetal health and development.

Uptake of prenatal ultrasound; is defined as doing at least one ultrasound scan during the antenatal period.

Routine ultrasound is the ultrasound performed in absence of any clinical condition that indicates the need for ultrasound scan.

Selective ultrasound is the diagnostic ultrasound examination employed in a number of specific circumstances during pregnancy such as after clinical complication e.g. bleeding.

Early ultrasound is the ultrasound performed before 24 weeks of gestation age.

Late ultrasound is the ultrasound performed late after 24 weeks of gestation age.

ABSTRACT

Background: The introduction of ultrasound in medicine in the 1970s was a major landmark in the history of medicine. Over the years it has become an indispensible part of modern antenatal care (ANC) and has gained acceptance because it is non-invasive, also safe for the mother, fetus and sonographer. The uptake of prenatal Uss scan during the ANC can be related with wide variety of factors include socio-demographic factors, antenatal factors and the awareness on importance of prenatal Uss.

Objective: The aim of this study was to determine the factors related with uptake of prenatal ultrasound scan among women delivered at Amana Regional Referral Hospital from August to October 2018.

Methods: Hospital based cross sectional study was conducted at Amana Regional Referral Hospital. A total of 402 women were involved in the study. The tool obtained information on the socio demographic characteristics (i.e age, marital status, residence, educational level and occupation), antenatal records (i.e parity, abortion /stillbirth, booking gestation age and number of ANC visits) and ultrasound awareness and utilization. **Data was analyzed using SPSS version 23. Bivariate analysis was done among the factors and those factors with p-value < 0.05 was considered to be statistically significant.**

Results: The proportion of prenatal Uss done was 41.8% and most of the Uss were requested by the health care providers while 4.2% were self requested. Moreover, only 2.5% of the delivered women had adequate awareness of Uss. In this study it was found that factors which were related with the uptake of prenatal Uss scan were; secondary & college education level, woman with formal employment and women whose husband's had formal employment. The study also found that history of at least one abortion, history of previous pregnancy Uss, ≥ 4 visits ANC and being attended by doctor/ both during ANC visits were related with increased uptake of Uss. Other factors related with uptake Uss includes; women delivered by C/S, women awareness that Uss is important during pregnancy and safe for the baby and lastly the affordable cost of the Uss scan.

Conclusion; The uptake of prenatal Uss is low among delivered women due to poor level of awareness, not being adviced at ANC and lack of Uss machine in the facilities.

1.0.INTRODUCTION

1.1.BACKGROUND

The introduction of ultrasound (Uss) in medicine in the 1970s was a major landmark in the history of medicine. Thereafter use of ultrasound rapidly gained acceptance in obstetrics because it is non-invasive and uses sound waves, which are safe for the mother, the fetus and the imager performing the examination (1). Ultrasound in pregnancy is done either as routine or selective for specific medical indications.

Routine Uss is performed in the absence of any clinical condition that indicates the need for Uss scan. Uss scan could either be early before 24 weeks gestation or late after 24 weeks **(2)**. The main objectives of early prenatal Uss are confirming fetal viability; establishing an accurate gestational age (GA) from the measurement of fetal crown-rump length (CRL); identifying multiple pregnancies and determining their chorionicity and amnionicity; and screening for major fetal anomalies both structural abnormalities and aneuploidies (3). Meta analysis of early routine Uss scanning showed that although the practice did not improve maternal/perinatal outcomes it provided better dating, pregnancy confirmation, location, determination of multiple pregnancies and to rule out any fetal anomaly (2). Routine late Uss has not been shown to be of benefit when it is done after having normal early prenatal Uss (4,5).

Selective Uss is diagnostic ultrasound examination employed in a number of specific circumstances during pregnancy such as after clinical complications (e.g. bleeding), or where the fetus is perceived to be at a particularly high risk of malformation or of being inappropriately growing (2). In 2016 World Health Organization (WHO) report recommended one Uss scan before 24 weeks gestation. WHO does not recommend a routine Uss scan after 24 weeks gestation for pregnant women who had an early Uss scan **(6)**. If an early Uss scan was not performed, then clinicians may consider performing Uss scan later in pregnancy, since adverse outcomes may also occur in pregnancies without clear risk factors (7).

Antenatal care (ANC) is one of the pillars of safe motherhood. It is defined as the routine care of pregnant women provided between conception and the onset of labour (8). ANC aims to provide safe pregnancy and delivery through monitoring of the pregnancy, detect and treat

anomalies of pregnancy and to deliver preventive health services such as immunization and HIV testing and counselling (9). For a pregnant woman to fully benefit these services, she must attend to the ANC timely and at the frequency as recommended. WHO recommends a minimum of four visits in low risk pregnancies and suggests the first visit to be as early as possible preferably in the first trimester.

Prevalence of ANC visit varies among regions. Globally, the prevalence of antenatal visit is 97%, and noted to be low in sub-Saharan Africa especially in Congo (10). In Tanzania the prevalence of at least one antenatal visit has gone up from 90% (TDHS, 2011) to 98% (TDHS-MIS, 2016) and from 43% to 54% of women who had recommended ANC visits. Worldwide coverage of early antenatal care visits has increased from 40·9% in 1990 to 58·6% in 2013 (8), in contrast to the findings in Tanzania which showed a rise from 15% to 24% (TDHS-MIS, 2016). Furthermore data from TDHS-MIS 2016 showed that urban women were more likely than rural women to have four or more ANC visits and to seek care early in pregnancy. Moreover 80% of the ANC services are provided by nurses and midwives, 96% of pregnant women received ANC by skilled health care providers at least once during pregnancy.

Integration of prenatal Uss in ANC in the low resource setting has an important role in diagnosis and management of pregnancy complications (11). It is however associated with a variety of challenges that may include political (budgeting for fees and tariffs), logistical (equipment maintenance, supplies, technical support), infrastructural (ensuring a reliable power supply and secure storage) and resources (6). Since growing numbers of pregnant women across the world are now routinely exposed to Uss scan, the application of this technology is of major public health significance. The expansion of obstetric ultrasonography has taken place under the influence of commercial interests; the interests of medical practitioners, who find it useful for a variety of purposes; and pregnant women's desire. Other influential factors include socio-demographic factors (e.g. age, residence, marital status, education level), antenatal factors (e.g. parity, abortion, stillbirth, booking gestational age, number of visits) and lastly the individual awareness on importance of prenatal Uss. In general these factors can either be barriers or motivators for pregnant women to do Uss scan.

1.2.LITERATURE REVIEW

Ultrasound coverage

In western medicine Uss has achieved almost universal coverage in obstetrics, where routine screening has become an integral part of ANC for every pregnant woman, while, in developing countries Uss is increasingly available to women because of its relatively low cost (12,13). **Countries in North Africa have significant prenatal Uss coverage 88% particularly in urban areas. In Sub Saharan Africa only one-third of pregnant women have performed prenatal Uss in urban areas (14).**

Research that was done in three public hospitals in 2018 in Dar es Salaam, showed an increased interest in Uss scan among women (11). Similarly in year 2011 the study in Northern Tanzania revealed an increased desire to do the prenatal Uss among pregnant women (15). This is supported by the findings that, integration of Uss scan as a part of routine ANC in developing countries has resulted in increased visits for antenatal checkups, although, women still book ANC late. (16–19).

Socio-demographic factors

Socio-demographic characteristics such as educational level, marital status, occupation etc play important role in determining the uptake of prenatal Uss and various studies have demonstrated this. For instance, in Iran (20) women covered by insurance had more frequency of Uss than other groups. This is in line with a study that was done in Nigeria (21) which showed that 81% of the women who did prenatal Uss were sponsored by either government or husbands. Among those who did prenatal Uss majority perceived Uss to be affordable. This was also supported by the findings in Denmark and Netherlands which showed that, level of maternal income has significant effect on uptake of prenatal Uss (22,23). Moreover, in Iran it was found that women with high educational level had more frequently done Uss than those with low educational level (20). This was in keeping with the findings in China and Nigeria (24,25).

In addition to the above factors studies in Nigeria have shown that doing prenatal Uss during the ANC can be influenced by patient attitude, cost of Uss and satisfaction with previous Uss. In Nigeria one study (26) found that among all women who did prenatal Uss, 97% had Uss

before and believed it is safe. Another study (21) showed that majority of women who believed that Uss is necessary during pregnancy and reliable had high frequency of Uss. Meanwhile, heavy financial cost, negative attitude and dissatisfaction with previous Uss were found to be the barriers (27).

Antenatal factors

In Iran primigravids had higher frequency of prenatal Uss than multigravids (20). This was contrary to what was found in Nigeria, Denmark and China where multiparity significantly influenced women to do prenatal Uss (22,24,25). In addition to that, history of abortion or miscarriage, maternal age and use of artificial reproductive technology had also shown to influence uptake of prenatal Uss (22,28).

Recent reports in Nigeria, Denmark and Iran showed that significant percentage of prenatal Uss scans are performed at the request of the pregnant woman and not at the recommendation by the attending physician. The commonest reasons for healthcare provider to request prenatal Uss scan were; to see the fetal viability, to determine fetal sex, to check for number of fetuses, confirm the pregnancy, fetal age and placental location and spousal reassurance about the pregnancy state (14,20,22,29–31). This was contrary to other studies done in India and Nigeria, which showed that majority of Uss done were recommended by doctors; 83% in Nigeria and 91% in India. The main reason for having scan was to check fetal status. In India, majority of the prenatal Uss scan were done in 2^{nd} trimester while only few were done in 1^{st} and 3^{rd} trimesters. Of those who did not do prenatal Uss scan, 6.9%, the major reasons were not advised by doctor, financial constraints and family problem (31,32) .

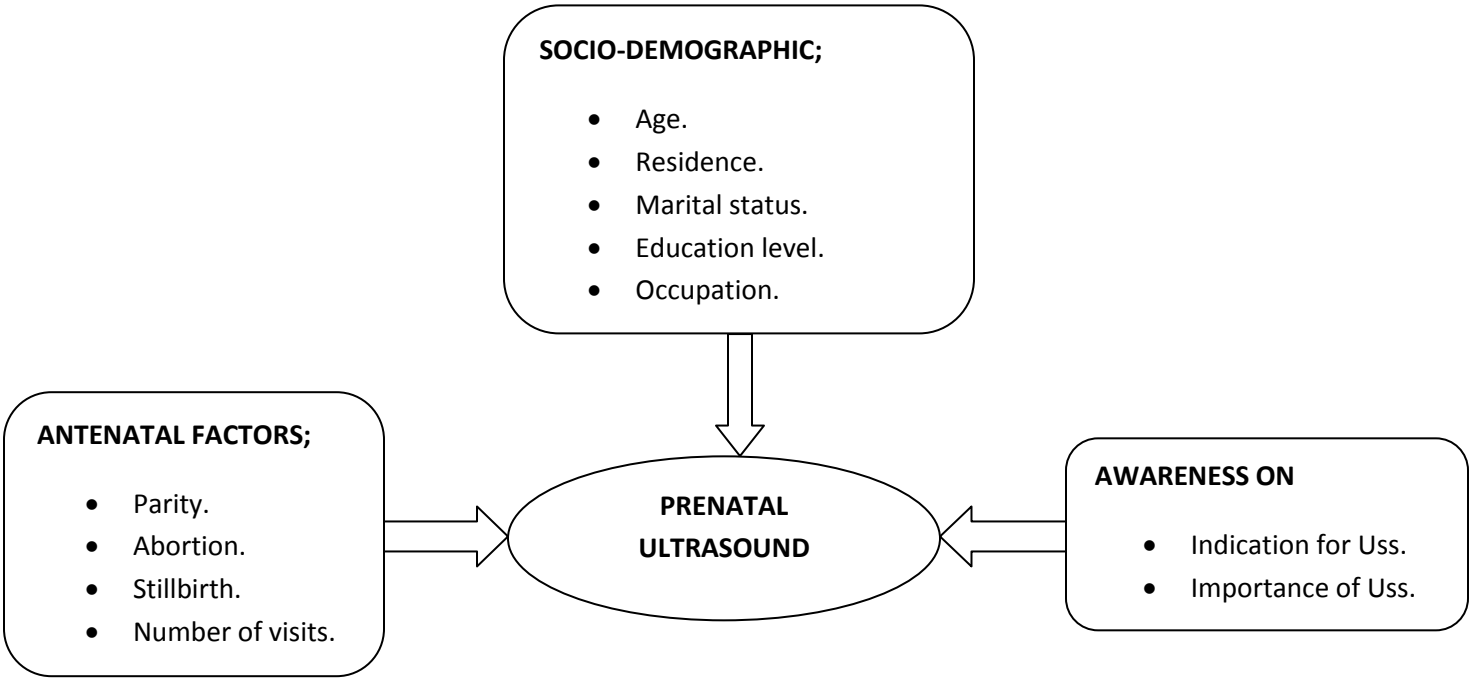
Awareness on importance of ultrasound

In Tanzania, a study done in Moshi (15) showed that majority of pregnant women desired Uss despite many not understanding the purpose. Among their expectations were discovering fetal position, sex determination and pregnancy problem. This was contrary to what was observed in Nigeria (31) where majority of women had good knowledge for use and indications for Uss in pregnancy. The level of education showed significant statistical difference in participants'

knowledge. Similarly, another study that was done in Nigeria (25), showed that most of the respondents who had awareness on prenatal Uss had at least a secondary school education, with awareness reducing with lower levels of education. This is supported by another study done in China (24) which found that attaining tertiary educational level had significant association with more knowledge and acceptance of prenatal Uss scan. In India, studies showed that overall awareness regarding the use of Uss during pregnancy and attitude was fairly good. Majority were aware of detection of fetal defects 70%, fetal position 74%, determining expected date of delivery (EDD) 86%, placental position 67%, fetal growth 88%, confirm pregnancy 86%, confirm multiple 79% and sex determination 36% (32,33).

In India the commonest source of information on benefits of Uss was from health care workers and role of media was negligible (32,33). This is different from what was found in Canada (34) where knowledge was not from healthcare giver but rather friends and media. In Nigeria more than half of respondents obtained their information about Uss upon their visits to the ANC (25).

1.3.CONCEPTUAL FRAMEWORK



Socio-demographic factors;

- Age, Residence, marital status, education level, occupation, economic status.

ANC factors;

- Parity, abortion, still birth, number of visits.

1.4.PROBLEM STATEMENT

At present Uss scan has become an indispensable part of modern ANC. It is safe, portable , less expensive than other imaging modalities, non-invasive and has a real time imaging capability that is essential in obstetric (35). Previous surveys in Sub Saharan countries showed low prenatal Uss coverage in urban and even worse in rural areas (14). The integration of the prenatal Uss scan has influenced number of ANC visits (16–19). With this increase in ANC attendance, recent reports showed also an increased interest and desire in uptake of prenatal Uss (11,15). Several studies have shown that there is an increase in personally requested Uss which can influence medical practice. The factors related with uptake of Uss are not known in our setting.

1.5.RATIONALE

An early ANC visit gives the opportunity to provide screening and tests that are most effective early in the pregnancy. In the developing countries evidence has suggested that many barriers and factors exist that contribute to the low uptake of the prenatal Uss scan. Factors like socio demographics, socioeconomic status, availability, accessibility, acceptability, family support, previous experience and several others have been shown to be among the major determinants.

The study aimed to find out the proportion of deliveried women who performed prenatal Uss scan. It also assessed the factors related with the uptake of prenatal Uss scan. The study has yielded information on whether the women were aware of the importance and indications of doing prenatal Uss scan.

On the other hand this study has portrayed and reflected the practice at our ANC and compared to the recommendation by the WHO. Hence in doing so it can help improve clinical practice and reduce preventable morbidity and mortality. Cochrane review showed that adverse outcomes may also occur in pregnancies without clear risk factors and the routine use of Uss in all pregnancies will prove beneficial. Prenatal Uss would detect clinical conditions which place the fetus or mother at high risk, which would not necessarily have been detected by other means such as clinical examination, and for which subsequent management would improve perinatal outcome.

1.6. RESEARCH QUESTION

1. What are the factors related with uptake of prenatal Uss during ANC?

1.7. OBJECTIVES

Broad objective

To determine the factors related with uptake of prenatal ultrasound scan among women who delivered at Amana Regional Referral Hospital from August to October 2018.

Specific objectives

1. To determine the proportion of delivered women who did prenatal Uss scan.
2. **To determine the factors related to uptake of prenatal Uss scan.**

2.0.METHODOLOGY

2.1. Study design

It was descriptive hospital based cross-sectional study.

2.2. Study duration

Data collected from August to October 2018.

2.3. Study settings

Amana Regional Referral Hospital (ARRH) is one among the five Dar es Salaam district hospitals. It serves Ilala district with a population of around 1 million (Census 2012). ARRH receives referrals from 200 health facilities including health centers, dispensary and private health facilities located within the Ilala municipality.

The maternity block has the antenatal ward (15 beds), labour ward (8 beds), post natal ward (66 beds), post-operative ward (15 beds) and gynecology & high risk pregnancy ward. It also provides ANC services which is selective for high risk pregnancies referred from the peripheral antenatal clinics. The total numbers of staffs in maternity unit are 9 registrars, 3 obstetrics and gynaecology specialists, 2 sonographers, 1 radiologist and 80 nurses.

The antenatal attendance is around 60-80 pregnant women per day and these women are seen by medical officers while few special cases are seen by specialist. Meanwhile on average number of deliveries range around 50-60 per day. Some of these women have been attending antenatal clinics in the peripheral facilities and others at Amana. The antenatal services are free but the ultrasound service is charged Tsh 20,000/= at Amana. There are two ultrasound machines, one radiologist and two sonographers. In other government facilities the Uss is charged between Tsh 10,000/= to 20,000/=. In Ilala municipality not all peripheral facilities have Uss services.

After delivery women are transferred to post natal ward/post caesarean section ward. In the post natal ward they are observed closely and discharged after 12 hours if they have no complications. In post operative ward they are observed and discharged after 3 days.

2.4. Study population

All women delivered at Amana Regional Referral Hospital from 1st August to 31st October 2018 were systematically selected and were involved in the study.

2.5. Inclusion criteria

All post delivery women during the study period.

2.6. Exclusion criteria

Post delivered women with no antenatal records.

Post delivered women who were very sick.

2.7. Sample size estimation

The situation analysis in Sub Saharan Africa showed only one-third have been given prenatal Uss scan in urban areas (14). Using the same prevalence, sample size was calculated as follows.

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

Where n=the minimum sample size required, z=level of confidence is this is 95% therefore z is 1.96, ε^2 =maximum likely error which is 5% and P=prevalence of doing prenatal US in Sub Saharan countries 33%.

$$= \frac{1.96^2 \times 33(100 - 33)}{5^2}$$

$$= 340$$

Adjusting for non-response rate

$$= 340 \times \frac{(100)}{100 - f\%}$$

Where f% is non response percentage = 10%

$$= 340 \times \frac{100}{90}$$

$$= 378$$

Minimum required sample size was 400.

2.8. Sampling technique

A systematic sampling was done whereby 10 post delivery women were picked per day. Daily delivery was around 50 women. The participants were selected from the delivery registry book. Random selection was done daily for the first participant among the initial 5 women by lottery in which numbers 1-5 were written on a pieces of paper then one piece was picked. Thereafter every 5^{th} from the first participant selected in registry book were included in the study. This continued until we obtained 10 participants every day of data collection.

- Sampling frame (N)
- Determined sample size (n)
- Establish sampling interval k: (k=N/n)
- The first element between 1^{st} and k^{th} of N
- Subsequent elements = n(t) + k

2.9. Training of research assistants

Research assistants were trained by principal investigator for one day. Three nurses (one registered nurse and two enrolled nurses) from postnatal ward were recruited for data collection process. They were trained on the purpose of the study and how to collect the data using the questionnaires. RCH card was used to supplement the woman antenatal records.

2.10. Recruitment of Participants

Recruitment of the study participants started with identification from the delivery registry books. This was done daily in the morning before discharged home and informed consent was sought. Those who consented, data were collected using a structured questionnaire by the researcher and trained research assistants.

The questionnaire was pretested at the same facility before initiation of data collection.

2.11. Data collection

This was done by the principal investigator and research assistants. After identification of participants, they were interviewed by the research assistant. The principal investigator then counter checked if the details in the questionnaire were correctly filled by the research assistant. The questionnaire obtained information on the socio demographic characteristics (i.e

age, marital status, residence, educational level and occupation), antenatal records (i.e parity, abortion /stillbirth, booking gestation age and number of ANC visits) and ultrasound awareness and utilization(importance of Uss, previous pregnancy Uss, Uss safety, Uss cost affordability etc). The questionnaire was made from reserach objectives and swahili version was validated.

For the given sample size of 400 participants, and recruitment of 10 participants per day in 5 days from Monday to Friday we had 50 participants per week. Hence the data collection was done for 8 weeks only.

2.12. Description of the variables

Maternal age had three categories ≤20 years, 21-30 years and >30 years. Marital status had three categories; single, married/cohabiting and divorced/separated. Education status had four categories; no formal education, primary level, secondary level and college/university level. Occupation had three categories; no employment, self employment and formal employment. Parity status was recorded as whole numbers and then further categorised into two, para 1 and multipara. Booking GA was recorded in weeks then further categorised into two groups ≤ 24 weeks and ≥ 25 weeks. Number of ANC visits was recorded in whole numbers then categorised into two groups ≤ 3 visits and ≥ 4 visits. Cadre of service provider were nurse/midwife and doctor.

Awareness on the ultrasound importance was dichotomized to aware and no awareness. A composite score was used in which awareness was considered as being able to mention at least five indications of Uss, while, no awareness was failure to mention at least five indications of Uss. Ten indications for Uss were considered, which included; To confirm pregnancy, confirm presence of multiple pregnancy, confirm wellbeing of the fetus, to detect defect/malformation in the baby, to determine the gestational age, to assess growth of the baby, to find the fetus position, to determine position of placenta, to determine amount of liquor and to determine the sex of the baby.

2.13. Data analysis

Using SPSS version 23, coded data were entered daily after data cleaning then analyzed. The dependent variable was recoded to as binary variable of uptake of prenatal Uss and no uptake of prenatal Uss represented as 1 and 0 respectively. Some independent variables were recoded as follows before analysis; maternal age had three categories ≤20 years, 21-30 years and >30 years. Marital status had three categories; single, married/cohabiting and divorced/separated. Education status had four categories; no formal education, primary level, secondary level and college/university level. Occupation had three categories; no employment, self employment and formal employment. Parity status was categorised into two, para 1 and multipara. Booking GA was categorised into two groups ≤ 24 weeks and ≥ 25 weeks. Number of ANC visits was recorded into two categories ≤ 3 visits and ≥ 4 visits. Cadre of service provider were nurse/mid-wife and doctor. Awareness on the ultrasound importance was dichotomized to aware and no awareness. Frequency distribution tables to present demographic and other variables were used. From bivariate analysis, factors with p-value < 0.05 the relation was statistically significant.

2.14. Ethical clearance

The ethical clearance for the study was obtained from the Senate Research and Publication Committee for Muhimbili University of Health and Allied Sciences (MUHAS). Permission to conduct the study was obtained from authorities and administration of Amana Regional Referral Hospital.

Written informed consent was obtained from the participants, where they were informed on the purpose of the study and the benefits obtained from the study findings. Participants had right to withdraw from the study any time they wished and withdrawal from the study would not affect their subsequent postnatal care or other services. The participants' information was kept confidential. The research data obtained would be kept for 5 years after the study dissemination and publication, and thereafter destroyed.

Other post natal care services were performed as per institution protocol.

3.0.RESULTS

The total number of 402 women were involved in the study. The number of women who delivered at Amana who did prenatal Uss scan were 168 (41.8%). The common indications for doing prenatal Uss were to confirm the fetal wellbeing 37.6%, assessing fetal growth 23.3% and determining fetal presentation 13.5%.

Table 1: Distribution of maternal characteristics among women delivered at ARRH (N=402)

Characteristics	Frequency (n)	Percentage(%)
Age group (years)		
≤ 20	107	26.6
21-30	199	49.5
≥ 31	96	23.9
Marital status		
Married/Cohabiting	346	86.1
Divorced/ Single	56	13.9
Education level		
No formal education	27	6.7
Primary	163	40.5
Secondary	173	43.0
College/university	39	9.7
Parity		
Para 1	158	39.3
Multiparity	244	60.7
Working status (woman)		
Formal employment	48	11.9
Self employment	264	65.7
No employment	90	22.4
Work status (husband)		
Formal employment	53	13.2
Self employment	349	86.8

A total of 402 women were involved in the study. Among the women interviewed majority were working group, multipara age range of 21-30, married and have primary/secondary level of education.

The proportion of delivered women at ARRH who performed prenatal ultrasound scan.

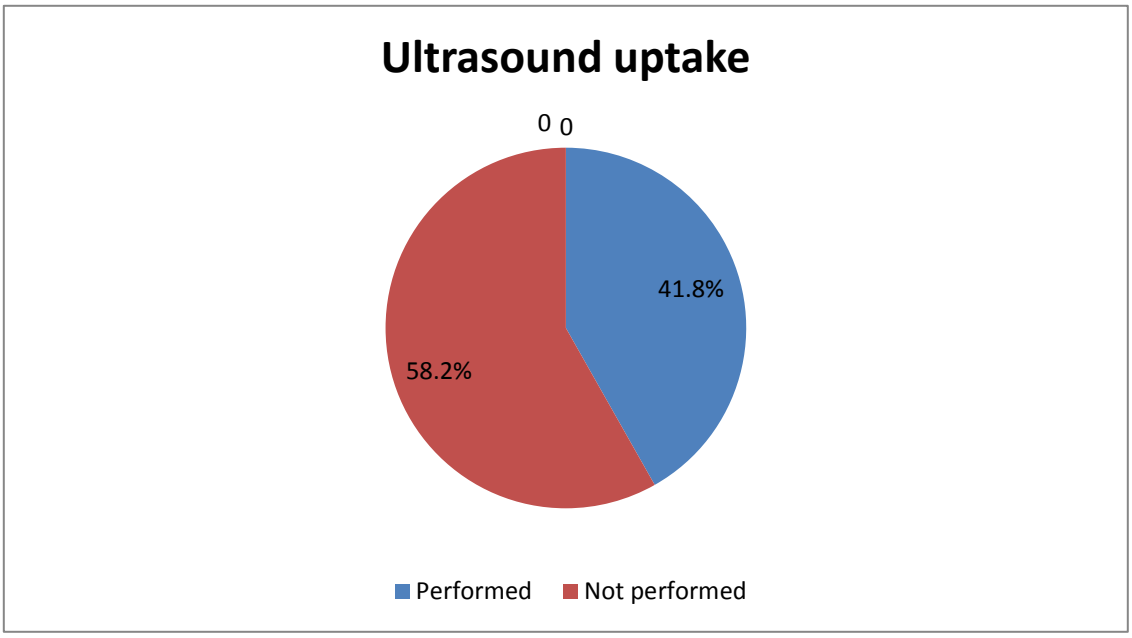


Figure 1; Pie chart showing the proportion of uptake of prenatal Uss among delivered women

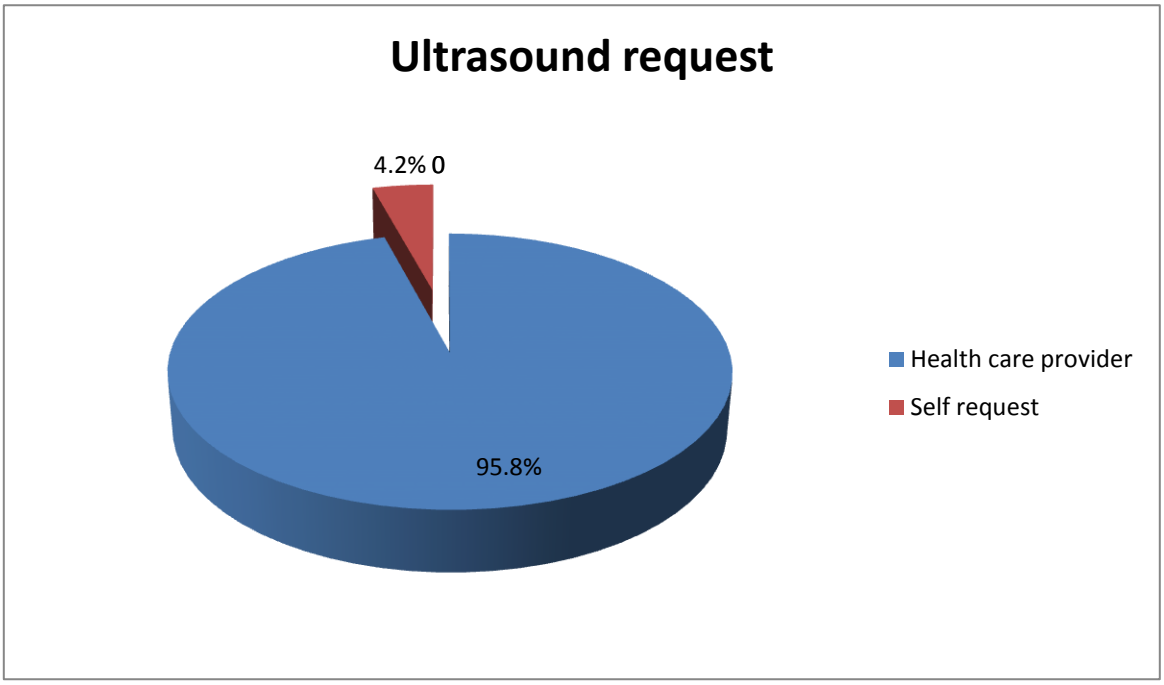


Figure 2; Pie chart showing who requested the prenatal Uss.

Table 2: The socio-demographic factors related with uptake of prenatal Uss scan.

Criteria		**Prenatal uss scan**		**P-value**
	Total	Yes(%)	No(%)	
Age groups				0.084
≤ 20	107	37(34.6)	70(65.4)	
21-30	199	83(41.7)	116(58.3)	
31 and older	96	48(50)	48(50)	
Marital status				0.187
Married/ Cohabiting	346	151(43.6)	195(56.4)	
Divorced/Single	56	17(30.4)	39(69.6)	
Education level				0.035
No education & primary	190	69(36.3)	121(63.7)	
Secondary & college/university	212	99(46.7)	113(53.3)	
Working status (women)				0.001
No employment	90	29(32.2)	61(67.8)	
Self employment	264	108(40.9)	156(59.1)	
Formal employment	40	31(77.5)	17(22.5)	
Working status(husband)				0.019
Self employment	349	138(39.5)	211(60.5)	
Formal employment	53	30(56.6)	23(43.4)	

Statistically significant at $p<0.05$

In table 2 above; women with secondary & college level of education have high uptake of Uss, similar to women with formal employment and women whose husbands have formal employment.

Table 3: The antenatal factors related with uptake of prenatal Uss scan

Criteria		Prenatal uss scan		P-value
	Total	Yes(%)	No(%)	
Parity				0.096
Para 1	158	58(36.7)	100(63.3)	
Para 2 and above	244	110(45.1)	134(54.9)	
Abortion				0.014
No abortion	360	143(39.7)	217(60.3)	
At least one abortion	42	25(59.5)	17(40.5)	
First ANC visit				0.106
≤ 24 weeks	351	152(43.3)	199(56.7)	
≥ 25 weeks	51	16(31.4)	35(68.6)	
Number of ANC visits				0.000
≤ 3 visits	174	44(25.3)	130(74.7)	
≥ 4 visits	228	124(54.4)	104(45.6)	
Attended by				0.000
Nurse only	202	22(10.9)	180(89.1)	
Doctor/Both	200	146(73)	54(27)	
Mode of delivery				0.000
SVD	319	89(27.9)	230(72.1)	
C/S	83	79(95.2)	4(4.8)	
Previous pregnancy uss**				0.000*
Not done	171	37(21.6)	134(78.4)	
Done	83	80(96.4)	3(3.6)	

Statistically significant at $p<0.05$, *Fisher's exact test, **the remained participants were primipara.

In table 3 above; Women with at least one abortion have high uptake of Uss, also women with ≥ 4 visits, delivered by C/S, previous pregnancy Uss and women attended by both/doctor during ANC.

The relation of ultrasound awareness and uptake of prenatal Uss scan.

The level of individual awareness on importance of prenatal Uss scan among women was poor in which 373 (92.8%) could not mention at least five reasons for of doing prenatal Uss scan. It was only 10 (2.5%) who managed to mention at least five importance of prenatal Uss. Moreover, 19 (4.7%) women had no awareness at all as they could not mention even a single indication for doing prenatal Uss during pregnancy. The source of information about the importance of Uss were from health care providers 65.7%, relatives/friends 10.5% and media 21% respectively. However, 16 (2.8%) women had no information about the prenatal Uss.

Table 4: The relation of Uss awareness and uptake of the prenatal Uss scan.

Criteria		**Prenatal uss scan**		**P-value**
	Total	Yes(%)	No(%)	
Prenatal uss is important in pregnancy.				0.001*
Don't know	19	1(5.3)	18(94.7)	
Yes	383	167(43.6)	216(56.4)	
Level of awareness				0.332*
Not aware	392	162(41.3)	230(58.7)	
Aware	10	6(60)	4(40)	
Is uss cost affordable				0.000*
Not affordable	188	42(22.3)	146(77.7)	
Affordable	38	21(55.2)	17(44.8)	
Don't know	176	175(99.4)	1(0.6)	
Ultrasound is safe for baby				0.000*
Yes	383	168(43.9)	215(56.1)	
Don't know	19	0(0)	19(100)	

Statistically significant at $p<0.05$, * Fisher's exact test.

In table 4 above; Women who agreed that Uss is affordable, safe and important during pregnancy had high uptake of prenatal Uss.

4.0.DISCUSSION;

The use of prenatal Uss provide real time imaging that can help improve clinical practice and routine use of Uss in pregnancy can be beneficial by detecting clinical conditions which place the fetus/mother at high risk. The coverage of prenatal Uss among women who delivered at ARRH was 41.8% which is above the overall coverage in Sub Saharan countries, but it is below the coverage in North Africa (14). This could be due to difference in economic levels and health sector development. This study revealed that for those who did not perform prenatal Uss, the major reason was not being advised by health care providers (73.3%). Others mentioned lack of ultrasound machine (22.1%) and only few (4.6%) reported that high cost of Uss scan was the barrier for them to do Uss.

Most of the prenatal Uss performed (95.8%) were requested by the health care providers; only 4.2% were self requested and major indication was to check fetal wellbeing. This finding was similar to what was found in Nigeria and India, where Uss were requested by healthcare providers and the major indication was to check fetal wellbeing (31,32). However, other studies in Denmark, Nigeria and Iran found that majority of the prenatal Uss were self requested (20,22,29,30). This could be due to high level of awareness among women in these areas and wide availability of Uss facilities.

In this study, high parity was not related with doing prenatal Uss, unlike in other similar studies done in Nigeria, Denmark and China which found that high parity had significantly influenced women to perform prenatal Uss (22,24,25). Possibly because of the differences in socio-economic factors and low awareness among women on importance of Uss in our settings..

Previous history of at least one abortion was related to uptake of prenatal Uss. This is similar to the findings in Denmark and Italy (22,28). This could be because having history of pregnacy loss women tend to become more concerned to see the progress of their current pregnacy by doing an Uss scan.

In Eastern Africa several studies (16–19) have shown that introduction of prenatal Uss influenced the number of antenatal visits but in the index study, it was found that having at least four visits was significantly related to the uptake of prenatal Uss. This can be explained by the fact that having an ultrasound in the facility would attract women to attend more frequently.

The index study revealed that being attended by doctors/doctor and nurse is significantly related to performing prenatal Uss compared to those seen by nurse only; similar to the findings in Nigeria (31). This could be because doctors have wider knowledge with regard to use of Uss and most of the women seen by doctors were more likely to have high risk pregnancy which would probably need Uss scan.

Previous history of doing prenatal Uss showed significant relation with uptake of Uss. In this study among women with previous pregnacy Uss 80 (96.4%) had Uss done in this pregnancy. A finding similar to the findings in Syria and Nigeria (26,36). It is possible that because these women were already aware of the importance of doing Uss, hence they were more likely to perform Uss.

Mode of delivery showed statistically significant association with the uptake of Uss, whereby women delivered by caesarean section were more likely to do Uss compared to those with previous normal delivery. Previous caesarean delivery being considered as high risk, would make one consider prenatal Uss as an important test.

Socio-demographic factors can also relate with the uptake of prenatal Uss. In the index study, age and marital status had no relation with uptake of Uss. However, educational levels and economic status were associated with uptake of Uss. The study showed that women with secondary and college level of education had more uptake of prenatal Uss compared to those women with no education/primary level of education. Similar findings were seen in Iran, China and Nigeria where by women with high educational level had more frequently done Uss than those with low educational level (20,24,25).

Economic status was another socio-demographic factor related with the uptake of prenatal Uss, in which working women and those whose husband's had formal employement had more uptake of prenatal Uss. This was similar to the findings in Nigeria, Iran, Denmark and Netherlands which showed that level of maternal income had significant effect on performing prenatal Uss (20–23).

The overall awareness on importance of prenatal Uss in this study was poor whereby only ten women (2.5%) had awareness. This is similar to the findings of a study done in Moshi (15) which revealed that majority of women had no understanding about Uss. Conversely in Nigeria and India, studies showed that majority of women had good awareness of Uss and indication for Uss in pregnancy (31,33). The level of education in the index study had no significant association with the level of awareness unlike in other studies in Nigeria and China (24,25).

In this study more than half of the women (55.5%) were not aware of how many Uss are required in a normal pregnancy. In Vietnam (37) many women thought that it was necessary to do Uss on each antenatal visit or a minimum of one scan per month, and they had assumed this was the medically recommended frequency. The women explained that they had been encouraged to do this by doctors. The WHO report (2016); recommended one Uss scan before 24 weeks gestation, and does not recommend a routine Uss scan after 24 weeks gestation for pregnant women who had an early normal Uss scan. If an early Uss scan was not performed, then one may consider performing Uss scan later in pregnancy, since adverse outcomes may also occur in pregnancies without clear risk factors.

Women who perceived Uss cost as affordable were more likely to do Uss. Those women who considered Uss to be safe for the baby and important in pregnancy also had high uptake of Uss. Conversely to what was observed in Iran (38,39) majority of the women considered Uss as harmful for fetus. Furthermore in one study (39) 83.2% of the women did not do Uss because they thought Uss is unsafe; similar to what was observed in Uganda (40).

Despite of the reported results, this study had some limitations. Amana is a regional referral hospital it receives patients from different peripheral facilities for clinic and delivery. In the study it was not possible to document if women were doing clinic at Amana or peripheral health facilities. However the results are valid as they show what specific factors are related with the uptake of Uss scan during the course of antenatal clinic. It also opens gate for more studies to be conducted especially at the peripheral facilities

5.0.CONCLUSION

The proportion of delivered women who did prenatal Uss was 41.8% and most of the Uss were requested by the health care providers compared to 4.2% which were self requested. With regards to Uss awareness only 2.5% of delivered women had adequate awareness. In this study it was found that factors which were related with the uptake of prenatal Uss scan were; secondary & college education level, woman with formal employment and women whose husband's had formal employment. The study also found that history of at least one abortion, history of previous pregnancy Uss, ≥ 4 visits ANC and being attended by doctor/ both during ANC visits were related with increased uptake of Uss. Other factors related to uptake Uss included; women delivered by C/S, women awareness that Uss is important during pregnancy and safe for the baby and lastly the affordable cost of the Uss scan.

6.0.RECOMMENDATION

The uptake of prenatal Uss is low among women who delivered at ARRH. Majority of the women had low level of awareness, not being advised at ANC and there was lack of Uss machine in the facilities. This gap has to be filled through counseling, provision of health education to women during antenatal period and establishment of Uss service in the facilities.

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APPENDIX;

Appendix I: Informed Consent (English Version)

MUHIMBILIUNIVERSITY OF HEALTH AND ALLIED SCIENCES

DIRECTORATE OF RSEARCH AND PUBICATIONS, MUHAS

ID-NO

Consent to participate in a research study

Greetings! My name is Hudson Manyanga and I am a student at Muhimbili University undertaking Masters of Obstetrics and Gynaecology. Currently I am working on this research on prenatal ultrasound scan assessing the factors influencing uptake of prenatal ultrasound among women delivered at Amana Regional Referral Hospital.

This study is going to help us know the level of knowledge on importance of prenatal ultrasound and what factors are influencing the uptake of prenatal ultrasound.

What Participation Involves

If you agree to participate in this study you will be required to spend a few minutes for an interview.

Confidentiality

All information recorded will be entered into computers with only the study identification number. However no participant's name will be published. We do not expect that any harm will happen to you after joining this study.

Rights to Withdraw and Alternatives

Taking part in this study is completely your choice. You are free to choose either to participate in this study or not. You can decide to stop participating in this study any time you wish even if you have already given your consent. Refusal to participate or withdrawal from the study will not involve penalty or loss of any benefits to which you are otherwise entitled

Benefits

If you agree to take part in this study there are no direct benefits that you will get from this study. We believe the information you will provide will help in improving the practice in future after the findings. A small group of scientific experts who are involved in implementing this study will monitor the results of this study and how we conduct this research.

Risks

We do not expect that you will get any physical injury resulting from participating in this study. However, if any injury resulting from participating in this study occurs, we will provide you with medical treatment according to current standard of care in Tanzania. There will be no additional compensations to you.

Who to Contact

If you ever have questions about this study, your rights as a participant, you should contact the principal investigator Hudson Manyanga at the department of obstetrics and gynaecology, Muhimbili University of Health and Allied Sciences, P.O. Box 65015, Dar es Salaam, through Mobile +255 715 730739.

Or contact Dr. Joyce R Masalu chairperson of the University Research and Publications Committee, P.O. Box 65001, Dar es Salaam. Tel: +255 222 152489.

Signature

Do you agree to participate?

He/she has agreed…….. He/she has refused…….

I……. have read the content in this form. My questions have been thoroughly answered. I agree to participate in this study

Signature of participant……..

Signature of witness (if participant cannot read) ……

Signature of Researcher…….

Appendix II: Informed Consent (Swahili Version)

CHUO KIKUU CHA AFYA NA SAYANSI SHIRIKISHI MUHIMBILI

KURUGENZI YA UTAFITI NA UCHAPISHAJI

FOMU YA RIDHAA

Namba ya Utambulisho				

Ridhaa ya kushiriki katika utafiti

Salaam!

Jina langu ni Hudson Manyanga ni Mwanachuo katika chuo kikuu cha Muhimbili ninayesomea shahada ya pili katika uzazi na magonjwa ya wanawake. Kwa sasa ninafanya utafiti juu ya kipimo cha ultrasonografia kwa wajawazito kuangalia sababu zinazochangia kufanyika kwa kipimo hicho.

Kushiriki Inahusisha nini?

Ukikubali kushiriki katika utafiti huu utahitajika kutumia muda kidogo kwa ajili ya kujibu maswali utakayoulizwa na mtafiti.

Usiri

Majibu yote yatakusanywa kutoka katika eneo la utafiti na yataingizwa kwenye compyuta kwa kutumia namba ya utambulisho tu. Hakuna jina la mshiriki litakalochapishwa. Hatutegemei kwamba kutakuwa na madhara yoyote kwa wewe kujiunga na utafiti huu isipokuwa kutumia muda wako tu katika majadiliano.

Haki ya Kutoka na Mbadala

Kushiriki katika utafiti huu ni uchaguzi wako, na una uhuru wa kukubali au kukataa kushiriki katika utafiti huu. Pia unaweza kuacha kushiriki katika utafiti huu muda wowote utakapojisikia hivyo hata kama umeshakubali kushiriki. Kukataa kushiriki au kuacha kushiriki katika utafiti huu hakutakufanya upate adhabu au ukose kufaidika na yale unayostahili kupata.

Faida

Ukikubali kushiriki katika utafiti huu hakuna faida ya moja kwa moja utakayopata lakini tunaamini maelezo utakayoyatoa yatasaidia kuboresha mfumo wa ufanyaji kipimo cha ultrasonografia kwa wamama kipindi cha uzazi. Kundi dogo la wataalam wa utafiti ambao hawahusiki katika kutekeleza utafiti huu watasimamia matokeo ya utafiti huu najinsi utafiti huu utakavyofanyika.

Madhara

Hatutegemei kwamba utapata madhara yoyote ya kimwili kwa kushiriki katika utafiti huu. Hata hivyo ikiwa kutakuwa na madhara yoyote yatakayotokana na kushiriki katika utafiti huu, tutakupa huduma ya matibabu kulingana na viwango vya huduma za afya vya Tanzania. Hakutakuwa na fidia ya nyongeza kwako.

Mawasiliano

Kama utakuwa na swali lolote kuhusu utafiti huu unaweza kuwasiliana na mkuu wa utafiti huu Daktari Hudson Manyanga wa Chuo Kikuu cha Afya ya Tiba ya Sayansi Muhimbili, S.L.P. 65015, Dar es Salaam. Na ukiwa na swali lolote kuhusu haki zako kama mshiriki, wasiliana nami kwa namba +255 715 730739

au Dr. Joyce R Masalu ambaye ni Mwenyekiti wa Kamati ya Utafiti ya Chuo, S.L.P. BOX 65001, Dar es Salaam. Simu: +255 222 152489.

Sahihi

Je umekubali?

Mshiriki amekubali……..…Mshiriki Hajakubali…….……

Mimi.....nimesoma maelezo ya fomu hii. Maswali yangu yamejibiwa. Nimekubali kushiriki katika utafiti huu.

Sahihi ya mshiriki……...

Sahihi ya shahidi (kama mshiriki hawezi kusoma) ……..

Sahihi ya mtafiti……..

Tarehe ya ukubali wa kushiriki……..

Appendix III: Questionnaire

SOCIO-DEMOGRAPHIC

1. Age.....
2. Marital status;
    - Single
    - Married/Cohabiting.
    - Divorced/Separated.
3. Residence.....
4. Education level;
    - No formal education
    - Primary.
    - Secondary.
    - College/university.
5. Occupation (Both).....

ANTENATAL CARE RECORDS;

6. Parity.....
7. Abortion/stillbirth.....
8. Booking GA.....
9. Number of ANC visits.....
10. Service provider (cadre) Nurse/Mid-wife..... Doctor..... Both.....

ULTRASOUND AWARENESS & UTILIZATION

11. Have you ever done prenatal ultrasound Yes..... No.....(Go to Qn.18)

If Yes; (Go to Qn. 11-17)

12. In this index pregnancy Yes..... No.....(Go to Qn.18)
13. How many times.....GA.....
14. In the previous pregnancy; Yes..... No.....(Go to Qn.18)
    - 1st pregnacy.....how many times.....GA.....
    - 2nd pregnacy.....how many times.....GA.....
    - 3rdpregnacy.....how many times.....GA.....
15. Who ordered the ultrasound
    - Doctor/Nurse.....
    - Personal request.....
16. Mention the indication for doing the ultrasound

    .....

    .....
17. Was the ultrasound service satisfactory..... OR not satisfactory

18. Can you mention reasons;
    - Ultrasound services were not available.
    - Was not recommended by health provider.
    - Could not afford the cost.
    - It is not important to do.
    - Others mention.....
19. Do you know how many times you are required to do routine ultrasound during pregnancy? At each ANC visit..... 1..... 2..... 3..... More than 3..... I don't know.....
20. Do you think ultrasound is essential investigation during pregnancy? Yes..... No..... I don't know.....
21. Mention any importance/advantages of prenatal ultrasound you know;
    - To confirm pregnancy.
    - To confirm presence of multiple pregnancy.
    - To confirm wellbeing of the fetus.
    - To detect defect in the baby.
    - To find the expected date of delivery.
    - To assess growth of the baby.
    - To find the fetus position.
    - To determine position of placenta.
    - To determine amount of liquor.
    - To determine the sex of the baby.
22. What is your source of information with regard to importance of doing ultrasound?
    - Doctors/Nurse.....
    - Friends/Family member.....
    - Media.....
23. Mention any challenges you have faced in doing ultrasound
    - Expensive.
    - Ultrasound services not available in many facilities.
    - Long waiting hours.
    - Other.....
24. Maternal perception;

	Is the ultrasound cost affordable?	Is the ultrasound safe for the baby?
I agree		
Disagree		
I don't know		

Appendix III: DODOSO

TAARIFA BINAFSI;

1. Umri.....
2. Hali ya ndoa;
    - Nimeolewa
    - Nimeachika/Tumetengana
    - Sijaolewa
3. Makazi.....
4. Kiwango cha elimu;
    - Sijasoma.
    - Msingi.
    - Sekondari.
    - Chuo
5. Unafanya kazi gani (mama & baba)
    - Umeajiriwa.
    - Mkulima
    - Mfanya biashara ndogondogo/umejiajiri
    - Sina kazi.

KUMBUKUMBU ZA KLINIKI;

6. Umezaa mara ngapi.....
7. Mimba zilizoharibika/motto kufia tumboni .....
8. Mahudhurio ya kwanza wakati wa kliniki ya ujauzito (kwa wiki).....
9. Umehudhuria kliniki ya ujauzito mara ngapi mpaka kujifungua.....
10. Wakati wa kliniki ulikuwa ukihudumiwa na; Muuguzi..... Daktari..... Wote.....

UFAHAMU NA MATUMIZI YA ULTRASONOGRAFIA

11. Umeshawahi kupiga picha ya ultrasonografia
    Ndio..... Hapana.....(Nenda swali la 18)

Kama ni ndio; (Endelea swali la 12-17)

12. Ulipiga kipindi cha ujauzito uliopita Ndio..... Hapana.....(Nenda swali la 18)
13. Ulifanya ultrasonografia mara ngapi.....wakati mimba ikiwa na umri gani.....
14. Mimba za nyuma ulishawahi kufanya ultrasonografia;
    Ndio..... Hapana.....(Nenda swali la 18)
    Mimba ya kwanza.....mara ngapi.....katika umri gani wa mimba…..

Mimba ya pili.....mara ngapi.....katika umri gani wa mimba.....

Mimba ya tatu.....mara ngapi.....katika umri gani wa mimba.....

15. Ni nani aliagiza kufanya ultrasonografia
    - Daktari/Muuguzi.....
    - Uliomba mwenyewe ufanyiwe.....
16. Ulifanya ultrasonografia kwasababu gani?

    .....

    .....

    .....
17. Huduma ya ultrasonografia uliyopata ilikuwa ya kuridhisha ..... AU isiyo ridhisha.....
18. Eleza ni kwa sababu gani hukufanya;
    - Hakukuwa na huduma za ultrasonografia.
    - Sikuwa nimeshauriwa kufanya.
    - Sikuweza kumudu gharama za kufanya.
    - Haina umuhimu kufanya.
    - Mengineyo.....
19. Je, unafahamu ni mara ngapi unatakiwa kufanya kipimo cha ultrasonografia wakati wa ujauzito mpaka unajifungua? Kila wakati akienda kliniki..... 1..... 2..... 3..... Zaidi ya mara 3..... Sijui.....
20. Je, unadhani kipimo cha ultrasonografia ni cha muhimu wakati wa ujauzito? Ndio..... Hapana..... Sijui.....
21. Eleza umuhimu wa kufanya ultrasografia kipindi cha ujauzito;
    - Kuhakikisha ujauzito upo.
    - Kuhakiki kama kuna mapacha.
    - Kuhakiki mtoto ana afya njema.
    - Kuchunguza kama mtoto ana maumbile yasiyo sawa.
    - Kujua tarehe ya makadirio ya kujifungua.
    - Kuangalia ukuaji wa mtoto.
    - Kujua mtoto amekaaje/katanguliza nini .
    - Kujua kondo la nyuma la mtoto lipo wapi.
    - Kujua kiwango cha maji katika mfuko wa uzazi.
    - Kujua jinsia ya mtoto.
22. Ufahamu na taarifa kuhusu ultrasonografia umezipata/kusikia kutoka wapi?
    - Daktari/Muuguzi.....
    - Rafiki / Ndugu.....
    - Vyombo vya habari.....

23. Ni changamoto gani umeziona kwenye kufanya ultrasonografia
    - Ina gharama kubwa.
    - Huduma za ultrasonografia hazipatikani vituoni sehemu nyingi.
    - Muda mrefu wa kusubiria huduma.
    - Mengineyo.....
24. Mtazamo wa kinamama;

	Je, huduma ya ultrasonografia ni rahisi?	Je, kipimo cha ultrasonografia ni salama kwa mtoto?
Nakubali		
Sikubali/ Nakataa		
Sijui		