IMPACT OF ULTRASOUND AND SOCIODEMOGRAPHIC VARIABLES ON MATERNAL FOETAL ATTACHMENT IN TARABA STATE, NIGERIA

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ABSTRACT

Background: Maternal foetal attachment is manifested in behaviors that demonstrate care and commitment to the foetus. Ultrasound decreases maternal anxiety and confers psychological benefit following a reassuring sonogram. Maternal-foetal attachment is affected by many socio-demographic factors which include maternal age, occupation, educational level, race, marriage duration, ethnicity, Religion, income status, pregnancy planning, and identification of the foetal gender

Aim: This study was aimed at assessing the effect of ultrasound and sociodemographic factors on maternal foetal attachment during pregnancy.

Method: A prospective study was conducted from November, 2019 to March, 2020. A convenient sampling method was employed and included 404 pregnant women aged 18-45 years old in their 2nd and 3rd trimester. The data were collected using a maternal foetal attachment scale questionnaire. Descriptive and inferential statistics were carried out at p value < 0.05.

Result: The score of maternal foetal attachment scale was greater with post ultrasound than the pre ultrasound. There was statistically significant difference between the pre and post ultrasound maternal foetal attachment scale (p=0.000).. A statistically significant difference was observed in the maternal foetal attachment across the different ethnic groups (p=0.000), planned and unplanned pregnancy (p=0.000).

Conclusion: This study revealed that ultrasound scan has influence on maternal foetal attachment, planned pregnancy. Hausa, Bandawa and Jenjo were found to be more attached to their foetuses.

Introduction

Maternal Foetal Attachment (MFA) is the extent to which women engage in behaviors that represent affiliation and interaction with their unborn child [1]. The terms bonding and attachment are both used interchangeably [2]. Maternal–foetal bonding is suggested to be related to three main aspects: cognitive, affective, and altruistic. The cognitive component of attachment is related to the desire to know about the infant. The affective component represents the pleasure accompanying thoughts of or interaction with the foetus, while the altruistic component is the desire for providing protection to the coming child[3]. Maternal–foetal attachment is

manifested in behaviors that demonstrate care and commitment to the foetus and include nurturance (eating well, abstaining from harmful substances such as alcohol), comforting (stroking the belly), and physical preparation[4].

Ultrasound imaging technology allows women to have a view of their foetus's months before delivery; the function of ultrasound cannot be over emphasized. The modalitynot only allows expectant mothers to see details of their foetus (in utero), but also allow a better visual understanding of the foetal structures and growth[4]. Ultrasound has been shown to give parents a confirmation of a new life, through two components: providing a visualization of the foetus and a realization that the unit will soon become part of the family[5]. Ultrasound is also known to be a reassuring tool, showing that the life-form carried inside the expectant mother is indeed a baby; this bond has been shown to start before birth and enhanced when the mother is aware of her growing foetus[6].

Pregnancy is one of the most significant events during a woman's life time, it is considered a period with its own tasks, during which a pregnant woman has to adapt to deep physiological, psychological, social changes and development[6]. Prenatal studies have been shown to be powerful tools in nurturing the MFA between an expectant mother and her unborn foetus[4]. While there has been little difference in the MFA in visual prenatal studies such as ultrasound versus no visual studies, it is important to recognize the positive effects a prenatal ultrasound can have on this important relationship[4].Although the transition to motherhood is accepted as stressful for all ages, the relevant literature suggests that women in their twenties are considered the ideal age for this transition[6]. Women above eighteen years of age have greater psychosocial readiness for mothering than those below who lack the needed knowledge and experiences for effective parenting[6].

In view of the varying impact of sociodemographic factors on MFA, there is need for ultrasound and socio-demographic based values of MFA in various locations to guide Sonographers and Obstetricians in the management of different categories of patient in different areas. To the best of the researchers' knowledge, no published studies using 2D US was carried out to determine the impact of ultrasound and socio-demographic factors on maternal foetal attachment in Northeastern Nigeria, in spite of having different ethnic diversity in the study area. Sonographers in various health facilities should

pay more attention during the course of obstetric ultrasound scan to multigravid women, women with unplanned pregnancy, women in 2nd trimester, Karimjo, Kabawa, Ichen and Kaka, so as to enhance their MFA. Obstetricians and midwives should educate, motivate and encouraged multigravid women, women with unplanned pregnancies, 2nd trimester women, Karimjo, Kabawa, Ichen and Kaka to go for more routine obstetric ultrasound scan so as toprepare them psychologically for both birth and their role as mothers.This study was aimed at assessing the effect of ultrasound and sociodemographic factors on maternal foetal attachment during pregnancy.

MATERIALS AND METHODS

This research was an experimental study as there was an intervention by ultrasound; ultrasound scan was performed before and after administering the questionnaire with the participant in supine position and the radiographer on the right side of the participant. The sonographic image on the ultrasound screen was made visible to the participant, after orienting the participant to the basic anatomy of the uterus, bladder, placenta, and foetal parts. The study was conducted in the Radiology Department of Federal Medical Centre, Jalingo, General Hospital Bali, First Referral Hospital Mutum Biyu and General Hospital Takum, Taraba State, between November 2018 and March 2019 were recruited.

In line with Helsinki Declaration, ethical approval was obtained from the Health Research Ethics Committee (HREC), Federal Medical Centre, Jalingo. The procedures were thoroughly explained to the participants including the study aims and written informed consent was signed by each participant before enrolling on the study. They were made aware of their option to withdraw from the study anytime without losing any benefit and healthcare services given by the facility. Apparently healthy pregnant women referred for an obstetric ultrasound scan in their second and third trimester were recruited for the study.

Cochran's (1977) formula was used to determine the minimum sample size for the study as stated below;

$$n_o = \frac{Z^2 pq}{e^2}$$

Where:

n = the desired sample size.

Z = the selected critical value of desired confidence level (1.96).

P =   the estimated proportion of an attribute that is present in the population (0.5).

q =   proportion of sampling error in a given proportion = 1-p (0.5).

e =   desired level of precision (0.05).

$$n_o = \frac{(1.96)^2(0.5)(0.5)}{(0.05)^2} = 384.16$$

So, the sample size of 404 was used for the study to increase the statistical power.

Non-probability (convenient method) sampling method was adopted for the study. Pregnant women in their 2nd and 3rd trimester, pregnant women aged between 18-45 years and willingness to participate included in the study, while 1st-trimester pregnant and women below the age of 18 were excluded in the study. The decision to exclude women in the first trimester of pregnancy is justified by the fact that the questionnaires chosen to measure maternal-foetal attachment (MFAS) contains items concerning foetal movements that pregnant women are not normally able to feel before the second trimester[8].

Ultrasound scans were performed using ZONCARE i50 Ultrasound equipped with 3.5MHz transducer. The participants were examined in the supine position, the radiographer was on the right side of the participant and ultrasound gel was applied to the abdominal and pelvic area of the participant. The sonographic image on the screen was made visible to the participant, after orienting the participant to the basic anatomy of the uterus, bladder, placenta, and foetal parts, a free exchange of questions and ideas was encouraged between the participant and the sonographer. Women were asked to identify specific foetal body parts or movements, at 12 weeks they were able to see the foetal head, body, hands, feet, and foetal heart beat, at 20 weeks these foetal parts were seen more clearly. The average duration of the ultrasound examination was 12.5 minutes (range, 10–25 minutes), average time viewing the screen was 14 minutes (range, 3–25 minutes), women were allowed to ask an average of 4 questions per session (range, 1–7)[9].

Statistical Package for the Social Sciences (SPSS) version 26.0 for Microsoft Windows was used for the analysis. The instrument used for measuring the MFA was in likert style (ordinal scale), hence the data was assumed to be non-parametric. Descriptive analysis was used to obtain the frequency and percentages of the participant's bio data. Wilcoxon test was used to obtain the differences between pre and post ultrasound mean scores of the maternal foetal attachment scale. Mann Whitney U test was used to find out the impact of gestational age and pregnancy planning on maternal foetal attachment after ultrasound scan. Kruskal-Wallis H Test was used to find out the impact of maternal age, ethnicity, educational qualification, occupation, and marriage duration after an ultrasound scan. The level of significance was taken at P values less than 0.05.

RESULTS

Table 1a-c shows frequency and percentage distribution of maternal foetal attachment scale responses, 114 (28.2%) of the participant strongly agreed to have pictured themselves feeding their babies after the ultrasound scan, as opposed to 3 (0.7%) before the ultrasound scan. Sixty-two (15.3%) strongly agreed to be eager to looking forward to seeing how their babies look after the ultrasound scan, contrary to 4 (1.0%) before the ultrasound scan. Following the ultrasound 64 (15.8%) of the participants strongly agreed to have been talking to their unborn babies as against the 5 (1.2%) before the ultrasound scan. After the ultrasound scan, 51 (12.6%) strongly agreed that they can guess what their babies personality will be, versus 3 (0.7%) ahead of the ultrasound scan. Also, after the ultrasound scan, 61 (15.1%) strongly agreed that the trouble of being pregnant worth it, as opposed to 9 (2.2%) prior to the ultrasound scan. Three hundred and ninety-eight (98.5%) attached to their baby after watching the ultrasound. Wilcoxon test shows that a of the participant agreed that they feel more difference between pre and post ultrasound scores of maternal foetal attachment scale is statistically significant (Z= -13.64, p=0.000), with post ultrasound score being greater than the pre ultrasound positively, hence ultrasound has an influence on maternal foetal attachment.

MFAS Questions   Responses

	SN	Items	Definitely Yes (%)		Yes (%)		Uncertain (%)		No (%)		Definitely No (%)	
ROLE TAKING	Q1	Picture myself feeding baby	3	0.7%	281	69.6%	96	23.8%	24	5.9%	0	0.0%
	Q2	Imagine myself taking care of baby	7	1.7%	218	54.0%	127	31.4%	52	12.9%	0	0.0%
	Q3	Can hardly wait to hold baby	1	0.2%	217	53.7%	138	34.2%	48	11.9%	0	0.0%
DIFFRENTIATIO OF SELF FROM FEOTUS	Q4	Enjoy watch tummy jiggle as baby kicks	6	1.5%	258	63.9%	95	23.5%	45	11.1%	0	0.0%
	Q5	Looking forward to see how the baby looks	4	1.0%	260	64.4%	87	21.5%	51	12.6%	2	0.5%
	Q6	Decided on a name for a girl	1	0.2%	206	51.0%	86	21.3%	111	27.5%	0	0.0%
	Q7	Talk to my unborn baby	5	1.2%	211	52.2%	103	25.5%	81	20.0%	4	1.0%
INTERACTION WITH FOETUS	Q8	Refer to baby by nickname	2	0.5%	230	56.9%	99	24.5%	71	17.6%	2	0.5%
	Q9	I poke to get him/her to poke back	2	0.5%	235	58.2%	86	21.3%	81	20.0%	0	0.0%
	Q10	I stroke my tummy to quite baby	4	1.0%	231	57.2%	97	24.0%	72	17.8%	0	0.0%
	Q11	I grasp baby foot to move it around	0	0.0%	259	64.1%	74	18.3%	71	17.6%	0	0.0%
	Q12	Wonder if baby feels cramped in there	5	1.2%	219	54.2%	103	25.5%	75	18.6%	2	0.5%
	Q13	Can guess what my baby's personality will be	3	0.7%	261	64.6%	76	18.8%	62	15.3%	2	0.5%
ATTRIBUTING CHARACTERISTICS TO FOETUS	Q14	Wonder if baby can hear inside	3	0.7%	244	60.4%	80	19.8%	74	18.3%	3	0.7%
	Q15	Wonder if baby thinks and feels inside	4	1.0%	270	66.8%	74	18.3%	56	13.9%	0	0.0%
	Q16	Baby kicks to tell me it is eating time	9	2.2%	272	67.3%	81	20.0%	42	10.4%	0	0.0%
	Q17	Can tell baby has hiccoughs	0	0.0%	48	11.9%	325	80.4%	26	6.4%	5	1.2%
	Q18	Feel the trouble of being pregnant is worth it	9	2.2%	315	78.0%	56	13.9%	21	5.2%	3	0.7%
	Q19	Do things to stay healthy	10	2.5%	301	74.5%	54	13.4%	39	9.7%	0	0.0%
GIVING OF SELF	Q20	I eat meat and vegetable to be sure my baby gets good diet	9	2.2%	312	77.2%	56	13.9%	27	6.7%	0	0.0%
	Q21	Feel my body is ugly	0	0.0%	5	1.2%	127	31.4%	224	55.4%	48	11.9%
	Q22	Give up doing things to help my baby	21	5.2%	293	72.5%	69	17.1%	21	5.2%	0	0.0%

Table 1b: Post-Ultrasound frequency and percentage distribution of maternal foetal attachment scale response

MFAS Questions   Responses

	SN	Items	Definitely Yes		Yes		Uncertain		No		Definitely No	
ROLE TAKING	Q1	Picture myself feeding baby	114	28.2%	247	61.1%	23	5.7%	20	5.0%	0	0.0%
	Q2	Imagine myself taking care of baby	110	27.2%	231	57.2%	24	5.9%	39	9.7%	0	0.0%
	Q3	Can hardly wait to hold baby	105	26.0%	228	56.4%	43	10.6%	28	6.9%	0	0.0%
DIFFRENTIATIO OF SELF FROM FEOTUS	Q4	Enjoy watch tummy jiggle as baby kicks	57	14.1%	300	74.3%	25	6.2%	22	5.4%	0	0.0%
	Q5	Looking forward to see how the baby looks	62	15.3%	285	70.5%	28	6.9%	29	7.2%	0	0.0%
	Q6	Decided on a name for a girl	56	13.9%	243	60.1%	30	7.4%	75	18.6%	0	0.0%
	Q7	Talk to my unborn baby	64	15.8%	242	59.9%	35	8.7%	63	15.6%	0	0.0%
INTERACTION WITH FOETUS	Q8	Refer to baby by nickname	34	8.4%	278	68.8%	44	10.9%	48	11.9%	0	0.0%
	Q9	I poke to get him/her to poke back	57	14.1%	276	68.3%	24	5.9%	47	11.6%	0	0.0%
	Q10	I stroke my tummy to quite baby	39	9.7%	273	67.6%	48	11.9%	44	10.9%	0	0.0%
	Q11	I grasp baby foot to move it around	27	6.7%	309	76.5%	20	5.0%	48	11.9%	0	0.0%
		Wonder if										

MFAS Questions   Responses

	SN	Items	Definitely Yes		Yes		Uncertain		No		Definitely No	
ATTRIBUTING CHARACTERISTICS TO FOETUS	Q12	baby feels cramped in there	71	17.6%	251	62.1%	32	7.9%	50	12.4%	0	0.0%
	Q13	Can guess what my baby's personality will be	51	12.6%	286	70.8%	31	7.7%	36	8.9%	0	0.0%
	Q14	Wonder if baby can hear inside	48	11.9%	278	68.8%	29	7.2%	49	12.1%	0	0.0%
	Q15	Wonder if baby thinks and feels inside	36	8.9%	307	76.0%	31	7.7%	30	7.4%	0	0.0%
	Q16	Baby kicks to tell me it is eating time	103	25.5%	268	66.3%	17	4.2%	16	4.0%	0	0.0%
	Q17	Can tell baby has hiccoughs	0	0.0%	55	13.6%	325	80.4%	24	5.9%	0	0.0%
	Q18	Feel the trouble of being pregnant is worth it	61	15.1%	317	78.5%	22	5.4%	4	1.0%	0	0.0%
	Q19	Do things to stay healthy	72	17.8%	328	81.2%	4	1.0%	0	0.0%	0	0.0%
GIVING OF SELF	Q20	I eat meat and vegetable to be sure my baby gets good diet	68	16.8%	329	81.4%	7	1.7%	0	0.0%	0	0.0%
	Q21	Feel my body is ugly	0	0.0%	5	1.2%	74	18.3%	214	53.0%	111	27.5%
	Q22	Give up doing things to help my baby	89	22.0%	304	75.2%	8	2.0%	3	0.7%	0	0.0%

Table 1c: Post-Ultrasound frequency and percentage distribution response related to foetus viewed on the screen

Post ultrasound questions		**Responses**								
SN	Items	Strongly agree (%)		Agree (%)		Uncertain (%)		Disagree (%)		Strongly Disagree (%)	
Q1	While I was watching the ultrasound, I learned to see my baby on the monitor.	83	20.5%	320	79.2%	0	0.0%	0	0.0%	0	0.0%
Q2	After watching the ultrasound, I know my baby better.	62	15.3%	336	83.2%	3	0.7%	0	0.0%	3	0.7%
Q3	After watching the ultrasound of my baby, I am concerned about how my feeling might affect my baby.	69	17.1%	306	75.7%	17	4.2%	9	2.2%	3	0.7%
	After viewing the ultrasound, I am										

Post ultrasound questions		**Responses**								
SN	Items	Strongly agree (%)		Agree (%)		Uncertain (%)		Disagree (%)		Strongly Disagree (%)
Q4	concerned about how my eating might affect my baby.	57	14.1%	309	76.5%	32	7.9%	6	1.5%	0	0.0%
Q5	After viewing the ultrasound, I am concerned about how exercise might affect my baby.	53	13.1%	328	81.2%	20	5.0%	3	0.7%	0	0.0%
Q6	After viewing the ultrasound, I am concerned about how my daily habits (smoking, alcohol, etc.) affect my baby.	59	14.6%	315	78.0%	30	7.4%	0	0.0%	0	0.0%
Q7	After watching the ultrasound, I am more concerned about my baby's health.	82	20.3%	311	77.0%	11	2.7%	0	0.0%	0	0.0%
Q8	After watching the ultrasound, I feel more attached to my baby.	99	24.5%	299	74.0%	6	1.5%	0	0.0%	0	0.0%
Q9	There was more time to see my baby's reactions to things I did during the ultrasound.	41	10.1%	150	37.1%	97	24.0%	79	19.6%	37	9.2%
Q10	Watching the ultrasound of my baby was worthwhile.	119	29.5%	278	68.8%	7	1.7%	0	0.0%	0	0.0%

Table 2: Comparison of the maternal foetal attachment between maternal age group
Table 2 shows that there is no significant difference in the maternal foetal attachment of the participants across the various age groups (p=0.083).
Table 4 shows that there is a significant difference in the maternal foetal attachment of the participants

	Maternal age (Years)	N	Mean Rank
Maternal Foetal Attachment	18-25	194	202.62
	26-35	181	197.51
	36 and above	29	232.86
Assymp. Sig, 0.083			

across the different ethnic groups (p=0.000).

Table 4: Comparison of the maternal foetal attachment between various ethnic groups

	ETHNICITY	N	Mean Rank
Maternal Foetal Attachment	Bandawa	6	269.75
	Chamba	20	191.95
	Dakawa	10	172.50
	Fulani	54	199.19
	Hausa	30	276.23
	Ichen	13	172.50
	Jenjo	13	262.27
	Jibawa	18	204.92
	Jukun	25	219.18
	Kabawa	5	172.50
	Kaka	20	172.50
	Kambu	8	227.75
	Karimjo	8	172.50
	Kumbo	10	230.85
	Kuteb	28	172.50
	Mambila	32	213.22
	Mbanso	12	172.50
	Mumuye	32	196.41
	Tigun	7	172.50
	Tiv	16	172.50
	Wurkun	29	192.62
	Yandang	8	172.50
	Total	404	

Assymp. Sig. 0'000

Table 4.5 shows no significant difference was observed in maternal foetal attachment between the different educational qualification levels (p=0.725).

Table 5: Comparison of the maternal foetal attachment between various educational qualifications

	EDU. QUALI.	N	Mean Rank
Maternal Foetal Attachment	No formal education	62	197.60
	Primary School	119	199.50
	Secondary School	110	209.63
	Tertiary level	113	201.41
	Total	404	

Assymp. Sig. 0.725

Table 6 shows that no significant difference is observed in the maternal foetal attachment across the four respective occupational groups (p=0.059).

Table 6: Comparison of the maternal foetal attachment between various Occupations

	OCCUPATION	N	Mean Rank
Maternal Foetal Attachment	House wife	182	209.13
	Employed	30	172.50
	Unemployed	179	202.97
	Business	13	172.50
	Total	404	

Assymp. Sig. 0.059

Table 7 show that there is a significant difference in the maternal foetal attachment between 2nd and 3rd trimester (p=0.01).

Table 7: Comparison of the maternal foetal attachment between 2nd and 3nd trimester

	GESTATIONAL AGE	N	Mean Rank
MATERNAL FOETAL ATTACHMENT	3RD TRIMESTER	215	224.36
	2ND TRIMESTER	189	183.28
	Total	404	
Assymp. Sig (0.000)			

Table 9: Comparison of the maternal foetal attachment between planned and unplanned pregnancies

	PRENANCY PLANNING	N	Mean Rank
MATERNAL FOETAL ATTACHMENT	UNPLANNED	83	188.58
	PLANNED	321	256.35
	Total	404	
Assymp. Sig. (0.000)			

Table 9 shows a significant difference in the maternal foetal attachment and pregnancy planning (p=0.000).

Table 10 shows that there is no significant difference in the maternal foetal attachment of the participants across the various marriage duration groups (p=0.274).

Table 10: Comparison of the maternal foetal attachment between various marriage duration

	Marriage Duration	N	Mean Rank
Maternal Foetal Attachment	1-2 Years	105	186.09
	3-5 Years	79	199.01
	Greater than 5 Years	207	199.88
	Total	391	
Assymp. Sig. 0.274			

DISCUSSION

The findings of this study shown on table 1a-c is in agreement with Sidiand Kuowho reported that ultrasound has a positive impact on maternal-foetal attachment, and that viewing the foetus during ultrasound scan influence the development of maternal foetal attachment respectively[16,19]. This research finding is also in tandem with that de Jong-Pleij that reported maternal foetal attachment to have increased following ultrasound scan[10], and that ultrasound may change the parental attitude toward pregnancy and may contribute to an increase in mother's bonding to her foetus[14]. The possible reason could be that, most of the women really feel nice when they hear the heartbeats of their baby when ultrasound are performed, and seeing movements of their babies make them more enthusiastic, therefore seeing their baby growing each time ultrasound is performed increase their happiness and eagerness to hold their baby[11].

This study finding shown on table 4.2is also in line with that of Moussa and Čėsnaitė whose findings reveals that MFA mean values obtained by the different age groups did not differ significantly[12,13]and contrary to that of Hassan and Fawzi that found increased in maternal age to have overall decreased of maternal-foetal attachment, specifically 94.3% of the teenage participants were strongly attached, compared to 72.1% of those who were in their thirties or more[6].

Table 3 finding of this study is contrary to that of

Eleonora & Siddiqui that reported no differences was observed in maternal foetal attachment across three ethnic groups[14]. The possible reason of the disagreement could be the scanty number of ethnic groups involved in the previous studies.

The findings from this study shown in table 4 is contrary to the study of Ahern who revealed that pregnant women with higher level education take better care of themselves during pregnancy, thereby having a higher MFA score[15]. The possible reason for the contradiction might be due to lack of higher level education among the participant of this study, as greater percentages are in the group of primary and secondary school education.

The findings from this study shown in table 4.5 is consistent with a study by Busonera whose result showed a significant effect of the trimester (p=0.028), with women in the third trimester of pregnancy having higher levels of attachment[4]. The result from this study is also in line with Righetti which showed that expectant mothers with higher gestational periods (in the third trimester) showed significantly higher mean scores[16]. A plausible explanation is that the higher the gestational age, the more likely the mother will adapt to the new role of transition and progress in the attachment process with her unborn child[12] and also ultrasound allow expectant mothers to see and understand the details of their foetal structures at 3rd trimester[8].

In this study, the result shown on table 6 is in line with the study of Moussa reported that bonding did not differ significantly with the duration of marriage[15].

Again finding from this study shown on table 7 is consistent with the finding of Hassan who found women with planned pregnancy to have an overall stronger maternal-foetal attachment level compared with unplanned pregnancies[6]. This result is also in tandem with the work of Shieh who found planning of pregnancy to be consistently related to maternal-foetal bonding[23]. The possible reason could be because the woman is aware, psychologically prepared and ready for transition to motherhood.

Conclusion

The result of this study affirmed that ultrasound scan has influence on maternal foetal attachment.

Womenwith planned pregnancy, women in their 3rd trimester, Hausa, Bandawa and Jenjo were found to be more attached to their foetuses, whereas no significant difference was found among the maternal age groups, occupation and educational qualification.

Recommendation from the study

· Sonographers in various health facilities should pay more attention during the course of obstetric ultrasound scan to multigravid women, women with unplanned pregnancy, women in 2nd trimester, Karimjo, Kabawa, Ichen and Kaka, so as to enhance their MFA. Obstetricians and midwives should educate, motivate and encouraged multigravid women, women with unplanned pregnancies, 2nd trimester women, Karimjo, Kabawa, Ichen and Kaka to go for more routine obstetric ultrasound scan so as to prepare them psychologically for both birth and their role as mothers.

· Stakeholders should carry out a form of public enlightenment on multigravid women, women with unplanned pregnancy, women in 2nd trimester, Karimjo, Kabawa, Ichen and Kaka, so as to enhance their MFA.

Conflict of Interest: Nil

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