

Antenatal Women's Knowledge and Attitudes respecting the practice of Ultrasonography in Saudi Arabia

Muhannad Faleh Alanazi

Introduction: Widely acknowledged as a crucial tool for antenatal care follow-up, ultrasound diagnoses early pregnancy problems and lowers maternal mortality. The purpose of this study was to ascertain the pregnant women's attitudes, knowledge, and related factors with regard to the safe use of ultrasonography in hospital research.

Methods: This hospital-based cross-sectional study was conducted from January 2023 to September 2023 at the Obstetrics department of Maternity and Children Hospital (MCH), enrolling 304 pregnant women who came for antenatal care and referred to Radiology department for routine follow-up. 15 consecutive volunteers were given a pretested questionnaire both before and after the ultrasonography examination. Data analysis by IBM SPSS 22.0. The quantitative variable's percentage, frequency, and standard deviation calculations. Bivariate and multivariate logistic regression was used to identify factors associated with knowledge and attitude. Chi-square test with a p-value of less than 0.05 for significance.

Results: A total 304 pregnant women participated by questionnaires and face to face interview in this study. The age less than 25 years found 41.1% higher compared to others age groups. Pregnant women who agreed to safe use of antenatal ultrasonography that noticed fairly good of knowledge and a positive attitude at 61.6% and 65.5%, respectively. Multivariate logistic regression of knowledge and attitudes revealed statistically significant relationships age between 26 and 30 and over 30 years (AOR 0.94, 95% CI, (0.44–1.66), (AOR 1.35, 95% CI, (0.78–1.77), educational background (AOR 0.53 95% CI, 0.12-2.36), occupation (AOR 0.186, 95% CI, 0.053-0.67), and location of residence in cities (AOR 0.151 95% CI, 0.033-0.44) and attitudes (AOR 0.63 95% CI, 0.78-2.68), educational background (AOR 0.54 95% CI, 0.11-2.17), occupation (AOR 0.181, 95% CI, 0.049-0.66), and location of residence in cities (AOR 0.153, 95% CI, 0.036-0.55) respectively.

Conclusion: According to this study, pregnant women have a generally good magnitude of knowledge and attitude regarding ultrasonography. Enhancing pregnant women's knowledge can be achieved by health workers in antenatal care facilities teaching them about the efficacy of ultrasonography.

Dr. Muhannad Faleh Alanazi
Department of Internal Medicine,
Division of Radiology,
College of Medicine,
Jouf University,
Sakaka, Saudi Arabia

Prof. Donald brought ultrasound technology to the obstetrics department for the first time in 1958. Worldwide results for antenatal follow-up and pregnancy outcomes have shown that routine use of ultrasonography during pregnancy is significantly beneficial.¹ In the last several years, antenatal follow-up ultrasound has been regarded as a standard technique or approach for evaluating the pregnant mother and foetus. According to a previous study, all expectant mothers viewed ultrasound as a useful diagnostic radiological tool that might aid in the early detection of difficulties.² However, ultrasound is a very valuable diagnostic tool for pregnant women. This tool is frequently used to assess various anatomical characteristics of the foetus, including gestational age, femur length, head circumference, abdominal circumference, and transverse length of the cerebellum.³ Several countries provide prenatal screening for foetal structural abnormalities and aneuploidies like Down syndrome as part of standard prenatal care.⁴ In order to determine gestational age (GA), assess placental placement, identify single or multiple pregnancies, increase foetal abnormality detection, and improve pregnancy outcomes, the World Health Organization (WHO) recommends that all pregnant women have one ultrasound scan before 24 weeks of pregnancy.⁵ While all expectant women should undergo two US scans in the first and second trimesters, according to the International Federation of Gynaecology and Obstetrics (FIGO), to lower the risk of adverse perinatal outcomes.⁶ Proper antenatal care (ANC), in which the US plays a significant role, can prevent the pregnancy-related complications that plague women in underdeveloped nations.^{7,8} Considering that women's decisions to undertake obstetric ultrasound tests are influenced by their attitude and amount of knowledge regarding pregnancy procedures. Pregnancy problems, however, might arise from a lack of knowledge of and understanding of the role of ultrasonography during pregnancy, Ultrasonography, on the other hand, can determine the date of delivery and discover foetal problems, health, and gestational weeks early. As a result, it's critical that all expectant mothers understand the benefits of using ultrasound. Numerous studies have demonstrated the significance of women's attitudes toward prenatal ultrasound and how it impacts their mental health; therefore, more research in this area is necessary.

Besides, determined that pregnant women undergoing antenatal ultrasounds have a variety of expectations, the majority of which centre around learning the sex of the pregnancy, viability, anticipated due date, and assurance that the baby is healthy.⁹ Nevertheless, research findings on the safe use of ultrasound during pregnancy were scant in Saudi Arabia, and no studies were conducted to assess attitudes and understanding in this Aljouf area. Therefore, the purpose of this study was to evaluate pregnant women's attitudes and knowledge regarding the safe use of ultrasonography.

MATERIAL AND METHODS

Design, Area and duration of study

This cross-sectional study was carried out from January 2023 to September 2023 at the Obstetrics department of the Maternity and Children Hospital (MCH) who were referred to the Radiology department for their ultrasonography follow-up. The MCH located at the Sakaka, Aljouf Saudi Arabia. The Sakaka has one Maternity and Children Hospital. At the Maternity and Children hospital (MCH), the pregnant women referred from surrounding cities and primary health care services including antenatal care (ANC) follow-up, delivery facilities and as well as postpartum care. This research approved by IRB of research with project No 2023-89. We have selected the pregnant women who came at OPD for antenatal care. A convenient and randomly method for collecting the participants who were came for ANC and consultants referred them to ultrasonography for routing follow-up. All recruited individuals were gathered from the Radiology department as well as the Obstetrics OPD.

Participants of study

The source of participants for this research study was the attendance at MCH for antenatal care follow-up of all pregnant mothers. We included the three hundred four pregnant women by convenience sampling who were available during data collection for this study from January 2023 to September 2023.

Method of Sampling and Estimating Sample Size

The Cochran formula was used to determine a minimum sample size of 304, giving this study a

power of 80% at a 95% level of significance and an alpha level of 0.05. For events such as non-response or recording error, an attrition value of 10% was permitted.

Sampling methods

Convenience sampling method applied for collection of participants who came in this hospital for their ANC between our research period.

Gathering of data

Face-to-face interviews were conducted using semi-structured, pretested questionnaires and posttest that recorded interviewee information or data. The

questionnaires were initially written in English, then translated into Arabic as a native language before being distributed to the participants. The questionnaires were designed with the participants' demographics, obstetrical history, awareness of and use of ultrasound for ANC, and mother attitudes and knowledge about ultrasonography.

Data quality

Five percent ($n = 15$) of the 304 participants took the pretest at the MCH. During the pretest period, the interview questions were evaluated for their readability, comprehensiveness, and simplicity. Based on the pretest results, adjustments and modifications were made.

Data analysis

All information was initially gathered on a data collection sheet, which was subsequently moved to an Excel spreadsheet in 2014 for statistical analysis using IBM SPSS 22.0. The quantitative variable's percentage, frequency, and standard deviation calculations. The crude relationship between the utilization of prenatal ultrasounds and explanatory variables was found using logistic regression. An odds ratio with a 95% confidence interval was used to assess the strength of the link. The test of significance for proportions was the Chi-square test. Less than 0.05 for the two-tailed P value was deemed significant.

Table 1 Demographic criteria of all participants

Factors	Frequency (%)	Percentage %
Age (years)		
Less than 25	125	41.1
Between 26-30	102	33.5
Over 30	77	25.3
Education background		
Primary school	66	21.7
Secondary school	109	35.8
Above secondary school	129	42.4
Occupation		
House wife	71	23.3
Students	17	5.4
Government job	50	16.4
School teacher	37	12.1
Others	129	42.4
Financial situation		
Middle class	34	11.1
Upper middle class	147	48.3
High class	123	40.4
Residence		
Cities	185	60.8
Out of cities	151	49.6

RESULTS

Three hundred four pregnant women were part of the current study, having attended MCH for antenatal follow-up. For their ultrasonography, all participants were referred to the Radiology department. Our study used questionnaires to collect data and present them. The demographic parameters include age, which is broken down into three categories: under 25 years old (41.1%), 26 to 30 years old (33.5%), and above 30 years old (77%). The mother's educational background is primary, secondary, and upper secondary school. 21.7%, 35.8%, and 42.4%, in that order. Whereas [Table 1](#) showed occupation, financial situation, and place of residence.

Of all individuals, 21.3% and 78.6%, respectively, were found to be primigravida and multigravida. In

the current study, there were 5.5% and 15.4% of birth defects and abortion histories, respectively. In this study, all antenatal pregnant women in variable trimesters—40.7% in the first, 43.7% in the second, and 15.4% in the third—participated. While 7.2% of minor issues were discovered, **Table 2** displays all of the facts.

Table 3 asked participants a series of questions about safety ultrasound procedures during pregnancy, to which all participants provided answers. At a value of $p < 0.05$, the majority of participants demonstrated good knowledge that was statistically significant. "Are you aware that US can decide on the delivery date?" is one such query. possess no discernible differences.

Factors related to obstetrical ultrasound knowledge of pregnant women

Among the study participants, the mother's age, educational background, occupation, and place of residence were appropriate for both bivariate and multivariate analysis. Multivariate logistic regression in the current study revealed statistically significant relationships between age between 26 and 30 and over 30 years (AOR 0.94, 95% CI, (0.44–1.66), (AOR 1.35, 95% CI, (0.78–1.77), educational background such as secondary and above seconder school (AOR 0.54, 95% CI, 0.11–2.17), (AOR 0.44, 95% CI, 0.021–

Table 2 *Obstetrics history of participants among study*

Factors	Frequency	Percentage
Gravida		
Multi	239	78.6
Primi	65	21.3
History of abortion		
No	257	84.5
Yes	47	15.4
Trimester of current pregnancy		
First (less than 3 months)	124	40.7
Second (between 3 to 6 months)	133	43.7
Third (above 6 months)	47	15.4
History of delivery approach		
Spontaneous vaginal delivery (SVD)	212	69.7
Caesarean section (CS)	92	30.2
History of birth defect		
Yes	17	5.5
No	287	94.4
Minor ailment of recent pregnancy		
Yes	22	7.2
No	282	92.7

Table 3 *knowledge of participants regarding use of Ultrasonography during pregnancy*

Items	Responses total number =304	
	Agree	Disagree
Is ultrasound a crucial part of prenatal care?	248 (81.6)	56 (18.4)
Does ultrasonography (US) pose a risk to your health or the health of your foetus?	19 (6.3)	285 (93.7)
Are you aware that the US can ascertain the pregnancy week?	235 (77.3)	69 (22.7)
Are you aware that US can decide on the delivery date?	182 (59.8)	122 (40.2)
Can foetal well-being be assessed with ultrasonography?	232 (76.3)	72 (23.7)
Is the foetal anomaly detectable by ultrasonography?	219 (72)	85 (28)
Can US aid in delivery management?	153 (50.3)	151 (49.7)
Are you aware that the US evaluates the amniotic fluid?	209 (68.8)	95 (31.2)
Good knowledge 61.6%		
Poor knowledge 38.4%		

Table 4 Bivariate and multivariate assessment of variables related to pregnant mothers' knowledge about obstetrical ultrasonography

Factors	Condition of knowledge		COR (95% CI)	AOR (95% CI)	P value
	Good	Poor			
	Age				
Less than 25	17	24	1		
Between 26-30	121	63	1.39 (1.168–2.018)	0.94 (0.44–1.66)	0.03
Over 30	47	32	2.08 (1.679–3.787)	1.35 (0.78–1.77)	0.01
Education back ground					
Primary school	47	70	1		
Secondary school	67	17	1.89(.68-2.44)	0.53(0.12-2.36)	0.02
Above secondary school	87	16	1.63(0.42-1.82)	0.32(.038-2.58)	0.01
Occupation					
House wife	91	69	1		
Students	12	7	.52(.28-.96)	0.52(0.16-1.73)	0.29
Government job	50	9	1.71(0.92-3.23)	0.186(0.053-0.67)	0.01
School teacher	21	29	.41(.11-1.34)	0.000(0.000)	0.998
Others	6	10	2.27 (1.65–4.34)	1.63 (0.35–1.02)	0.266
Residence					
Out of cities	42	82	1		
cities	144	36	1.76(0.66-3.19)	0.151(0.033-0.44)	0.01

2.46), occupation as Government job (AOR 0.181, 95% CI, 0.049-0.66), school teacher (AOR 1.201, 95% CI, .678- 2.177) and location of residence in cities (AOR 0.151 95% CI, 0.033-0.44) all data represented in [Table 4](#).

Attitude towards Ultrasonography

Every participant in the current study demonstrated a positive attitude toward the safe and other important aspects of using ultrasonography while pregnant. Although there were some negative statements, 37.2% and 21.3% of respondents thought that the ultrasonography process was painful and that it was a cause of cancer, respectively ([Table 5](#)).

Factors related to obstetrical ultrasound attitude of pregnant women

The Bivariate and multivariate assessment were performed and significant positive responded comparatively more than negative. Their noteworthy attitude toward age, educational background, and location was revealed by the logistic regression as far as (AOR 0.63 95% CI, 0.78-2.68), (AOR 1.02,95% CI, 0.86–3.25), educational background (AOR 0.54 95% CI, 0.11-2.17), (AOR 0.44 ,95% CI, 0. .021-2.46), occupation (AOR 0.181,95% CI, 0.049-0.66), (AOR 1.201,95% CI, 0.678- 2.177), and location of residence in cities (AOR 0.153, 95% CI, 0.036-0.55) respectively ([Table 6](#)).

Table 5 Attitudes of participants regarding use of Ultrasonography during pregnancy

Variables	Responses total number =304(%)	
	Agree	Disagree
Is antenatal ultrasonography safe to use when pregnant?	269(88.5)	35 (11.5)
Can an ultrasound scan result in cancer?	65 (21.3)	239 (78.6)
Do you think getting an ultrasound painful?	113 (37.2)	191 (62.8)
Do you believe that foetal sex can be determined using ultrasound?	245(80.6)	59 (19.4)
Are you aware that routine ultrasound scans can be provided?	234 (77)	70 (23)
Do you know that Ultrasound finding is more accurate.	269 (88.5)	35 (11.5)
Positive attitude ($\geq 50\%$): 65.5%		
Negative attitude ($< 50\%$): 34.5%		

Table 6 Bivariate and multivariate assessment of variables related to pregnant mothers' knowledge about obstetrical ultrasonography

Factors	Condition of attitude		COR (95% CI)	AOR (95% CI)	P value
	Positive	Negative			
	Age				
Less than 25	56	30	1	1	
Between 26-30	89	33	1.22 (1.462–1.249)	.63 (0.78–2.68)	0.01
Over 30	69	27	1.86 (1.342–2.47)	1.02 (0.86–3.25)	0.03
	Education back ground				
Primary school	50	67	1		
Secondary school	71	13	1.78(0.50-2.12)	0.54(0.11-2.17)	0.03
Above secondary school	93	10	1.83(0.45-1.91)	0.44 (0.021-2.46)	0.01
	Occupation				
House wife	100	60	1		
Students	15	4	0.39(0.122-.89)	1.19(0.29-4.98)	0.87
Government job	52	7	1.69(0.89-3.21)	0.181(0.049-0.66)	0.01
School teacher	30	20	1.623(1.121–2.572)	1.201(0.678-2.177)	0.03
Others	7	9	2.31 (1.63–4.39)	0.64 (0.37–1.05)	0.41
	Residence				
Out of cities	38	86	1	1	
cities	155	25	1.26(0.68-3.21)	0.153(0.036-0.55)	0.02

As far as we are aware, the Aljouf area was the site of our initial investigation; there are no published statistics on this field there. Three hundred four pregnant women in total voluntarily participated in this study, and all of them answered the questionnaire. For their antenatal imaging follow-up, we enrolled pregnant women who were referred by the obstetrics department to the Radiology department. The chosen questions were designed so short and easy to answer that pregnant women with any kind of educational level may do so. Nonetheless, the majority of respondents in this study were between the ages of 26 and 30, which is the right age to become pregnant, according to earlier research that revealed similar data.¹⁰⁻¹² According to earlier research, the majority of pregnancy-related issues, including chromosomal defects, preterm or premature birth, and foetal abnormalities, develop after the age of 35.¹³ In addition, the study's multigravida individuals had a response rate that was significantly higher than that of primiparous. In the current study, about 60.8% of the pregnant women are from cities; as a result, they have access to more information than those who live outside of cities and have similar reports regarding their place of residence.¹⁴ The purposes, indications, and limitations of ultrasound were far better understood by patients with college degrees. As to the recommendations of the American Institute of Ultrasound in Medicine, ultrasonography is a safe and appropriate diagnostic tool during pregnancy.¹⁵

Knowledge of Antenatal Ultrasonography

The current study's findings showed that 61.6% of participants had strong knowledge, which was almost identical to what was observed in the other study.^{6,16,8} These findings would suggest that when they visited the obstetrics department for antenatal care, they learned impotency of ultrasonography from medical professionals there. Additionally, those multigravida pregnant women who reside in Sakaka and have access to MCH frequently do so because they have a strong understanding of ultrasonography from a previous pregnancy. A total 8 question selected for knowledge and 84.9% of pregnant women agreed to know that ultrasonography (US) is important and safe investigation during pregnancy.

While 76.3%, 72% and 77.3%, pregnant women believe that US detected the foetal wellbeing, foetal defect and week of gestation respectively. The primary reason for this high proportion of knowledge is because ultrasonography is now widely conducted in numerous countries and is routinely utilized as a component of antenatal (ANC) investigation in addition to other investigations. After learning the purpose of amniotic fluid in detail, 68.8% of participants in the current study were aware of it. According to a previous study, having a solid understanding of safety ultrasonography is crucial for identifying and managing pregnancy issues early on.¹⁷ Nonetheless, it is essential that medical practitioners inform pregnant women about the safety of ultrasound during ANC.

Attitudes towards Antenatal Ultrasonography

Antenatal ultrasonography scans were generally viewed positive by 65.5% of participants. This positive rate is attributable to ANC services provided by medical personnel. Therefore, the majority of participants learn about ultrasonography scans by health providers from their initial appointment with the ANC. Furthermore, in the present study, the participants exhibited 88.5% and 88.5% positive attitudes on the safety of ultrasound during pregnancy, as well as knowledge regarding foetal sex determination, which in turn influences the respect for ultrasound during pregnancy. Nevertheless, comparable studies described in a different study.¹⁸⁻²⁰ Moreover, 78.7% of pregnant women had confidence in safe ultrasonography.²¹ Although 21.3% of participants stated that ultrasonography causes cancer (Table 5), this concern was not well-represented due to low educational background. In contrast to other studies such as Nigeria, Jeddah and India, the attitude level in the current study is thought to be lower than 73.1% ,78.9% and 88%.²²⁻²⁴

Factors associated with knowledge regarding used antenatal ultrasonography

The educational standing of pregnant women has a major impact on their knowledge; women who have completed secondary school or higher are more likely to have good knowledge than those who have not. Comparable results were found in research done in other nations.^{23,25,26} One possible explanation for this could be that pregnant women who have higher

educational statuses may also be more exposed to information. Living in a city is linked to having better ultrasound knowledge than living outside of one. This suggests that a lack of facilities stems from a lack of educational background, while comparable results were found in another study.^{25,26}

Factors associated with attitude regarding used antenatal ultrasonography

The status of education, age, and city of residency all had an impact on the pregnant women's attitudes of the safe use of ultrasonography in the current study. Evidence from earlier research shows that education level is crucial for obtaining knowledge about the safe use of ultrasonography in pregnant women.²² Current study, it is known that people working for the government had an upbeat attitude than others, however a similar finding was made in another study.²³ Since its inception in clinical care, obstetric ultrasound has become a major part of obstetrics, and there is no question that the benefits of this method have improved pregnancy outcomes. Therefore, in order to improve the management of pregnancy problems and ensure improved pregnancy outcomes, all pregnant women should undergo an ANC ultrasonography scan. A few limitations apply to this study: first, the research follow-up period was too short; second, because this study focused on pregnant women from a single hospital, the results could not be applied to the total community of pregnant women. We hope to conduct additional study that may involve various hospitals.

CONCLUSION

According to this study, pregnant women have a generally fairly good magnitude of knowledge 61.6% and attitude 65.5% regarding ultrasonography. Age, occupation, educational background, place of residence, and attitude toward antenatal ultrasonography were associated factors. Enhancing pregnant women's knowledge can be achieved by health workers in antenatal care facilities teaching them about the efficacy of ultrasonography. It is necessary to dispel the myth about the negative consequences of ultrasonography, particularly the cancer risk, by promoting interaction between sonographers and pregnant women and holding health discussions during ANC sessions. The author concluded by recommending that antenatal ultrasound screening be a component of antenatal care and that mothers should be informed about the benefits of obstetric ultrasonography. However, ultrasonography is widely acknowledged as a crucial study that plays a major role in antenatal care.

Funding

This work was funded by the Deanship of Scientific Research at Jouf University under grand No (DSR2023-01-02521).

REFERENCE

1. Dasan TA, Singh S, Koratagere RS, Raja B, Rangaswamy NB. Knowledge and attitude of antenatal women towards routine ultrasound screening in pregnancy at a tertiary institution in Bengaluru. *Int J Anat Radiol Surg*. 2016;5:(4)RO11-4.
2. Arvan M, Motlagh KM, Zare S, Gholami M. Knowledge and attitude of pregnant women 15-49 years old about ultrasound examinations: a cross-sectional study. *J Res Med Dent Sci*. 2019;7:(2)177-81.
3. Chavez MR, Ananth CV, Smulian JC, Yeo L, Oyelese Y, Vintzileos AM. Fetal transcerebellar diameter measurement for prediction of gestational age at the extremes of fetal growth. *J Ultrasound Med*. 2007;26:1167-71.

4. Skirton H, Barr O. Influences on uptake of antenatal screening for Down syndrome: a review of the literature. *Evid Based Midwifery*. 2007;5:(1)4-9.
5. World Health Organization. WHO recommendations on antenatal care for a positive pregnancy experience. Geneva: World Health Organization; 2016.
6. International Federation of Gynecology and Obstetrics. International Federation of Gynecology and Obstetrics. 2015.
7. Portela A, Gülmezoglu AM. WHO recommendations on antenatal care for a positive pregnancy experience: going beyond survival. *BJOG*. 2017;124:(6)860-2.
8. Stanton K, Mwanri L. Global maternal and child health outcomes: the role of obstetric ultrasound in low resource settings. *J Prev Med*. 2013;1:(3)22-9.
9. Nigenda G, Langer A, Kuchaisit C, et al. Women's opinions on antenatal care in developing countries: results of a study in Cuba, Thailand, Saudi Arabia and Argentina. *BMC Public Health*. 2003;3:17.
10. Saleh AA, Idris G, Dare A, Yahuza MA, Suwaid MA, Idris SK. Awareness and perception of pregnant women about obstetric ultrasound at Aminu Kano Teaching Hospital. *Sahel Med J*. 2017;20:38-42.
11. Dasan TA, Singh S, Koratagere RS, Raja B, Rangaswamy NB. Knowledge and attitude of antenatal women towards routine ultrasound screening in pregnancy at a tertiary institution in Bengaluru. *Int J Anat Radiol Surg*. 2016;5:(4)RO11-4.
12. Bellieni C. The best age for pregnancy and undue pressures. *J Fam Reprod Health*. 2016;10:(3)104-7.
13. Ravintaran T, Go KX, Che Isa IN, et al. Effectiveness of an educational module in improving knowledge, awareness and perception among pregnant women regarding the safe use of prenatal ultrasound. *Heliyon*. 2023;9:e12773.
14. Oche MO, Umar AS, Raji MO, et al. Knowledge of the use and indications for obstetric ultrasound scan among women attending a main referral hospital, Sokoto, Nigeria. *Res Obstet Gynaecol*. 2013;2:(5)55-62.
15. American Institute of Ultrasound in Medicine. AIUM practice guideline for the performance of obstetric ultrasound examinations. *J Ultrasound Med*. 2013;32:1083-101.
16. Palaniappan B. Role of antenatal care in safe motherhood. *J Indian Med Assoc*. 1995 Feb;93:(2)53-4, 52.
17. Usman BO, Idris SH, Abdulaziz U, Abdulhakim AO. Factors affecting utilization of obstetric ultrasound: a study of semi-urban pregnant women in a developing nation. *Sahel Med J*. 2020;23:(2)82-7.
18. Ikeako LC, Ezegwui HU, Onwudiwe E, Enwereji JO. Attitude of expectant mothers on the use of ultrasound in pregnancy in a tertiary institution in South East of Nigeria. *Ann Med Health Sci Res*. 2014;4:(6)949-53.
19. Krishnamoorthy N, Kasinathan A. Knowledge and attitude regarding obstetric ultrasound among pregnant women: a cross-sectional study. *Int J Reprod Contracept Obstet Gynecol*. 2016;5:(7)2192-6.
20. Firth ER, Mlay P, Walker R, Sill PR. Pregnant women's beliefs, expectations and experiences of antenatal ultrasound in Northern Tanzania. *Afr J Reprod Health*. 2011;15:(2)91-107.

21. Arvan M, Motlagh KM, Zare S, Gholami M. Knowledge and attitude of pregnant women 15-49 years old about ultrasound examinations: a cross-sectional study. *J Res Med Dent Sci.* 2019;7:(2)177-81.
22. Ikeako LC, Ezegwui HU, Onwudiwe E, Enwereji JO. Attitude of expectant mothers on the use of ultrasound in pregnancy in a tertiary institution in South East of Nigeria. *Ann Med Health Sci Res.* 2014;4:(6)949-53.
23. Abduljabbar HS, Jabal NAB, Hussain FA, et al. Knowledge, attitudes and practice about obstetric ultrasonography among women attending a university hospital: a cross-sectional study. *Open J Obstet Gynecol.* 2020;10:(12)1763-75.
24. Majeed AI, Gul SS. Ultrasound scanning and prenatal diagnosis: its knowledge and cognisance in pregnant women of Islamabad. *Ann PIMS.* 2017;13.
25. Kasap B, Yeniçeri EN, Akın MN, et al. Ultrasound in pregnancy: a cross-sectional study of knowledge and expectations among pregnant women in Southwest Turkey. *Med Bull Haseki.* 2016;54:224-31.
26. Ghavami SM, Abedinzadeh-Azari R, Ghatresamani Z, et al. Assessing pregnant women's expectations, concerns, and knowledge towards prenatal sonography in Tabriz, the major city of north-western Iran. *Am J Sci Ind Res.* 2014;5:(4)126-33.