

# Knowledge, Attitudes and Practice about Obstetric Ultrasonography among Women Attending a University Hospital: A Cross-Sectional Study

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## Abstract

**Background:** Obstetric sonography is one of the prenatal tests offered to most pregnant women and an essential tool that helps health care providers to establish fetal condition and growth. **The Objective:** to assess the knowledge, attitudes, and practice about obstetric sonography among women at KAUH in Jeddah, Saudi Arabia. **Method:** A cross-sectional study was conducted during 2018-2019 among 367 women. It included all women that attend the OB/GYN outpatient clinic at KAUH in Jeddah. The data was collected through interviewing questionnaire. The questionnaire consisted of 5 items to assess their knowledge, attitude, practice, and sociodemographic characteristics. Data were entered into a Microsoft Excel 2014 sheet, and statistical analysis was performed using IBM SPSS Statistics. **Result:** The mean knowledge score about obstetric sonography was  $13.9 \pm 1.7$ , where 343 (93.0%) had good knowledge, and only 26 (7.0%) had poor knowledge. The result revealed that the third-fourths of the women 291 (78.9%) believed that obstetric sonography is safe, and 309 (83.8%) believed that obstetric sonography doesn't lead to a congenital anomaly. There was a difference in the knowledge score regarding education level, occupation, monthly income, and those with higher education, those who worked, and those with higher monthly payment had a higher knowledge score. Also, there was a positive correlation between knowledge score and both gravidity and parity. **Conclusion:** Women's knowledge, attitude, and practice about the purpose of the obstetric sonography were good. So, the primary health care providers should be advised to focusing more on providing health education on obstetric sonography to

all pregnant women during their ANC visits.

## Keywords

Knowledge, Attitude, Practice, Obstetric Ultrasonography

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## 1. Introduction

As part of effective medical practice, medical imaging has become essential. There are plenty of imaging modalities with ultrasonography, also known as ultrasound, being one of them [1]. Ultrasound scan (USS) is an imaging diagnostic procedure that mainly uses sound waves of frequency greater than 20 Kilohertz (20 K-Hz). Unlike X-Rays, gamma rays, and many others, USS uses safe non-ionizing energy. It is a non-aggressive, less expensive tool with real-time imaging capabilities [1].

It is an essential radiological examination tool, which recently has been widely used in antenatal maternity care. With the global increase in pregnancy percentages due to the advanced improvement of technology, there come the needs for improved technology such as ultrasound [2].

In Saudi Arabia (SA), antenatal units offer routinely obstetric ultrasonography to pregnant women who are in early and mid-trimester, which is performed at 18 - 22 weeks of pregnancy [3]. It can diagnose fetal anomalies, any of the pregnancy complications, and any syndrome related to genetic abnormalities that could eventually result in decreasing in infant mortality rate.

It aids doctors in a calculation of gestational age and early diagnosis of multiple pregnancies [2]. Besides, it can bring parents a bundle of joy and a source of connection with the unborn baby [2]. So, it helps in management for a high-risk group of pregnancy but also can use as routine assessment for low-risk groups [4].

Obstetric ultrasonography has many risks in a pregnant woman; it is divided into two categories: diagnostic errors and possible biological effect [5]. The risks of diagnosis errors include overdiagnosis, underdiagnoses, and reporting issues [5]. The false-positive finding describes the overdiagnosis condition; such as if it indicates that there is a mass of fetal anomalies. Yet still, everything is normal; this will lead to termination of pregnancy via unnecessary medication [5].

The missed finding (false negative) such as missed fetal structure anomaly and missed ectopic pregnancy, it called underdiagnoses [5]. The third part of diagnosis errors is reporting issues, incorrect dating, misdiagnosis of fetal weight, and gender [5]. The disorders and birth problems become worsening in underdiagnoses and reporting problems [5].

On the other hand, there are biologic effects that have thermal effects and non-thermal effects. The thermal effects result in the passage of waveform and energy transformed into heat; this represents the major risk for the fetus [5].

Many factors contribute to the ignorance of the value of obstetric ultrasonography among pregnant women such as society, culture, the way of life, and the level of literacy [1] [2].

Doctors who request ultrasonography, unfortunately, do not give enough information to these patients. Nurses who frequently interact with women are equally ignorant of the value of obstetric ultrasonography; due to the educational courses which do not include varieties in Obstetrics and Gynecological Ultrasound [1].

In a previous study at a medical college hospital in Kolhapur District of Maharashtra, India on Apr. 28 2017, observed of awareness and attitude regarding the uses of the obstetric ultrasonography during pregnancy was found to be modest. However, worldwide availability and acceptability, but the actual knowledge about the purpose of use and limitation of using them are decreased [2].

In Saudi Arabia, good knowledge about proper use and early diagnosis, especially detect the anomalies provide a better outcome by giving the appropriate management and initial treatment [3]. Moreover, the researcher considered the shortcomings of some studies, like using very few samples of the community, such as pregnant women in small centers rather than taking a sample representing society appropriately and adequately.

Bias and insufficient information and we took into consideration to reduce these errors and avoid them [3].

We have the mildest awareness of obstetric ultrasonography scanning during pregnancy in a different region in Saudi Arabia. Still, until now, we don't have the actual level of understanding of Saudi women in Jeddah. The mildest knowledge influences the pregnant and fetus health even on the fetal mortality rate.

When pregnant women don't realize the importance of obstetric ultrasonography scanning, they may not do it. The ignorance of the appropriate time for scanning lead to delay it, therefore, the early detection of the fetal abnormality will not happen, and the treatment is become difficult or impossible and often forces us to abortion. At the same time, we can avoid by early obstetric ultrasonography scanning.

This study aimed to assess the knowledge, attitudes and practice about obstetric ultrasonography among women at King Abdulaziz University Hospital, in Jeddah, Saudi Arabia.

## **2. Method and Material**

The institutional review board (IRB) of KAU approve the study. Our study is a cross-sectional during 2018-2019. It included all pregnant women attend the obstetrical outpatient clinic at King Abdulaziz University Hospital, in Jeddah, Saudi Arabia. An online calculator calculated the sample size according to the population size of the patient who came to the obstetrical outpatient clinic through 2018-2019. Approximately 367 women with a 95% confidence level and 5% margin of error.

## 2.1. Data Collection

The data collected through interviewing questionnaire. The questionnaire consisted of 5 parts and 35 items. "Personal & socio-economic data" (11 items), "knowledge" (17 items), "attitude" (2 items), "practice" (2 items), and "general information" (3 items).

## 2.2. Statistical Analysis

Data entered into a Microsoft Excel 2014 sheet, and statistical analysis performed using IBM SPSS Statistics (Version 21). Frequencies and percentages calculated and mean and standard deviation or median presented for a quantitative variable. A comparison made using the Chi-square test for categorical variables, and independent test or one-way ANOVA for the quantitative variable. The confidence level was 95%, and P-value <0.05 was considered significant.

## 3. Result

Out of 367 pregnant women, 332 (90%) were Saudi, and 190 (51.5%) were from groupage (26 - 35) with average age  $33.4 \pm 7.9$ . Third of the cases were from the south region and forth from the north region. More than half had a university degree or above (40.9% had bachelor and 22.2% had master or PhD). Third fourth of the women were housewives, and 172 (46.6%) had monthly income between 5000 - 10,000 Riyal. Fourth of the cases, 98 (26.6%) were at 3rd trimester and 81 (22.0%) at 2nd trimester, with average GA  $26.9 \pm 8.8$ .

The median score of gravidity and parity were 3 and 2, respectively (**Table 1**). Regarding the level of knowledge of obstetric ultrasonography scanning, the results revealed that the most common right answers with more the 90% were "help in determining the fetal, cord and placenta position", knowing the sex of the fetus. "The Fetal Heart rate detected and confirmed the presence of abnormal pregnancy".

The answers to determine the sex of the fetus in the 10th weak, and diagnosing the cerebral palsy was (26.8%) and (37.7%) respectively. The mean knowledge score was  $13.9 \pm 1.7$ , where 343 (93.0%) had good knowledge, and only 26 (7.0%) had poor knowledge (**Table 2**).

The result revealed that 291 (78.9%) believed that obstetric ultrasonography is safe. 309 (83.8%) believed that doesn't lead to a congenital anomaly. On the other hand, almost half of 172 (46.6%) believed that obstetric ultrasonography cost is average and 144 (39.0%) believed it's costly (**Table 3**). All the participated women-run obstetric ultrasonography, where 194 (52.6%) run it more than five times, and 143 run it 3 - 5 times.

The primary resources of information were "Obstetrician." by 263 (71.3%), followed by "Internet." by 170 (46.1%). More third fourth of the women 288 (78.0%) reported receiving detailed and precise information about the baby from the doctor after performed obstetric ultrasonography, while only 34 (9.2%) didn't receive any information. Fourth of the cases reported "Congenital abnormality", where the most common was "First-trimester fetal demise" by 73 (19.8%) (**Table 4**).

**Table 1.** Personal & socio-economic data.

Variable	N	%
Nationality		
• Saudi	332	90.0
• Non-Saudi	37	10.0
Region		
• North	102	27.6
• South	141	38.2
• East	59	16.0
• West	45	12.2
• Center	22	6.0
Education		
• Illiterate	14	3.8
• School education	122	33.1
• Graduate	151	40.9
• Postgraduate	82	22.2
Occupation		
• Working	84	22.8
• Housekeeper	285	77.2
Income		
• Less than 5000 SR	76	20.6
• Between 5000 to 10,000 SR	172	46.6
• More than 10,000 SR	121	32.8
Age		
• 18 - 25	59	16.0
• 26 - 35	190	51.5
• 36 - 45	85	23.0
• 46 - 55	32	8.7
• >55	3	8
Trimester		
• 1st	14	3.8
• 2nd	81	22.0
• 3rd	98	26.6
• Unknown	176	47.7

**Continued**

Variable	Mean $\pm$ SD	Rang (min-max)
Age	33.4 $\pm$ 7.9	(20 - 65)
Gestational age	26.9 $\pm$ 8.8	(5 - 41)
Variable	Median	Quartile (25, 75)
Gravidity	3	(2, 5)
Parity	2	(1, 4)

**Table 2.** Knowledge of obstetric ultrasonography.

Variable	Number	Percentage
<b>Knowledge statements</b>		
Helps in determining the fetal, cord and placenta position	341	92.4
Assists with finding the expected date of delivery	309	83.7
Useful with knowing the Sex of the fetus	360	97.6
Determines the Sex of fetus in the 10th weak	99	26.8
Use to detect any defect or congenital abnormalities during pregnancy	289	78.3
The monitoring of pregnancy complication one of the practices of the USS	271	73.4
Helps to detect amniotic fluid volume	273	74.0
Reduced maternal morbidity and perinatal mortality	209	56.6
The Fetal Heart rate detected by obstetric ultrasonography	357	96.7
Determines the fetal heart rate in the 6th weak	246	66.7
Predicts the way of delivery (normal? C-section)	249	67.5
Confirms the presence of abnormal pregnancy (multiple, ectopic and molar)	334	90.5
Give accurate information about fetal weight	293	79.4
Doesn't help in determining the Autism	235	63.7
Doesn't help in determining the cerebral palsy	137	37.1
Doesn't help in determining the learning difficulties	244	66.1
Contributes to the prediction of miscarriage during pregnancy.	270	73.2
<b>Knowledge score category</b>		
Poor ( $\leq$ 50%)	26	7.0
Good ( $>$ 50%)	343	93.0
Variable	Mean $\pm$ SD	Rang (min-max)
Knowledge score	13.9 $\pm$ 1.7	(8 - 17)

**Table 3.** Attitude towards obstetric ultrasonography scanning.

Variable	N	%
<b>Obstetric ultrasonography is safe</b>		
• Strongly disagree	6	1.6
• Disagree	11	3.0
• Not sure	61	16.5
• Agree	93	25.2
• Strongly Agree	198	53.7
<b>Obstetric ultrasonography can lead to congenital anomaly</b>		
• Strongly disagree	266	72.1
• Disagree	43	11.7
• Not sure	40	10.8
• Agree	15	4.1
• Strongly Agree	5	1.4
<b>Views on the cost of obstetric ultrasonography</b>		
• Cheap	53	14.4
• Average	172	46.6
• Costly	144	39.0

**Table 4.** Practice of obstetric ultrasonography scanning and general information.

Variable	N	%
<b>Number of obstetric ultrasonography</b>		
• 1 - 2	32	8.7
• 3 - 5	143	38.8
• >5	194	52.6
<b>Information resources</b>		
• Family and Friends	98	26.6
• Internet	170	46.1
• Media (press, TV, radio)	47	12.7
• Obstetrician	263	71.3
<b>The doctor who performs the scan gave you information about the baby</b>		
• Yes, I was given details, and it was clear for me	288	78.0
• Yes, I was given details, but it was not clear for me	47	12.7
• No, I wasn't given details	34	9.2
<b>Congenital abnormality</b>		
• Lethal anomaly (e.g., anencephaly, renal agenesis)	1	0.3
• Cognitive impairment (e.g., hydrocephaly)	4	1.1
• Renal (non-lethal) anomaly (e.g., missing kidney, enlarged kidney)	11	3.0
• Mobility impairment (e.g., spina bifida)	2	0.5
• Other (e.g., club foot, cleft palate, choroid plexus cysts)	4	1.1
• First-trimester fetal demise	73	19.8

The knowledge score regarding education level, occupation, and monthly income showed a significant difference. The cost, where those with higher education, those who worked, those with higher monthly income, and those who thought that obstetric ultrasonography is costly had the higher knowledge score ( $p = 0.008$ ,  $p = 0.031$ ,  $p = 0.001$ , and  $p = 0.001$ ) respectively.

The knowledge score for both factors nationality and region was no difference (Table 5). In comparing the knowledge score and both gravidity and parity, it showed positive relationship ( $r = 0.157$ ,  $p = 0.003$ ) and ( $r = 0.152$ ,  $p = 0.003$ ). The knowledge score and both age and gestational age had no relationship (Table 6 & Table 7). However, our results showed a significant positive correlation between knowledge score and both gravidity and parity ( $r = 0.157$ ,  $p = 0.003$ ) and ( $r = 0.152$ ,  $p = 0.003$ ), statistically no considerable correlation between knowledge score and both age and gestational age (Table 8).

**Table 5.** The relation between Personal & socio-economic data and knowledge score.

Variable	mean	SD	p-value
Nationality			
• Saudi	12.2779	2.34355	0.461
• Non-Saudi	11.9730	2.71300	
Region			
• North	12.5784	2.15919	0.123
• South	12.2908	2.56776	
• East	12.1864	2.48773	
• West	11.9556	2.02210	
• Center	11.1429	2.30837	
Education level			
• Illiterate	11.6429	2.27384	0.008*
• School education	12.0492	2.41159	
• Graduate	12.0400	2.38249	
• Postgraduate	13.0244	2.21652	
Occupation			
• Working	12.7381	2.31870	0.031*
• Housekeeper	12.1021	2.38372	
Monthly income			
• Less than 5000 SR	11.5132	2.45761	0.001*
• Between 5000 to 10,000 SR	12.1570	2.33303	
• More than 10,000 SR	12.8417	2.26777	
The views of USS cost			
• Cheap	12.1132	2.50891	0.001*
• Average	11.8012	2.27679	
• Costly	12.8264	2.34843	



**Table 6.** The association between Personal & socio-economic data and attitude of safety.

Variable	Attitude 1			p-value
	1.00	2.00	3.00	
<b>Nationality</b>				
• Saudi	14 (82.4%)	60 (98.4%)	258 (88.7%)	0.411
• Non-Saudi	3 (17.6%)	1 (1.6%)	33 (11.3%)	
<b>Region</b>				
• North	4 (23.5%)	17 (27.9%)	81 (27.8%)	0.861
• South	8 (47.1%)	25 (41.0%)	108 (37.1%)	
• East	1 (5.9%)	10 (16.4%)	48 (16.5%)	
• West	3 (17.6%)	5 (8.2%)	37 (12.7%)	
• Center	1 (5.9%)	4 (6.6%)	17 (5.8%)	
<b>Education</b>				
• Illiterate	0 (0.0%)	1 (1.6%)	13 (4.5%)	0.676
• School	7 (41.2%)	19 (31.1%)	96 (33.0%)	
• Graduate	6 (35.3%)	28 (45.9%)	117 (40.2%)	
• Postgraduate	4 (23.5%)	13 (21.3%)	65 (22.3%)	
<b>Occupation</b>				
• Working	3 (17.6%)	15 (24.6%)	66 (22.7%)	0.884
• Housekeeper	14 (82.4%)	46 (75.4%)	225 (77.3%)	
<b>Income</b>				
• Less than 5000 SR	6 (35.3%)	17 (27.9%)	53 (18.2%)	0.372
• Between 5000 to 10000 SR	5 (29.4%)	22 (36.1%)	145 (49.8%)	
• More than 10000 SR	6 (35.3%)	22 (36.1%)	93 (32.0%)	
<b>Pregnant</b>				
• Yes	8 (47.1%)	39 (63.9%)	147 (50.5%)	0.323
• No	9 (52.9%)	22 (36.1%)	144 (49.5%)	

**Table 7.** The association between Personal & socio-economic data and attitude of congenital anomaly causing.

Variable	Attitude1			p-value
	1.00	2.00	3.00	
<b>Nationality</b>				
• Saudi	278 (90.0%)	38 (95.0%)	16 (80.0%)	0.516
• Non-Saudi	31 (10.0%)	2 (5.0%)	4 (20.0%)	
<b>Region</b>				
• North	82 (26.5%)	13 (32.5%)	7 (35.0%)	0.119
• South	115 (37.2%)	17 (42.5%)	9 (45.0%)	
• East	52 (16.8%)	5 (12.5%)	2 (10.0%)	
• West	43 (13.9%)	1 (2.5%)	1 (5.0%)	
• Center	17 (5.5%)	4 (10.0%)	1 (5.0%)	
<b>Education</b>				
• Illiterate	12 (3.9%)	1 (2.5%)	1 (2.5%)	0.975
• School	105 (34.0%)	10 (25.0%)	10 (25.0%)	
• Graduate	124 (40.1%)	16 (40.0%)	16 (40.0%)	
• Postgraduate	68 (22.0%)	13 (32.5%)	13 (32.5%)	
<b>Occupation</b>				
• Working	68 (22.0%)	11 (27.5%)	5 (25.0%)	0.512
• Housekeeper	241 (78.0%)	29 (72.5%)	15 (75.0%)	
<b>Income</b>				
• Less than 5000 SR	63 (20.4%)	9 (22.5%)	4 (20.0%)	0.431
• Between 5000 to 10,000 SR	142 (46.0%)	18 (45.0%)	12 (60.0%)	
• More than 10,000 SR	104 (33.7%)	13 (32.5)	4 (20.0)	

**Table 8.** The correlation between parametric data and knowledge score.

	r	Variable			
		Age	Gestational age	Gravidity	Parity
Knowledge score		0.019	0.081	0.157**	0.152*
	P-value	0.716	0.260	0.003	0.003

## 4. Discussion

The first time to use ultrasound in obstetrics was in 1959 by Ian Donald [6] [7]. Since that day, obstetric ultrasonography became the main part of antenatal care worldwide with advanced health care services [2] [6].

It has been reported that psychological issues have a very grateful effect on physiological well-being [6] [8]. Where, satisfied patients will show more compliance with discharge instructions [9]. Consequently, there is a need to detect the satisfaction of patients after obstetric ultrasonography scans.

In The present study, we evaluate the knowledge of 367 pregnant women about obstetric ultrasonography and the factors associated with insufficient knowledge among them.

The results of this study showed that the majority of women 343 (93.0%) expressed an adequate level of knowledge about obstetric ultrasonography, while less than a (7%) had poor knowledge.

Yadav *et al.* reported that 94.8% had an adequate level of knowledge [2]. While it is higher than a study of Singh *et al.*, in Lucknow, India, reported that only (7.5%) of pregnant women had an adequate level of knowledge [10].

Several studies have reported the different levels of women's knowledge regarding obstetric ultrasonography are difference could be due to the variety of socio-economic factors and geographic areas.

The highest participants' correct responses were regarding that obstetric ultrasonography were useful with knowing the sex of the fetus" (97.6%), "The fetal Heart rate detected by obstetric ultrasonography" (96.7%) and "obstetric ultrasonography confirm the presence of abnormal pregnancy" (90.5%).

While the least identified obstetric sonography knowledge was doesn't help in determining the cerebral palsy" (37.1%), and "obstetric ultrasonography determines the Sex of fetus in the 10th week" (26.8%). Yadav *et al.*, in India, reported that 81.72% of them replied for knowing the growth of the baby and 71.38% for identifying fetal anomalies the most identified knowledge about obstetric sonography.

While the least knowledge was about sex determination of fetus (15.5%) and knew the age of the fetus (37.2%) [2]. And in Wahabi *et al.* study, they reported that 30% know the gender of the baby, 28% check for the baby's growth and if it's alive, and 20% know about congenital abnormalities [3]. in the present study, the lower level of knowledge about details information of obstetrics ultrasonographic may be explained by a lack of communication between physician and patient, short time of physician spent with the patient because had a busy clinic and depended on physician experience.

Regarding the attitude towards obstetric ultrasonography, the majority believed that "obstetric ultrasonography is safe" and doesn't lead to congenital anomaly.

Yadav reported a similar result, 94.8% believed that obstetric ultrasonography is safe [3]. It is primarily due to the ultrasound nature of being noninvasive, with

no radiation, and harmless to the fetus.

Findings of the present study showed that participants' knowledge grades regarding obstetric ultrasonography were significantly better among those with higher education, those who worked, those with higher monthly income and those who thought that obstetric ultrasonography is costly. A similar study done in Hong Kong showed that women with high education levels had higher knowledge scores than women who had a low level of education [11].

According to educational level, occupation, and monthly income, this could be because educational and employed women have more chances to receive information and share experience with others, then decides by visiting ANC earlier than others.

The current study found that knowledge level regarding obstetric ultrasonography was significantly higher among women with multiparous. This result may be explained by the fact that the experience of previous pregnancy plays a significant rule to increase the knowledge, and our health care providers also participate in improving the per cent among multiparous women through their routine follow up during pregnancy [11].

## 5. Conclusion

We found the importance of receiving the correct education messages from their proper sources. Essential health education to pregnant women through antenatal care is necessary as a useful tool to decrease maternal and perinatal morbidity and mortality. Therefore, every consultation at a health care facility should be used optimally so that pregnant women get the maximum benefits from the health care providers. Knowledge related to "obstetric ultrasonography" must be repeated at every visit. The comprehensive counselling and transferring so much information in an efficient way during ANC are essential.

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## What Is Already Know on This Topic

- The first time to use ultrasound in obstetrics was in 1959.
- Obstetric ultrasonography became the main part of antenatal care worldwide.

## What This Study Adds

- To assess the knowledge, attitudes and practice about obstetric ultrasonography.
- In Saudi women.

## Authors' Contributions

(A group of medical student under my supervision) designed the study protocol and, data collection and entry, (N.B, F.H, R.A wrote the draft the manuscript) (F.M, S.A, L.A, and H.A. did interpretation of data and the analysis) and I critically revised the manuscript.

## Conflicts of Interest

The authors declare having no conflict of interest related to this work.

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