

Original Article

Pregnant Women's Knowledge and Expectations about Prenatal Ultrasound: A Cross-Sectional Study

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Abstract

Background

Ultrasound imaging has been shown to improve maternal health outcomes through timely diagnosis of pregnancy problems. Despite ultrasound being vital for women's management in pregnancy, studies have reported low awareness among African women

Objective

To evaluate the knowledge and expectations of pregnant women in Harare about prenatal ultrasound.

Methods

A cross-sectional survey of 385 pregnant women was done at the ultrasound department of a private maternity hospital in Harare, Zimbabwe. Statistical Package for Social Sciences (SPSS) 27.0 and Windows Excel were used to analyse the data.

Results

The majority of women (85.4%) concurred that ultrasound scans are important during pregnancy, but most (79.3%) were not aware that congenital abnormalities can be detected through ultrasound. Despite low overall knowledge of congenital abnormalities, 80.2% of women were familiar with Down's syndrome, and this knowledge tended to increase with higher education levels, although not statistically significant (linear-by-linear association = 0.057). The primary expectation of ultrasound scans among pregnant women was to confirm the expected delivery date, and gender determination, with the least expectation being a diagnosis of congenital abnormalities.

Conclusion

Knowledge levels were lower in our setting relative to other similar studies, and hence this underscores the need for further public education.

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Keywords: Congenital abnormalities, 3D/4D obstetric ultrasound, Awareness, Downs Syndrome

Introduction

According to the World Health Organisation (WHO), almost 800 women died every day in 2020 due to preventable causes related to pregnancy and childbirth, with nearly 95% of these mostly avoidable deaths occurring in low and middle-income countries.[1] Ultrasound imaging has been shown to improve maternal health outcomes through timely diagnosis of pregnancy complications.[2] However, while the use of ultrasound in prenatal diagnosis has increased, many women still lack awareness about its applications and limitations.[3] Unlike other imaging methods, medical ultrasound does not use ionizing radiation, making it a widely accepted and safe method for evaluating pregnancies.[4] By enabling early detection of pregnancy issues, ultrasound imaging can significantly improve maternal health outcomes.[5] Nevertheless, it is important to note that ultrasound does not capture everything, highlighting the need to educate pregnant women and manage their expectations.[6]

In addition to its medical advantages, prenatal ultrasound also has psychological effects. Research conducted in developed countries has shown that ultrasound provides reassurance to expectant mothers, encourages healthy behaviours during pregnancy, allows for gender determination, and promotes maternal bonding.[4,7–9] Prenatal ultrasound can also be employed as a tool to reduce anxiety in expectant mothers.[10] Indeed, prenatal ultrasound has become a social experience and an expectation in our current society in both developed and developing nations.[11] The advent of 3D/4D ultrasound in obstetrics has made the experience of operators and patients even better. The negative side of prenatal ultrasound use is when there are major congenital abnormalities or other unexpected findings that may aggravate emotions.[12]

However, due to the perceived safety of ultrasound, there could be abuse by unscrupulous healthcare professionals

for financial gain. A study on the utilization of ultrasound in a peri-urban health centre in Uganda reported that more than half of the scans were categorized as inappropriate.[13]

Despite numerous educational campaigns, many pregnant women have been shown to have inadequate or lack information about the diagnostic capabilities of ultrasound.[14] Most pregnant women in developing countries complained that they had received insufficient information about prenatal ultrasound scans. Inadequate or lack of information can lead to anxiety and negative experiences in many pregnant women. It has been shown that women's satisfaction and their ability to cope with anxiety during pregnancy improved greatly with the amount of information they received before and during the scan.[4] Additionally, inadequate information leaves pregnant women vulnerable to dishonest healthcare professionals, especially in the self-referral population. In an attempt to increase awareness, WHO recommends that before performing the ultrasound examination, the healthcare provider should inform the woman on the potential risks and benefits of the scan.[15] Furthermore, the dissemination of information about prenatal ultrasound may motivate pregnant women to access this service earlier, leading to better pregnancy outcomes.[16]

Unfortunately, anecdotal evidence shows that Zimbabwean women present late for prenatal ultrasound screening. Moreover, it has been reported that some women still use Traditional Birth Attendants (TBA) and mission homes, with a few of them going for prenatal scanning as part of their pregnancy assessment.[11] This calls into question the knowledge of the importance of ultrasound. Despite ultrasound being vital for management of pregnancy, studies have reported low awareness amongst African women.[17,18] While studies examining the knowledge and expectations of pregnant women regarding the use of ultrasound during pregnancy have been conducted in different settings,[4,9,11,19,20] there has not been much work done in this respect in Zimbabwe.

The findings from other studies cannot be generalised to the Zimbabwean population due to significant sociodemographic differences. Indeed, limited knowledge of the uses and benefits of prenatal ultrasound can lead to both abuse and underutilization of this imaging modality by pregnant women. In addition, some dishonest healthcare professionals may take advantage of pregnant women for their own monetary gain. Therefore, this study aimed to evaluate the knowledge and expectations of pregnant women in Harare about prenatal ultrasound. To increase satisfaction associated with ultrasound examinations, healthcare professionals must be more aware of patient knowledge levels as well as expectations among pregnant patients. The findings from this study have the potential to enhance the use of prenatal ultrasound by pregnant women, leading to better antenatal care in Zimbabwe. Additionally, these results could inspire further research in the same field globally.

Methods

Study design and setting

A cross-sectional survey of pregnant women was conducted between April 5 and 26 June 2022. Similar studies in the literature have employed this design.[11,21] Data collection was carried out at the ultrasound department of a private maternity hospital in Harare, Zimbabwe.

Study population and sampling

Approximately 600 obstetric scans are carried out per month in this department. The population of the study consisted of all the women who came for an obstetric ultrasound scan at the chosen centre during the duration of the study. Participants were selected by consecutive sampling, that is, all the pregnant women who met the eligibility criteria and agreed to take part were recruited successively. The inclusion criteria were consent to participate in the study and an age of 18 years or older. The exclusion criteria were emergency conditions, having too much pain or discomfort to complete

the questionnaire, and refusal to take part in the study. A single population proportion formula was used to determine the sample size:

$$n = (z (\alpha/2))^2 p(1-p)/d^2$$

taking 0.05 margin of error at a 95% confidence level.[21]

Data collection instrument and procedure

The instrument for data collection was a self-administered, semi-structured questionnaire consisting of closed-ended questions. This instrument was adapted from previous studies in the literature and had a total of 14 questions. [4] Pilot testing of the instrument was done on 20 pregnant women (5% of the participants). Section A solicited the socio-demographic information of the participants (age, level of education, employment status, and religion). Section B assessed the ultrasound knowledge levels of the participants using questions with responses “yes”, “no” or “do not know”. Lastly, Section C evaluated the expectations of women when they go for an ultrasound scan. Pregnant women waiting for ultrasound scans were asked to participate in a study. The participants were provided with information sheets and questionnaires and were then asked to fill out the questionnaires. However, illiterate participants were guided through the questions and their responses were recorded appropriately.

Data analysis

The data obtained was analysed descriptively and inferentially using statistical instruments, including frequency tables, pie charts, and chi-square test for a contingency table with ordered categories (linear-by-linear association). IBM SPSS Statistics for Windows version 27.0 (IBM Corp, Armonk, NY, USA) and Windows Excel (2016) were used to analyse the data. Demographic data was analysed using means and standard deviations for continuous, normal variables. Normality assumptions of continuous demographic variables were checked using histograms and Shapiro-Wilk test for normality. For variables violating the normality assumption,

medians and interquartile ranges were reported. Categorical demographic variables were reported using frequencies and percentages. Other variables were analysed using frequencies and percentages. Bar graphs and pie charts were used to present data.

Ethical considerations

Participants provided informed consent, allowing withdrawal at any time. The study protected patient confidentiality and respected human dignity, anonymity, and knowledge rights, with ethical approval from the Harare Institute of Technology Ethics Committee (SAHS/DR00058/22).

Results

Demographics

A total of 392 pregnant women took part in the survey. The mean (SD) age was 27.8 (5.7) years, and most of the respondents (62.9%) had attained a secondary-level education. Most of the respondents (57.9%) were not employed at the time of the survey. Concerning religious affiliation, the majority of the respondents were Christians (90.5%). Table 1 gives a summary of the demographic characteristics.

Table 1. Demographic characteristics

Variable	N (%)
Age (mean, SD)	27.8 (5.7)
Level of education	
None	6 (1.6)
Primary	10 (2.7)
Secondary	232 (62.9)
Tertiary	121 (32.8)
Employment status	
Formally employed	90 (25.8)
Informally employed	57 (16.3)
Unemployed	202 (57.9)
Religion	
Christianity	344 (90.5)
Traditionalism	27 (7.1)
Islam	5 (1.3)
Other	1 (0.3)
None	2 (0.5)

A considerable proportion of women (32%) reported having been pregnant once at the time of the survey, while only 22% of the women were pregnant for the first time when the survey was conducted. Figure 1 summarises the number of previous pregnancies among the participants.

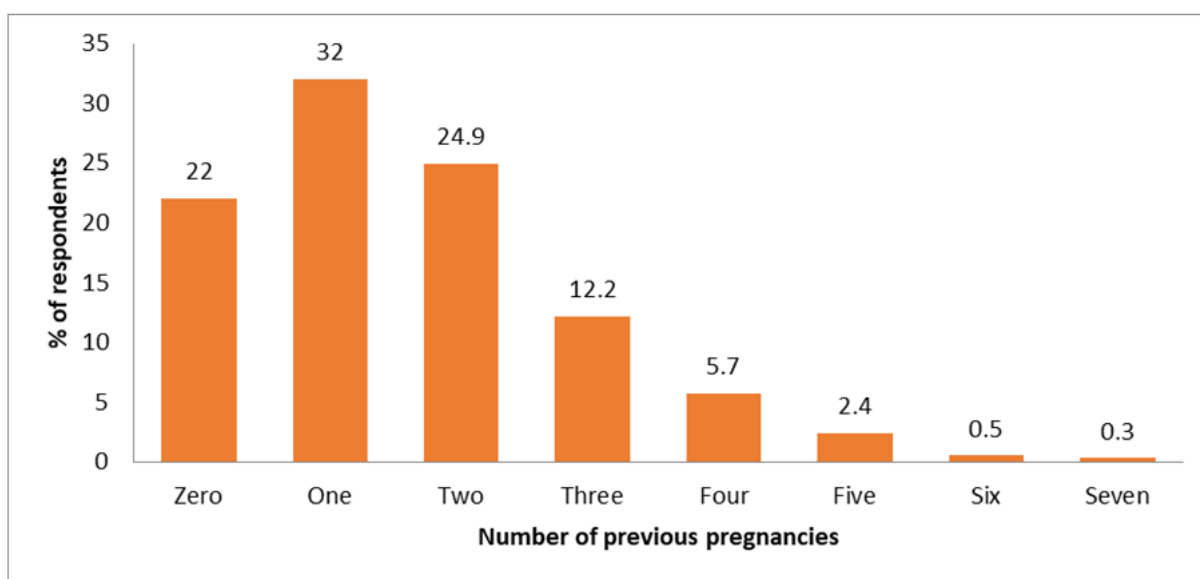


Figure 1. Number of previous pregnancies

Table 2. Knowledge of pregnant women

Variable	N (%)
US is necessary in pregnancy	
Yes	304 (85.4)
No	14 (3.9)
Don't know	38 (10.7)
Frequency of US in pregnancy	
Once	56 (16.4)
Twice	92 (26.9)
Three or more	103 (30.1)
Don't know	91 (26.6)
Knowledge of congenital abnormalities	
No	71 (20.7)
Yes	272 (79.3)
Knowledge of Down's syndrome	
Yes	288 (80.2)
No	71 (19.8)
3D/4D scan should be used in pregnancy	
Yes	75 (25.2)
No	28 (9.4)
Don't know	195 (65.4)

Knowledge levels

The majority of women (85.4%) agreed that an ultrasound scan is important in pregnancy, while 3.9% disagreed and 10.7% were unsure. With regard to the frequency of ultrasound scans per pregnancy, 30.1% of the respondents reported that it should be done at least three times during the pregnancy. Knowledge of congenital abnormalities was low among the respondents, with only 20.7% of them reporting that they knew what congenital abnormalities were. Most of the respondents (79.3%) were not aware of congenital abnormalities. However, despite a low knowledge level on congenital abnormalities, most women (80.2%) knew about Down's syndrome, and this knowledge increased with increasing education level, even though the linear trend was not statistically significant (linear-by-linear association = 0.05711) as shown in Table 3. Current trends in obstetric ultrasound (3D/4D) were not common among the participants, with only 25% of the women interviewed reporting that 3D/4D ultrasound scans should be used in pregnancy.

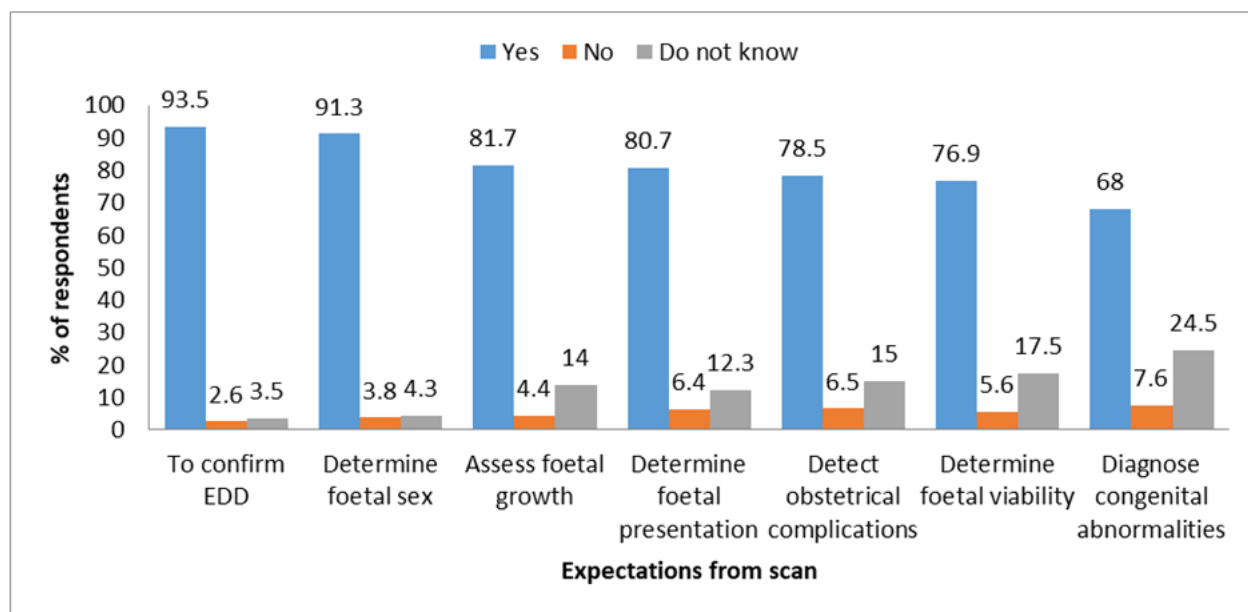
Table 3. Women's Knowledge of Down's Syndrome

Education level	Down's syndrome knowledge (Yes) n (%)	Down's syndrome knowledge (No) n (%)
None	3 (0.87)	2 (0.58)
Primary	4 (1.17)	3 (0.87)
Secondary	169 (49.28)	47 (13.70)
Tertiary	100 (29.15)	15 (4.38)
Total	276	67

Chi-square = 7.52, df = 3, linear -by- linear association P = 0.057

Expectations

Overall, the majority of pregnant women (93.5%) expected an ultrasound scan to confirm the expected date of delivery (expected due date – EDD). The second expectation of ultrasound was to determine the gender of the foetus (91.3%). Only 68% expected ultrasound to diagnose congenital abnormalities. Other expectations were to assess foetal growth (81.7%), determine foetal presentation (80.7%), detect obstetric complications (78.5%), and determine foetal viability (76.5%). This is summarised in Figure 2.



Abbreviation: EDD, Estimated due date

Figure 2. Expectations of pregnant women

Discussion

Despite ultrasound being vital for women's management of pregnancy, studies have reported low awareness amongst African women.[17,18] This study, therefore, aimed to evaluate the knowledge and expectations of pregnant women in Harare about prenatal ultrasound as well as their level of awareness of its purpose, limitations, and safety. While most women in this study concurred that an ultrasound scan is important in pregnancy, the majority of the respondents were not aware of its use in the detection of congenital abnormalities.

The late average debut gestational age in our setting put into question the knowledge levels on the importance of early prenatal ultrasound screening. Knowledge about the importance and proper timing of an ultrasound scan can help improve maternal health outcomes. In this study, most women (85.4%) agreed that an ultrasound scan was important in pregnancy compared to 97% in a study done in Nigeria [19] and 93.5 % in work done in Pakistan.[9] Apparently, the knowledge levels in our setting were a little lower compared to what the other studies found. However, in all three studies, the women believed that ultrasound should be performed at least twice during pregnancy.

The high level of knowledge can be attributed to the readily available information from online media, family and the government's efforts in health education. Three-dimensional/four-dimensional (3D/4D) ultrasound has been shown to augment diagnosis in obstetrics.[22] Despite the advantages, in this study, most of the women (65.4%) professed ignorance about its existence. The importance of 3D/4D ultrasound is well understood by ultrasound diagnosticians [23] hence the need to educate the public.

Despite the fact that most women have basic information about ultrasound, the kind of knowledge they have varies mainly due to their level of education. A study done in Iran, shows the importance of maternal age and level of education as key factors in the knowledge of prenatal ultrasound. Women of a higher age and education level knew more about the nature of and reasons for a prenatal ultrasound. [18] They were less anxious about the harmful effects of prenatal ultrasound on their fetuses. The main concern of these women was the health of the baby. On the other hand, women with lower age and education were more concerned about the harmful effects of ultrasound, especially causing jaundice. [20]

In our settings , knowledge also improved with increasing educational levels, even though the linear trend was not statistically significant.

Congenital abnormalities are an important but under-recognized cause of mortality and disability among infants and children under five years of age. The expectation of congenital abnormalities is low probably due to their low prevalence in a normal population. A study done in Ogbomoso, Nigeria reports a prevalence rate of 6.3%, [24] which agrees with the figures quoted by WHO.[25] In work done in Ghana, only 46.3% of participants had knowledge of the risk factors of congenital abnormalities while 48.1% believed that were of supernatural origin.[26] Nonetheless, a study done in Iran revealed that the overall knowledge of pregnant women about congenital abnormalities showed a significant relationship between age and the level of education.[27] This study also showed that women lacked knowledge of congenital abnormalities like the other studies above. Only 20.7% of the respondents knew of congenital abnormalities.

Insufficient or lack of information can lead to anxiety in expectations and create negative experiences in many pregnant women. Women's satisfaction and their ability to cope with anxiety during pregnancy improve greatly with the amount of information received before and during the scanning. [1] The commonest expectation from the prenatal ultrasound scan was to confirm the expected date of delivery. In contrast to work done in Ibadan [11] the commonest expectation in their setting was to check foetal viability. The desire to know the baby's gender was the second most common expectation in both in the study in Ibadan. [11] The least expectation in our setting was the detection of congenital abnormalities while in Ibadan, it was determination of foetal presentation.[11] Encouragingly, 80.2% knew about Down's syndrome in this study; which shows that there was a good public awareness campaign on the condition.

Conclusion

This study showed that most women have some understanding of the importance of prenatal ultrasound. There is, however, a paucity of knowledge with regard to congenital abnormalities and the importance of newer trends like 3D/4D ultrasound. Furthermore, the knowledge levels were lower in our setting relative to other studies, and this underscores the need for more public education. This can be done by sufficient counselling alongside patient information leaflets at the time of the antenatal booking appointment. Sonographers and antenatal nurses in polyclinics can help disseminate the information as per WHO recommendations. Due to the unique sample available for the study, the results may not be generalizable beyond the specific population from which they were drawn. Nevertheless, the study shed some light on the women's' level of knowledge and expectations about prenatal ultrasound that can be used to design intervention strategies and plan a larger study.

Authors' contribution

BC designed the study, collected, analysed, interpreted the data, and wrote the manuscript. LM supervised the study and contributed to data analysis and manuscript writing. All authors have read and approved the manuscript for publication

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Conflicting interests

All authors approved this manuscript in its form, and no conflicting interest exists.

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