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Original Article

Knowledge and Beliefs of Pregnant Women on Antenatal Ultrasound at Limbe and Buea Regional Hospitals: A Cross-Sectional Study

Connaissances et Croyances des Femmes Enceintes sur l'Échographie Prénatale dans les Hôpitaux Régionaux de Limbé et Buea : une Étude Transversale

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Mots-clés : Connaissances, Croyances, Femmes enceintes, Échographie obstétricale, Hôpital Régional de Limbe, Hôpital Régional de Buea.

RÉSUMÉ

Background. Obstetric ultrasound is the use of high-frequency sound waves to produce images of a developing embryo or foetus. It is non-invasive, harmless and contributes to reduce maternal and perinatal mortality. Mother's considerations are thought to influence their response toward obstetric ultrasonography, especially in low-income countries. The aim of this study was to assess pregnant women's knowledge and beliefs toward obstetric ultrasound in Limbe and Buea Regional Hospitals. **Methods.** A hospital-based cross-sectional study was conducted. Consecutive sampling was used to select pregnant women attending antenatal consultation from February to April 2023, using a questionnaire to collect data related to sociodemographic characteristics and maternal history, knowledge and beliefs towards antenatal ultrasound during a face-to-face interview. Data were entered into an Excel spreadsheet and analysed using Statistical Package for the Social Sciences version 25.0 for Windows. A p-value less than 0.05% was considered statistically significant. **Results.** A total of 391 pregnant women were included in the study. The mean age of participants was 28.59±4.5 years. About 74.4% (291) of participants were aged between 21 and 30 years. For 83.6% (327) of participants, health personnel were the main source of information regarding obstetric ultrasound. About half of the participants (54.2% & 52.9%) had adequate knowledge and good beliefs about antenatal ultrasound. **Conclusion.** Pregnant women in our setting have good general knowledge on obstetric ultrasound and the majority believe that obstetric ultrasound is safe. The main source of information of pregnant women regarding obstetric ultrasound is health personnel.

ABSTRACT

Introduction. L'échographie obstétricale est utilisée pour le suivie du développement intra-uterin de l'embryon ou du fœtus. Elle est non invasive, inoffensive et contribue à réduire la mortalité maternelle et périnatale. Les connaissances et considérations de la femme enceinte pourraient influencer son adhérence à l'échographie obstétricale. Le but de cette étude était d'évaluer les connaissances et les croyances des femmes enceintes à l'égard de l'échographie obstétricale dans les hôpitaux régionaux de Limbe et de Buea. **Méthodes.** Une étude transversale descriptive a été menée en milieu hospitalier auprès de femmes enceintes du 5 février au 30 avril 2023. Un questionnaire structuré a permis de recueillir des données relatives aux caractéristiques sociodémographiques et antécédents maternels, aux connaissances et croyances vis-à-vis de l'échographie prénatale. Les données ont été saisies dans un tableur Excel et analysées à l'aide du package statistique pour les sciences sociales version 25.0 pour Windows. **Résultats.** 391 femmes enceintes ont participé à l'étude. L'âge moyen était de 28.59±4.5 ans. 74.4% des participants (291) étaient dans la tranche 21-30 ans. Notre étude a montré que pour la plupart des participants soit 83.6%, le personnel de santé était la principale source d'information sur l'échographie obstétricale. La moitié (54.2% & 52.9%) des participants avaient des connaissances et des croyances adéquates sur l'échographie prénatale. **Conclusion**. Les femmes enceintes ont de bonnes connaissances sur l'échographie obstétricale et la majorité pense que l'échographie obstétricale est sans danger. La principale source d'information des femmes enceintes est le personnel de santé.

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HIGHLIGHTS

What is already known on this topic
Antenatal ultrasound is important for reduction of maternal and perinatal mortality. Mothers knowledge and beliefs can influence their attitude towards antenatal ultrasound.

What question this study addressed
Assessment of pregnant women's knowledge and beliefs toward obstetric ultrasound in Limbe and Buea Regional Hospitals.

What this study adds to our knowledge
- The main source of information for pregnant women about obstetrical ultrasound is health personnel.
- More than half had good knowledge and beliefs towards antenatal ultrasound.

How this is relevant to practice, policy or further research.
The communication strategy in antenatal care should be reinforce for a better comprehension of obstetrical ultrasound role in pregnancy follow-up and thus improve pregnant women adherence.

INTRODUCTION

Obstetric ultrasound is an indispensable part of modern antenatal care in both high and low-income countries[1]. It is safe, available, portable, non-invasive, does not make use of ionizing radiations, and is a real-time imaging modality which is essential in obstetrics[2]. World Health Organization (WHO) recommends that all pregnant women have one ultrasound scan before 24 weeks of pregnancy to estimate gestational age, assess placenta position, determine single or multiple pregnancies, increase foetal abnormality detection, in order to improve pregnancy outcomes[3,4].

The impact of obstetric ultrasound tends to be underestimated in Sub-Saharan Africa and in Cameroon. The society, the culture and the quality of life of pregnant women affect and influence their awareness, opinion and expectations towards antenatal ultrasound scan[5]. Sub-Saharan Africa has one of the highest levels of perinatal mortality globally, estimated at 34.7 per 1000 births[6]. Intrauterine growth retardation is a major cause of perinatal mortality and morbidity, and ultrasound may be useful in identifying expectant mothers who are at early risk.[7]

In 2008 Ugwu et al reported in Nigeria, that only 46% women asked for ultrasonography without a prescription, while 36% visited their doctors for ultrasonography and only 2.7% believed that an infection could occur during pregnancy ultrasound[8]. For Oche et al, nearly one-third of pregnant women (31.3%) believed that too many ultrasonography procedures were harmful to the baby, while 13.8% believed it could lead to cancer[9]. In Cameroon, a study conducted by Tambe et al in 2013 revealed that 16.8% of pregnant women declared they had never done an ultrasound scan while 58.4% stated that they had not received any information on what ultrasonography is all about[10].

There is a clear problem of adherence to obstetric ultrasound. Pregnant women probably lack information about antenatal ultrasound, underestimate its importance and probably have some misconceptions about its practice. Socio-economic status and education have been shown to have an impact on women's perception towards obstetric ultrasound [11]. Literature on pregnant women's knowledge and beliefs on antenatal ultrasound remains scarce in Cameroon especially in the South-West Region[12]. This study aimed at providing data about the knowledge and beliefs of pregnant women on antenatal ultrasound and help define strategies or interventions to increase women acceptability and compliance to obstetric ultrasound.

METHODS

Study area, design and period
This was a hospital-based cross-sectional study conducted in Buea and Limbe Regional Hospitals. Data were collected from 1st February to 30th April 2023 using a pre-structured and pre-tested questionnaire.

Study population, inclusion and exclusion criteria
The study was targeting pregnant women attending antenatal care and/or ultrasound unit, aged 21 years and above, and who accepted to participate and signed a consent form. Each participant was allowed to participate only once. Pregnant women with emergency conditions were excluded.

Sample size and sample technique
A minimum number of 372 participants was required. This was calculated using COCHRAN formula as follow $n=Z^2p(1-p)/d^2$, taking 0.05 margin of error at 95% confidence level. Prevalence of pregnant women attending ANC in 2018 according to Cameroon Demographic and Health Survey[13] was used. The sampling method was consecutive.

Ethical clearance
Ethical clearance number 2023/1993-02/UB/SG/IRB/FHS was obtained from the institutional review board of the Faculty of Health Sciences (FHS) of the University of Buea. Then administrative approval was obtained from the South-West Regional Delegation of Public Health and the directors of the two hospitals. Prior to data collection, written informed consent was obtained from each study participant.

Data collection
The data were collected by the main investigator through an interviewer-administered pre-structured and pre-tested questionnaire. The questionnaire was written in English but was translated by the interviewer in the local languages, for participants who do not understand English. Participants were mostly met before obstetric ultrasound, at the waiting room for antenatal care. After consent, the following data were collected: socio-demographic data, obstetrical and maternal data, knowledge and beliefs towards obstetric ultrasound helped by twenty knowledge and beliefs determining statements. All patient's informations were coded to ensure confidentiality.

Study variables
Independent variables were socio-demographic data such as age, occupation, marital status, education level,

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religion, residence and; obstetrical and maternal data such as gestational age, gravidity, parity and obstetric relevant history, number of antenatal care, time of initiation of antenatal care.

Dependant variables were knowledge and beliefs of pregnant women towards obstetrics ultrasound.

Knowledge in this study is defined as the information and understanding of pregnant women about antenatal ultrasound gained through education or experience. It was accessed by calculating the mean score of the 15 items. Each correctly answered question gave a score of 1 and each wrongly answered a score of 0 for a maximum total of 15. A similar method was used by Molla et al in 2021 in Ethiopia[14]. The result was categorized as knowledgeable, if participant scored equal to or more than the mean score of the correctly answered questions; and not knowledgeable if participant scored less than the mean score of the correctly answered questions.

Belief is defined as a conviction of the truth of a proposition without its verification. It is a subjective mental interpretation derived from perceptions, contemplation, or communication. Except the question on the cost of obstetric ultrasound, the remaining question was graded from 1 to 5 according to how close are the response to the correct answer to the questions. Each participant's score ranged from 4 to 20. Participants with a score below the mean score were considered to have poor beliefs.

Data Management and analysis

The collected data were entered into Epi-info version 7, then transferred to Microsoft EXCEL 2016 and analysed with Statistical Package for the Social Sciences version 25. Descriptive statistics such as mean, median, frequency, and percentage were used. Binary logistic regression analysis helped us to identify candidate variables for multivariable logistic regression. And variables with a p-value less than 0.25 was regressed to multivariable logistic regression analysis. Multivariable analysis was used to identify an independent determinant factor among explanatory variables. The confidence interval is 95%, and a p-value <0.05 is considered significant.

RESULTS

Socio demographic and obstetrical characteristics of respondents

A total of 391 questionnaires were distributed to pregnant women with a response rate of 100%. Age of participants ranged from 21 to 42, with mean age 28.59±4.5 years. About 164 respondents (41.9%) were from the age group 26-30 and close to three quarters (74,4%) aged between 21 and 30 as showed in Table 1.

Half of the participants that is 220 (56.2%) were primigravida and gravida 2. The average time of initiation of ANC was at 17.5±7.0 weeks of gestation age. Participants were usually in the 3rd trimester. The obstetrics and maternal characteristics are detailed in Table 2.

Table 1: Sociodemographic distribution

Variable	Category	Frequency	Percentage (%)
Age group	21-25	127	32.5
	26-30	164	41.9
	31-35	75	19.2
	36-42	25	6.4
OCCUPATION	Business	166	42.5
	Civil servant	50	12.8
	Housewife	85	21.7
	Other	39	10.0
	Student	51	13.0
MARITAL STATUS	Married	276	70.6
	Single	115	29.4
EDUCATIONAL LEVEL	No formal education	7	1.8
	Primary	33	8.4
	Secondary	113	28.9
	University	238	60.9
RELIGION	Animist	4	1.0
	Christian	379	96.9
	Muslim	8	2.0
	Others	0	0
TOWN OF RESIDENCE	Buea	275	70.3
	Limbe	107	27.4
	Others	9	2.3

Table 2 : Obstetric data

Variable	Category	Frequency	Percentage (%)
Gestational age	1st trimester	17	4.3
	2nd trimester	140	35.8
	3rd trimester	234	59.8
Gravidity	1	121	30.9
	2	99	25.3
	3	78	19.9
	4	53	13.6
	>=5	40	10.2
Parity	>=3	64	16.4
	0	140	35.8
	1	104	26.6
	2	83	21.2

Sources of information

Most participants (327/391) reported health personnel as the main source of information, followed by school (18/391), and television and radio (8/391).

Table 3: Source of information

Category	Frequency	Percentage (%)
Family and friends	26	6.6
Health personnel	**327**	**83.6**
Internet and social media	8	2
School	18	4.6
Television and radio	12	3.0

Level of Knowledge

The most reported component of knowledge on prenatal ultrasound by participants was that it permits to confirm the pregnancy, with about 380 (97.2%) participants; permits to know the gender of the foetus was the second most reported important feature of ultrasound, it was mentioned by 365 (93.4%) of respondents. Reduced maternal morbidity and perinatal mortality was the least reported component of knowledge regarding obstetric ultrasound, with only 201 (51.4%) mentions (as seen in Table 4).

The individual score of knowledge about ultrasound ranged from 1 to 15, with a mean (SD) estimated at 12.06± 2.57. About half (54.2%) of the participants had adequate knowledge about ultrasound, which constituted 212 out of the 391 pregnant women that were recruited in the study.

The individual score of beliefs about obstetric ultrasound ranged from 5 to 20, with a mean (SD) estimated at 11.54±2.11. About half (52.9%) of the participants had good beliefs about ultrasound, which constituted 207 out of 391.

Table 4: Knowledge regarding obstetric ultrasound

Variable	Category	Frequency	Percentage (%)
Permits to confirm the pregnancy	NO	11	2.8
	YES	380	97.2
Helps in determining the foetal, cord and placenta position	NO	34	8.7
	YES	357	91.3
Easier the calculation of the expected date of delivery	NO	30	7.7
	YES	361	92.3
Permits to know the Sex of the foetus	NO	26	6.6
	YES	365	93.4
Determines the Sex of foetus in the 10th weeks	YES	162	41.4
	NO	229	58.6
Use to detect any defect or congenital abnormalities during pregnancy	NO	65	16.6
	YES	326	83.4
The monitoring of pregnancy complication is one of the practices of the USS	NO	77	19.7
	YES	314	80.3
Helps in determining the foetal, cord and placenta position	NO	88	22.5
	YES	303	77.5
Reduced maternal morbidity and perinatal mortality	NO	190	48.6
	YES	201	51.4
The foetal Heart rate detected by obstetric ultrasonography	NO	32	8.2
	YES	359	91.8
Determines the foetal heart rate in the 6th weeks	NO	104	26.6
	YES	287	73.4
Predicts the way of delivery (normal? C-section?)	NO	76	19.4
	YES	315	80.6
Confirms the presence of abnormal pregnancy (multiple, ectopic and molar)	NO	32	8.2
	YES	359	91.8
Gives accurate information about foetal weight	NO	78	19.9
	YES	313	80.1
Contributes to the prediction of miscarriage during pregnancy.	NO	145	37.1
	YES	246	62.9

Beliefs of pregnant women

More than three quarters of participants agreed that obstetric ultrasound is safe (77,5%) (303/391), While 54.9% (215/391) disagreed that it can cause congenital malformations. The majority of participants think the cost of an obstetric ultrasound is average.

Table 5: Beliefs

Variable	Category	Frequency	Percentage (%)
Obstetric ultrasonography is safe	Strongly disagree	20	5.1
	Disagree	13	3.3
	Not sure	55	14.1
	Agree	211	54.0
	Strongly Agree	92	23.5
Obstetric ultrasonography can lead to congenital anomaly	Strongly disagree	60	15.3
	Disagree	155	39.6
	Not sure	143	36.6
	Agree	20	5.1
	Strongly Agree	13	3.3
Obstetric ultrasonography can give cancer	Strongly disagree	73	18.7
	Disagree	147	37.6
	Not sure	145	37.1
	Agree	18	4.6
	Strongly Agree	8	2.0
Views on the cost of obstetric ultrasonography	AVERAGE	272	69.6
	CHEAP	12	3.1
	COSTLY	107	27.4
Obstetric ultrasound can treat some conditions	Strongly disagree	35	9.0
	Disagree	128	32.7
	Not sure	88	22.5
	Agree	116	29.7
	Strongly Agree	24	6.1

DISCUSSION

The mean age of participants in our study was 28.59±4.5 years with about (291) 74.4% aged between 21 to 30. This contrast with the study conducted by Abduljabbar et al in Kingdom of Saudi Arabia where the mean age was 33.4 ± 7.9 and 51.5% of participants were from group age 26-35[15]. Our results agree with those of Kasap et al in Turkey with a mean age of 28.6±4.9 and Tambe et al in Yaounde with a mean age of 27.9±6.1[4,10]. They are also similar to the results of Maniragena et al in Uganda and Saleh et al in Nigeria where most participants were within the age group 21–30 years at 63.5% and 63.7% respectively[16,17].This is a common observation, particularly in developing countries like Cameroun where women are more likely to marry and have their first child young, typically in their early twenties.

In this study, about 238 (60.9%) participants attended university level of education which contrasts with the work of Maniragena et al where only 26.7% of participants had a tertiary level of education[16].For Saleh et al at Kano, most of the participants (58.5%) attended tertiary education[17].This can be explained by the fact that as for Saleh and al's study, this study was carried out in an urban area.

Most participants reported health personnel as the main source of information 327(83.6%), followed by school 18(4.6%). Also, the level of knowledge regarding the use

of ultrasound during pregnancy was generally good among the participants (54.2%). These findings are similar to those found in literature[9,16,17]. Actually, at Limbe and Buea Regional Hospitals, pregnant women attend and participate to health discussions focusing on pregnancy on each antenatal care day. They eventually have the chance to ask questions for further clarification on their specific concerns. In another hand, Buea and Limbe have a high educational standard related to the number of high schools and state and private university institutes. So the good level of education has an impact on the ability of pregnant women to reason and understand informations they are given when interacting with health personnel. This might explain also why schools are the 2nd most common source of information.

Our results contrast with those of Molla et al. where only 35.3% of respondents had good knowledge on obstetrical ultrasound[14]. However, they discovered that relatives were the main sources of information which could account for the lower level of knowledge compared to our findings. In fact, information from relatives are likely to be speculative, subjective and with minimal scientific basis.

As reported in other studies [9,16], majority of participants noted the value of ultrasound in antenatal care, citing its use to confirm the pregnancy, assess fetus well-being, determine the age of pregnancy and sex of the baby, estimate the date of delivery and identify abnormal pregnancy. This is possibly due to the wide use of ultrasound and because the majority of people got their information from the hospital where ultrasound is frequently requested as part of routine ANC. However, Tambe et al in 2013, reported in a Central Africa population that majority of respondent expectations were assurance of the wellbeing of the fetus (58%), gender determination (44.5%) and information on fetal position (20.5%); only 46,5% of respondents considered obstetric ultrasound safe for them and the unborn baby [10]. These results were not consistent with our findings, likely because in their study, 58.4% of participants reported that they have never received information on antenatal ultrasound. The majority of participants in our study (77,5%) agreed obstetric ultrasound is safe and disagreed it can cause congenital malformations (54.9%). This is demonstrating that limited health literacy can prevent proper understanding of health messages and recommendations. Thus, it is essential that health workers employ effective methods for transferring information to pregnant women[18].

CONCLUSION

In this study, health personnel are the main source of information regarding obstetric ultrasound for pregnant women. They have a good general level of knowledge on obstetric ultrasound which reflect continuous interaction with health care provided during antenatal visits. Finally, a high level of education is consistent with a good health literacy, thus compliance to ANC and to obstetric ultrasound which are very important in perinatal and maternal mortality prevention.

Authors contribution

Conflict of interest

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

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