International Journal of Community Medicine and Public Health
Wihioka JT et al. Int J Community Med Public Health. 2026 Jul;13(7):3424-3429
https://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20262234

Original Research Article

Knowledge, attitude and competency of basic obstetric imaging services among health workers in primary healthcare facilities in Rivers State

Joy Tonye Wihioka[1], Siyeofori Belema Dede[2], Pearl Iyaye Daibi Abereton[3,4]*, Ishmael Daniel Jaja[5], Adaeze Chidinma Oreh[6]

[1]Department of Community Health Services, Rivers State Primary Health Care Management Board (RSPHCMB), Port Harcourt, Rivers State, Nigeria
[2]Department of Health Planning, Research and Statistics, RSPHCMB, Port Harcourt, Rivers State, Nigeria
[3]Department of Medical Services, RSPHCMB, Port Harcourt, Rivers State, Nigeria
[4]Department of Environmental Health, School of Public Health, University of Port-Harcourt, Rivers State, Nigeria
[5]Rivers State Hospitals Management Board, RSPHCMB, Port Harcourt, Rivers State, Nigeria
[6]Rivers State Ministry of Health, Rivers State, Nigeria

Received: 10 March 2026
Revised: 26 May 2026
Accepted: 02 June 2026

***Correspondence:**
Dr. Pearl Iyaye Daibi Abereton,
E-mail: pearl_abereton@uniport.edu.ng

ABSTRACT

Background: Human-resources-for-health is a vitally important aspect of health system as they ensure the availability obstetric imaging services in health facilities, which are essential for improving maternal and child health outcomes of pregnancy. This study aimed to determine the knowledge, attitude and competency in providing basic obstetric imaging services (BOIS) among primary health care workers (PHCWs) in Rivers State, Nigeria.
Methods: This study utilized a descriptive design, and was conducted among 290 PHCWs in Rivers State, Nigeria. It was conducted at selected model PHC facilities located in the 23 local government areas (LGAs) of Rivers State, Nigeria. Responses were elicited from all willing respondents using a self-administered adapted questionnaire. Assessment of the respondents' knowledge and attitude of BOIS was done using a set of fifteen and ten questions respectively. Competencies and ultrasonographic skills were also assessed.
Results: Most PHCWs had good knowledge 273 (95.0%) and good attitude 264 (91.0%) towards BOIS provision. Most workers 222 (80%) did not have the required ultrasonographic skills needed to provide BOIS. Of the few that possessed the skills, most were competent in using the equipment to perform various tasks including the identification of foetal anatomy 56 (84.8%), perform first trimester dating scan 48 (72.7%), assist in the use of the ultrasound scan 48 (72.7%), among other tasks.
Conclusions: Knowledge and attitude towards basic obstetric ultrasound service provision were found to be good, however, practice was poor due to non-possession of required skills. Development and implementation of structured training programs to develop skills are recommended.

Keywords: Attitude, Basic obstetric imaging services, BOI service provision, Competency, Knowledge

INTRODUCTION

Maternal death rates have been pointed out as a crucial indicator for assessing the condition and quality of healthcare, as well as general socioeconomic development within a society.[1] Tackling the problem of maternal deaths has been a global area of action considering the magnitude of global maternal deaths.[1,2] The commitments of various countries around the world were bolstered by effective maternal and neonatal health interventions offered to women during pre-natal, natal, labour and delivery, and postpartum phases.[2] One such

intervention is the provision of antenatal care services, which has been shown to enhance pregnancy outcomes and decrease maternal and infant illness and death rates.[3] The updated guidelines from the World Health Organization (WHO) suggest a minimum of eight antenatal care (ANC) visits during pregnancy, which should include one ultrasound examination or obstetric imaging before reaching 24 weeks of gestation.[4] The obstetric ultrasound is a non-invasive imaging modality which utilizes sound waves to visualize the fetus and monitor its development in real time. The obstetric ultrasound is especially useful for the management of high-risk pregnancies, as well as for the diagnosis of foetal congenital deformities, identifying placenta location, and the assessment of the biophysical profile of the fetus and well-being.[5] It is a very useful tool for improving patient diagnosis, and management, as well as resource utilization.[6]

Despite improved access, most women in sub-Saharan Africa still face challenges in obtaining ultrasound examinations. In these regions, obstetricians and radiologists are the main providers of obstetric imaging services.[7] Several factors hinder the availability of ultrasound scanning, including a shortage of skilled health professionals (60%), insufficient ultrasound equipment and supplies (45%), and inadequate maintenance capabilities (47%). These limitations are particularly pronounced at the PHC level.[8] Also, maternal mortality issues have been blamed on various facility-related factors which directly relate with obstetric ultrasonographic training. These include the poor use of treatment protocols, lack of skills by providers to use available equipment among other identified factors.[1]

Without proper training and availability, there would be poor knowledge of the application as well as inadequate competencies in the use of the ultrasound.[9,10] Obstetric ultrasound is now a standard component of antenatal care, prompting mothers to travel long distances to access it because of the shortage of radiologists in rural areas. Therefore, it is crucial to train other health workers in basic skills to perform point-of-care ultrasound (task shifting and task sharing), particularly in emergency situations that necessitate immediate clinical intervention, to help reduce maternal mortality.[11] In a study that assessed perceived barriers in the use of the ultrasound scan in developing countries, barriers identified included lack of training (60%), lack of equipment (45%), ultrasound machine malfunction (37%), among others. The study also pointed out that most of the respondents had a desire for further training in the use of the ultrasound device for obstetric purposes among other important applications.[11]

Education programmes for healthcare workers should be centred around the promotion of standards and training in skills for routine gestational age assessment during antenatal care. Their skills should also be developed for effective history and physical examinations as well as to help understand the strengths and limitations of the ultrasound equipment. Training is advocated to go beyond capture and interpretation of obstetric-related images to include a range of competencies as part of a continuous approach to learning.[9,12] It is essential to note that optimizing the capacity of available human resources and effective distribution of healthcare services can be affective in improving access to, quality of, and equity of healthcare services.[2] When healthcare professionals are well trained and possess requisite current knowledge and skills/competencies to provide necessary healthcare services, it is capable of boosting the delivery of these services, and contribute in improving the healthcare indices of the society.[10,12,13] Considering the relevance in identifying knowledge and competency gaps among healthcare workers, especially in boosting healthcare delivery, and the need for more research in this direction, it became necessary to conduct this study. The study was thus conducted to determine the knowledge, attitude and competency in providing BOIS among PHCWs in Rivers State, Nigeria.

METHODS

This study utilized a descriptive design to determine the knowledge, attitude and competency in providing BOIS among 290 PHCWs in Rivers State, Nigeria. It was conducted at selected Model PHC facilities and comprehensive PHC facilities located in the 23 LGAs of Rivers State, Nigeria. The study was conducted between the May, 2024 - August, 2024. A multi-stage sampling method was employed to recruit participants. Model PHC facilities were randomly selected from the three senatorial districts in Rivers State, and PHCWs were also randomly selected from the model PHC facilities. PHCWs who were present at the time of study were recruited as participants, and those who were on annual leave, sick leave or casual leave were excluded from the study. Responses were elicited from all willing respondents using a self-administered adapted questionnaire. Assessment of the respondents' knowledge of BOIS was done using a set of 15 questions with responses: "yes" (2 points), "I don't know" (1 point) and "no" (no point allotted). The attitude of the PHC workers towards basic obstetric ultrasound service provision was also assessed using a 10-item questionnaire. Responses included: strongly agree (4 points), agree (3 points), undecided (2 points), disagree (1 point), and strongly disagree (0 point) for positively-directed questions. The reverse was also the case for the negatively-directed questions. The perceived competency of the PHC workers in the use of the ultrasound scan equipment to perform various procedures in the PHC facilities was also assessed.

After seeking their consent alongside other ethical considerations for the research, the instrument was administered to the workers during their free periods at work. Ethics approval was obtained for this study from the Health Research Ethics Committee of the Rivers State Hospital Management Board (approval number:

RSHMB/RSHREC/2024/013). Permission to carry out the evaluation was obtained from the executive secretary and director planning, research and statistics of the Rivers State Primary Health Care Management Board (RSPHCMB) as well as the medical-officers-of-health and/or facility heads of the various PHC facilities in Rivers State. Also, the data collection tools were anonymized to ensure protection of the privacy of respondents and confidentiality of their responses.

Data was collected electronically and safely stored in a secure server of the Kobo toolbox open-source mobile data collection platform. Data was cleaned, collated and analyzed on a Microsoft Excel spreadsheet, was expressed as frequencies/percentages and mean±SD, and was presented on tables and charts. Assessment of knowledge of the respondents on BOIS was done by adding all scores obtained after responses were made to the 15 questions assessing knowledge. This was done to obtain a knowledge score ranging from 0 to 30. Scores between 0 and 9 were categorized as poor knowledge, scores between 10 and 19 were categorized as moderate knowledge and scores between 20 and 30 were categorized as good knowledge. In the assessment of the attitude of the workers towards BOIS, responses were also summed to obtain an attitude score which was categorized into "good", and "poor" attitude. An attitude score ranging between 0 and 20 signified poor attitudes, while scores ranging between 21 and 40 signified good attitude. The PHCWs also provided responses on if they were competent or incompetent in the use of the ultrasound scan equipment to perform various imaging procedures.

RESULTS

As seen in Figure 1, facilities assessed in this study were selected from all local government areas of the state with Obio-Akpor and Port Harcourt LGAs accounting for most of the PHC facilities.

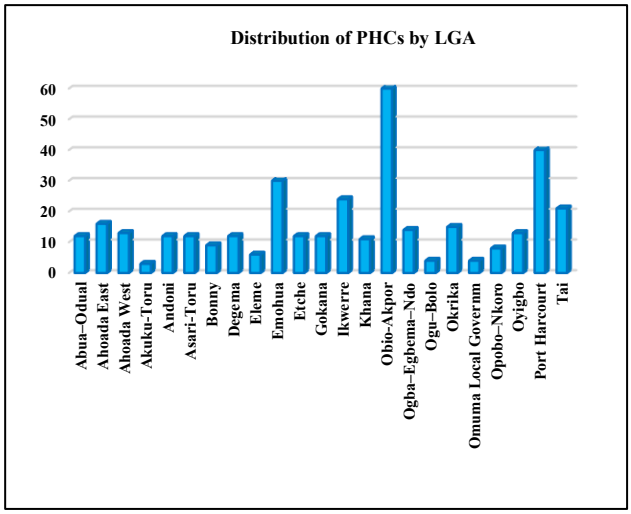

Figure 1: Distribution of the PHCs included in this study according to LGAs.

Also in Figure 2, among the PHC workers, most were found to be females 237 (82.0%), aged between 40 and 49 years 159 (55.0%), who earned more than 3000 naira daily 106 (36.7%), were married 264 (91.3%) and had completed tertiary education 285 (99.0%). Also, as seen in Figure 3, the majority of PHC workers included in this study community health workers 145 (50.2%).

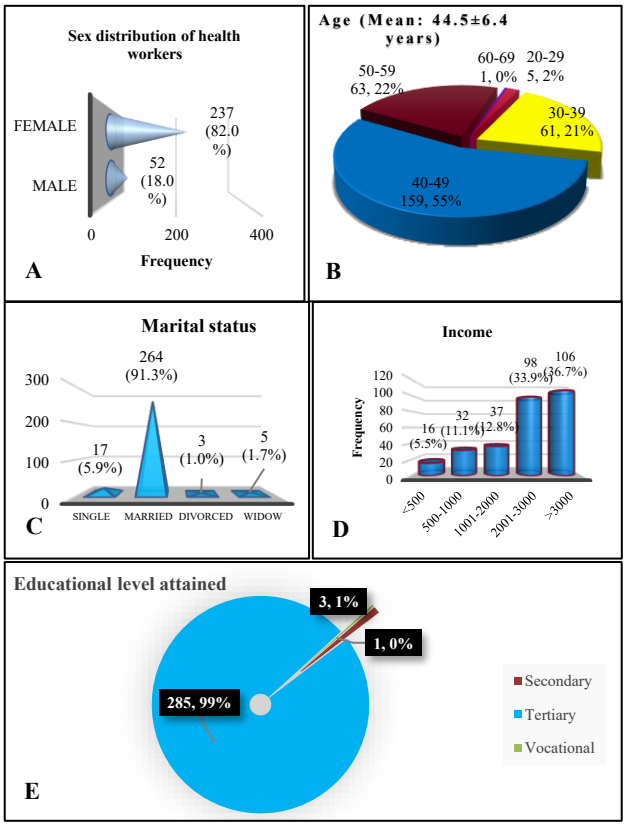

Figure 2 (A-E): Sociodemographic characteristics of PHC workers.

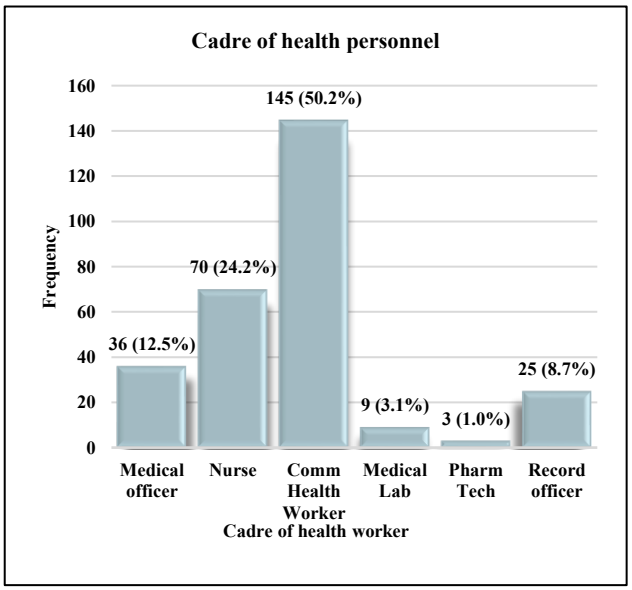

Figure 3: Cadre of PHC workers.

Knowledge and attitude towards basic obstetric ultrasound service provision

Most of the PHC workers were found to have good knowledge 273 (95.0%) and good attitude 264 (91.0%) towards basic obstetric ultrasound service provision as seen in Figures 4 and 5.

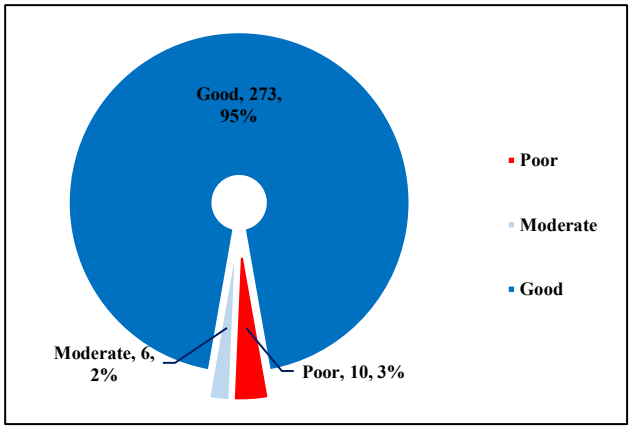

Figure 4: Levels of knowledge of basic obstetric ultrasound service provision among PHC workers.

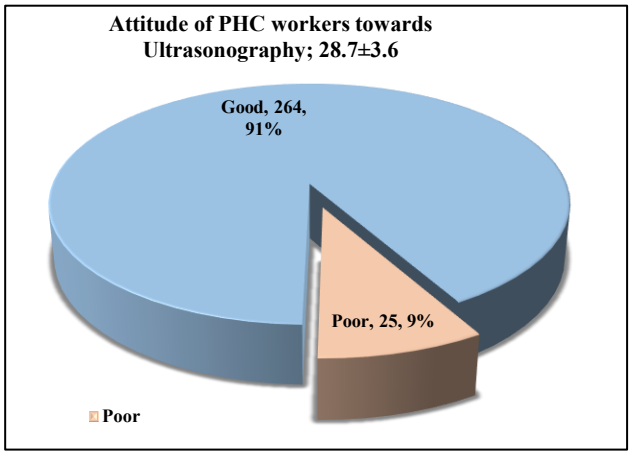

Figure 5: Attitude towards basic obstetric ultrasound service provision among PHC workers

PHC workers aged >44 years were also found to have significantly better attitude towards basic obstetric ultrasound service provision than those aged ≤44 years, (p value: 0.004). Facility heads were also found to have significantly better attitude towards basic obstetric ultrasound service provision than all other workers, (p value: 0.027).

Ultrasonographic competence of the PHC workers

Despite majority of the PHC workers having good knowledge and attitude towards the provision of basic obstetric ultrasound services, most of the workers 222 (80%) were of the opinion that they did not have the required ultrasonographic skills needed to provide basic obstetric ultrasound services as seen in Figure 6.

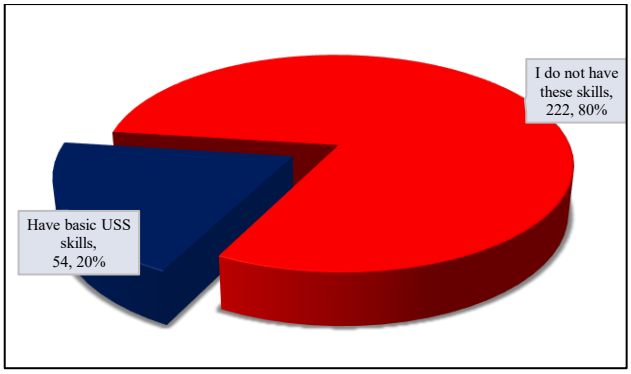

Figure 6: Possession of ultrasonographic skills among the PHC workers.

Among those who possessed the ultrasonographic skills, most workers were of the opinion that they were competent in using the equipment to perform various tasks including the identification of foetal anatomy 56 (84.8%), perform first trimester dating scan 48 (72.7%), assist in the use of the ultrasound scan 48 (72.7%), among other tasks, as shown in Figure 7.

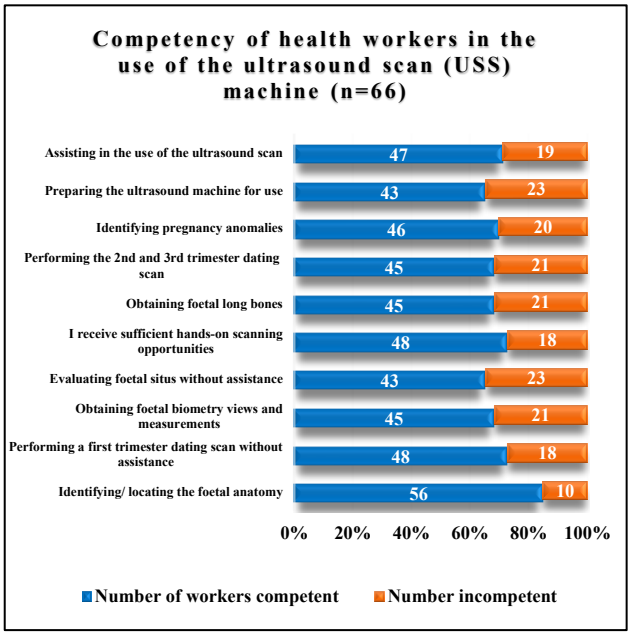

Figure 7: Perceived competency of the PHC workers in using the USS machine.

DISCUSSION

Most of the PHC workers were found to have good knowledge and good attitude towards basic obstetric ultrasound service provision. This finding agrees with the findings of other authors who reported good attitude among healthcare workers in north eastern Nigeria regarding the obstetric ultrasound. The study however revealed average levels of knowledge among the healthcare workers.[1] This finding portrays a high level of readiness among these workers to be involved in the provision of basic obstetric imaging services in the PHC

facilities, and this would help them make accurate and timely diagnosis of pregnancy-related conditions and fetal development, resulting in better management strategies and better health outcomes for both the mother and the baby.[5,6] Moreover, knowledgeable healthcare providers with a favorable disposition towards obstetric ultrasonography can effectively communicate findings to expecting mothers, which fosters trust and informed decision-making among the mothers.[4] These portray the ultimate goal of antenatal ultrasound service provision which is to support equitably provided, high-quality care, alongside ensuring individual clinical visits that are safe, educational, and incorporated as part of the antenatal care package.[4,9] This present study also revealed that PHC workers aged greater than 44 years significantly exhibited better attitude towards basic obstetric ultrasound service provision than those aged below 44 years. This is suggestive that older PHC workers could be better used to influence the attitude and disposition of other workers and patients towards obstetric ultrasound services. Facility heads were also found to have significantly better attitude towards these services than all other workers, and is a pointer to the importance of the use of experienced and trained facility heads in the efforts to further improve the adoption and use of the obstetric ultrasound among PHCWs.[10]

Despite majority of the PHC workers in this present study having good knowledge and attitude towards the provision of basic obstetric ultrasound services, most of the workers were of the view that they did not have the required ultrasonographic skills needed to provide these basic services. This finding of the absence of the necessary skills to provide obstetric ultrasound services has also been reported as a factor inhibiting the provision of these services.[9,11] The absence of the requisite hands-on skills means that these healthcare workers cannot directly perform ultrasonographic examinations, potentially leading to delays in diagnosis and intervention if referrals to specialists are not promptly managed.[10-12] The finding also portrays the need for continuous capacity building for PHC workers as the Rivers State Government seeks to integrate these services into PHC, in the bid to improve access to routine ultrasound check-ups during pregnancy. Also, in this present study, it was identified that among those who possessed the ultrasonographic skills, most of the workers were of the opinion that they were competent in using the equipment to perform various tasks including the identification of foetal anatomy, perform first trimester dating scan, assist in the use of the ultrasound scan, among other tasks. This could be a pointer signifying that they may have received informal training on how to carry out these tasks while on-the-job. It is thus necessary that formal training programmes are organized to keep these workers abreast with current skills necessary for the provision of quality obstetric ultrasound services.[10,14] Ensuring that PHC workers are able to provide basic ultrasonography services to pregnant women is practically beneficial to public healthcare as they enhance the overall quality and accessibility of maternal healthcare services to the Rivers State populace, and enhance maternal health indices in the state.

This study addresses a relevant topic about a critical gap in health care with regards to knowledge, attitude and competencies in BOIS in primary health care facilities. It aligns well with WHO and the need to reduce maternal morbidity and mortality. While this study has a strong public health impact as discussion links the findings to reducing maternal mortality and feto-maternal complications among the populace, and the need for improved ANC and imaging services across PHC facilities, it was however, limited, because it was purely descriptive in nature, it utilized self-reported measures for competencies, which could introduce bias. Reasons being that this study was an assessment of the baseline state of the PHC facilities. We therefore recommend future studies to incorporate the inferential component in the statistical analyses, assess the practical competencies of health workers as it relates to BOIS.

CONCLUSION

Most of the PHC workers were found to have good knowledge and good attitude towards basic obstetric ultrasound service provision in this study, which was associated with the age and being a facility head. Most of the workers were also of the view that they did not have the required ultrasonographic skills needed to provide these basic services.

Recommendations

Primary healthcare stakeholders in Rivers State need to develop and implement structured training programs targeting the development of basic obstetric ultrasonographic skills for primary healthcare workers in Rivers State. These should include both theoretical knowledge advancement alongside extensive hands-on practice sessions. Regular workshops and seminars can also contribute in keeping these workers updated on the latest techniques and best practices in obstetric ultrasonography.

In areas where feasible, the Rivers State Ministry of Health can also deploy technology through the development of telemedicine to provide real-time support and consultation from ultrasonographic specialists. Primary healthcare workers can perform the scans with remote guidance from these specialists, thus ensuring accuracy and immediate feedback.

It is also necessary that when ultrasonographic equipment are deployed, PHC facility heads should be trained on how to ensure the longevity of the equipment through the implementation of regular maintenance exercises. Standard protocols and guidelines for the use of the obstetric ultrasonographic equipment should also be

clearly disseminated to the PHC workers, to enhance their effective and consistent use of the equipment.

ACKNOWLEDGEMENTS

The authors wish to thank Benson Ephraim-Emmanuel, and Mabel Ekpo for their advice and technical assistance.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee of the Rivers State Hospital Management Board (approval number: RSHMB/RSHREC/2024/013)

REFERENCES

1. Malgwi FD, Elshami WE, Zira JD, Edwin AU, Alhamdu MS, Laushugno SS, et al. Knowledge, perception, and attitude of health-care professionals toward obstetrics ultrasonography in selected internally displaced persons' camps in north-east Nigeria. West Afr J Radiol. 2019;26(2):121-6.
2. Abawollo HS, Argaw MD, Tsegaye ZT, Beshir IA, Guteta AA, Heyi AF, et al. Institutionalization of limited obstetric ultrasound leading to increased antenatal, skilled delivery, and postnatal service utilization in three regions of Ethiopia: a pre-post study. PLoS One. 2023;18(2):e0281626.
3. Tunçalp Ö, Pena-Rosas JP, Lawrie T. WHO recommendations on antenatal care for a positive pregnancy experience-going beyond survival. BJOG. 2017;124:860-2.
4. World Health Organization. WHO recommendations on antenatal care for a positive pregnancy experience. World Health Organization; 2016. Available at: https://www.who.int/publications/i/item/9789241549912. Accessed on 27 January 2026.
5. Haile ZW, Gurmu AG. Knowledge, attitude, barriers, and associated factors of obstetric ultrasound among pregnant women in public hospitals, Ethiopia, 2022: a cross-sectional study. J Ultrasound. 2024;27:31-40.
6. Ginsburg AS, Liddy Z, Khazaneh PT, May S, Pervaiz F. A survey of barriers and facilitators to ultrasound use in low-and middle-income countries. Sci Rep. 2023;13(1):3322.
7. Roro MA, Aredo AD, Kebede T, Estifanos AS. Enablers and barriers to introduction of obstetrics ultrasound service at primary care facilities in a resource-limited setting: a qualitative study in four regions of Ethiopia. BMC Pregnancy Childbirth. 2022;22(1):278.
8. Shah S, Bellows BA, Adedipe AA, Totten JE, Backlund BH, Sajed D. Perceived barriers in the use of ultrasound in developing countries. Crit Ultrasound J. 2015;7(1):11.
9. Noguchi L, Bucagu M, Tunçalp Ö. Strengthening antenatal care services for all: implementing imaging ultrasound before 24 weeks of pregnancy. BMJ Glob Health. 2023;8:e011170.
10. Mohammad SH, Sommerich CM, Butwin AN, Evans KD. Assessment of OB/Gyn residents' knowledge of basic obstetric sonography and psychomotor skills post training on a computer-based simulator. J Diagn Med Sonogr. 2022;38(1):5-17.
11. Abrokwa SK, Ruby LC, Heuvelings CC, Belard S. Task shifting for point of care ultrasound in primary healthcare in low-and middle-income countries-a systematic review. EClinicalMedicine. 2022; 1:45.
12. Tefera M, Mezmur H, Jemal M, Assefa N. Health professionals' perspectives on the role of obstetric ultrasonography in maternity care in rural eastern Ethiopia: a qualitative descriptive study. BMJ Open. 2024;14(4):e075263.
13. Wachira J, Matheka DM, Masheti SA, Githemo GK, Shah S, Haldeman MS, Ramos M, Bergman K. A training program for obstetrics point-of-care ultrasound to 514 rural healthcare providers in Kenya. BMC Medical Education. 2023;23(1):922.
14. Mubuuke AG, Erem G, Nassanga R, Kiguli-Malwadde E. Point of care obstetric ultrasound training for midwives and nurses: implementation and experiences of trainees at a rural based hospital in Sub-saharan Africa: a qualitative study. BMC Res Notes. 2023;16(1):287.

Cite this article as: Wihioka JT, Dede SB, Abereton PID, Jaja ID, Oreh AC. Knowledge, attitude and competency of basic obstetric imaging services among health workers in primary healthcare facilities in Rivers State. Int J Community Med Public Health 2026;13:3424-9.