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Knowledge and Utilization of Ultrasound Scan among Pregnant Women Attending Antenatal Clinic at Orile-Agege General Hospital, Lagos State

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Abstract

This study aimed to assess the knowledge and utilization of ultrasound scans among pregnant women attending antenatal clinics at Orile-Agege General Hospital, Lagos State. The objectives were to evaluate their awareness and usage of ultrasound scans and identify the challenges affecting their utilization. A convenience sampling technique was used to select 125 pregnant women, out of which 122 were validated for the study. Data were collected using a self-developed questionnaire and analyzed using frequency/percentage tables and charts with SPSS version 25 and Microsoft Excel 2010.The findings indicated a generally fair level of knowledge and utilization of ultrasound scans among participants. The key challenges to ultrasound scan utilization included lack of spousal or family support (57.4%), cultural beliefs and societal norms (37.7%), cost of scans (31.1%), limited access to ultrasound services (26.2%), lack of awareness (16.4%), and long waiting times at diagnostic centers (13.1%).Furthermore, the study established a significant relationship between participants' educational levels and their knowledge of ultrasound scans ($p < 0.05$). However, no significant relationship was found between their knowledge and actual utilization of ultrasound scans ($p > 0.05$).

Keywords: Knowledge, Utilization, Ultrasound Scan, Pregnant Women, Antenatal Clinic

CHAPTER ONE

Introduction

1.1 Background Of The Study

Prenatal ultrasonography is a diagnostic tool that has significantly transformed obstetric practice, with its applications continuing to expand. Healthcare providers commonly request prenatal ultrasound scans as part of routine prenatal evaluations or for specific medical indications during pregnancy. In many healthcare settings, ultrasound scans are considered essential components of prenatal assessments. Obstetric ultrasound, or sonography, is a safe, cost-effective, and non-invasive imaging technique used to examine pregnant women and provide real-time images of the fetus. With the global increase in pregnancies, the demand for obstetric ultrasound has become even more critical. Routine obstetric sonography is now widely acknowledged as a key strategy for reducing maternal and fetal mortality (Molla, Mengistu & Wudneh, 2022).Ultrasound has gained rapid acceptance in the medical field due to its

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non-invasiveness, affordability, and safety. Today, antepartum ultrasound is an essential aspect of prenatal care worldwide. In Western medicine, ultrasound has become nearly universal in obstetrics, with routine ultrasound screening now an integral part of prenatal examinations for pregnant women. Ultrasound is one of the few screening techniques that allow expectant mothers to see their babies in real time. Routine obstetric sonography is now widely recognized as an effective method for reducing maternal and fetal mortality (Yetwale, Kabeto&Biyazin, 2022). The use of ultrasound in obstetrics is essential, as it helps detect various disorders early in pregnancy, thereby enhancing the quality of antenatal care and improving pregnancy outcomes (Molla & Mengistu, 2022). Antenatal ultrasound scans may be performed either as a routine screening tool during prenatal care or based on specific clinical indications determined by a clinician or midwife (Luntsi& Agwu, 2022).Since its introduction in the 1950s, ultrasound has become an indispensable tool in modern prenatal care. It provides critical information that enhances fetal well-being and aids in the early detection of abnormalities related to the heart, gastrointestinal tract, kidneys, nervous system, and chromosomes, including Down syndrome (Nakimera, 2020).Pregnancy and childbirth are periods of immense joy but also heightened vulnerability for both mothers and their unborn children. In 2017, over 800 women worldwide died daily from preventable pregnancy- and childbirth-related complications, with more than 90% of these deaths occurring in low- and middle-income countries. Additionally, approximately 2.6 million pregnancies ended in stillbirths during the same period. One of the primary contributors to persistently high maternal and neonatal mortality rates, particularly in sub-Saharan Africa, is limited access to quality antenatal care (ANC) (Luntsi, Agwu & Ohagwu, 2022).Low- and middle-income countries (LMICs) experience significantly higher perinatal mortality rates—approximately ten times that of high-income countries (HICs). The causes of perinatal mortality in LMICs are multifaceted, including high rates of home deliveries, inadequate intrapartum care, and undetected pregnancy complications such as fetal growth restrictions (Kabajaasi & Luntsi, 2021). Limited uptake and utilization of ultrasound scans among pregnant women contribute to adverse outcomes, including maternal and neonatal deaths. Antenatal ultrasound is a well-established component of prenatal care, enabling early detection of fetal anomalies (Nakimera, 2020).

Sub-Saharan Africa (SSA) has some of the highest perinatal mortality rates globally, with an estimated 34.7 deaths per 1,000 births. Intrauterine growth restriction (IUGR) is a major factor in perinatal morbidity and mortality, and ultrasound plays a crucial role in identifying high-risk pregnancies at an early stage. For instance, a study conducted in Cairo, Egypt, found that 11.8% of infants experienced growth retardation, and approximately 89.7% of these cases were detected through obstetric ultrasound (Molla, Mengistu &Wudneh, 2022).With advancements in medical technology, pregnancy has become increasingly medicalized worldwide, particularly in obstetric care. This shift is driven by long-term trends emphasizing improved maternal and perinatal health outcomes. Policymakers advocate for these changes, highlighting the significant role of routine obstetric ultrasound in reducing maternal and perinatal morbidity and mortality. Antenatal care is an essential component of maternal and fetal health worldwide, with obstetric sonography being one of the most commonly performed prenatal tests. It serves as a critical tool for

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healthcare providers to assess fetal growth and overall condition (Abduljabbar, Jabal & Hussain, 2020). The World Health Organization (WHO) envisions a future where every pregnant woman and newborn receives high-quality care throughout pregnancy, childbirth, and the postnatal period.Despite ongoing efforts to improve maternal and neonatal health, approximately 40% of fetal, neonatal, and maternal deaths still occur during labor or on the day of birth. Early detection, timely confirmation, and appropriate referral of high-risk pregnancies are key strategies for reducing morbidity and mortality, particularly in low- and middle-income countries. Providing at least one ultrasound scan to every pregnant woman plays a crucial role in achieving these outcomes (Abawollo, Argaw & Tsegaye, 2023).

1.2 Statement of Problem

Between 1990 and 2015, there was a global reduction of over 40% in maternal mortality. However, maternal mortality rates in sub-Saharan Africa remained alarmingly high. In developing countries like Nigeria, the maternal mortality ratio (MMR) remains significantly elevated, ranging between 496 and 560 deaths per 100,000 live births. Pregnant women, particularly those in rural and semi-urban areas, continue to face high risks of morbidity and mortality (Luntsi, Agwu &Ohagwu, 2022). Many of these complications could be prevented through adequate prenatal care, with ultrasound scans being one of the most critical components in ensuring maternal and fetal well-being (Molla & Mengistu, 2022).underscores the importance of increasing awareness and accessibility of prenatal ultrasound services in low-resource settings. Pregnant women in developing countries are at a higher risk of experiencing complications during pregnancy, while their newborns are more susceptible to complications at birth or shortly after delivery (Molla & Mengistu, 2022). A critical gap in healthcare services in resource-limited settings is the lack of basic imaging services such as ultrasound during antenatal care, which could facilitate the early detection of complications and timely interventions.In developed countries, antenatal ultrasound is a routine component of prenatal care and has become an indispensable tool in obstetric practice. It enables healthcare providers to assess fetal anatomy and detect abnormalities, determine placental position, confirm pregnancy location, and identify fetal presentation and number. Early detection of complications allows for timely intervention and adjustments in case management, thereby improving maternal and fetal health outcomes (Luntsi, Agwu &Ohagwu, 2022). Despite its benefits, maternal and neonatal morbidity and mortality rates remain high due to inadequate utilization of prenatal ultrasound scans for detecting pregnancy-related complications. Limited research has explored the use of prenatal ultrasound in low-resource settings (Yetwale, Kabeto&Biyazin, 2022). While obstetric sonography has proven beneficial in cases where it is clinically indicated, its role as a routine screening tool remains a subject of debate. Nonetheless, studies suggest that women's awareness and perceptions of antenatal ultrasonography significantly influence their healthcare-seeking behavior, ultimately impacting maternal and neonatal health outcomes.This is particularly relevant in settings where ultrasonography is a relatively new practice. Despite its growing use, several studies indicate that many women have limited awareness of prenatal ultrasound and often hold unrealistic expectations regarding its capabilities (Molla, Mengistu &Wudneh, 2022).Unfortunately, a significant number of women in low- and middle-income

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countries, particularly in sub-Saharan Africa, go through pregnancy without the opportunity to undergo even a single ultrasound scan. Obstetric sonography is widely recognized as an essential component of antenatal care. However, it is crucial for both expectant mothers and healthcare providers to have a clear understanding of its safety, intended uses, and limitations (Luntsi, Agwu &Ohagwu, 2022).In light of these concerns, this study was undertaken to evaluate the knowledge and utilization of ultrasound scans among pregnant women attending antenatal care at Orile-Agege General Hospital, Lagos State.

1.3 Objectives of the Study

The primary aim of this study is to examine the knowledge and utilization of ultrasound scans among pregnant women attending antenatal care at Orile-Agege General Hospital, Lagos State.

The specific objectives of the study are:

i. To assess the level of knowledge about ultrasound scans among pregnant women attending antenatal care at Orile-Agege General Hospital, Lagos State.

ii. To evaluate the extent to which pregnant women utilize ultrasound scans during antenatal care at Orile-Agege General Hospital, Lagos State.

iii. To identify the barriers affecting the utilization of ultrasound scans among pregnant women attending antenatal care at Orile-Agege General Hospital, Lagos State.

1.4 Research Questions

The following research questions have been formulated to guide this study:

i. What is the extent of knowledge about ultrasound scans among pregnant women attending antenatal care at Orile-Agege General Hospital?

ii. To what degree do pregnant women attending antenatal care at Orile-Agege General Hospital utilize ultrasound scans?

iii. What are the barriers affecting the utilization of ultrasound scans among pregnant women at Orile-Agege General Hospital?

1.5 Research Hypotheses

H_{01}: No significant association exists between educational level and knowledge of ultrasound scans among pregnant women attending antenatal care at Orile-Agege General Hospital.

H_{02}: There is no significant relationship between knowledge of ultrasound scans and their utilization among pregnant women attending antenatal care at Orile-Agege General Hospital.

1.6 Significance of the Study

The findings of this study will offer essential insights for the World Health Organization, national health agencies, healthcare institutions, and government bodies to effectively reduce maternal and perinatal morbidity and mortality associated with delayed detection of anomalies and pregnancy complications in Lagos, Nigeria, Africa, and beyond. The study's outcomes will highlight the challenges hindering the utilization of routine obstetric sonography among expectant mothers attending antenatal care.Additionally, the findings will provide valuable guidance to healthcare administrators, policymakers, facility managers, nurses, and midwives on enhancing knowledge and increasing the use of ultrasound scans among pregnant women across healthcare settings. The study will also identify gaps in training, resource allocation, and organizational support, shedding light on areas that require improvements in antenatal care guidelines, healthcare professionals' proficiency, skills, safety measures, and overall interventions.For future researchers, this study will serve as a foundation for analysing and enhancing expectant mothers'

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knowledge and utilization of ultrasound scans. It will also act as a reference material for those conducting studies related to this subject.For the Nursing and Midwifery profession, the findings of this study will contribute to the advancement of ultrasonography across various areas of nursing and midwifery care, ultimately improving patient outcomes and maternal healthcare services.

1.7 Scope of the Study

This study is limited to assessing the knowledge and utilization of ultrasound scan among pregnant women attending antenatal clinic at Orile-Agege General Hospital, Lagos State.

1.8 Operational Definition of Terms

Antenatal Clinic: A designated healthcare facility at Orile-Agege General Hospital, Lagos State, where pregnant women receive medical assessments and monitoring to ensure the well-being of both mother and baby during pregnancy.

Knowledge: The extent of awareness and understanding that pregnant women attending the antenatal clinic at Orile-Agege General Hospital have regarding ultrasound scans.

Pregnant Women: Expectant mothers receiving antenatal care at Orile-Agege General Hospital in Lagos State.

Ultrasound Scan: A prenatal imaging technique used to evaluate fetal growth and development, detect multiple pregnancies, and identify any maternal or fetal abnormalities.

Utilization: The extent to which pregnant women attending the antenatal clinic at Orile-Agege General Hospital in Lagos State make practical and effective use of ultrasound scans.

CHAPTER TWO

Literature Review

This chapter deals with the review of literature on the variables of the study. This chapter will be discussed under the following headings: conceptual review, theoretical framework, and empirical review.

2.1 Conceptual Review

In low- and middle-income countries, ultrasound is primarily utilized for diagnosing obstetric conditions. However, it has also been employed in evaluating gynecological conditions, particularly in emergency medicine. A study conducted in Monrovia, Liberia, reported that 53% of ultrasound scans were performed for either obstetric or gynecological cases. Similarly, research in Cameroon found that ultrasound identified gynecological conditions in 33% of patients and obstetric conditions in 15% (Komakech, 2023).Beyond obstetrics and gynecology, ultrasound applications extend to abdominal, musculoskeletal, cardiac, renal, pulmonary, trauma-related, soft tissue, and vascular conditions. Studies have shown that the utilization of ultrasound varies based on geographic location and disease prevalence. Its versatility and adaptability make ultrasound a valuable tool in healthcare systems of low- and middle-income countries (Maniragena& Kasozi, 2021).Additionally, advancements in medical technology, such as obstetric sonography, have introduced social, ethical, and economic challenges for both healthcare providers and patients. These concerns have developed over time, influenced by evolving trends in medical practice.Policymakers often emphasize the reduction in maternal and perinatal morbidity and mortality as the

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rationale for various advancements in obstetric care. One of the most significant developments in antenatal care globally has been the routine use of obstetric ultrasound (Haile &Gurmu, 2024). It has become an almost universal component of antenatal care services provided to pregnant women.Ultrasound can serve as both a screening tool and a definitive diagnostic method. However, the routine use of ultrasound in antenatal care has been debated, as studies have not shown direct improvements in perinatal mortality rates. Positive perinatal outcomes through ultrasound can only be realized if early detection of fetal anomalies is prioritized and acted upon (Omeye&Kajang, 2024).

Knowledge on Ultrasound Scan

Ultrasonography is a widely accepted imaging technique that offers a portable, low-power diagnostic tool that can be easily learned by various healthcare professionals, enabling quick assessment and treatment across different medical settings. Unlike other imaging technologies such as Computed Tomography (CT) or Magnetic Resonance Imaging (MRI), ultrasound devices are cost-effective, handheld, and can be operated by a single user.

These features make ultrasonography—also referred to as ultrasound (US)—a highly suitable option for both inpatient and outpatient care in low and middle-income countries (LMICs) (Stewart, Navarro & Kambala, 2020).Ultrasound has numerous applications in LMICs, including diagnosing obstructed labor, fetal presentation, multiple pregnancies, incomplete miscarriage, molar pregnancy, ectopic pregnancy, fetal abnormalities, intrauterine growth restriction, and placenta previa. It is also used to assess pelvic dimensions and estimate gestational age. Although the accuracy of diagnosis may vary depending on when pregnant women undergo ultrasound examinations, studies consistently highlight its importance. For instance, accurately determining gestational age helps distinguish preterm infants from those with low birth weight but carried to term, ensuring appropriate interventions (Maniragena, Kasozi, Mubuuke&Murachi, 2021).A study conducted in Nigeria found that most participants (96.4%) had good knowledge of ultrasound scans. However, nearly one-third (31.3%) believed that frequent ultrasound exposure could be harmful to the baby, while 13.8% thought it could cause cancer (Molla & Mengistu, 2022). In line with the World Health Organization (WHO) recommendations, at least one ultrasound scan before 24 weeks of gestation is advised for every pregnant woman as part of routine prenatal care. Additionally, the International Federation of Gynecology and Obstetrics (FIGO) recommends two ultrasound screenings during the first and second trimesters for all pregnant women (Yetwale, Kabeto&Biyazin, 2022).In the early first trimester, ultrasound scans are used to confirm pregnancy, determine its location, estimate gestational age, and identify multiple pregnancies. During the mid-trimester, routineultrasonography, particularly between 18 and 24 weeks, plays a crucial role in prenatal screening by detecting potential fetal anomalies. In the late trimester, ultrasound is beneficial for

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assessing fetal position, presentation, and estimated weight, as well as for evaluating placental location and amniotic fluid volume. Additionally, it assists in guiding invasive procedures such as amniocentesis, fetal cord sampling, and intrauterine infusion (Komakech, 2023).Ultrasound is commonly used during pregnancy to estimate fetal age, determine the number of fetuses, assess placental location, screen for spinal malformations, monitor fetal growth and presentation, and diagnose complications such as obstructed labor, incomplete miscarriage, hydatidiform mole, and ectopic pregnancy. Moreover, it has psychological benefits, including enhancing maternal bonding, reducing anxiety, alleviating depression, and minimizing physical discomfort when effectively integrated into prenatal care. The early identification of malformations and obstetric complications through routine ultrasonography provides essential information, allowing for timely decisions regarding pregnancy management, appropriate interventions at birth, and prompt referral to specialized neonatal care units (Yetwale, Kabeto&Biyazin, 2022).

Utilization of Ultrasound Scan

The utilization of ultrasound scans by pregnant women varies significantly across countries. For example, rural areas in Eastern China report a high rate of antenatal ultrasound use, whereas studies in Venezuela indicate low utilization of ultrasound services (Nakimera, 2020). In Britain, the use of obstetric scans to prevent pregnancy complications was found to be 59%. Similarly, studies in Rajasthan and Mumbai reported utilization rates of 52.4% and 34.3%, respectively.

The high maternal mortality rates in developing countries, particularly in Nigeria, may be attributed to the inadequate use of obstetric scans for detecting and preventing pregnancy complications (Usman, Idris & Abdulaziz, 2020).A systematic review on ultrasound usage trends in low- and middle-income countries found that nearly 70% of research studies on ultrasound application originated from Southeast Asia and sub-Saharan Africa, with the latter being the leading region in innovative ultrasound use (Stewart, Navarro & Kambala, 2020). Research on obstetric ultrasound screening services in public hospitals in Addis Ababa, Ethiopia, revealed that 70.3% of pregnant women utilized prenatal ultrasound, although their reasons for doing so varied (Haile, Gadisa & Belay, 2023). Ethiopia has been implementing various initiatives to improve maternal healthcare services, reduce maternal and neonatal morbidity and mortality, and meet sustainable development goals. However, maternal and neonatal complications remain prevalent due to the underutilization of prenatal ultrasound for early complication detection. Furthermore, there is a limited number of published studies examining prenatal ultrasound use in resource-limited settings (Yetwale&Kabeto, 2022).The utilization of ultrasound scans among pregnant women in sub-Saharan Africa varies across regions. For instance, Lagos State, Nigeria, has reported increased use of ultrasound scans among expectant mothers, a trend that is also evident in Nairobi, Kenya. However, in Uganda, there are disparities in access, with urban and city-

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dwelling pregnant women being more likely to utilize ultrasound services compared to those in rural areas (Nakimera, 2020).Over the past three decades, there has been a steady rise in the use of prenatal ultrasound scans in Nigeria, particularly in urban areas. Additionally, reports indicate that some women seeking care from traditional birth attendants and mission homes also undergo prenatal ultrasound as part of their assessment (Omeye&Kajang, 2024). A descriptive survey conducted among pregnant women in Rivers State, Nigeria, found that the majority (98.3%) had undergone at least one ultrasound scan during pregnancy, while 48.7% had received three scans. Furthermore, nearly all participants (99.6%) had their ultrasound performed during the second trimester, with most (98.3%) indicating that it was recommended by their healthcare provider (Samuel & Pepple, 2023).

Challenges of Utilization of Ultrasound Scan

Several factors contribute to the lack of awareness regarding the importance of obstetric ultrasonography among pregnant women, including societal influences, cultural beliefs, and literacy levels. Unfortunately, doctors who request ultrasound scans often do not provide adequate information to patients. Similarly, nurses and midwives, who frequently engage with pregnant women, may also lack sufficient knowledge about obstetric ultrasonography. This is partly due to gaps in their educational training, which may not cover a broad range of obstetric and gynecological ultrasound applications.When expectant mothers are unaware of the significance of obstetric ultrasonography, they may not prioritize undergoing the scan. A lack of knowledge about the appropriate timing for an ultrasound can result in delayed scans, reducing the chances of early anomaly detection and making treatment more challenging or even impossible (Abduljabbar, Jabal & Hussain, 2020).

Studies conducted in Uganda indicate that educational background and sources of information play a crucial role in the utilization of obstetric ultrasound (Molla & Mengistu, 2022). Women's knowledge and attitudes toward ultrasound significantly influence their willingness to undergo the procedure. Those who are uninformed about its benefits are less likely to seek the service and may even reject the diagnosis when complications arise, making it essential to assess their awareness of obstetric ultrasound (Haile &Gurmu, 2024).Enhancing the capacity of existing healthcare personnel and distributing responsibilities among different health professionals can help improve access to quality and equitable healthcare services. In 2020, Ethiopia, with a population exceeding 100 million, had only 95 radiologists and 462 obstetricians/gynecologists available to provide obstetric ultrasound services. Additionally, most antenatal care, skilled birth attendance, and postnatal care services were conducted in rural health centers, where ultrasound services were largely unavailable.Research has shown that providing obstetric point-of-care ultrasound services has led to improved maternal and neonatal healthcare utilization, better pregnancy outcomes for both mothers and

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infants, and enhanced service quality, particularly in remote areas worldwide (Abawollo, Argaw & Tsegaye, 2023). However, the absence of standardized obstetric ultrasound training guidelines for frontline healthcare workers in Sub-Saharan Africa, along with limited awareness among pregnant women regarding the benefits of ultrasound, has contributed to its low uptake. Additionally, cultural and societal beliefs in developing nations, coupled with inadequate communication between healthcare providers and expectant mothers about sonography services, are believed to impact its utilization.A lack of appropriate medical technology and skilled professionals in obstetric sonography within healthcare systems in developing countries further hinders access to ultrasound services (Matiangi, Joosse &Ngunju, 2021). Studies conducted in resource-limited settings indicate that while the cost of care does not directly influence perinatal outcomes, it does affect the utilization of healthcare services. The shortage of advanced technology and trained personnel in radiography and ultrasonography at primary healthcare facilities has necessitated the implementation of government-led initiatives such as the Managed Equipment Services (MES) program in Kenya, aimed at bringing essential medical technology closer to the population (Matiangi& Joosse, 2021).Moreover, previous research in low- and middle-income countries has explored the perspectives and experiences of local stakeholders regarding the implementation of obstetric ultrasound services.Overall, pregnant women had differing opinions about antenatal ultrasound; while the majority viewed it as beneficial, some expressed concerns or fears about its safety. Studies in Uganda and Thailand, for example, indicated that certain respondents believed ultrasound could pose risks. However, healthcare providers generally regarded it as a valuable tool in pregnancy management. Additionally, both healthcare professionals and local women identified key barriers to the regular use of ultrasound, including a lack of equipment, limited trained personnel, high equipment costs, and maintenance challenges (Ali, Kabajaasi& Kawooya, 2021).In high-income countries, women can easily confirm pregnancy status using home pregnancy tests, which are widely available.

By contrast, in many sub-Saharan African countries, ultrasound services remain expensive and are often unavailable in public healthcare facilities. Despite this, some argue that the versatility and relatively low cost of antenatal ultrasound—compared to other imaging techniques—make it a viable option for routine use in low-income settings (Yetwale, Kabeto&Biyazin, 2022). In Kenya's public health sector, ultrasound scanning is rarely incorporated into routine focused antenatal care at district hospitals and rural health facilities, where most pregnant women receive care. Instead, gestational age is commonly determined based on the date of the last menstrual period (LMP). If this information is unclear or unavailable, healthcare providers rely on symphyseal-fundal height (SFH) measurements, which are converted into weeks using standard dating charts (Nakimera, 2020).Several challenges limit the use of ultrasound in developing

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countries. According to a World Health Organization report, women in sub-Saharan Africa continue to encounter barriers to early pregnancy screening due to a combination of individual health-seeking behaviors, healthcare facility limitations, and unclear national policies. Additional constraints include the high cost of ultrasound equipment, the fees charged for scans in private clinics, a shortage of trained sonographers and physicians, and the technical expertise required to perform the scans (Yetwale, Kabeto&Biyazin, 2022). The unequal distribution and high costs of obstetric ultrasound technology in resource-poor settings have further restricted access to early pregnancy scans.The World Health Organization acknowledges that midwives with comprehensive training can meet up to 87% of the healthcare needs of pregnant women and newborns. However, many developing countries face critical workforce shortages, exacerbated by limited government funding for hiring additional staff. In Kenya, for example, only 30% of the approximately 3,000 nurse-midwives who graduate annually secure formal employment (Matiangi& Joosse, 2021).Women in sub-Saharan Africa have yet to widely adopt early pregnancy ultrasound screenings due to various factors, including individual health-seeking behaviors, healthcare facility constraints, and gaps in national policy frameworks. In Kenya, only 62% of pregnant women have access to skilled care, with significant disparities between urban and rural populations—82% of urban pregnant women receive skilled care compared to just 50% in rural areas. Among the key barriers to high-quality antenatal care are insufficient diagnostic services, the cost of healthcare in primary facilities, and a shortage of trained healthcare professionals in underserved regions (Matiangi, Joosse &Ngunju, 2021).In 1997, the World Health Organization (WHO) estimated that half of the developing world lacked access to ultrasound imaging. Even in places where ultrasound was available, much of the equipment was either outdated or malfunctioning. Additional barriers to imaging access in urban areas included a shortage of trained maintenance technicians and the circulation of unregulated ultrasound machines, while rural areas faced even greater limitations due to a severe lack of healthcare and imaging resources. However, recognizing the benefits of ultrasound in low-resource settings has driven efforts to expand access, including increased availability of ultrasound machines, improved diagnostic capabilities, enhanced training programs, more research initiatives, and greater overall utilization of ultrasound in low- and middle-income countries (Stewart, Navarro & Kambala, 2020).

Several socio-demographic and clinical factors influence pregnant women's use of ultrasound services, including the availability of support systems, accessibility of healthcare facilities, and improved access to health information. Other factors identified in sub-Saharan Africa include the educational level of couples—particularly the head of the household—socioeconomic status, service coverage, income levels, distance to health facilities, perceived quality of care, and social support (Nakimera, 2020).Pregnant women's

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perceptions of prenatal ultrasound vary significantly, encompassing concerns about safety, perceived benefits, and personal motivations for seeking scans. While some women consent to ultrasound primarily for medical reasons, studies indicate that others request scans for non-medical purposes, such as seeing the baby, determining fetal sex, or reassuring their spouse about the pregnancy. These preferences are shaped by socio-demographic, obstetric, and attitudinal factors (Maniragena, Kasozi &Mubuuke, 2021).For many pregnant women, the primary reason for undergoing ultrasound screening is to monitor the baby's health. Expectant fathers also value the scan as a confirmation of the pregnancy's progress. Some parents use antenatal screening to prepare for the possibility of having a child with a disability or genetic disorder, while others seek the knowledge needed to make informed decisions about diagnostic tests (Omeye&Kajang, 2024).Ultrasound scans can make pregnancy feel more tangible, offering parents reassurance about the baby's well-being. Seeing the fetus on the screen often strengthens emotional connections between parents and their unborn child, reinforcing their roles as mother and father. Most women experience ultrasound as a positive event, though those with mixed feelings about their pregnancy may react differently. The healthcare professionals conducting the ultrasound play a crucial role in shaping parents' understanding of the scan and how they perceive their baby. In Finland, there is limited recent data on parental expectations and experiences regarding first-trimester ultrasound screenings (Molla, Mengistu &Wudneh, 2022).Across many countries, women consider ultrasonography a vital part of their antenatal care. Despite its well-documented benefits, misconceptions about the procedure have hindered widespread adoption in parts of Africa. Women's perceptions of antenatal ultrasound in sub-Saharan Africa vary greatly and are strongly linked to their level of education (Edzie&Dzefi-Tettey, 2020). In some African societies, cultural resistance persists due to traditional beliefs and superstitions. For example, some ethnic group's view revealing the contents of the womb as bad luck, and others believe that seeing the fetus before birth is inappropriate.However, in certain areas of sub-Saharan Africa, ultrasound is widely embraced and valued for its role in ensuring safer pregnancies and childbirth. In a rural district hospital in Botswana, for instance, pregnant women demonstrated greater trust in ultrasound results than in their own bodily sensations when confirming a live fetus (Edzie, Dzefi-Tettey &Gorleku, 2020). As imaging technology advances, there is growing potential to detect markers of uncertain significance, which may require careful interpretation and communication with expectant parents.While ultrasound offers numerous benefits, it has also raised concerns regarding over-diagnosis and the psychological impact on women and their partners, particularly when the significance of certain findings remains unclear.

Some critics highlight eugenic implications, as the detection of fetal abnormalities compels parents to choose between raising a child with disabilities or opting for termination—an option that may be

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unacceptable in certain social, cultural, or religious contexts. Additionally, in some communities, ultrasound-based sex determination has been linked to female feticide and potential gender imbalances, sparking ethical, moral, and gender equity debates (Moncrieff, Finlayson & Cordey, 2021).

2.2 Theoretical Framework

For this study, the Health Belief Model (HBM) will be utilized to enhance understanding of the research topic. Developed in the early 1950s by social scientists at the U.S. Public Health Service, the model was originally designed to explain why individuals failed to adopt disease prevention measures or undergo early screening for disease detection. Over time, its application has expanded to include patients' responses to symptoms and their adherence to treatment recommendations.The HBM proposes that an individual's perception of a personal health threat, combined with their belief in the effectiveness of a recommended health behavior, influences the likelihood of adopting that behavior. Rooted in psychological and behavioral theories, the model is based on two key principles:

1. The desire to avoid illness or recover if already sick.
2. The belief that a specific health-related action can prevent or cure illness.

Ultimately, a person's decision to engage in a health-promoting behavior is influenced by their perception of its benefits and barriers. The model consists of six constructs, with the first four forming its original foundation and the last two added as the theory evolved:

- **Perceived Susceptibility:** An individual's subjective assessment of their risk of contracting an illness or disease. Those who consider themselves at high risk are more likely to adopt preventive measures.
- **Perceived Severity:** A person's evaluation of how serious an illness or its consequences might be, including potential medical, social, and personal impacts. Individuals who perceive a health issue as severe are more motivated to take preventive action.
- **Perceived Benefits:** The belief in the effectiveness of a specific health action in reducing illness risk or improving health outcomes. A person is more likely to follow a recommended health behavior if they perceive its benefits to outweigh its risks.
- **Perceived Barriers:** The individual's perception of obstacles that might prevent them from adopting the recommended health behavior, such as cost, time, inconvenience, or potential side effects. This leads to a cost-benefit analysis, where the person weighs the effectiveness of the action against its perceived challenges.
- **Cues to Action:** Triggers that prompt individuals to take action, which may be internal (e.g., experiencing symptoms) or external (e.g., advice from healthcare providers, media reports, or witnessing illness in a family member).
- **Self-Efficacy:** Added to the model in 1980, this refers to a person's confidence in their ability to successfully perform the recommended health behavior. It is a key determinant in whether an individual will

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- take action to change their health behavior.

Application of Theory to the Study

Construct	Knowledge on Ultrasound Scan	Utilization of Ultrasound Scan
Perceived Susceptibility	Pregnant women perceive that they are at risk of complications of pregnancy and childbirth due to some anomalies, conditions, or factors.	They believe that they may have been exposed to previous complications in pregnancy and childbirth.
Perceived Severity	Pregnant women believe that the consequences of late identification of anomalies are significant enough to avoid.	They believe that the consequences of delayed identification of anomalies, with prior knowledge or experience, are significant enough to avoid.
Perceived Benefits	Pregnant women believe that recommended prenatal ultrasonography will improve pregnancy outcome, and reduce perinatal morbidity and mortality rates.	They believe that recommended prenatal ultrasonography will be of great benefit to them by preventing maternal and child morbidity and mortality, and enhancing their overall wellbeing later in life.
Perceived Barriers	Pregnant women identify no barriers to antenatal education on importance of ultrasound scans.	They identify barriers to its utilization as cultural and societal norms, personal and religious beliefs, lack of awareness, cost of service, attitude of healthcare providers, lack of spousal support; and explore ways to improve these barriers.

2.3 EMPIRICAL REVIEW

Knowledge on Ultrasound Scan

A cross-sectional study conducted by Abduljabbar et al. (2020) titled **"Knowledge, Attitudes, and Practice about Obstetric Ultrasonography Among Women Attending a University Hospital in Jeddah, Saudi Arabia"** involved 367 participants, including women visiting obstetric and gynecological outpatient clinics. Data collection was carried out through interviewer-administered

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questionnaires.The questionnaire included five sections assessing participants' knowledge, attitudes, practices, and socio-demographic characteristics. Statistical analysis was performed using **Microsoft Excel** and **IBM SPSS Statistics**. The average knowledge score on obstetric ultrasonography was **13.9±1.7**, with **343 women (93.0%)** demonstrating good knowledge and only **26 women (7.0%)** having poor knowledge. Additionally, **291 participants (78.9%)** believed that obstetric ultrasound does not cause congenital anomalies. The study also identified variations in knowledge scores based on factors such as educational background and occupation.Women with higher education, better employment, and higher monthly income demonstrated greater knowledge scores. Additionally, a positive correlation was observed between knowledge scores and both gravidity and parity.A **descriptive cross-sectional study** conducted by **Maniragena et al. (2021)** on **"Knowledge, Attitudes, and Practices of Pregnant Women Towards Obstetric Ultrasound at Mulago Hospital in Kampala, Uganda"** included **300 pregnant women** who visited the hospital for obstetric ultrasonography. Participants were recruited using a **consecutive sampling technique**, and data were gathered through **interviewer-administered questionnaires**. The collected data were analyzed quantitatively using **SPSS version 25.0**, with results presented in tables, percentages, and graphs. The study achieved a **100% response rate**, revealing that most participants had **good knowledge** about obstetric ultrasound. However, some held misconceptions regarding its **potential harm**. While the overall attitude was **positive**, actual **practices** related to ultrasound were poor.

The most commonly reported barriers were **long waiting times** and **lack of privacy**.A **cross-sectional study** by **Haile et al. (2024)** on **"Knowledge, Attitude, Barriers, and Associated Factors of Obstetric Ultrasound Among Pregnant Women in Public Hospitals in Ethiopia"** involved **422 pregnant women**, selected through **systematic random sampling**. Data collection was conducted using **structured questionnaires**, and analysis was performed using **Epi-Info 7.2 and SPSS 23**. **Bivariate and multivariate logistic regression** identified key factors influencing knowledge and attitude. The study found that **51.4%** of women had **good knowledge** of obstetric ultrasound, while **70.1%** had a **positive attitude** toward it. Significant factors associated with knowledge included **higher education (AOR=2.70; 95% CI: 0.21-35.23)**, **government employment (AOR=3.901; 95% CI: 1.92-7.90)**, and **previous ultrasound experience (AOR=1.966; 95% CI: 1.24-3.12)**. Similarly, factors associated with a positive attitude included **government employment (AOR=6.83; 95% CI: 2.43-19.18)**, **household income of 1000-5000 birr (AOR=5.31; 95% CI: 2.01-14.03)**, and **a history of congenital anomalies in previous births (AOR=21.07; 95% CI: 2.09-21.21)**. Among the reported barriers, **long waiting times (77.3%)** were the most frequently mentioned.An **institution-based cross-sectional study** by **Yetwale et al. (2023)** titled **"Pregnant Women's Knowledge of Prenatal Ultrasound in**

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Jimma Town Public Health Institutions, Ethiopia" surveyed **303 pregnant women** at **public healthcare facilities**. The sample size was determined using the **single population proportion formula**, and participants were selected through **proportional allocation** at hospitals and health centers. Data were entered into **Epi-Data version 3.1.1** and analyzed in **SPSS 21.0**. **Logistic regression analysis** was conducted to examine the relationship between explanatory and response variables, with results presented as **crude and adjusted odds ratios (AORs) at a 95% confidence interval**. The study found that **190 women (62.7%)** had **good knowledge** of obstetric ultrasound. Key factors significantly associated with knowledge included **residency, educational level, and a history of at least one abortion**.

UTILIZATION OF ULTRASOUND SCAN

A **descriptive survey** conducted by **Samuel et al. (2023)** on **"Utilization of Sonography Among Pregnant Women in Rivers State, Nigeria"** examined **770 pregnant women**, selected through a **multistage sampling technique**. Data collection was performed using a **structured questionnaire** with a **reliability coefficient of 0.79**. Statistical analysis was carried out using **SPSS version 23.0**, employing **percentages, frequencies, and chi-square tests**. The study revealed that **693 women (98.3%)** had undergone **sonography during pregnancy**, with **343 (48.7%)** having undergone it **three times**. The majority (**702 women, 99.6%**) had their ultrasound in the **second trimester**, with **693 (98.3%)** stating that it was recommended by healthcare providers. No significant association was found between **age, parity, educational background, religion, gender preference, and sonography utilization** among the participants.

A **descriptive cross-sectional study** by **Haile et al. (2023)** on **"Obstetric Ultrasound Screening Service Utilization Among Pregnant Women in Public Hospitals in Addis Ababa, Ethiopia"** surveyed **404 pregnant women**.

Participants were selected using **systematic and simple random sampling techniques**. **Bivariate and multivariable logistic regression** was applied to assess factors influencing ultrasound utilization. **Odds ratios (ORs) with a 95% confidence interval** were used, and statistical significance was determined at **$p < 0.05$**. The findings indicated that **70.3% of participants** had used **prenatal ultrasound services**. The primary reasons for undergoing ultrasound included **evaluating fetal health in pregnancy complications, determining gestational age and fetal position, and identifying fetal sex**. Key barriers to ultrasound utilization included **long waiting times, financial costs, the presence of student trainees, distance to healthcare facilities, and lack of privacy**.A **systematic review** by **Stewart et al. (2020)** on **"Trends in Ultrasound Use in Low- and Middle-Income Countries (LMICs)"**analyzed research from **electronic databases**, including **Medline OVID, EMBASE, and Cochrane**, with studies available in **English, French, and Spanish**. Excluded materials included **commentaries, opinion pieces, reviews, and book chapters**. The review categorized studies

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into two groups: **reported applications of ultrasound in LMICs** and **novel ultrasound studies**. A total of **6,276 articles** were initially screened, with **4,563 studies** included in the final review. Among them, **287 studies** focused on original or innovative ultrasound applications in LMICs. Approximately **70% of studies** originated from **Southeast Asia and sub-Saharan Africa**, with **sub-Saharan Africa** emerging as the leading region for **innovative ultrasound applications**. The review highlighted **educational initiatives, international collaborations, and funded research** as significant contributors to ultrasound advancements.

Challenges of Utilization of Ultrasound Scan

An **institution-based cross-sectional study** conducted by **Yetwale et al. (2022)** on **"Prenatal Ultrasound Utilization and Its Associated Factors Among Pregnant Women in Jimma Town Public Health Institutions, Ethiopia"** surveyed **303 pregnant women**. **Systematic sampling** was used to select participants attending **antenatal care (ANC) clinics** during data collection. **Logistic regression analysis** assessed the relationship between explanatory and response variables. The association between **dependent and independent variables** was presented as **crude and adjusted odds ratios (AORs) with a 95% confidence interval**. A p-value of **less than 0.05** in **multivariable logistic regression** indicated statistical significance. Results were presented through **narratives, figures, and tables**. The **prenatal ultrasound utilization rate** was **60.7% (95% CI: 55.4%-66%)**. Factors significantly associated with ultrasound utilization included **residency (AOR=6.09; 95% CI: 2.35-15.78)**, **low household income (AOR=0.159; 95% CI: 0.035-0.73)**, **history of at least one abortion (AOR=5.78; 95% CI: 1.89-17.64)**, and **knowledge of prenatal ultrasound (AOR=15.77; 95% CI: 6.39-38.92)**.A **descriptive cross-sectional study** by **Nakimera (2020)** on **"Factors Influencing Utilization of Ultrasound Scan Services Among Pregnant Mothers at Ndejje Health Center IV, Wakiso District"** involved **30 respondents**, selected through **simple random sampling**. The study used both **quantitative and qualitative methods**, collecting data through interviews. The findings highlighted key factors influencing ultrasound utilization among pregnant women.

While **all 30 participants (100%)** were aware of ultrasound scan services, only **20 (66.7%)** had used them once, and **10 (33.3%)** underwent an ultrasound in the **third trimester** due to factors such as **fear of ultrasound scans (21 participants, 70%)**, **fear of receiving a bad scan report (14 participants, 46.7%)**, and **lack of spousal support (18 participants, 60%)**. Facility-related barriers also played a role, with **20 participants (66.7%)** citing **equipment breakdowns and poor maintenance**, leading to **limited availability of services**. Additionally, **12 respondents (40%)** reported **long waiting times**, often exceeding **two hours**.A **cross-sectional study** by **Matiangi et al. (2021)** on **"Barriers and Enablers That Influence Utilization of Ultrasound Screening**

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Services Among Antenatal Women in Kajiado and Kisii Counties in Kenya" examined **366 women** in **late pregnancy** or who had **given birth within three months** before the survey. Data were collected through **interviews**, with **descriptive statistics** summarizing findings. **Bivariate and logistic regression analyses** were used to determine predictive variables, with **odds ratios (ORs) at a 95% confidence interval** assessing the strength of associations. The study found that **36% of the women** had delivered recently, about **half were aged 25-34 years**, **55% were housewives**, and **48% had completed secondary education**. Only **21% of respondents had undergone routine ultrasound screening before 24 weeks of gestation**. Factors such as **employment status, household income, education level, pregnancy/gestation stage, and distance to healthcare facilities** showed **statistical significance ($p<0.05$)** in influencing ultrasound utilization.

CHAPTER THREE
Research Methodology

This chapter outlines the research methodology, including the study design, study setting, target population, sample size determination, sampling technique, data collection instrument, validity and reliability of the instrument, data collection procedure, data analysis method, and ethical considerations.

3.1 Research Design

A cross-sectional descriptive study utilizing a quantitative approach was employed to evaluate the knowledge and utilization of ultrasound scans among pregnant women attending antenatal clinics at Orile-Agege General Hospital, Lagos State.

3.2 Study Setting

This study was conducted at Orile-Agege General Hospital, a public healthcare facility located in Orile-Agege, Lagos State, Nigeria. As a government-owned institution, the hospital provides affordable healthcare services to a wide segment of the population, including low-income families.Orile-Agege General Hospital is well-equipped with various facilities and medical equipment, including:

- Multiple wards catering to different patient needs, such as maternity, pediatric, and surgical wards.
- Operating theaters furnished with modern surgical tools.
- Intensive care units for critical patients.
- Diagnostic facilities, including ultrasound machines and X-ray equipment.
- A fully functional laboratory for a wide range of medical tests.

The hospital provides a comprehensive range of medical services, including:

- Outpatient and inpatient care in general medicine and surgery.
- Maternal and child health services, such as antenatal, postnatal, and pediatric care.
- Emergency services, including accident and emergency care.
- Specialist clinics covering cardiology, dermatology, ENT, and other specialties.
- Diagnostic services, including laboratory tests and radiology.

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- Pharmacy services, including medication dispensing.
- Immunization programs and reproductive health services.
- Health education and counseling, focusing on preventive care.

The hospital is staffed by qualified healthcare professionals, including doctors, nurses, pharmacists, and support staff, all committed to delivering quality healthcare to the community.Antenatal clinics are held twice a week, with an average of 80 pregnant women attending each session, totaling approximately 160 attendees weekly. Each clinic is facilitated by four to five midwives, with a total of around ten healthcare staff members conducting clinics every week.

3.3 Target Population

The study focused on pregnant women who attended antenatal clinics at Orile-Agege General Hospital in Lagos State.

Eligibility Criteria

Inclusion Criteria

Participants eligible for the study included:
i. Pregnant women aged 21 to 45 years present during the data collection period.
ii. Pregnant women within the specified age range who were willing to participate in the study.

Exclusion Criteria

Individuals excluded from the study included:
i. Pregnant women younger than 21 years or older than 45 years present during data collection.
ii. Pregnant women aged 21 to 45 years who declined participation in the study.

3.4 Sample Size Determination

The study participants were selected from the total number of pregnant women attending antenatal clinics weekly at Orile-Agege General Hospital. Given that the estimated weekly attendance was 160, the sample size was calculated using the Taro Yamane (1967) simplified formula, as shown below.

$n = N/(1+N(e)2)$

Where,

n = sample size 40

N = population under study (160)

e = margin of error/level of significance (0.05)

$n = 160/(1+160(0.05)2)$

$n = 160/(1+160(0.0025))$

$n = 160/(1+0.4)$

$n = 160/1.4$

$n = 114.3$

$n = 114$

Attrition rate = 10% of sample size (114) = 11.4

Total sample size = n + attrition rate = 114 + 11.4 = 125.4 = 125

Therefore, a total number of one hundred and twenty-five (125) pregnant women would participate in the study.

3.5 Sampling Technique

A convenience sampling technique was used to select one hundred and twenty-five (125) pregnant women attending antenatal clinic at Orile-Agege General Hospital in Lagos State.

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3.6 Instrument for Data Collection

A well-structured questionnaire was the instrument used for the data collection. The questionnaire contained open and close-ended questions classified into four (4) sections:

Section A: Socio-demographic data of respondents.

Section B: Respondents' knowledge on ultrasound scan.

Section C: Respondents' utilization of ultrasound scan.

Section D: Challenges of respondents' utilization of ultrasound scan.

3.7 Validity of Instrument

The questionnaire was developed using study objectives and research questions, as well as consultation of relevant literatures in addition to modification of questionnaires used in previous studies on related matters to ensure content validity. Each question was examined for content, coverage and relevance. Ambiguous items were reconstructed; amendments, suggestions and corrections were also strictly followed. Face validity was ensured by peer review and scrutinized by the research expert.

3.8 Reliability of Instrument

The reliability of the instrument was determined through a pilot study of the instrument among 11(10% of sample size) pregnant women attending antenatal clinics at Alimosho General Hospital in Lagos State, and corrections were made before the administration of instrument to the actual respondents. The Cronbach's alpha reliability coefficient of the instrument was 0.772, considering it to be acceptable.

3.9 Method of Data Collection

Structured and pretested questionnaires were used for data collection. After obtaining formal permission from the ethical committee of Orile-Agege General Hospital, questionnaires were distributed among the pregnant women using convenience sampling technique. The details of the study were explained to the respondents, and their consent was sought before participation. Clarity was made where necessary, and questionnaires were collected the same day after filling.

3.10 Method of Data Analysis

Upon completion of the filling of the questionnaires, they were collected and checked for completeness. Descriptive statistics of frequency counts, percentages, tables and charts was used for analysis of the data. The questionnaires collected were analyzed electronically with Statistical Package for Social Sciences version 25. Hypotheses were tested using Pearson's correlation coefficient and chi-square analysis. Chi-square test was used to test the association existing between variables. Statistical significance would be said to be achieved when p-value is <0.05.

3.11 Ethical Consideration

The research proposal and questionnaire were submitted to the ethical committee of Lagos State University Teaching Hospital (LASUTH). A letter of introduction was obtained from the department and taken to the Health Service Commission board for approval. All respondents were informed that the survey was voluntary, and that they did not have to participate if they chose not

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to, or could withdraw at any time. Respondents were assured that anonymity and confidentiality of responses would be maintained during and after data collection. All sources of data obtained in the study were acknowledged.

CHAPTER FOUR

Results of Findings

This chapter presents the analysis of the data collected for this study, utilizing Statistical Package for Social Sciences (SPSS) version 25 and Microsoft Office Excel 2010. Descriptive statistics, including frequencies, percentages, and bar charts, were used to organize and interpret the data.

A self-developed questionnaire consisting of 30 items was administered to a sample population of 125 pregnant women. However, the valid response rate was 97.6% (122 participants), and the analysis is presented accordingly.The following section includes frequency tables, percentage distributions, and bar charts, along with the analytical approach used to address the research questions.

4.1 Presentation and Analysis Of Data

TABLE 4.1: Respondents' Socio-Demographic Characteristics

Variables	Frequency (N=122)	Percentage (%)
Age		
21-25 years	30	24.6
26-30 years	33	27.0
31-35 years	27	22.1
36-40 years	24	19.7
41 years and above	8	6.6
Religion		
Christianity	86	70.5
Islam	34	27.9
Traditional	2	1.6
Ethnicity		
Yoruba	84	68.9
Igbo	31	25.4
Others (Itsekiri, Ijaw & Urhobo)	7	5.7
Educational level		
Primary	4	3.3
Secondary	45	36.9
Tertiary	73	59.8
Occupation		
Unemployed	21	17.2
Self-employed	46	37.7

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Employed	55	45.1
Average family income		
Less than #100,000	50	41.0
#100,000 - #300,000	64	52.5
#400,000 - #600,000	6	4.9
Above #600,000	2	1.6

Based on Table 4.1 above, the age distribution of participants indicates that 33 (27.0%) falls within the 26-30 years range, followed by 30 (24.6%) aged 21-25 years, 27 (22.1%) aged 31-35 years, 24 (19.7%) aged 36-40 years, and 8 (6.6%) aged 41 years and above. The mean age of the participants is 30.8 ± 1.5 years. In terms of religion, the majority, 86 (70.5%), identify as Christians, while 34 (27.9%) are Muslims, and 2 (1.6%) practice traditional religion. Regarding ethnic background, Yorubas make up the largest proportion at 84 (68.9%), followed by Igbos at 31 (25.4%), and 7 (5.7%) from other ethnic groups, including Itsekiris, Ijaws, and Urhobos. Education-wise, 73 (59.8%) of the Participants have attained a tertiary level of education, 45 (36.9%) have secondary education, while 4 (3.3%) have only primary education. Regarding employment status, 55 (45.1%) are employed, 46 (37.7%) are self-employed, and 21 (17.2%) are unemployed. For average family income, 64 (52.5%) of respondents earn between ₦100,000-₦300,000, while 50 (41.0%) earn less than ₦100,000. Additionally, 6 (4.9%) have an income range of ₦400,000-₦600,000, and 2 (1.6%) earn above ₦600,000.

Table 4.2: Respondents' Knowledge on Ultrasound Scan

Variables	**Parameters**	**Frequency (N=122)**	**Percentage (%)**
An ultrasound scan is a non-invasive medical test that uses high-frequency sound waves to create images of the developing baby and the mother's reproductive organs during pregnancy.	Strongly agree Agree Disagree	54 56 12	44.3 45.9 9.8

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Ultrasound scans are used to monitor the baby's growth and development, check for any abnormalities, estimate the due date, confirm the number of fetuses (single or multiple pregnancies), and assess the baby's position in the womb.	Strongly agree Agree Disagree	60 58 4	49.2 47.5 3.3
Ultrasound scans also evaluate the health of the placenta, amniotic fluid levels, and the position of the umbilical cord.	Strongly agree Agree Disagree Strongly disagree	33 34 30 25	27.0 27.9 24.6 20.5
During the first trimester, an ultrasound scan is often used to confirm pregnancy, check for a fetal heartbeat, determine the gestational age, and rule out ectopic pregnancy.	Strongly agree Agree Disagree	50 66 6	41.0 54.1 4.9

According to Table 4.2, a majority (54.1%) of participants agreed that ultrasound scans are commonly used during the first trimester to confirm pregnancy, detect a fetal heartbeat, estimate gestational age, and rule out ectopic pregnancy. Additionally, 41.0% strongly agreed, while 4.9% disagreed. Regarding second-trimester scans, 51.6% strongly agreed that ultrasounds are performed to evaluate the baby's organs, spine, limbs, facial features, and determine gender. Furthermore, 44.3% agreed, whereas 4.1% disagreed. Half of the participants (50.0%) strongly supported the notion that routine ultrasounds help identify malformations and obstetric complications, facilitating early decision-making for termination, appropriate birth management, and specialized neonatal care. Another 41.0% agreed, while 9.0% disagreed. Slightly less than half (49.2%) strongly affirmed that ultrasound scans monitor fetal growth and development, detect abnormalities, estimate due dates, confirm

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the number of fetuses, and assess fetal positioning. Additionally, 47.5% agreed, whereas 3.3% disagreed. In the third trimester, 46.7% acknowledged that ultrasounds are used to monitor fetal growth, check fetal position, and evaluate placenta and amniotic fluid health. Moreover, 24.6% strongly agreed, while 19.7% disagreed, and 9.0% strongly disagreed. Regarding the safety and non-invasive nature of ultrasound, 45.9% agreed, 44.3% strongly agreed, and 9.8% disagreed that ultrasounds utilize high-frequency sound waves to generate images of the baby and reproductive organs. Less than half (44.3%) agreed that ultrasounds are safe for both mother and baby, as no harmful effects have been recorded. Meanwhile, 37.7% strongly agreed, 12.3% disagreed, and 5.7% strongly disagreed. Additionally, 27.9% agreed, and 27.0% strongly agreed that ultrasounds evaluate placental health, amniotic fluid levels, and umbilical cord position, while 24.6% disagreed, and 20.5% strongly disagreed. Overall, the participants demonstrated a moderate level of knowledge regarding ultrasound scans.

Table 4.3: Respondents' Utilization of Ultrasound Scan

Variables	**Parameters**	**Frequency (N=122)**	**Percentage (%)**
How many ultrasound scans have you undergone during your current pregnancy?	1 2-3 4 or more	62 46 14	50.8 37.7 11.5
At what stage of this pregnancy did you have your first ultrasound scan?	First trimester. Second trimester.	40 82	32.8 67.2
What was the primary reason for your previous ultrasound scan?	- To check for fetal abnormalities. - To determine the baby's gender. - To monitor the baby's growth and development.	11 5 106	9.0 4.1 86.9
Who primarily decides when you will have an ultrasound scan during your	Myself. My healthcare provider. My husband.	20 95 7	16.4 77.9 5.7

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pregnancy?			
Do you agree that ultrasound scans are important for monitoring the health of your baby during pregnancy?	Yes Not sure	109 13	89.3 10.7
Do you use an ultrasound scan to determine your baby's gender?	Yes Not sure No	34 58 30	27.9 47.5 24.6
How satisfied are you with the ultrasound services you have received?	Satisfied Neutral	68 54	55.7 44.3
Do the results of your ultrasound scan(s) have any impact on the decisions you make in pregnancy?	Yes Not sure No	52 47 23	42.6 38.5 18.9

According to Table 4.3 above, about half (50.8%) of the respondents reported undergoing at least one ultrasound scan during their current pregnancy. Additionally, 37.7% had undergone 2-3 scans, while 11.5% had four or more scans during their pregnancy. Regarding the timing of their first ultrasound, 32.8% had their first scan in the first trimester, while the majority (67.2%) had their first scan in the second trimester. Most participants (86.9%) indicated that the primary reason for their ultrasound scan was to monitor fetal growth and development. Meanwhile, 9.0% stated it was to check for abnormalities, and 4.1% used it to determine the baby's gender. When asked who primarily decides when they undergo an ultrasound scan, the majority (77.9%) identified their healthcare provider as the main decision-maker. Additionally, 16.4% made the decision themselves, while 5.7% reported that their husband decided for them. The importance of ultrasound scans was acknowledged by 89.3% of the respondents, who agreed that it is essential for monitoring the baby's health during pregnancy. However, 10.7% were unsure. Regarding gender determination, 27.9% of respondents stated they used ultrasound scans to find out their baby's gender, while 47.5% were unsure, and 24.6% disagreed with this purpose. In terms of satisfaction with ultrasound services, 55.7% expressed satisfaction, while 44.3% remained neutral. Additionally, 42.6% of the participants stated that their ultrasound results influenced their pregnancy-related

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decisions, whereas 38.5% were unsure, and 18.9% disagreed that ultrasound results impacted their choices. Overall, the participants demonstrated a moderate level of ultrasound utilization during pregnancy.

Table 4.4: Challenges of Utilization of Ultrasound Scan among Respondents

Variables	Parameters	Frequency (N=122)	Percentage (%)
Cost of ultrasound scans.	Strongly agree	34	27.9
	Agree	38	31.1
	Disagree	30	24.6
	Strongly disagree	20	16.4
Poor access to ultrasound services.	Strongly agree	26	21.3
	Agree	32	26.2
	Disagree	40	32.8
	Strongly disagree	24	19.7
Lack of awareness.	Strongly agree	18	14.8
	Agree	20	16.4
	Disagree	51	41.8
	Strongly disagree	33	27.0
Cultural beliefs and societal norms.	Strongly agree	36	29.5
	Agree	46	37.7
	Disagree	30	24.6
	Strongly disagree	10	8.2
Fear and anxiety.	Disagree	47	38.5
	Strongly disagree	75	61.5
Poor attitude of ultrasound service providers.	Disagree	64	52.5
	Strongly disagree	58	47.5
Lack of spousal or family support.	Strongly agree	70	57.4
	Agree	52	42.6
Long waiting times at diagnostic centers.	Strongly agree	15	12.3
	Agree	16	13.1
	Disagree	47	38.5
	Strongly disagree	44	36.1

Based on Table 4.4 above, the majority of participants (61.5%) strongly disagreed that fear and anxiety influenced their utilization of ultrasound scans, while 38.5% disagreed, indicating that emotional concerns were not a significant barrier. However, lack of spousal or family support was identified as a major challenge, with 57.4% strongly agreeing and 42.6% agreeing that it influenced their use of ultrasound services. Regarding the attitude of ultrasound service

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providers, 52.5% disagreed, and 47.5% strongly disagreed, showing that provider behavior was not perceived as a major obstacle. Cultural beliefs and societal norms played a role, as 37.7% of respondents agreed, and 29.5% strongly agreed that these factors influenced their use of ultrasound scans, while 24.6% disagreed, and 8.2% strongly disagreed. The cost of ultrasound scans was another barrier, with 31.1% agreeing, and 27.9% strongly agreeing that it influenced their utilization, whereas 24.6% disagreed, and 16.4% strongly disagreed. Regarding access to ultrasound services, 26.2% of respondents agreed, and 21.3% strongly agreed that poor accessibility affected their usage. However, 32.8% disagreed, and 19.7% strongly disagreed. A lack of awareness was reported as a challenge by 16.4%, while 14.8% strongly agreed. However, 41.8% disagreed, and 27.0% strongly disagreed, indicating that most participants were adequately informed.Long waiting times at diagnostic centers were identified as a minor challenge, with 13.1% agreeing, and 12.3% strongly agreeing. However, 38.5% disagreed, and 36.1% strongly disagreed.

Key Barriers to Ultrasound Utilization among Participants:

- Lack of spousal or family support (57.4%)
- Cultural beliefs and societal norms (37.7%)
- Cost of ultrasound scans (31.1%)
- Limited access to ultrasound services (26.2%)
- Lack of awareness (16.4%)
- Long waiting times at diagnostic centers (13.1%)

These findings suggest that social, cultural, and financial factors were the main challenges affecting ultrasound utilization among the respondents.

4.2 Hypothesis Testing

Null Hypotheses:

- **H_{01}:** There is no significant association between educational attainment and knowledge of ultrasound scans among pregnant women attending antenatal clinics at Orile-Agege General Hospital.
- **H_{02}:** There is no significant association between knowledge of ultrasound scans and their utilization among pregnant women attending antenatal clinics at Orile-Agege General Hospital.

Analysis Plan:

- Significance Level (S.I.) = 0.05
- Decision Criterion:
  - If the p-value obtained from the correlation coefficient or chi-square test is less than 0.05, the null hypothesis is rejected, indicating a significant relationship between the variables.
  - If the p-value is greater than 0.05, the null hypothesis is not rejected, suggesting no significant relationship.

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Table 4.5: Testing of Research Hypothesis

		Educational Level	**Knowledge on Ultrasound Scan**
Educational Level	Pearson's Correlation Sig. (2-tailed) **N**	**1** **122**	.703 .000 **122**
Knowledge on Ultrasound Scan	Pearson's Correlation Sig. (2-tailed) **N**	.703 .000 **122**	**1** **122**

r=0.703; p-value is <0.00001. The result is significant at p < 0.05

Conclusion: There is a significant relationship between educational level and knowledge on ultrasound scan among pregnant women attending antenatal clinic at Orile-Agege General Hospital ($p < 0.05$).

Table 4.6: Testing of Research Hypothesis

Knowledge on Ultrasound Scan	**Utilization of Ultrasound Scan**					
	Did you undergo your first ultrasound scan in the first trimester?					
Ultrasound scans are used to monitor the baby's growth and development, and check for any abnormalities.	**Yes**	**No**	**X^2**	**df**	**p-value**	**Total**
Strongly agree /Agree	40	78				118 (96.7%)
Disagree /Strongly disagree	0	4				4 (3.3%)
Total	40 (32.8%)	82 (67.2%)	2.014	1	0.155854	**122 (100.0%)**

Chi-square value=2.014; df =1; p-value is 0.155854. The result is not significant at p<0.05

Conclusion: There is no significant relationship between knowledge and utilization of ultrasound scan among

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pregnant women attending antenatal clinic at Orile-Agege General Hospital ($p > 0.05$).

4.3 Answering Research Questions

Research Question 1: What is the level of knowledge on ultrasound scan among pregnant women attending antenatal clinic at Orile-Agege General Hospital? According to Table 4.2 above, more than half of the participants, 66 (54.1%), stated that ultrasound scans are commonly used in the first trimester to confirm pregnancy, detect a fetal heartbeat, determine gestational age, and rule out ectopic pregnancy. Additionally, 63 (51.6%) strongly agreed that ultrasound scans in the second trimester are performed to examine the baby's organs, spine, limbs, and facial features, as well as to determine the baby's gender.A total of 61 (50.0%) participants strongly agreed that routine ultrasonography aids in the early detection of malformations and obstetric complications, facilitating timely decisions regarding termination, appropriate birth management, and immediate transfer to specialized neonatal care units.

Similarly, 60 (49.2%) strongly affirmed that ultrasound scans help monitor fetal growth and development, detect abnormalities, estimate the due date, confirm single or multiple pregnancies, and assess fetal positioning in the womb.Moreover, 57 (46.7%) acknowledged that ultrasound scans during the third trimester are useful for monitoring fetal growth, determining fetal position, and ensuring the health of the placenta and amniotic fluid. Furthermore, 56 (45.9%) affirmed that ultrasound is a non-invasive medical imaging technique that utilizes high-frequency sound waves to create images of the developing baby and the mother's reproductive organs.In addition, 54 (44.3%) of respondents recognized ultrasound scans as safe for both the mother and baby, with no harmful effects attributed to the sound waves used in imaging. Lastly, 34 (27.9%) agreed that ultrasound scans help assess placental health, amniotic fluid levels, and umbilical cord positioning.Overall, the findings indicate that pregnant women attending antenatal clinics at Orile-Agege General Hospital possess a moderate level of knowledge regarding ultrasound scans.

Research Question 2: What is the level of utilization of ultrasound scan among pregnant women attending antenatal clinic at Orile-Agege General Hospital?

Based on Table 4.3 above, approximately half of the respondents, 62 (50.8%), reported undergoing an ultrasound scan during their current pregnancy. Additionally, 40 (32.8%) indicated that they had their first ultrasound scan during the first trimester. A significant majority, 106 (86.9%), stated that the primary purpose of their previous ultrasound scan was to monitor fetal growth and development.Furthermore, 95 (77.9%) identified their healthcare provider as the primary decision-maker regarding when they should undergo an ultrasound scan during pregnancy. Additionally, 34 (27.9%) reported using ultrasound scans to determine their baby's gender.Overall, these findings suggest that pregnant women attending antenatal clinics at Orile-Agege General Hospital demonstrate a moderate level of ultrasound scan utilization.

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Research Question 3: What are the challenges of utilization of ultrasound scan among pregnant women attending antenatal clinic at Orile-Agege General Hospital?

From table 4.4 above, it was gathered that more than half 70(57.4%) of the participants strongly affirmed that lack of spousal or family support influence their utilization of ultrasound scan; 46(37.7%) of them acknowledged that cultural beliefs and societal norms influence their utilization of ultrasound scan; 38(31.1%) affirmed that the cost of ultrasound scans influence their utilization of the scan; 32(26.2%) revealed that poor access to ultrasound services influence their utilization of ultrasound scan; 20(16.4%) revealed that lack of awareness influence their utilization of ultrasound scan; while 16(13.1%) affirmed that long waiting times at diagnostic centers influence their utilization of ultrasound scan. The challenges of utilization of ultrasound scan among pregnant women attending antenatal clinic at Orile-Agege General Hospital are lack of spousal/family support 70(57.4%); cultural beliefs and societal norms 46(37.7%); cost of ultrasound scans 38(31.1%); poor access to ultrasound services 32(26.2%); lack of awareness 20(16.4%); and long waiting times at diagnostic centers 16(13.1%).

CHAPTER FIVE

Discussion, Conclusion and Recommendations

This chapter examines the study's findings and compares them with relevant research conducted by other scholars. It also highlights the study's implications for midwifery practice, along with a summary, conclusion, recommendations, and suggestions for future research.

5.1 Discussion of Findings

Antenatal ultrasound is an integral component of routine prenatal care in developed nations and has become a vital tool in obstetric care. However, in developing countries, inadequate utilization of ultrasound scans to detect pregnancy complications contributes to persistently high rates of maternal and neonatal morbidity and mortality. This study, therefore, evaluated the knowledge and utilization of ultrasound scans among pregnant women attending antenatal clinics at Orile-Agege General Hospital, Lagos State.

Key Findings

Demographics

Over a quarter of the participants, 33 (27.0%), fall within the age range of 26-30 years, with a mean age of 30.8±1.5 years. The majority, 86 (70.5%), identify as Christians. The predominant ethnic group among the study population is Yoruba, accounting for 84 (68.9%) of the respondents. More than half, 73 (59.8%), have attained a tertiary level of education. Less than half, 55 (45.1%), are employed. Additionally, more than half, 64 (52.5%), report an average family income ranging from ₦100,000 to ₦300,000.

Objective 1: Evaluate knowledge on ultrasound scan among pregnant women attending antenatal clinic at Orile-Agege General Hospital, Lagos State

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The assessment of participants' knowledge of ultrasound scans indicated an overall moderate level of awareness. More than half, 66 (54.1%), acknowledged that ultrasound scans are commonly used in the first trimester to confirm pregnancy, detect a fetal heartbeat, determine gestational age, and rule out ectopic pregnancy. Additionally, 60 (49.2%) strongly affirmed that ultrasound scans play a role in monitoring fetal growth and development, identifying abnormalities, estimating the due date, determining the number of fetuses (single or multiple pregnancies), and assessing fetal positioning in the womb. Furthermore, 54 (44.3%) recognized ultrasound scans as a safe procedure for both the mother and baby, as no harmful effects have been associated with the sound waves used in imaging. Meanwhile, 34 (27.9%) agreed that ultrasound scans are also useful in evaluating the health of the placenta, assessing amniotic fluid levels, and determining the position of the umbilical cord.

Objective 2: Assess utilization of ultrasound scan among pregnant women attending antenatal clinic at Orile-Agege General Hospital, Lagos State

The evaluation of ultrasound scan utilization indicated a generally moderate level of use among participants. About half, 62 (50.8%), reported undergoing an ultrasound scan during their current pregnancy, while 40 (32.8%) had their first scan in the first trimester. The majority, 106 (86.9%), stated that their primary reason for undergoing an ultrasound scan was to monitor fetal growth and development. Additionally, 95 (77.9%) identified their healthcare provider as the primary decision-maker regarding when they should have an ultrasound scan during pregnancy. Meanwhile, 34 (27.9%) reported using ultrasound scans to determine their baby's gender.

Objective 3: Identify the challenges of utilization of ultrasound scan among pregnant women attending antenatal clinic at Orile-Agege General Hospital, Lagos State

The study identified several challenges affecting the utilization of ultrasound scans among participants, including lack of spousal or family support (57.4%), cultural beliefs and societal norms (37.7%), the cost of ultrasound scans (31.1%), limited access to ultrasound services (26.2%), lack of awareness (16.4%), and long waiting times at diagnostic centers (13.1%).

Comparison of Findings with Previous Studies

The assessment of participants' knowledge of ultrasound scans indicated a moderate level of awareness. This aligns with the findings of Haile et al. (2024), where slightly over half (51.4%) of respondents demonstrated good knowledge of obstetric ultrasound, with factors such as educational level, employment status, and previous ultrasound exposure influencing their awareness. However, the results of a study by Yetwale et al. (2023) differ slightly, as a majority (62.7%) of participants had a high level of knowledge about obstetric ultrasound, influenced by their area of residence, education level, and history of abortion. In contrast, Abduljabbar et al. (2020) reported significantly higher

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knowledge levels (93.0%), with most participants believing that ultrasound does not cause congenital anomalies. Similarly, Maniragena et al. (2021) found that most participants had strong knowledge of obstetric ultrasound, though some held misconceptions about its potential harm. The evaluation of ultrasound utilization revealed a moderate level of use among participants, similar to findings from Samuel et al. (2023), where 98.3% of respondents had undergone ultrasonography during pregnancy, mainly in the second trimester, as recommended by healthcare providers. Nearly half (48.7%) of participants had three ultrasound scans during pregnancy. However, Haile et al. (2023) reported higher utilization rates (70.3%), with respondents citing reasons such as monitoring fetal health during pregnancy complications, determining gestational age and fetal position, and identifying fetal sex. A review by Stewart et al. (2020) contradicts this study's findings, as ultrasound usage studies from Sub-Saharan Africa indicated higher adoption and innovative applications of ultrasound technology in the region.

The barriers to ultrasound utilization in this study—lack of spousal or family support (57.4%), cultural beliefs (37.7%), cost (31.1%), poor access to services (26.2%), lack of awareness (16.4%), and long wait times (13.1%)—are supported by Yetwale et al. (2022), where residence, low household income, and knowledge of prenatal ultrasound significantly influenced utilization rates. Similar findings were reported by Matiangi et al. (2021), where employment status, income, education, pregnancy stage, and distance to healthcare facilities played significant roles in ultrasound use. However, Nakimera (2020) reported differing results, with participants citing fear of ultrasound scans (70%), concerns about receiving bad news (46.7%), lack of spousal support (60%), long waiting times (40%), and poor access to ultrasound services (66.7%) as primary barriers. The study established a significant relationship between education level and knowledge of ultrasound scans ($p < 0.05$). This finding is consistent with Haile et al. (2024), which highlighted those women with higher education levels exhibited better knowledge of ultrasound scans. Similarly, Yetwale et al. (2023) found a strong association between education and prenatal ultrasound awareness. The findings of Abduljabbar et al. (2020) also align with this study, as their results indicated a significant correlation between respondents' knowledge scores and their educational level, with those having higher education demonstrating greater knowledge.

5.2 Implications for Midwifery Practice

This study highlights the level of knowledge and utilization of ultrasound scans among pregnant women. To enhance their awareness and usage, it is crucial to address the barriers limiting access to ultrasound services. One effective strategy is implementing community-based health education programs to raise awareness about the importance of ultrasound during pregnancy. Midwives can facilitate this by providing educational materials such as posters, leaflets, and videos in antenatal clinics to explain the benefits and safety of ultrasound scans. Additionally, midwives

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should advocate for the inclusion of routine ultrasound screening in national antenatal care guidelines and encourage early and regular scans during antenatal visits. Engaging partners and family members in antenatal care can foster a supportive home environment that promotes ultrasound utilization. To address cultural and religious barriers, midwives should collaborate with community and religious leaders to promote positive attitudes toward ultrasound scans. Misconceptions about ultrasound should be clarified through counseling and community discussions. Furthermore, midwives should monitor adherence to early ultrasound screening among pregnant women attending antenatal clinics.Healthcare organizations should ensure that primary healthcare centers are equipped with ultrasound machines to improve accessibility, particularly for women in rural areas. The introduction of mobile ultrasound services can help reach underserved communities, ensuring wider coverage. Additionally, midwives should advocate for subsidized or free ultrasound services for low-income pregnant women, improving access and reducing financial barriers.

5.3 Study Limitations

The study was limited in scope as it could not extend to other secondary healthcare facilities in Lagos State for a comparative analysis of knowledge and utilization of ultrasound scans among pregnant women attending antenatal clinics. This was due to time constraints and financial limitations.

5.4 Summary

This cross-sectional descriptive study examined the knowledge and utilization of ultrasound scans among pregnant women attending antenatal clinics at Orile-Agege General Hospital, Lagos State. The study aimed to assess their knowledge and utilization levels and identify barriers to ultrasound scan usage. A convenience sampling technique was employed to select 125 pregnant women, out of which 122 responses were validated for analysis. A self-developed questionnaire was used for data collection, and the gathered data were analyzed using frequency/percentage tables and charts via Statistical Package for Social Sciences (SPSS) version 25 and Microsoft Excel version 2010.The study findings indicated that pregnant women had a moderate level of knowledge and utilization of ultrasound scans. The primary barriers to ultrasound utilization included lack of spousal or family support (57.4%), cultural beliefs and societal norms (37.7%), high cost of scans (31.1%), limited access to ultrasound services (26.2%), lack of awareness (16.4%), and long waiting times at diagnostic centers (13.1%). Additionally, a significant relationship was found between educational level and knowledge of ultrasound scans ($p < 0.05$), whereas no significant relationship was observed between knowledge and utilization of ultrasound scans ($p > 0.05$).

5.5 Conclusion

This study provided insights into the knowledge and utilization of ultrasound scans among pregnant women. The findings revealed an overall fair level of awareness and usage, with slightly less than half

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(49.2%) strongly affirming that ultrasound scans are used for monitoring fetal growth, detecting abnormalities, estimating due dates, determining the number of fetuses, and assessing fetal positioning. Approximately half (50.8%) had undergone an ultrasound scan during their current pregnancy.The main barriers to utilization were lack of family/spousal support (57.4%), cultural beliefs and societal norms (37.7%), cost of scans (31.1%), poor access to ultrasound services (26.2%), lack of awareness (16.4%), and long waiting times at diagnostic centers (13.1%). The lack of a significant correlation between knowledge and utilization suggests the need for independent efforts to enhance both aspects through targeted interventions. To improve knowledge and utilization, efforts should focus on community-based health education programs highlighting the importance of ultrasound in pregnancy, promoting early and regular scans during antenatal visits, involving partners and family members in antenatal care, addressing cultural and religious barriers, advocating for subsidized or free ultrasound services, and enhancing accessibility to ultrasound scan facilities.

5.6 Recommendations

Based on the findings of this study, the following recommendations are suggested to enhance the knowledge and utilization of ultrasound scans among pregnant women attending antenatal clinics at Orile-Agege General Hospital, Lagos State:

1. Midwives should organize community-based health education programs to raise awareness about the importance of ultrasound scans during pregnancy.
2. Educational materials such as posters, leaflets, and videos should be provided in antenatal clinics to explain the benefits and safety of ultrasound scans.
3. Midwives should advocate for the inclusion of routine ultrasound screenings in national antenatal care guidelines.
4. Pregnant women should be encouraged to undergo early and regular ultrasound scans as part of their antenatal care.
5. Partners and family members should be involved in antenatal care to foster a supportive home environment for pregnant women.
6. Community and religious leaders should be engaged to address cultural and religious barriers and promote positive attitudes toward ultrasound scans.
7. Midwives should ensure compliance with early ultrasound screenings among pregnant women attending antenatal clinics.
8. Healthcare organizations should equip primary healthcare centers with ultrasound machines to improve accessibility, especially in rural areas.
9. Mobile ultrasound services should be introduced to reach underserved communities.
10. Efforts should be made to implement subsidized or free ultrasound services for low-income pregnant women.

5.7 Suggestions for Future Research

Due to financial and time constraints, the scope of this study was limited. Therefore, future research should extend to other secondary healthcare facilities in Lagos State for a broader assessment, ensuring

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more comprehensive and generalizable findings. Additionally, future studies could explore the quality of antenatal care services to provide a more in-depth understanding of maternal healthcare practices.

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