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FROM AWARENESS TO FINANCIAL READINESS: EVALUATING STRUCTURED PUBLIC HEALTH EDUCATION FOR CHILDBIRTH AND OBSTETRIC EMERGENCY PREPAREDNESS AMONG ANTENATAL CLINIC ATTENDEES IN DELTA NORTH, NIGERIA

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Abstract

Background: Financial preparedness is an important component of birth preparedness and complication readiness, particularly where inadequate resources may delay access to skilled obstetric care. This study examined the effect of structured public health education on financial preparation for childbirth and financial readiness for obstetric emergencies among antenatal clinic attendees in Delta North, Nigeria.

Methods: A cluster-based quasi-experimental pretest–posttest comparison-group design was employed among 168 antenatal clinic attendees recruited from eight public health facilities in Oshimili North and Oshimili South Local Government Areas, Delta State, Nigeria. Four facilities were assigned to the intervention group (n = 84), while four served as comparison facilities (n = 84). Participants were assessed at baseline, immediately after intervention and at eight-week follow-up using a structured Birth Preparedness and Complication Readiness questionnaire. Of the 168 participants recruited, 158 completed the follow-up assessment, representing a retention rate of 94.05**%**, while 10 participants (5.95%) were lost to follow-up. Descriptive statistics and baseline-adjusted analysis of covariance (ANCOVA) were used to evaluate intervention-associated differences in financial preparedness.

Results: Structured public health education was associated with significant improvements in financial preparation for childbirth at immediate post-intervention, $F(1, 155) = 37.22$, $p < .001$, partial $\eta^2 = .194$, and eight-week follow-up, $F(1, 155) = 66.16$, $p < .001$, partial $\eta^2 = .299$. Financial readiness for obstetric emergencies also showed a significant intervention-associated effect at eight-week follow-up, $F(1, 155) = 85.85$, $p < .001$, partial $\eta^2 = .356$. These findings indicate improvements in both financial preparedness domains, with intervention-associated differences remaining evident eight weeks after education.

Conclusion: Structured public health education was associated with improved financial preparedness for childbirth and obstetric emergencies. Integrating practical financial planning into routine antenatal education may strengthen maternal preparedness. However, improved self-reported preparedness does not necessarily establish adequate savings or the affordability of emergency obstetric care.

Keywords: Birth preparedness; complication readiness; financial preparedness; antenatal education; obstetric emergencies; quasi-experimental study; Nigeria.

Introduction

Maternal health remains a major global public health priority, particularly in low- and middle-income countries where preventable obstetric complications continue to contribute substantially to maternal morbidity and mortality. Although access to skilled maternity services is essential for improving maternal outcomes, the availability of healthcare facilities does not necessarily guarantee timely utilisation when women and their families face financial barriers. The World Health Organization and collaborating United Nations agencies estimated that approximately 260,000 women died from maternal causes globally in 2023, with sub-Saharan Africa accounting for approximately 70% of these deaths (WHO et al., 2025). The continuing burden of maternal mortality highlights the importance of addressing socioeconomic barriers that influence access to essential maternal healthcare. Evidence from recent African studies demonstrates that financial preparation remains an important component of birth preparedness and complication readiness, particularly where households must anticipate transportation and delivery-related expenses (Demsash et al., 2024). Furthermore, Kukula et al. (2024) demonstrated that structured antenatal interventions could improve practical preparedness activities, including saving money for transportation. These findings underscore the relevance of financial preparedness as an important consideration in maternal health promotion and the prevention of avoidable delays in obtaining obstetric care.

Across sub-Saharan Africa, financial constraints remain an important challenge to maternal healthcare utilisation because pregnant women may encounter direct medical expenses and indirect costs associated with transportation, referrals and other delivery-related requirements. The financial demands of childbirth become particularly concerning when unexpected complications require urgent assessment or treatment. In Ethiopia, Demsash et al. (2024) documented gaps in practical birth preparedness, including financial planning; demonstrating that knowledge of maternal healthcare requirements does not necessarily translate into adequate preparation. In Ghana, Kukula et al. (2024) reported improvements in financial and transportation preparedness following structured group antenatal care, suggesting that organised educational approaches may strengthen practical planning behaviours. However, financial preparedness also depends on household economic circumstances, access to support and the affordability of healthcare services. Consequently, antenatal education may encourage appropriate financial planning without necessarily eliminating the underlying economic constraints affecting women's ability to obtain skilled obstetric care.

In Nigeria, the importance of financial preparedness is closely associated with the economic realities surrounding pregnancy and childbirth. Women and their families may need to mobilise funds for antenatal services, transportation, delivery materials, medicines and other anticipated expenditures, while unexpected obstetric emergencies may introduce additional financial obligations. Akinwaare and Oluwatosin (2023) demonstrated that goal-oriented prenatal education improved birth preparedness and complication readiness among pregnant women in Nigeria, supporting the potential value of structured maternal health education. Similarly, Anikwe et al. (2020) documented deficiencies in BPCR among antenatal attendees in Abakaliki, including gaps in practical childbirth preparation. Evidence concerning the relationship between financial circumstances and the utilisation of skilled maternity care further indicates that maternal health knowledge must be considered alongside the resources required to act on that knowledge (Olowokere et al., 2020). These findings suggest that financial preparedness represents an important area for intervention within Nigerian antenatal services.

Within the broader framework of birth preparedness and complication readiness (BPCR), financial preparedness serves as an enabling component that supports other maternal health arrangements. Identifying a skilled birth attendant, selecting a delivery facility and arranging transportation may be insufficient if the resources required to implement these plans are unavailable when labour begins or complications occur. Financial preparedness therefore involves anticipating likely expenditures, identifying sources of funds and making practical arrangements to meet healthcare-related costs. Recent intervention evidence from Ghana indicates that structured antenatal care can improve specific preparedness activities, including financial planning (Kukula et al., 2024). Nigerian findings similarly demonstrate that targeted prenatal education can strengthen maternal preparedness beyond routine exposure to antenatal information (Akinwaare & Oluwatosin, 2023). Nevertheless, financial preparedness should not be equated with household wealth alone, because it also involves decisions concerning budgeting, resource mobilisation and family participation in childbirth planning.

A particularly important consideration is the distinction between financial preparation for childbirth and financial readiness for obstetric emergencies. Financial preparation for childbirth concerns anticipated expenses associated with routine delivery, including savings for healthcare services, transportation and essential materials. Financial readiness for obstetric emergencies, however, concerns the capacity to mobilise additional resources when unforeseen complications require urgent treatment, referral or specialised care. Although these constructs are related, they differ in the predictability of expenses, urgency of financial mobilisation and potential resources required. Evidence from Delta State demonstrates the importance of this distinction. Osaze et al. (2021) reported that the proportion of women saving money for anticipated delivery expenses was higher than the proportion preparing financially for emergency complications. This finding suggests that planning for routine childbirth does not necessarily indicate readiness to meet unexpected obstetric costs. The broader preparedness deficiencies documented by Anikwe et al. (2020) and the practical financial improvements reported by Kukula et al. (2024) further support the need to investigate these financial domains separately rather than treating them as interchangeable components of a composite BPCR measure.

Financial preparedness also has important implications for understanding delays in obtaining appropriate maternal healthcare. The Three Delays Model identifies delays in deciding to seek

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care, reaching appropriate healthcare facilities and receiving adequate treatment as important contributors to adverse maternal outcomes (Thaddeus & Maine, 1994). Financial difficulties may influence these stages when women or their families must obtain money for transportation, medicines, investigations or emergency treatment before appropriate care can be accessed. Although recognising obstetric danger signs may encourage timely healthcare-seeking, such recognition may not translate into effective action when financial resources are unavailable. Olowokere et al. (2020) identified cost-related considerations affecting the utilisation of skilled maternity services in Nigeria, while Kukula et al. (2024) demonstrated that practical preparedness activities could improve following structured antenatal intervention. These findings support financial planning as a potentially useful component of maternal health education, although education alone cannot resolve structural barriers associated with poverty or healthcare financing.

Evidence from Delta State provides a more specific justification for investigating financial preparedness among pregnant women. Osaze et al. (2021), in a study involving rural communities, reported that 48.7% of respondents were prepared for birth and 42.9% were prepared for complications. Only 36.7% had saved money for delivery expenses, while 26.6% had saved funds for emergency complications. These findings reveal important deficiencies in financial planning and indicate that preparation for routine childbirth expenses may be more common than financial readiness for unexpected complications. The study also identified variations in preparedness associated with socioeconomic and community characteristics, suggesting that women's financial circumstances and local environments may influence their ability to make appropriate arrangements. Although the findings provide valuable evidence concerning maternal preparedness in Delta State, they do not establish whether structured public health education can improve these financial behaviours or whether improvements can be maintained after intervention.

The relevance of this problem becomes more pronounced among antenatal clinic attendees in Oshimili North and Oshimili South Local Government Areas of Delta North Senatorial District. These women constitute an important population because pregnancy presents a period during which financial arrangements can be discussed, initiated and reviewed before childbirth. Antenatal attendance provides opportunities for receiving information about delivery requirements, possible complications and the importance of financial planning. However, receiving such information does not necessarily guarantee that women have adequate savings or access to emergency financial assistance. Evidence from Delta State demonstrates existing deficiencies in childbirth and complication preparedness (Osaze et al., 2021). More recent research in Oshimili South also identifies challenges relating to the translation of preparedness knowledge into practical arrangements among women accessing primary healthcare services (Akpovienehe & Odikpo, 2026). These findings make the selected LGAs particularly relevant for examining whether structured public health education can strengthen financial preparedness among women already accessing antenatal services.

The selection of antenatal clinic attendees is also justified by the opportunities offered through routine maternal healthcare delivery. Public antenatal clinics provide established settings for repeated contact between pregnant women and healthcare professionals, allowing financial planning messages to be incorporated into existing health education activities. Such education

may encourage women to identify anticipated delivery costs, discuss financial responsibilities with household members, consider available savings arrangements and identify potential sources of emergency assistance. Akinwaare and Oluwatosin (2023) demonstrated the effectiveness of goal-oriented prenatal education in strengthening maternal preparedness among Nigerian women. Similarly, Kukula et al. (2024) reported improvements in practical preparedness activities following structured group antenatal care. Nevertheless, the effectiveness of these approaches in improving specific financial preparedness outcomes among antenatal attendees in Delta North requires empirical investigation, particularly because women's ability to implement financial plans may be influenced by household income, family support and other contextual circumstances.

The inclusion of public health facilities across Oshimili North and Oshimili South also provides an opportunity to examine financial preparedness within the healthcare environments where maternal education is routinely delivered. Women attending these facilities may differ in employment, income, previous childbirth experiences, household decision-making and access to financial support. These circumstances are relevant because financial preparedness requires more than understanding the importance of saving; it involves the practical organisation of resources before childbirth and potential emergencies. The socioeconomic variations identified by Osaze et al. (2021) suggest that financial preparedness may be influenced by contextual characteristics within Delta State. Similarly, the educational improvements demonstrated by Akinwaare and Oluwatosin (2023) indicate that antenatal interventions may provide opportunities for strengthening preparedness-related behaviours. Studying women in these facilities is therefore relevant to the development of maternal health education approaches that are responsive to the practical needs of antenatal service users.

Evidence from intervention studies further supports examining structured public health education as a strategy for improving financial preparedness. In Nigeria, Akinwaare and Oluwatosin (2023) reported significant improvements in birth preparedness and complication readiness following goal-oriented prenatal education. In Ghana, Kukula et al. (2024) demonstrated that structured group antenatal care improved several practical preparedness activities, including saving money for transportation, which increased from 19% to 73% in the intervention group compared with 19% to 32% among women receiving individualised care. These findings suggest that structured education may strengthen practical maternal health planning rather than knowledge alone. However, the reported outcomes largely concern broader BPCR measures or selected financial activities, leaving uncertainty about whether educational interventions produce comparable improvements in financial preparation for routine childbirth and financial readiness for obstetric emergencies.

The theoretical basis for examining financial preparedness can be understood through the Health Belief Model and the Theory of Planned Behaviour. The Health Belief Model suggests that individuals' health-related decisions are influenced by perceived susceptibility, severity, benefits and barriers (Rosenstock et al., 1988), while the Theory of Planned Behaviour emphasises attitudes, subjective norms and perceived behavioural control (Ajzen, 1991). Applied to financial preparedness, these perspectives suggest that pregnant women may become more willing to organise resources when they understand the consequences of inadequate preparation and perceive financial planning as beneficial and achievable. However, behavioural intentions may

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be constrained by income, household responsibilities and access to financial support. The intervention findings of Akinwaare and Oluwatosin (2023) and Kukula et al. (2024) support the potential relevance of education in strengthening preparedness, although the specific theoretical pathways through which improvements occur require direct measurement before causal mechanisms can be established.

Despite growing evidence on birth preparedness and complication readiness, important gaps remain concerning the financial dimensions of maternal preparedness. Existing studies frequently assess financial planning as one component of a broader BPCR index, making it difficult to determine whether preparation for routine childbirth expenses and financial readiness for unexpected obstetric complications respond differently to structured education. Furthermore, descriptive evidence from Delta State demonstrates deficiencies in financial preparedness but provides limited information concerning intervention-associated changes over time. Although educational interventions in Nigeria and Ghana have demonstrated improvements in maternal preparedness, their findings do not fully establish the magnitude and persistence of changes in these two financial domains among antenatal clinic attendees in Delta North. Addressing this gap is important for developing antenatal programmes that distinguish routine delivery planning from the additional financial demands associated with obstetric emergencies.

The present study therefore examined the effect of structured public health education on financial preparation for childbirth and financial readiness for obstetric emergencies among antenatal clinic attendees in eight public health facilities in Oshimili North and Oshimili South Local Government Areas, Delta North Senatorial District, Nigeria. Using a cluster-based quasi-experimental pretest–posttest comparison-group design, the study assessed both constructs at baseline, immediately after intervention and eight-week follow-up. By evaluating these related but distinct dimensions of financial preparedness, the investigation seeks to provide context-specific evidence concerning the contribution of structured education to maternal financial planning. The findings may inform the integration of practical financial preparedness messages into routine antenatal education while highlighting the importance of complementary financial protection and maternal healthcare support mechanisms.

Literature Review and Theoretical Framework

Financial preparedness for childbirth and obstetric emergencies represents an important intersection between maternal health knowledge, household economic capacity and the ability to obtain timely obstetric care. Although birth preparedness and complication readiness (BPCR) interventions encourage women to anticipate delivery requirements, financial preparation is influenced by circumstances that extend beyond individual awareness. Recent intervention evidence from Ghana demonstrates that structured antenatal education can improve practical preparedness activities, including saving money for transportation (Kukula et al., 2024). Similarly, Akinwaare and Oluwatosin (2023) established that goal-oriented prenatal education could strengthen birth preparedness among Nigerian pregnant women. However, the extent to which education improves financial preparation for anticipated childbirth expenses and financial readiness for unexpected obstetric complications remains insufficiently established among antenatal clinic attendees in Delta North. This review therefore examines the conceptual distinctions between these financial domains, evaluates relevant empirical evidence and develops

a theoretical explanation for how structured public health education may influence financial preparedness within the socioeconomic circumstances of the target population.

Financial Preparation for Childbirth and Obstetric Emergencies

Financial preparedness is an essential component of BPCR because childbirth requires arrangements that extend beyond identifying skilled birth attendants and appropriate delivery facilities. Pregnant women and their families may need to anticipate transportation expenses, delivery-related payments, medicines and essential materials before labour begins. In Abakaliki, Anikwe et al. (2020) documented deficiencies in practical birth preparedness despite women's exposure to antenatal services, indicating that awareness of childbirth requirements does not necessarily translate into adequate preparation. More recent evidence from Ghana demonstrates that financial planning activities can respond to structured antenatal interventions (Kukula et al., 2024). These findings suggest that financial preparedness should be examined as practical maternal health behaviour rather than merely as an indication of general BPCR knowledge.

Within this broader construct, financial preparation for childbirth concerns anticipated expenditure associated with routine delivery, while financial readiness for obstetric emergencies involves arrangements for obtaining additional resources when unforeseen complications arise. The distinction is important because planned childbirth expenses are relatively predictable, whereas emergency treatment may require immediate access to funds for referral, investigations, transportation or specialised obstetric care. Osaze et al. (2021), studying women in Delta State, reported that 36.7% had saved money for childbirth compared with 26.6% who had saved for emergency complications. This difference indicates that routine delivery preparation may be more developed than emergency financial readiness. The finding also suggests that assessing financial preparedness through a single composite indicator may conceal important differences between the two domains.

The distinction becomes particularly relevant when financial planning is considered alongside the actual resources available to pregnant women. Although education may improve knowledge of delivery expenses and the importance of saving, the ability to implement such recommendations depends partly on household income, competing financial obligations and access to family assistance. Olowokere et al. (2020) identified financial considerations among the factors affecting skilled maternity care utilisation in Nigeria, demonstrating that economic circumstances can constrain healthcare-seeking even where women recognise the importance of professional care. Consequently, financial preparedness should be understood as the interaction between planning-related knowledge and the practical opportunity to mobilise resources. This understanding provides a basis for examining whether structured public health education can improve preparedness-related responses without assuming that education independently removes economic barriers.

Empirical Evidence on Financial Preparedness and Educational Interventions

Evidence from Nigeria indicates that inadequate financial preparedness remains a concern among pregnant women accessing maternal healthcare services. Anikwe et al. (2020) reported gaps in BPCR among antenatal attendees in Abakaliki, highlighting the difference between

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receiving maternal health information and making practical childbirth arrangements. In Delta State, Osaze et al. (2021) identified deficiencies in savings for both routine delivery and obstetric emergencies, providing evidence that financial preparedness remains incomplete within the broader geographical setting of the present investigation. These studies demonstrate the existence of the problem but offer limited evidence concerning whether structured education can improve the two financial domains over time.

Intervention research provides a basis for examining this possibility. Akinwaare and Oluwatosin (2023) reported improvements in birth preparedness and complication readiness following goal-oriented prenatal education among Nigerian pregnant women. Their findings support the potential effectiveness of structured educational approaches in strengthening maternal preparedness. However, improvements in overall BPCR do not necessarily establish equivalent changes in every component, particularly where financial planning depends on household resources. This limitation makes it important to examine financial preparation for childbirth and emergency financial readiness as separate outcomes rather than infer their improvement from composite preparedness scores.

Evidence from Ghana provides further insight into the practical effects of antenatal education. Kukula et al. (2024) reported that saving money for transportation increased from 19% to 73% among women receiving structured group antenatal care, compared with an increase from 19% to 32% among those receiving individualised care. The findings demonstrate that educational interventions may influence practical financial arrangements rather than knowledge alone. Nevertheless, transportation savings represent only one component of financial preparedness and do not establish whether women have resources for routine delivery expenses or unexpected obstetric emergencies. The distinction is particularly relevant to the present study because the two financial outcomes involve different levels of predictability, urgency and resource mobilisation.

Further Nigerian intervention evidence suggests that financial preparedness may improve when educational messages are linked to practical support mechanisms. Ekabua et al. (2020) examined a community-based behavioural intervention involving health education, emergency transportation arrangements and a fund-saving mechanism. The intervention demonstrated improvements in preparedness-related behaviours, including financial planning. This finding suggests that educational interventions may be more effective when women are supported in translating information into achievable actions. However, interventions incorporating community savings mechanisms differ from education delivered through routine antenatal clinics. It therefore remains necessary to determine whether structured public health education, within existing maternal healthcare services, is associated with improvements in the financial preparedness of antenatal attendees.

The evidence also raises questions about the persistence of educational effects. Improvements measured immediately after intervention may reflect increased awareness or favourable responses to educational messages without establishing that financial arrangements remain in place several weeks later. Akinwaare and Oluwatosin (2023) demonstrated the potential of structured prenatal education to strengthen preparedness, while Kukula et al. (2024) provided evidence concerning practical preparedness outcomes under organised antenatal care. However,

these findings do not fully resolve whether improvements in routine childbirth financial preparation and emergency financial readiness remain measurable at subsequent assessments among women attending public health facilities in Delta North. This limitation supports the use of repeated assessments in the present investigation.

Relevance of Existing Evidence to Antenatal Clinic Attendees in Delta North

The relevance of financial preparedness to antenatal clinic attendees in Oshimili North and Oshimili South extends beyond the general importance of saving money for childbirth. These women are already accessing formal maternal healthcare services and therefore represent a population that can receive structured financial preparedness education through existing antenatal arrangements. However, clinic attendance does not necessarily indicate that adequate financial preparations have been made. Osaze et al. (2021) documented deficiencies in childbirth and emergency savings among women in Delta State, suggesting that practical financial preparedness requires attention even within communities where maternal health information may be available. The findings establish a local justification for investigating whether educational engagement can strengthen financial planning among pregnant women.

The socioeconomic circumstances of antenatal attendees are equally important because the ability to prepare financially may depend on household income, employment, partner participation and access to support. Evidence from Delta State indicates that preparedness varies according to socioeconomic and community characteristics (Osaze et al., 2021). More geographically specific research involving pregnant women in Oshimili South also identifies barriers affecting the translation of preparedness knowledge into practical arrangements (Akpovienehe & Odikpo, 2026). These findings suggest that women may recognise the need for financial preparation but experience difficulties implementing recommended arrangements. Consequently, an intervention designed for this population must be evaluated not only for its educational contribution but also with an understanding that financial preparedness is shaped by circumstances beyond individual knowledge.

The selected antenatal population also provides an important opportunity to examine whether structured education can influence preparedness before childbirth occurs. Antenatal clinics allow repeated contact between pregnant women and healthcare professionals, creating opportunities to discuss anticipated delivery costs, emergency expenses and potential sources of financial assistance. Akinwaare and Oluwatosin (2023) demonstrated that organised prenatal education could strengthen preparedness among Nigerian women, supporting the relevance of this delivery approach. Nevertheless, their findings do not establish whether the same intervention-associated improvements occur in the two specific financial domains among antenatal attendees in Oshimili North and Oshimili South. This constitutes an important contextual gap because the effectiveness of education may depend on the characteristics of the population and the healthcare environment in which it is delivered.

Theoretical Framework: Health Belief Model

The Health Belief Model (HBM) provides a useful explanation of how perceptions of health risks and anticipated benefits may influence preparedness-related behaviour. The model proposes

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that health actions are influenced by perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self-efficacy (Rosenstock et al., 1988). In relation to financial preparedness, perceived susceptibility concerns recognition that complications may arise during pregnancy or childbirth, while perceived severity concerns understanding the possible consequences of delayed treatment. Perceived benefits relate to the advantages of advance financial planning, whereas perceived barriers may include inadequate income, competing household expenses and limited access to assistance.

The model is relevant to the present investigation because structured public health education may influence how pregnant women perceive the importance of preparing financially for childbirth and emergencies. Educational discussions can provide cues to action by encouraging women to anticipate likely expenses, identify sources of funds and discuss financial responsibilities with family members. The improvements in maternal preparedness reported by Akinwaare and Oluwatosin (2023) are consistent with the potential contribution of structured education to preparedness-related decisions. However, the HBM does not fully explain why women who understand the benefits of financial planning may remain unable to implement those plans. This limitation is particularly important in settings where financial opportunity is constrained by household economic circumstances.

Complementary Theoretical Framework: COM-B Model of Behaviour

The Capability, Opportunity, Motivation–Behaviour (COM-B) Model offers a complementary explanation by recognising that behaviour depends on the interaction of capability, opportunity and motivation (Michie et al., 2011). Capability refers to the knowledge and skills required to perform a behaviour, opportunity concerns the physical and social conditions that make the behaviour possible, and motivation encompasses the processes influencing willingness and commitment to act. Unlike approaches that concentrate primarily on perceptions or intentions, COM-B explicitly recognises that behavioural implementation depends on opportunities available within the individual's environment.

Applied to financial preparedness, capability concerns women's understanding of anticipated delivery expenses, emergency healthcare costs and practical financial planning strategies. Opportunity concerns the availability of household resources, access to savings, financial assistance and supportive family relationships. Motivation concerns willingness to prepare financially, recognition of potential risks and commitment to making arrangements before childbirth. The practical improvements reported by Kukula et al. (2024) suggest that structured antenatal education may strengthen preparedness-related capability and motivation. However, the socioeconomic barriers identified by Osaze et al. (2021) indicate that opportunity may remain constrained even where women understand the importance of financial preparation.

The COM-B Model is particularly relevant to the distinction between routine childbirth financial preparation and emergency financial readiness. Women may possess sufficient knowledge and motivation to estimate expected delivery costs but lack access to additional resources when complications arise unexpectedly. Similarly, they may identify potential financial assistance without having confirmed that such assistance will be available when needed. The model therefore provides a basis for explaining why the two financial domains may respond differently

to structured education. Nevertheless, the present investigation did not independently measure capability, opportunity and motivation as separate mediating variables. COM-B is consequently employed as an explanatory framework rather than as a model whose behavioural pathways were directly tested.

Integration of the Frameworks and Research Gap

The Health Belief Model and COM-B Model offer complementary explanations for the relationship between structured public health education and financial preparedness. The HBM explains why pregnant women may recognise the importance of preparing for childbirth and obstetric emergencies, while COM-B explains why recognition and motivation may not necessarily result in practical financial arrangements. Their integration suggests that education may strengthen financial preparedness by improving knowledge, encouraging anticipation of expenses and promoting deliberate planning, while the implementation of these behaviours remains influenced by household resources and social support. The relevance of this interpretation is supported by the educational improvements reported by Akinwaare and Oluwatosin (2023). The financial preparedness differences documented by Osaze et al. (2021) further demonstrate why economic opportunity must be considered alongside educational exposure.

Despite the available evidence, a specific gap remains concerning the effect of structured public health education on financial preparation for childbirth and financial readiness for obstetric emergencies among antenatal clinic attendees in Oshimili North and Oshimili South. Existing Delta State studies demonstrate deficiencies in financial preparedness but do not establish intervention-associated changes in these two domains. Nigerian intervention evidence supports the effectiveness of structured education for broader BPCR outcomes, yet it does not adequately distinguish routine childbirth financial preparation from emergency financial readiness. Evidence from Ghana demonstrates improvements in selected financial activities, but differences in healthcare settings and intervention approaches limit direct application to the present population. Furthermore, the persistence of improvements at eight-week follow-up remains insufficiently established for these two outcomes in the selected Delta North facilities.

The present study addresses this gap by evaluating both financial domains among antenatal clinic attendees exposed to structured public health education and those receiving routine antenatal care. The Health Belief Model provides a basis for understanding the perceived importance of financial preparation, while COM-B provides a broader explanation of how knowledge, motivation and available resources may influence preparedness-related behaviour. By examining intervention-associated differences at baseline, immediate post-intervention and eight-week follow-up, the investigation seeks to determine whether structured education strengthens measured financial preparedness within the circumstances of the target population. The findings may inform the development of antenatal education programmes that incorporate practical financial planning while recognising the need for complementary household support and affordable maternal healthcare services.

Method

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Study Design and Setting

The study adopted a cluster-based quasi-experimental pretest–posttest comparison-group design to examine the effect of structured public health education on financial preparedness for childbirth and obstetric emergencies. It was conducted in eight public health facilities across Oshimili North and Oshimili South Local Government Areas of Delta North Senatorial District, Delta State, Nigeria. Four facilities constituted the intervention group, while four served as comparison facilities. Financial preparedness was assessed at baseline, immediately after the educational intervention and eight weeks later.

Study Population and Sampling

The study population comprised pregnant women attending antenatal clinics in the selected public health facilities. A total of 168 participants were recruited, comprising 84 women from intervention facilities and 84 from comparison facilities. Multistage sampling involved purposive selection of Delta North Senatorial District, selection of two local government areas and identification of eight eligible public health facilities. Systematic random sampling was subsequently employed to recruit 21 antenatal attendees from each facility using antenatal attendance registers. Facilities, rather than individual participants, formed the intervention and comparison clusters.

Intervention Procedures

Participants in the intervention facilities received structured public health education alongside routine antenatal care, while those in comparison facilities continued receiving routine services. The educational programme addressed birth preparedness and complication readiness, including identification of skilled birth attendants, appropriate delivery facilities, essential childbirth materials, transportation arrangements, obstetric danger signs and emergency referral procedures. For the present analysis, attention was directed towards education concerning anticipated childbirth expenses, financial planning, savings arrangements, family financial support and access to resources during obstetric emergencies. Assessments were conducted before the intervention, immediately afterwards and at eight-week follow-up.

Research Instrument and Outcome Measures

Data were obtained using the structured Birth Preparedness and Complication Readiness questionnaire developed for the parent study. The present analysis focused on two four-item domains: financial preparation for childbirth (C4) and financial readiness for obstetric emergencies (C8). The former assessed arrangements for anticipated delivery expenses, including savings and financial support, while the latter examined emergency savings, access to financial assistance and arrangements for meeting unexpected obstetric healthcare costs. The parent study reported a Cronbach's alpha coefficient of 0.78 for its research instrument. Higher domain scores represented greater measured preparedness; however, questionnaire responses did not independently verify actual savings or the adequacy of available funds.

Data Analysis

Descriptive statistics were used to summarise participants' financial preparedness at baseline, immediate post-intervention and eight-week follow-up. Mean scores and standard deviations were examined for both study groups. Baseline-adjusted analysis of covariance (ANCOVA) was used to assess intervention-associated differences in the two financial preparedness outcomes at immediate post-intervention and follow-up. Statistical significance was evaluated at the 0.05 level, with F statistics, p-values and partial eta-squared (η^2) used to report adjusted group differences and effect sizes. The analytical sample for each ANCOVA and the treatment of facility clustering require confirmation against the original statistical output.

Ethical Considerations

Ethical approval was obtained from the Ministry of Health Ethics Committee, Asaba, Delta State (Approval No. **HRC.10206/1/T/28**), and the Health Research Ethics Committee of Federal Medical Centre, Asaba, Delta State (Approval No. **NHREC/TR/FMCASABA-HREC/31/7/24/250**), before data collection commenced. Administrative permission was also obtained from the management of the participating health facilities. Written informed consent was obtained from all participants after explaining the study objectives, procedures and voluntary nature of participation. Participants were informed of their right to withdraw without affecting their access to healthcare services. Confidentiality was maintained through the use of identification codes, secure data storage and restricted access to research information. Participants in the comparison facilities continued receiving routine antenatal care, and educational materials were subsequently made available to these facilities. The study adhered to the ethical principles of the Declaration of Helsinki.

Results

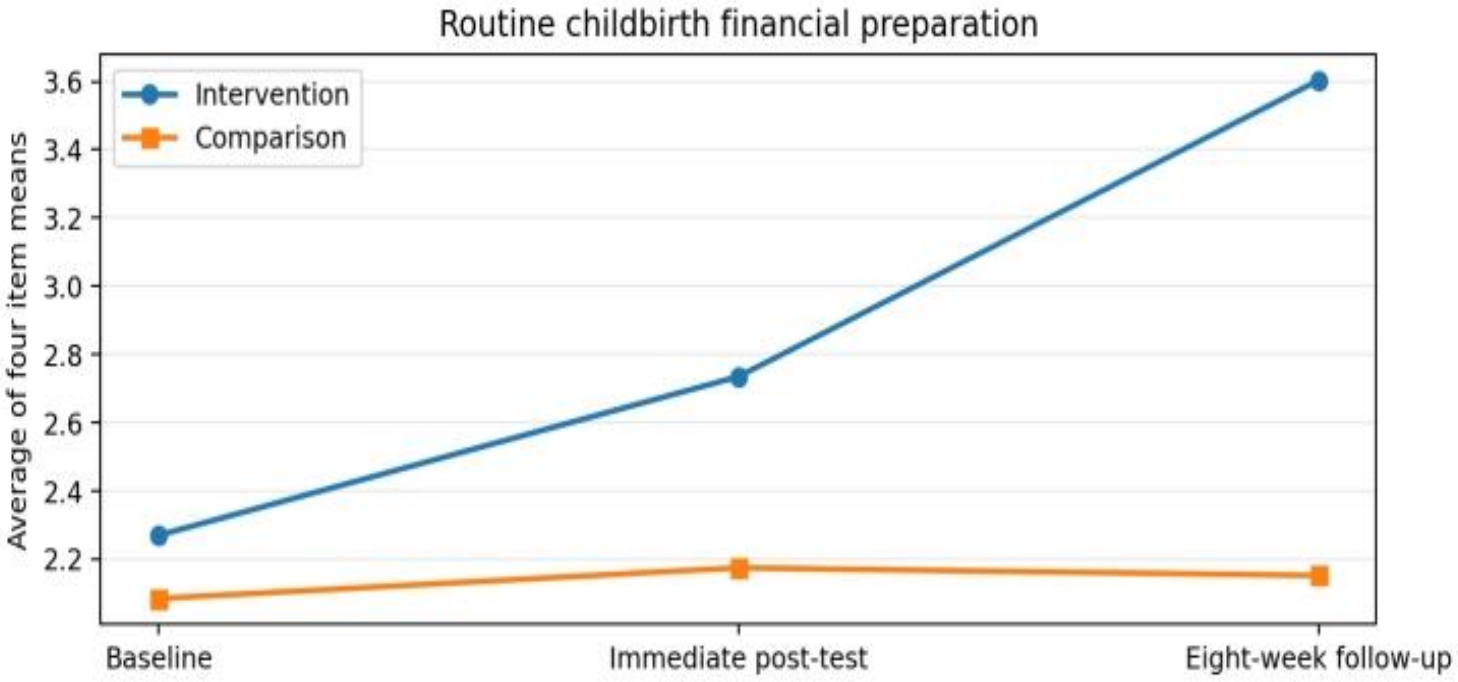
This section presents findings on financial preparation for childbirth and financial readiness for obstetric complications among 168 antenatal clinic attendees (84 intervention and 84 comparison participants) in eight public health facilities. Descriptive tables are presented first for each outcome, followed by interpretation, baseline-adjusted ANCOVA findings and graphical displays of the observed trajectories. The tables retain the numerical entries and wording reported in the source dissertation.

Table 1: Means and between-group differences in saving funds for childbirth among intervention and comparison groups at pretest, post-test and eight-week follow-up

			Pre		Post	Post	Post	Eight-week follow-up	Eight-week follow-up	Eight-week follow-up
S/N	**Questionnaire item**	**Interv. (x̄)**	**Comp. (x̄)**	**Diff.**	**Interv. (x̄)**	**Comp. (x̄)**	**Diff.**	**Interv. (x̄)**	**Comp. (x̄)**	**Diff.**

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1	Which action best demonstrates financial preparation for routine childbirth?	2.38	2.21	+0.17	2.59	2.30	+0.29	3.40	2.29	+1.11
2	How much of your expected routine delivery cost is already covered by accessible funds?	2.31	2.03	+0.28	2.67	2.11	+0.56	3.56	2.11	+1.45
3	Which expense belongs in a routine childbirth budget?	2.24	2.12	+0.12	2.89	2.19	+0.70	3.87	2.12	+1.75
4	What is the current status of your childbirth savings?	2.15	1.98	+0.17	2.79	2.10	+0.69	3.58	2.09	+1.49



Source: Field Survey

Figure 1: Routine Childbirth Financial Preparation

Table 1 presents item-level mean scores for financial preparation for routine childbirth at baseline, immediate post-intervention and eight-week follow-up. At baseline, intervention-group means ranged from 2.15 to 2.38, compared with 1.98 to 2.21 in the comparison group; between-group differences were modest (+0.12 to +0.28). Immediately after the intervention, means in the intervention group rose to 2.59–2.89, while comparison means remained between 2.10 and 2.30, widening the differences to +0.29–+0.70. By eight-week follow-up, intervention means increased further to 3.40–3.87, against 2.09–2.29 in the comparison group. The largest follow-up difference concerned identifying an expense that belongs in a routine childbirth budget (3.87 versus 2.12; difference +1.75), followed by the reported status of childbirth savings (3.58 versus 2.09; difference +1.49). These patterns indicate greater improvements in questionnaire-measured childbirth financial preparation in the intervention facilities, particularly at follow-up. Figure 1 illustrates the mean trajectory across the four childbirth financial preparation items. The intervention group increased from approximately 2.27 at baseline to 2.74 immediately after education and 3.60 at eight-week follow-up. The corresponding comparison-group averages were approximately 2.09, 2.18 and 2.15. The widening separation between the trajectories is consistent with the item-level results in Table 1 and indicates that the intervention groups measured preparedness continued to improve during the follow-up period.

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Table 2: Analysis of covariance (ANCOVA) on the effect of public health education on saving funds for childbirth and potential emergencies at immediate post-intervention and eight-week follow-up

Source	df	Post-test SS	Post-test MS	Post-test F	Post-test p-value	Partial η^2	Follow-up SS	Follow-up MS	Follow-up F	Follow-up p-value	Partial η^2
Corrected Model	**2**	**8.82**	**4.41**	**23.58**	**< .001**	**.233**	**14.96**	**7.48**	**40.43**	**< .001**	**.343**
Intercept	1	91.74	91.74	490.59	< .001	.760	108.52	108.52	586.59	< .001	.791
Intervention	1	6.96	6.96	37.22	< .001*	.194	12.24	12.24	66.16	< .001*	.299
Pretest Covariate	1	1.86	1.86	9.95	.002*	.060	2.72	2.72	14.70	< .001*	.087
Error	155	28.99	0.187				28.67	0.185			
Corrected Total	157	37.81					43.63				

Source: Field Survey

Table 2 presents the baseline-adjusted analysis of covariance for financial preparation for childbirth. After controlling for pretest scores, the intervention-group effect was statistically significant at immediate post-intervention, $F(1, 155) = 37.22$, $p < .001$, partial $\eta^2 = .194$. A significant adjusted group effect was also observed at eight-week follow-up, $F(1, 155) = 66.16$, $p < .001$, partial $\eta^2 = .299$. The larger follow-up effect size indicates that group membership accounted for a greater share of adjusted outcome variance at eight weeks than immediately after the intervention. Baseline preparedness was also a significant covariate at post-test, $F(1, 155) = 9.95$, $p = .002$, partial $\eta^2 = .060$, and follow-up, $F(1, 155) = 14.70$, $p < .001$, partial $\eta^2 = .087$. The findings therefore support an association between structured education and improved childbirth financial preparation after adjustment for baseline scores.

Table 3: Means and between-group differences in financial readiness for obstetric complications among intervention and comparison groups at pretest, post-test and eight-week follow-up

		Pre			Post			Eight-week follow-up		
S/N	**Questionnaire item**	**Interv. ($\bar{x}$)**	**Comp. ($\bar{x}$)**	**Diff.**	**Interv. ($\bar{x}$)**	**Comp. ($\bar{x}$)**	**Diff.**	**Interv. ($\bar{x}$)**	**Comp. ($\bar{x}$)**	**Diff.**
1	Which is the best emergency financial plan?	2.14	1.93	+0.21	2.76	2.01	+0.75	3.45	2.04	+1.41
2	How prepared are you to meet unexpected emergency-care expenses?	2.49	2.02	+0.47	2.89	2.04	+0.85	3.67	2.02	+1.65
3	Which approach makes emergency funds most useful?	2.30	2.00	+0.30	2.96	2.06	+0.90	3.98	2.09	+1.89
4	How quickly could you access money for emergency obstetric care?	2.56	1.98	+0.58	3.00	2.00	+1.00	3.89	2.03	+1.86

Source: Field Survey

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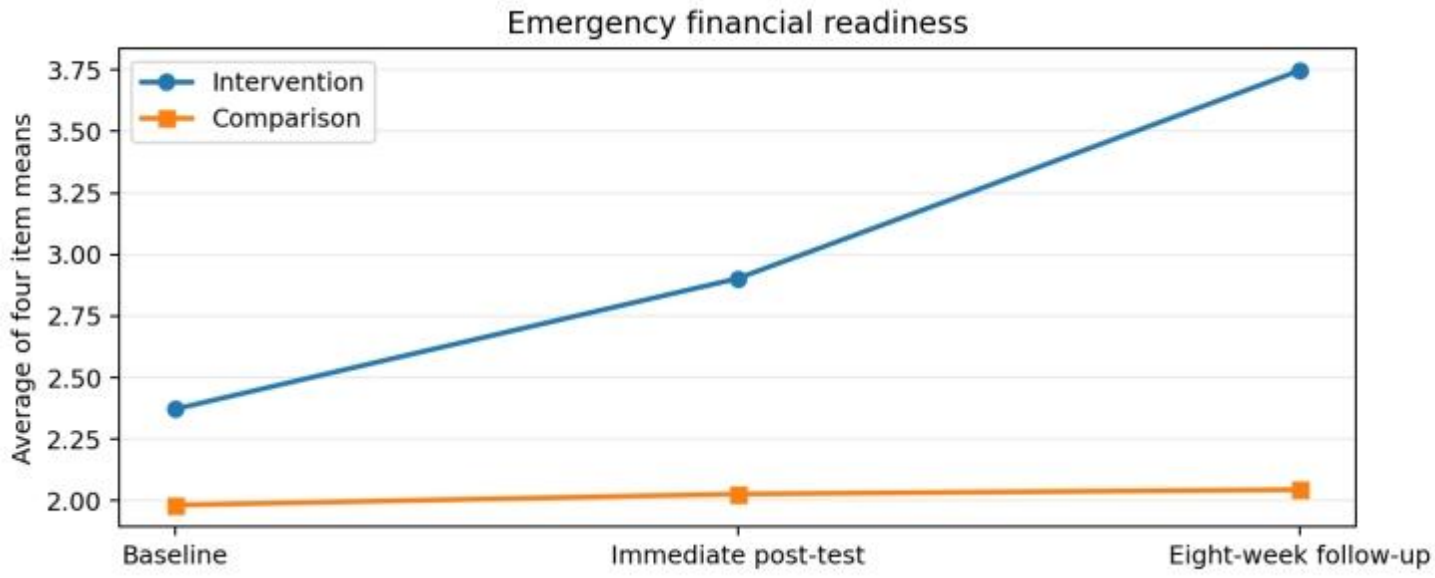


Figure 2 Mean financial readiness for obstetric emergencies by assessment period and study group.

Table 3 shows item-level mean scores for financial readiness for obstetric emergencies across the three assessments. Baseline intervention means ranged from 2.14 to 2.56, compared with 1.93 to 2.02 in the comparison group, with differences of +0.21–+0.58. At immediate post-intervention, intervention means increased to 2.76–3.00, whereas comparison means remained between 2.00 and 2.06; the differences widened to +0.75–+1.00. By eight-week follow-up, intervention means reached 3.45–3.98, compared with 2.02–2.09 in the comparison group. The largest follow-up difference was recorded for identifying the approach that makes emergency funds most useful (3.98 versus 2.09; difference +1.89), closely followed by the reported speed of access to money for emergency obstetric care (3.89 versus 2.03; difference +1.86). The findings indicate improvements in both emergency financial planning knowledge and self-reported access arrangements, without independently confirming the availability or sufficiency of funds. Figure 2 displays the average trajectory of the four emergency financial readiness items. The intervention-group average increased from approximately 2.37 at baseline to 2.90 immediately after the intervention and 3.75 at eight-week follow-up. In contrast, the comparison-group averages were approximately 1.98, 2.03 and 2.05, showing little change. The widening difference is consistent with the item-level findings in Table 3 and suggests that gains in measured emergency financial readiness were more pronounced at the eight-week assessment. The plotted averages were calculated from the published item means rather than from individual participant records

Table 4: Analysis of covariance (ANCOVA) on the effect of public health education on financial readiness for obstetric complications at immediate post-intervention and eight-week follow-up

Source	df	Post-test SS	Post-test MS	Post-test F	Post-test p-value	Partial η^2	Follow-up SS	Follow-up MS	Follow-up F	Follow-up p-value	Partial η^2
Corrected Model	**2**	**10.96**	**5.48**	**30.11**	**< .001**	**.280**	**18.74**	**9.37**	**51.38**	**< .001**	**.399**
Intercept	1	97.83	97.83	537.53	< .001	.776	121.96	121.96	668.72	< .001	.812
Intervention	1	8.63	8.63	47.42	< .001*	.234	15.66	15.66	85.85	< .001*	.356
Pretest Covariate	1	2.33	2.33	12.80	.001*	.076	3.08	3.08	16.89	< .001*	.098
Error	155	28.48	0.184				28.27	0.182			
Corrected Total	157	39.44					47.01				

Source: Field Survey

Table 4 presents baseline-adjusted ANCOVA results for financial readiness for obstetric emergencies. A statistically significant intervention-group effect was observed immediately after education, $F(1, 155) = 47.42$, $p < .001$, partial $\eta^2 = .234$. The adjusted effect remained significant and was larger at eight-week follow-up, $F(1, 155) = 85.85$, $p < .001$, partial $\eta^2 = .356$. Pretest scores were also significantly associated with post-intervention readiness, $F(1, 155) = 12.80$, $p = .001$, partial $\eta^2 = .076$, and follow-up readiness, $F(1, 155) = 16.89$, $p < .001$, partial $\eta^2 = .098$. These findings indicate that intervention-group differences in measured emergency financial readiness persisted after adjustment for baseline preparedness. However, they do not establish that participants possessed sufficient money to meet the actual cost of an obstetric emergency.

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Discussion

The present study examined the effect of structured public health education on financial preparation for childbirth and financial readiness for obstetric emergencies among antenatal clinic attendees in Delta North Senatorial District, Nigeria. The findings demonstrated improvements in both financial preparedness domains among women attending intervention facilities, with greater differences from the comparison group at eight-week follow-up than immediately after the intervention. These results are important because financial preparation involves more than recognising the need to save money. It requires women and their households to anticipate maternity expenses, identify accessible resources and establish arrangements that can be activated when complications occur. The discussion considers the findings in relation to previous empirical evidence, the Health Belief Model and the practical circumstances influencing maternal healthcare access in Nigeria.

Financial Preparation for Childbirth

The baseline findings revealed limitations in financial preparation for routine childbirth among antenatal clinic attendees in both study groups. Although participants demonstrated some awareness of delivery-related expenses, their initial responses indicated that financial planning was not consistently translated into practical arrangements. This finding is important because childbirth expenditure may involve delivery charges, medicines, transportation, essential materials and other costs that households must anticipate before labour begins. Osaze et al. (2021), in a study conducted in Delta State, reported that only 36.7% of the women investigated had saved money for delivery. Their finding provides relevant local evidence that financial preparation may remain inadequate even among women who have access to antenatal services. The present study extends this concern by examining whether structured education could improve financial preparedness rather than merely documenting its existing level.

The descriptive findings showed that financial preparation improved more substantially among women in the intervention facilities than among those receiving routine antenatal care. Improvements were evident immediately after the intervention and became more pronounced at eight-week follow-up. Particularly notable were the gains in identifying appropriate childbirth expenses and reporting progress towards financial preparation. This pattern suggests that structured education may have helped participants move beyond general awareness towards more specific planning decisions. Akinwaare and Oluwatosin (2023) similarly investigated the contribution of prenatal education to birth preparedness among Nigerian women, supporting the relevance of antenatal education as a means of strengthening preparation for delivery. However, the present study offers a more focused assessment of financial preparedness as a distinct outcome rather than relying solely on overall birth preparedness scores.

The ANCOVA findings further demonstrated a statistically significant intervention-associated difference in financial preparation for childbirth at immediate post-intervention, $F(1, 155) = 37.22$, $p < .001$, partial $\eta^2 = .194$. At eight-week follow-up, the adjusted difference remained significant and was larger, $F(1, 155) = 66.16$, $p < .001$, partial $\eta^2 = .299$. These results suggest that the difference between intervention and comparison groups was not limited to the immediate period following education. The larger follow-up effect may reflect participants having

additional time to discuss financial arrangements with household members, estimate expenses and identify possible sources of support. Nevertheless, the study did not independently establish which of these actions occurred or whether participants accumulated sufficient savings. Consequently, the findings support improvement in measured financial preparedness, rather than confirmed improvement in household financial capacity.

The eight-week pattern is particularly relevant in settings where financial preparation may require gradual household decisions. Antenatal education can communicate the importance of advance planning during a clinic visit, but implementing that advice may depend on income availability, family cooperation and competing household expenditure. Akpovienehe et al. (2026) reported that 49.3% of pregnant women investigated in Oshimili South had saved money for childbirth and complications, indicating that financial preparation remained incomplete among a substantial proportion of women in the same geographical setting. This local evidence helps explain why education should address practical planning difficulties rather than simply advising pregnant women to save. The present findings suggest that financial education delivered through antenatal clinics may be useful when it encourages realistic cost estimation, early household discussion and identification of accessible financial support.

Financial Readiness for Obstetric Emergencies

Financial readiness for obstetric emergencies presented a related but distinct challenge. Unlike routine delivery expenses, emergency obstetric costs are difficult to predict because complications may require urgent treatment, additional medicines, referral or unexpected transportation. The baseline findings indicated weaknesses in participants' reported arrangements for accessing funds when such situations arise. Osaze et al. (2021) found that only 26.6% of women in their Delta State study had saved money for obstetric emergencies, compared with 36.7% who had saved for routine childbirth. This difference suggests that households may be more likely to prepare for expected delivery expenses than for complications whose timing and financial consequences are uncertain. The present study therefore appropriately treated emergency financial readiness as a separate outcome rather than assuming that preparation for normal childbirth automatically provides adequate emergency protection.

Following the educational intervention, emergency financial readiness improved across the measured indicators in the intervention group. The descriptive results showed increases in reported access to emergency funds, identification of financial assistance, availability of alternative support and understanding of timely access to money for unexpected obstetric expenses. Improvements were already apparent immediately after the intervention and were more substantial at eight-week follow-up. These findings suggest that structured education may have encouraged participants to consider the practical consequences of an obstetric emergency before it occurred. Demsash et al. (2024), examining birth preparedness in Ethiopia, reported that only 18.97% of pregnant women had saved money for childbirth-related needs. Although the Ethiopian study differed in setting and design, its findings reinforce the broader concern that financial preparation remains a difficult component of maternal healthcare readiness.

The adjusted analysis demonstrated a statistically significant intervention-associated effect on emergency financial readiness immediately after the educational programme, $F(1, 155) = 47.42$,

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$p < .001$, partial $\eta^2 = .234$. The effect was larger at eight-week follow-up, $F(1, 155) = 85.85$, $p < .001$, partial $\eta^2 = .356$. Compared with routine childbirth financial preparation, emergency financial readiness showed a larger adjusted group effect at both assessment points. This difference may indicate that the educational intervention was particularly useful in drawing attention to financial needs that participants had previously overlooked. However, the effect sizes relate to different questionnaire outcomes and should not be interpreted as proof that emergency preparedness improved more in absolute financial terms. The findings demonstrate differences in measured preparedness, not verified savings or guaranteed access to emergency treatment.

The practical importance of these results lies in the relationship between financial arrangements and delays in obtaining obstetric care. Thaddeus and Maine (1994) identified delays in deciding to seek care, reaching an appropriate facility and receiving adequate treatment as interconnected contributors to maternal mortality. Financial uncertainty can affect the first two delays when households must obtain money before making treatment or transportation decisions. The present findings suggest that structured antenatal education could strengthen advance planning for such circumstances by encouraging women to identify potential financial assistance and consider how quickly resources could be accessed. Nevertheless, an improved emergency plan cannot eliminate financial barriers where household income is inadequate, health services are unaffordable or promised assistance is unavailable when needed.

Interpretation of the Findings through the Health Belief Model

The findings can be interpreted through the Health Belief Model, which explains health-related behaviour in relation to perceived susceptibility, perceived severity, anticipated benefits, perceived barriers, cues to action and self-efficacy. Rosenstock et al. (1988) emphasised the importance of these perceptions in understanding preventive health behaviour. In the present study, education about childbirth expenses and obstetric emergencies may have increased participants' recognition of the consequences of inadequate financial preparation. Awareness that unexpected complications could require immediate expenditure may also have strengthened the perceived benefit of identifying financial resources before delivery. These mechanisms offer a plausible explanation for the improvements observed in both financial preparedness domains.

The distinction between routine childbirth preparation and emergency readiness is especially relevant to the model. Routine childbirth is anticipated, whereas obstetric complications may be perceived as unlikely or difficult to imagine. Educational discussions that explain possible emergencies may therefore serve as cues to action by encouraging women to prepare for circumstances they had not previously considered. The larger follow-up differences are also compatible with the possibility that participants required time to translate these cues into reported arrangements. However, the study did not directly measure changes in Health Belief Model constructs. Accordingly, the model provides an interpretive framework for the findings rather than direct evidence that changes in perceived susceptibility, severity or self-efficacy mediated the intervention effect.

The findings may also be considered through the Capability, Opportunity and Motivation–Behaviour model. Michie et al. (2011) proposed that behaviour depends on the interaction of capability, opportunity and motivation. Structured education may strengthen psychological

capability by improving understanding of maternity expenses and emergency financial planning. It may also strengthen motivation by clarifying the benefits of preparation. However, financial opportunity remains dependent on household resources, access to support and the affordability of maternity services. This distinction helps explain why improved questionnaire scores should not be equated with sufficient financial resources. The model is used here as a complementary interpretation and was not prospectively tested as part of the original intervention.

Conclusion

The study established that structured public health education was associated with significant improvements in financial preparedness for childbirth and obstetric emergencies among antenatal clinic attendees in Delta North, Nigeria. Following baseline adjustment, financial preparation for childbirth improved significantly at immediate post-intervention and eight-week follow-up, with stronger intervention-associated differences observed at follow-up. Similarly, emergency financial readiness demonstrated significant improvements, particularly in identifying appropriate financial arrangements and accessing funds for unexpected obstetric expenses. The comparison group showed relatively limited changes across both financial preparedness domains. These findings demonstrate the value of structured antenatal education in strengthening women's understanding and reported financial planning behaviours beyond routine antenatal services. However, improved questionnaire scores do not necessarily indicate sufficient savings or guaranteed access to emergency funds. The study therefore concludes that structured public health education can strengthen financial preparedness, although its contribution to actual healthcare affordability requires further investigation within maternal healthcare settings.

Recommendations

Based on the significant improvements observed in financial preparation for childbirth and obstetric emergencies, the following recommendations are proposed;

Structured financial preparedness education should be incorporated into routine antenatal services in public health facilities across Delta North. Healthcare providers should emphasise anticipated delivery expenses, childbirth savings, emergency financial arrangements and practical identification of accessible funding sources, reflecting the areas where intervention participants demonstrated improvements.

Antenatal educators should distinguish routine childbirth financial planning from emergency financial readiness, since both domains demonstrated significant intervention-associated improvements and require different preparations. Educational messages should also be reinforced during subsequent antenatal visits, considering the stronger differences observed at eight-week follow-up.

Healthcare facilities should periodically assess women's financial preparedness using structured questions addressing savings arrangements, anticipated expenses and access to emergency funds. Future intervention evaluations should additionally verify actual financial resources and affordability, as improved self-reported preparedness alone cannot establish sufficient financial capacity for obstetric care.

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