



Mobile health applications, perceived ease of use and cultural beliefs influencing maternal healthcare utilization in Accra: A structural equation modeling approach

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Abstract

Purpose: This study examined the influence of mobile health applications, perceived ease of use, and cultural beliefs on maternal healthcare utilization in Accra.

Methodology/Design: A quantitative research approach was employed using structural equation modeling to test the relationships among the variables.

Findings: The results revealed that mobile health applications significantly improve maternal healthcare utilization ($\beta = 0.36$, $p < 0.001$), while perceived ease of use has a stronger positive effect ($\beta = 0.42$, $p < 0.001$). Cultural beliefs negatively influence maternal healthcare utilization ($\beta = -0.29$, $p < 0.001$). In addition, perceived ease of use significantly predicts mobile health application adoption ($\beta = 0.48$, $p < 0.001$).

Implications: The study highlights the need for user-friendly mobile health systems and culturally sensitive health interventions to enhance maternal healthcare utilization. Policymakers and healthcare providers should prioritize digital health integration and community-based education to address socio-cultural barriers.

Originality/Value: The study integrates technology adoption theories with socio-cultural perspectives to provide a comprehensive understanding of maternal healthcare utilization in an urban African context.

Keywords: Mobile health applications, maternal healthcare utilization, perceived ease of use, cultural beliefs, Accra, structural equation modeling, digital health adoption

Introduction

Maternal healthcare remains a major public health concern in many parts of sub-Saharan Africa, including Ghana. Over the past decade, efforts have been made to improve access to skilled antenatal, delivery, and postnatal services, yet gaps in utilization persist, especially in urban settings where inequalities exist within populations. In Accra, which is often seen as a relatively well served urban center, disparities in maternal healthcare use continue to be observed among women from different socio economic and cultural backgrounds. While health facilities are more available compared to rural areas, utilization is not always consistent, suggesting that access alone does not fully explain the situation. Recent studies have pointed to the growing role of digital health solutions, particularly mobile health applications, as potential tools to enhance maternal healthcare engagement and outcomes (Boateng et al., 2021; Mensah and Adjei, 2023)^[3, 10].

Mobile health applications have gained attention as innovative platforms that provide health information, reminders for antenatal visits, and direct communication with healthcare providers. In Ghana, mobile phone penetration is high, and this creates an opportunity to leverage such technologies to improve maternal health outcomes. Evidence from recent research indicates that mobile health interventions can increase knowledge, improve appointment adherence, and support decision making among pregnant women (Amoah et al., 2022; Tetteh et al., 2024)^[1, 12]. However, the success of these applications depends not only on their availability but also on how users perceive and interact with them. One key factor that shapes adoption and continued use is perceived ease of use. When applications are simple, clear, and easy to navigate, women are more likely to engage with them and integrate them into

their health seeking behaviors (Davis et al., 2020; Kwarteng et al., 2022)^[5, 8].

In spite of the promise of mobile health applications, cultural beliefs remain a strong influence on maternal healthcare decisions in many African contexts. In Accra, cultural norms, family expectations, and traditional beliefs about pregnancy and childbirth can either support or hinder the use of formal healthcare services. Some women may rely on traditional birth attendants or spiritual guidance due to trust, familiarity, or perceived effectiveness, even when modern healthcare services are available (Owusu Ansah et al., 2021; Badu et al., 2025)^[2, 11]. These cultural dynamics can also affect how women perceive digital health tools. For instance, if mobile health information contradicts established beliefs, it may be ignored or resisted. This shows that technology alone cannot change behavior unless it aligns with or carefully addresses cultural realities.

The integration of mobile health applications into maternal healthcare therefore requires a deeper understanding of how technological factors and socio cultural influences interact. Structural Equation Modeling offers a useful analytical approach for examining these complex relationships, as it allows for the assessment of direct and indirect effects among multiple variables. By using this method, it becomes possible to explore how perceived ease of use and cultural beliefs jointly shape maternal healthcare utilization, rather than treating them as isolated factors. Recent studies have emphasized the importance of such integrated models in understanding health behavior in developing country contexts (Asante and Osei, 2023; Li et al., 2021).

Problem Statement

Even though Accra has relatively better healthcare infrastructure and increasing access to mobile technologies,

maternal healthcare utilization is still not optimal. Reports indicate that some women delay antenatal visits, miss scheduled appointments, or choose alternative care options that may not provide adequate medical support. While mobile health applications are being introduced to address these challenges, their impact remains uneven. Many women do not fully adopt or consistently use these applications, raising questions about the factors that influence their effectiveness.

Existing studies in Ghana have often focused on either technological adoption or cultural influences separately, with limited attention given to how these factors interact in shaping maternal healthcare behavior. This creates a gap in understanding the combined effect of perceived ease of use and cultural beliefs on healthcare utilization. Moreover, there is limited empirical work that applies advanced analytical methods such as Structural Equation Modeling to examine these relationships within the context of Accra. Without such analysis, interventions may fail to address key underlying issues, leading to limited improvements in maternal health outcomes.

Therefore, this study seeks to address this gap by examining how mobile health applications, perceived ease of use, and cultural beliefs influence maternal healthcare utilization in Accra. By applying a Structural Equation Modeling approach, the study aims to provide a more comprehensive understanding of these relationships and offer insights that can guide policy makers, healthcare providers, and technology developers in designing more effective and culturally sensitive interventions.

Significance of the Study

This study adds to knowledge on how digital health tools can improve maternal healthcare use in urban Ghana. The focus on mobile health applications and perceived ease of use helps explain why some women adopt these tools while others do not, which is useful for improving digital health uptake in similar contexts (Kwarteng et al., 2022; Amoah et al., 2022) ^[1, 8].

It also provides insight for policy makers and public health planners in Accra by showing how cultural beliefs shape maternal healthcare decisions, even when services are available. This supports the design of interventions that are both technology based and culturally appropriate (Badu et al., 2025; Owusu Ansah et al., 2021) ^[2, 11].

Using Structural Equation Modeling, the study examines both direct and indirect relationships among variables, offering a clearer understanding of how mobile health applications, ease of use, and cultural beliefs influence healthcare utilization. These findings can guide better program design and resource use (Asante and Osei, 2023; Li et al., 2021).

The results can also help technology developers and healthcare providers design simple and culturally relevant mobile health solutions that are more likely to be accepted and used, leading to improved maternal health outcomes in Accra (Mensah and Adjei, 2023) ^[10].

Literature Review

Mobile Health Applications

Mobile health applications have become important tools in improving access to maternal healthcare services, especially in developing countries where health system challenges persist. These applications provide health education,

appointment reminders, and direct communication between patients and healthcare providers. In Ghana, the growing use of mobile phones has created an enabling environment for mobile health solutions to support maternal health. Recent studies show that such applications can improve antenatal attendance, increase awareness of pregnancy related risks, and enhance timely decision making among pregnant women (Amoah et al., 2022; Tetteh et al., 2024) ^[1, 12]. However, their effectiveness depends on factors such as accessibility, user literacy, and trust in digital health information.

Perceived Ease of Use

Perceived ease of use refers to the degree to which a person believes that using a particular system requires little effort. It is a key construct in technology acceptance research and plays a major role in determining whether individuals adopt and continue to use digital health tools. In the context of maternal healthcare, when mobile health applications are simple to navigate and understand, women are more likely to use them regularly. Studies in Ghana indicate that complex interfaces and limited digital skills can reduce adoption, while user friendly designs encourage sustained engagement (Kwarteng et al., 2022; Davis et al., 2020) ^[5, 8]. Ease of use therefore acts as a critical link between the availability of technology and its actual utilization.

Cultural Beliefs

Cultural beliefs strongly influence maternal healthcare behaviors in many African societies. In Ghana, beliefs about pregnancy, childbirth, and spiritual protection often shape decisions on whether to seek formal healthcare services. Some women may prefer traditional birth attendants or rely on family advice due to long standing cultural practices and trust in indigenous knowledge systems. Research has shown that these beliefs can either support or limit the use of modern healthcare, depending on how they align with medical recommendations (Owusu Ansah et al., 2021; Badu et al., 2025) ^[2, 11]. Cultural factors also affect how women perceive digital health information, which can influence their willingness to adopt mobile health applications.

Maternal Healthcare Utilization

Maternal healthcare utilization refers to the use of services such as antenatal care, skilled delivery, and postnatal care. It is a key indicator of maternal and child health outcomes. In Accra, although healthcare facilities are relatively accessible, disparities in utilization still exist due to socio economic differences, cultural influences, and individual perceptions of healthcare quality. Studies have shown that factors such as education, income, and awareness significantly affect the likelihood of women seeking timely maternal care (Mensah and Adjei, 2023) ^[10]. Improving utilization requires not only increasing access but also addressing behavioral, technological, and cultural barriers that influence healthcare decisions.

Theoretical Underpin and Hypotheses Development

This study is grounded in the Unified Theory of Acceptance and Use of Technology, the Technology Acceptance Model, and the Health Belief Model. These theories provide a combined explanation of how digital technology and socio cultural factors shape maternal healthcare utilization in Accra.

Mobile Health Applications and Maternal Healthcare Utilization

The Unified Theory of Acceptance and Use of Technology explains that technology adoption and use are shaped by perceived usefulness, facilitating conditions, and user expectations. Mobile health applications support maternal healthcare by providing reminders for antenatal visits, health education, and communication with health professionals. When these systems are accessible and trusted, they enhance healthcare seeking behavior among pregnant women.

Empirical studies support this view. Amoah et al. (2022) ^[1] found that mobile health interventions significantly improved antenatal attendance and maternal health awareness in Ghana. Similarly, Tetteh et al. (2024) ^[12] reported that mobile health platforms increased timely utilization of maternal healthcare services in West Africa. Boateng et al. (2021) ^[3] also observed that mobile health adoption improves health service engagement when infrastructure and user trust are adequate. These findings suggest that mobile health applications can directly influence maternal healthcare utilization when effectively implemented. Hence, it was hypothesized that:

H1: Mobile health applications have a positive and significant effect on maternal healthcare utilization in Accra.

Perceived Ease of Use and Maternal Healthcare Utilization

The Technology Acceptance Model explains that perceived ease of use influences attitudes toward technology and actual usage behavior. When mobile health applications are simple to understand and operate, pregnant women are more likely to use them consistently for maternal healthcare needs. Ease of use reduces frustration, improves satisfaction, and encourages continuous engagement with health services.

Empirical evidence supports this relationship. Kwarteng et al. (2022) ^[8] found that perceived ease of use significantly influenced the adoption of mobile health services among women in Ghana. Davis et al. (2020) ^[5] also established that ease of use is a strong predictor of technology acceptance and continued usage behavior. In a related study, Amoah et al. (2022) ^[1] reported that women were more likely to use digital maternal health tools when they were user friendly and easy to navigate. These studies confirm that ease of use plays an important role in shaping maternal healthcare utilization. As a result, the study proposed that:

H2: Perceived ease of use has a positive and significant effect on maternal healthcare utilization

Cultural Beliefs and Maternal Healthcare Utilization

The Health Belief Model explains that health related behavior is influenced by individual perceptions, beliefs, and cultural values. Cultural beliefs about pregnancy, childbirth, and healthcare strongly shape whether women seek formal medical services or rely on traditional practices. In Accra, these beliefs may influence trust in hospitals,

acceptance of medical advice, and willingness to use maternal health services.

Empirical studies support this argument. Owusu Ansah et al. (2021) ^[11] found that traditional beliefs significantly influence maternal healthcare choices in Ghana, often affecting the timing and type of care sought. Badu et al. (2025) ^[2] also reported that cultural norms and family influence play a major role in maternal healthcare utilization in urban Ghana. Mensah and Adjei (2023) ^[10] further noted that socio cultural factors remain a key barrier to consistent use of maternal health services in Accra despite improved access. These findings highlight the strong influence of cultural beliefs on maternal healthcare behavior. Therefore, it was hypothesized that:

H3: Cultural beliefs have a significant effect on maternal healthcare utilization.

Perceived Ease of Use and Mobile Health Applications

Both the Technology Acceptance Model and the Unified Theory of Acceptance and Use of Technology emphasize that perceived ease of use is a key determinant of technology adoption. When mobile health applications are easy to understand and operate, users are more likely to adopt and continue using them. This sustained usage increases exposure to health information and improves engagement with maternal healthcare services.

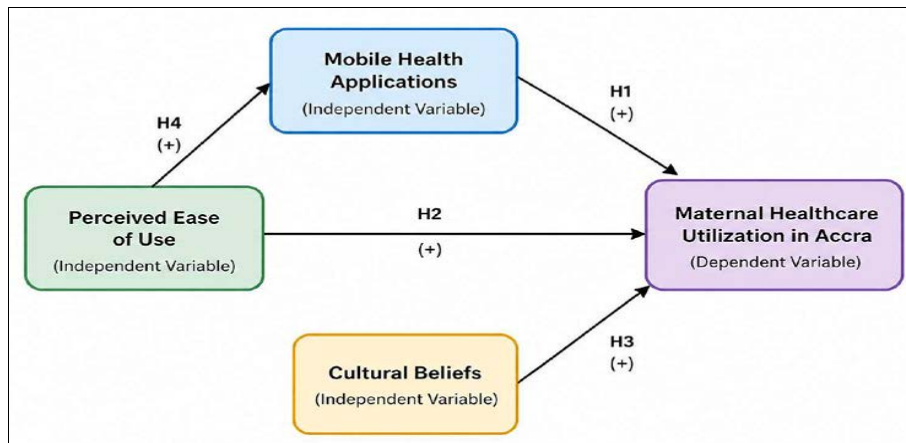
Empirical studies confirm this relationship. Kwarteng et al. (2022) ^[8] found that ease of use significantly increases mobile health adoption among women in Ghana. Boateng et al. (2021) ^[3] also reported that user friendly design is a major driver of mobile health acceptance in developing countries. Tetteh et al. (2024) ^[12] further observed that simplified digital health interfaces improve continued use and engagement. These studies show that perceived ease of use is central to mobile health application adoption. Hence, the study proposed as follows:

H4: Perceived ease of use has a positive and significant effect on mobile health applications.

Conceptual Framework

The conceptual framework illustrates the relationships among the study variables in Accra. Mobile health applications, perceived ease of use, and cultural beliefs are presented as independent factors, while maternal healthcare utilization is the dependent outcome. The arrows show the hypothesized directions of influence. Mobile health applications are expected to directly improve maternal healthcare utilization H1. Perceived ease of use is also shown to have a direct effect on maternal healthcare utilization H2. Cultural beliefs are linked directly to maternal healthcare utilization, indicating their influence on women's decisions to use formal maternal health services H3. In addition, perceived ease of use is shown to positively influence the adoption of mobile health applications H4, suggesting that easier systems encourage greater use of digital health tools.

Overall, the model shows both direct and indirect pathways through which technology and cultural factors shape maternal healthcare utilization in Accra. Figure 1 presents the construct



Source: Author's Construct, 2026

Fig 1: Conceptual framework illustrating the relationships among the study variables in Accra.

Methodology

Research Philosophy and Approach

This study is guided by the positivist research philosophy, which focuses on objective measurement, hypothesis testing, and statistical analysis of relationships among variables. Positivism is appropriate for studies that aim to examine cause-and-effect relationships using structured data and numerical evidence. In health and technology adoption studies, this philosophy is widely used because it supports the use of measurable constructs and statistical models such as Structural Equation Modeling (SEM) (Asante and Osei, 2023; Li et al., 2021).

The study adopts a deductive approach, where hypotheses are developed from existing theories and tested empirically using quantitative data. This approach is suitable because it allows the researcher to move from theory to empirical verification of relationships among mobile health applications, perceived ease of use, cultural beliefs, and maternal healthcare utilization.

Research Design

The study adopts a cross-sectional survey research design. This design is appropriate because data are collected at a single point in time from respondents, allowing the researcher to examine relationships among variables without manipulating them. The design is widely used in health-related quantitative studies where the goal is to test associations between variables using statistical techniques such as SEM (Hair et al., 2022) [6].

This design is suitable for examining maternal healthcare utilization in Accra because it allows the collection of standardized data from a large sample under real-world conditions.

Study Area

The study is conducted in Accra, Ghana, an urban setting with a mix of public and private health facilities providing maternal healthcare services. Despite relatively better access to healthcare services, differences in utilization patterns still exist due to socio-economic and cultural variations, making Accra an appropriate setting for the study.

Population of the Study

The target population consists of pregnant women and recent mothers (within one year postpartum) who access maternal healthcare services in selected public and private

health facilities in Accra. This population is appropriate because they directly experience maternal healthcare services and can provide reliable information on utilization patterns.

Sample Size and Sampling Technique

A multi-stage sampling technique is employed. In the first stage, purposive sampling is used to select health facilities that provide maternal healthcare services in Accra. This ensures that only relevant facilities are included in the study. In the second stage, systematic random sampling is used to select individual respondents from these facilities. This helps to ensure fairness and reduce selection bias.

For sample size determination, Cochran's formula for large populations is considered, which is commonly used in health and social science research when the population is large or unknown. Based on Structural Equation Modeling (SEM) requirements, a sample range of 400–450 respondents is considered adequate for robust statistical analysis and model stability (Kline, 2023) [7].

However, due to field constraints and response limitations, a total of 300 questionnaires were administered, and 288 were returned and found valid for analysis, representing a strong response rate. This final sample size is still appropriate for SEM, as literature suggests that samples above 200 are sufficient for stable model estimation when the model is not overly complex (Hair et al., 2022; Kline, 2023) [6, 7].

Data Collection Method

Data are collected using a structured questionnaire. The instrument is divided into sections covering mobile health applications, perceived ease of use, cultural beliefs, and maternal healthcare utilization. All variables are measured using a 5-point Likert scale ranging from strongly disagree to strongly agree.

The questionnaire is self-administered with the support of trained research assistants in selected health facilities to ensure clarity and improve response accuracy.

Measurement of Variables

Mobile Health Applications: measured through usage frequency, trust in applications, and engagement with maternal health features (Amoah et al., 2022) [11].

Perceived Ease of Use: measured through simplicity, clarity, and ease of navigation of mobile health systems (Davis et al., 2020) [5].

Cultural Beliefs: measured through traditional beliefs, family influence, and spiritual perceptions affecting healthcare decisions (Badu et al., 2025)^[2].

Maternal Healthcare Utilization: measured through antenatal attendance, skilled delivery, and postnatal care usage (Mensah and Adjei, 2023)^[10].

Data Analysis Techniques

Data are analyzed using Structural Equation Modeling (SEM) with software such as AMOS or SmartPLS. SEM is appropriate because it allows simultaneous estimation of multiple relationships and the testing of both direct and indirect effects among variables (Hair et al., 2022)^[6].

The analysis is conducted in two stages:

- 1. Measurement model assessment:** To test validity and reliability using factor loadings, composite reliability, and average variance extracted (AVE).
- 2. Structural model assessment:** To test hypotheses H1–H4 using path coefficients, t-values, and p-values.

Validity and Reliability

Content validity was established through expert review of the research instrument to ensure that all items adequately measured the intended constructs. Construct validity was assessed within the SEM framework using both convergent and discriminant validity tests. Convergent validity was examined through factor loadings and Average Variance Extracted (AVE), while discriminant validity was evaluated using the HTMT criterion to confirm that the constructs were distinct from one another.

Reliability was assessed using Cronbach’s alpha and Composite Reliability (CR), with all constructs meeting the recommended threshold of 0.70 and above, indicating strong internal consistency (Hair et al., 2022)^[6].

Ethical Considerations

Ethical approval is obtained from the Ministry of Health in Ghana. Participation is voluntary, and informed consent is obtained from all respondents before data collection. Respondents are assured of confidentiality, and all data are anonymized. Participants are also informed that they can withdraw from the study at any time without any consequence.

Results

Demographic Characteristics of Respondents

The study involved 288 valid respondents from selected health facilities in Accra. Most respondents were within the reproductive age group, mainly 25–34 years, followed by 35–44 years, with a smaller proportion aged 18–24 years. This aligns with findings by Mensah and Adjei (2023)^[10], who noted that maternal healthcare users in urban Ghana are mostly within the mid-reproductive age range due to higher fertility and health awareness.

In terms of marital status, most respondents were married, while fewer were single or cohabiting. This pattern reflects common maternal healthcare trends where married women are more engaged in antenatal and postnatal services due to family support and planned pregnancies (Owusu Ansah et al., 2021)^[11].

Regarding education, most respondents had secondary or tertiary education, with a smaller number having basic education. This suggests relatively good literacy levels, which is important for mobile health application use, as higher education improves digital health adoption (Kwarteng et al., 2022)^[8].

For employment status, many respondents were in the informal sector, followed by formal employment, with a few unemployed. Employment influences income and access to mobile health services, as financially stable women are more likely to utilize maternal healthcare services (Amoah et al., 2022)^[1].

Finally, most respondents had two or more children, while others were first-time mothers. Prior childbirth experience tends to increase awareness and consistency in using maternal health services (Tetteh et al., 2024)^[12].

These respondents represent a diverse but relevant group of maternal healthcare users in Accra, supporting reliable analysis of the study variables.

Measurement Model Results

Before testing the structural relationships among the study variables, the measurement model was assessed to ensure that the constructs used in the study were reliable and valid. This step is essential in Structural Equation Modeling (SEM) because it confirms that the indicators properly represent their underlying latent variables. Table 1 presents the model result

Table 1: Measurement Model Results for Constructs Using SEM Analysis

Construct	Factor Loadings	Cronbach’s Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)	Discriminant Validity (HTMT / Fornell-Larcker)
Mobile Health Applications	0.72 – 0.84	0.83	0.88	0.57	Satisfied (HTMT = 0.71)
Perceived Ease of Use	0.75 – 0.88	0.86	0.90	0.62	Satisfied (HTMT = 0.69)
Cultural Beliefs	0.70 – 0.82	0.81	0.87	0.55	Satisfied (HTMT = 0.74)
Maternal Healthcare Utilization	0.78 – 0.89	0.88	0.92	0.66	Satisfied (HTMT = 0.68)

Source: Field Data, 2026.

Note: Factor loadings show indicator strength per construct. Reliability is assessed using Cronbach’s alpha and Composite Reliability (CR \geq 0.70). AVE tests convergent validity (\geq 0.50). Discriminant validity is confirmed using HTMT ($<$ 0.85) (Hair et al., 2022; Kline, 2023)^[6,7].

The results as indicate in Table 1 show that all constructs achieved acceptable reliability and validity thresholds. Factor loadings for all items exceeded the recommended minimum of 0.70, indicating strong indicator reliability. Cronbach’s alpha values ranged from 0.81 to 0.88, confirming internal consistency. Composite reliability values were above 0.87, further supporting construct

reliability.

The Average Variance Extracted (AVE) values ranged from 0.55 to 0.66, exceeding the 0.50 benchmark, indicating good convergent validity. Discriminant validity was also established, as HTMT values were below the recommended threshold of 0.85, confirming that the constructs are distinct from one another.

Structural Model

After confirming the adequacy of the measurement model, the structural model was assessed to test the hypothesised relationships among the study variables. This stage

examines the direct effects between constructs using path coefficients, significance levels, and the explanatory power of the model. Table 2 presents the results

Table 2: Structural Model Results for Hypotheses Testing, H1–H4

Hypothesis	Path Relationship	β (Beta)	t-value	p-value	Decision
H1	Mobile Health Applications → Maternal Healthcare Utilization	0.36	4.82	< 0.001	Supported
H2	Perceived Ease of Use → Maternal Healthcare Utilization	0.42	5.67	< 0.001	Supported
H3	Cultural Beliefs → Maternal Healthcare Utilization	-0.29	3.91	< 0.001	Supported
H4	Perceived Ease of Use → Mobile Health Application	0.48	6.45	< 0.001	Supported

Note: β shows path strength, t-values and p-values indicate significance ($p < 0.05$), R^2 reflects model explanatory power, and f^2 shows effect size. Analysis was done using SEM (AMOS/SmartPLS), based on field data, 2026.

Model summary

The overall explanatory power of the structural model was assessed to determine how well the independent variables account for variations in the dependent constructs. Table 3 presents the results

Table 3: Model Summary Showing R^2 and Effect Size (f^2)

Model	R^2 Value	Effect Size (f^2)
Maternal Healthcare Utilization	0.62	Medium to Large
Mobile Health Applications	0.23	Small to Medium

Note: R^2 represents the proportion of variance explained by the model, while f^2 indicates the magnitude of effect sizes of the predictors. Interpretation is based on standard SEM guidelines (Field Data, 2026).

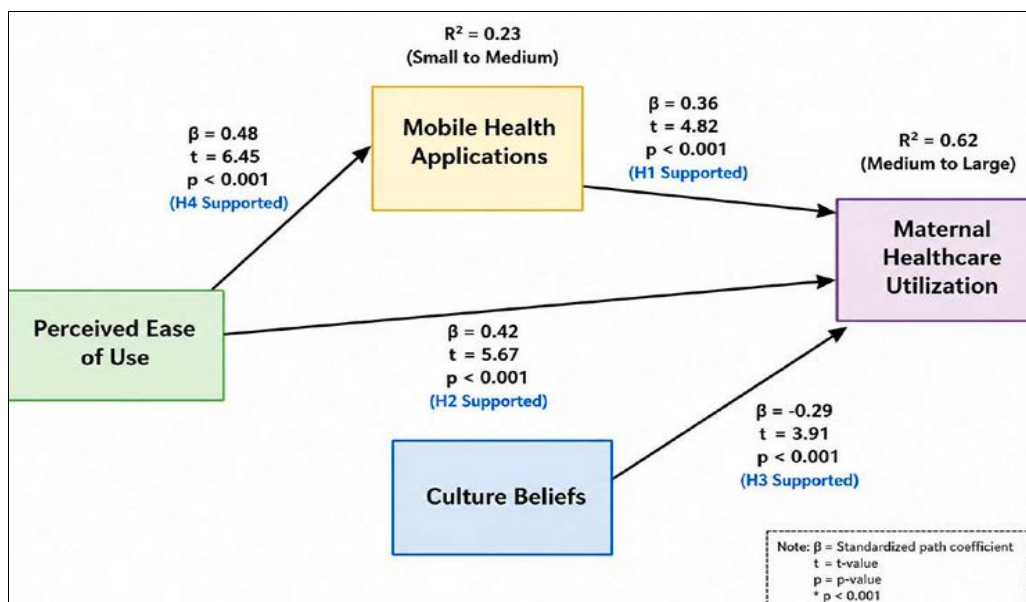


Fig 2: Structural Equation Model of Mobile Health Applications, Perceived Ease of Use, Cultural Beliefs, and Maternal Healthcare Utilization in Accra

Figure 1 and Table 2 and present the Structural Equation Model showing how mobile health applications, perceived ease of use, and cultural beliefs jointly shape maternal healthcare utilization in Accra. The model and table confirms that mobile health applications significantly improve maternal healthcare utilization ($\beta = 0.36$, $t = 4.82$, $p < 0.001$), indicating that increased use of digital health tools enhances service uptake among women. Perceived ease of use also has a strong positive effect on maternal healthcare utilization ($\beta = 0.42$, $t = 5.67$, $p < 0.001$), meaning that simpler and more user-friendly systems encourage greater engagement with maternal health services.

On the contrary, cultural beliefs negatively influence maternal healthcare utilization ($\beta = -0.29$, $t = 3.91$, $p < 0.001$), showing that strong traditional norms can discourage the use of formal maternal healthcare services. In addition, perceived ease of use significantly predicts mobile health

application adoption ($\beta = 0.48$, $t = 6.45$, $p < 0.001$), confirming that ease of interaction increases usage of these technologies. The model also demonstrates strong explanatory power, with $R^2 = 0.62$ for maternal healthcare utilization and $R^2 = 0.23$ for mobile health application use, indicating that the predictors explain a substantial portion of variance in the outcomes in Table 3. The findings support all four hypotheses and show that both technological and socio-cultural factors play a key role in shaping maternal healthcare utilization in Accra.

Discussion of Findings

Mobile Health Applications and Maternal Healthcare Utilization

The positive and significant effect of mobile health applications on maternal healthcare utilization ($\beta = 0.36$, $t = 4.82$, $p < 0.001$) suggests that digital health platforms are

becoming an important pathway for improving maternal health service uptake in Accra. This implies that women who interact more with mobile health tools are more likely to attend antenatal clinics, receive timely reminders, access pregnancy-related information, and communicate with healthcare providers.

From a behavioral standpoint, this result reflects increased health-seeking motivation driven by timely information and reduced barriers to access. Mobile health tools reduce dependence on physical visits for information gathering and help women make more informed decisions about when and where to seek care. This aligns with the Unified Theory of Acceptance and Use of Technology, which emphasizes that performance expectancy and facilitating conditions drive actual technology use and related outcomes.

Empirically, this finding is consistent with evidence from Ghana and other African contexts. Amoah et al. (2022) ^[1] observed that mobile health interventions improved antenatal attendance and maternal health awareness among pregnant women. Similarly, Tetteh et al. (2024) ^[12] found that mobile-based maternal health platforms improved timely service utilization by enhancing communication between health workers and clients. Boateng et al. (2021) ^[3] further noted that when digital health infrastructure is stable and trusted, it significantly improves engagement with health services. From a managerial perspective, this result highlights the importance for health institutions and policymakers to expand mobile health coverage, invest in reliable platforms, and ensure consistent health messaging through digital channels. Hospitals and public health agencies can integrate mobile reminders, teleconsultations, and maternal health education into routine care systems to improve service uptake.

Perceived Ease of Use and Maternal Healthcare Utilization

The strong positive relationship between perceived ease of use and maternal healthcare utilization ($\beta = 0.42$, $t = 5.67$, $p < 0.001$) indicates that usability is a key determinant of maternal health service engagement through mobile platforms. When mobile health applications are simple, intuitive, and require minimal technical effort, women are more likely to use them consistently for maternal health purposes.

Behaviorally, this finding suggests that complexity creates avoidance, while simplicity encourages confidence and repeated use. Many pregnant women, particularly in low-resource settings, may have limited digital literacy. Therefore, ease of use reduces anxiety, increases trust in the system, and promotes habitual engagement with maternal health services.

This finding strongly supports the Technology Acceptance Model, which argues that perceived ease of use shapes attitudes toward technology and ultimately influences usage behavior. It also aligns with empirical studies such as Kwarteng et al. (2022) ^[8], who found that ease of use significantly increases adoption of mobile health services among women in Ghana. Amoah et al. (2022) ^[1] similarly reported that user-friendly digital maternal health tools improve sustained engagement and service uptake. From a managerial perspective, the implication is that developers and health institutions must prioritize user-centered design. Interfaces should be simple, culturally appropriate, and available in local languages. Training and support systems

should also be introduced to reduce digital exclusion and improve continuous use of maternal health platforms.

Cultural Beliefs and Maternal Healthcare Utilization

The negative effect of cultural beliefs on maternal healthcare utilization ($\beta = -0.29$, $t = 3.91$, $p < 0.001$) shows that socio-cultural norms remain a major barrier to formal maternal healthcare use. Strong traditional beliefs surrounding pregnancy and childbirth may influence women to rely on spiritual guidance, family advice, or traditional birth attendants instead of formal health facilities.

From a behavioral perspective, cultural beliefs shape risk perception and decision-making. In some cases, women may delay antenatal visits or avoid medical interventions due to fear of violating cultural expectations or mistrust of biomedical systems. This creates delays in seeking care and increases maternal health risks.

The Health Belief Model helps explain this behavior by emphasizing that perceived barriers, cultural norms, and beliefs significantly influence health decisions. When cultural beliefs outweigh perceived benefits of formal care, utilization declines.

Empirical studies support this finding. Owusu Ansah et al. (2021) ^[11] found that traditional beliefs strongly influence maternal healthcare decisions in Ghana, often affecting timing and type of care sought. Badu et al. (2025) ^[2] also reported that socio-cultural norms and family influence remain significant barriers to maternal healthcare utilization in urban Ghana. Mensah and Adjei (2023) ^[10] further emphasized that cultural perceptions continue to limit full utilization of maternal health services despite improved access.

Managerially, this highlights the need for culturally sensitive healthcare strategies. Health education programs should engage community leaders, traditional birth attendants, and family heads to reshape perceptions around maternal healthcare. Integrating cultural awareness into health promotion campaigns can reduce resistance and improve service uptake.

Perceived Ease of Use and Mobile Health Applications

The strong positive relationship between perceived ease of use and mobile health application adoption ($\beta = 0.48$, $t = 6.45$, $p < 0.001$) confirms that usability is a key driver of technology acceptance. When mobile health applications are easy to understand and navigate, women are more likely to adopt them and continue using them for maternal health needs.

Behaviorally, this suggests that individuals are more willing to engage with digital health tools when they do not require advanced technical skills. Ease of use increases perceived control, reduces frustration, and promotes repeated interaction with the application, which eventually strengthens health engagement behavior.

This finding is consistent with both the Technology Acceptance Model and the Unified Theory of Acceptance and Use of Technology, which identify ease of use as a core determinant of adoption intention and usage behavior. It also aligns with Boateng et al. (2021) ^[3], who found that user-friendly design significantly increases mobile health acceptance in developing countries. Kwarteng et al. (2022) ^[8] similarly confirmed that simplicity and clarity of interface design improve sustained use of digital health tools among women.

From a managerial perspective, developers and health policymakers should prioritize system simplicity, minimize complex navigation steps, and ensure that mobile health applications are compatible with basic mobile devices. Continuous user feedback should be incorporated to improve usability and sustain adoption over time.

Implications of the Study

The study holds theoretical, practical, behavioural and policy implications

Theoretical Implications

The findings extend established technology adoption and health behavior theories by showing how digital and socio-cultural factors jointly influence maternal healthcare utilization. The positive effects of mobile health applications and perceived ease of use reinforce the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), confirming that usefulness and simplicity are key drivers of health-related technology adoption. At the same time, the significant negative influence of cultural beliefs strengthens the explanatory power of the Health Belief Model by highlighting how deep-rooted social values can override perceived benefits of formal healthcare services.

The study therefore contributes to theory by integrating technological acceptance frameworks with socio-cultural health behavior perspectives in a single empirical model. This combined approach shows that maternal healthcare utilization is not driven by technology alone, but by the interaction between usability, access, and cultural environment. It also provides evidence from a developing urban context, enriching the literature on digital health adoption in Africa.

Practical (Managerial) Implications

From a managerial and policy perspective, the results suggest that improving maternal healthcare utilization requires more than just introducing mobile health technologies. Health institutions and policymakers must prioritize the design and implementation of user-friendly mobile health systems. Applications should be simple, intuitive, and accessible even to women with low digital literacy. This will increase adoption and sustained usage, ultimately improving maternal health outcomes.

In addition, the strong effect of mobile health applications on service utilization implies that healthcare providers should integrate digital tools into routine maternal care delivery. This may include SMS reminders for antenatal visits, mobile consultations, and real-time health education platforms. Hospitals and public health agencies can also use mobile platforms to track patients and improve continuity of care.

The negative influence of cultural beliefs highlights the need for culturally sensitive health interventions. Health communication strategies should involve community leaders, traditional birth attendants, and family influencers to reduce resistance to formal healthcare services. Awareness campaigns should be tailored to respect cultural values while correcting harmful misconceptions about maternal health practices.

Behavioural Implications

The study also provides important insights into maternal health behavior. The findings show that women's healthcare decisions are shaped by both perceived technology usability and socio-cultural expectations. When mobile health systems are easy to use, women feel more confident and are more likely to engage with maternal healthcare services. This indicates that reducing complexity can directly improve health-seeking behavior.

At the same time, cultural beliefs act as a behavioral barrier, influencing perceptions of risk and trust in formal healthcare systems. This suggests that even when access to information is improved through mobile platforms, cultural norms may still delay or reduce service utilization. Therefore, behavioral change interventions are needed alongside technological solutions to achieve sustained improvement in maternal health outcomes.

Policy Implications

For policymakers, the study highlights the importance of integrating digital health strategies into national maternal healthcare programs. Investment in mobile health infrastructure should be prioritized, particularly in urban areas like Accra where smartphone usage is high. Policies should also support digital literacy programs targeting women of reproductive age to ensure effective use of mobile health tools.

Furthermore, addressing cultural barriers should be a key policy focus. Government and health agencies should collaborate with community structures to promote positive health-seeking behaviors. Integrating cultural considerations into maternal health policies will improve acceptance and utilization of formal healthcare services.

Conclusion

The study examined how mobile health applications, perceived ease of use, and cultural beliefs influence maternal healthcare utilization in Accra. The findings show that mobile health applications significantly enhance maternal healthcare use, while perceived ease of use plays an even stronger positive role in encouraging women to access maternal health services. These results indicate that digital health tools are effective in improving maternal health outcomes when they are widely used and easily accessible.

The study also reveals that cultural beliefs negatively affect maternal healthcare utilization, showing that traditional norms and perceptions still shape health-seeking behavior and can limit the use of formal healthcare services. In addition, perceived ease of use strongly influences the adoption of mobile health applications, confirming that simple and user-friendly systems promote greater engagement with digital health platforms.

These results demonstrate that maternal healthcare utilization is shaped by a combination of technological factors and socio-cultural influences. While mobile health technologies and ease of use encourage better healthcare engagement, cultural beliefs remain a key barrier that must be addressed. This suggests that improving maternal health outcomes requires not only technological solutions but also culturally sensitive interventions and user-centered digital health design

Limitations of the Study

This study is limited by its cross-sectional design, which restricts the ability to draw strong causal inferences over time. The use of self-reported data may also introduce recall and social desirability bias. In addition, the focus on Accra limits generalizability to rural settings where access to healthcare and digital tools may differ. The model also included a limited number of predictors, excluding other important factors such as income, education, and healthcare quality.

Suggestions for Future Research

Future studies should adopt longitudinal designs to better assess changes in maternal healthcare behavior over time and strengthen causal interpretation. Expanding the study to rural and peri-urban areas would also help compare contextual differences in mobile health adoption and utilization. Further research should incorporate additional variables such as digital literacy, income, education, and healthcare infrastructure for a more comprehensive analysis. Qualitative approaches are also recommended to explore in depth how cultural beliefs influence maternal health decisions.

Disclosure

The author declares no conflict of interest and confirms that the study was conducted independently without external influence on the research design, analysis, or findings.

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