

## ÉDITORIAL

# Renforcer les systèmes de données pour promouvoir la santé et les droits sexuels et reproductifs en Afrique subsaharienne

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Le développement de la santé et des droits sexuels et reproductifs (SDSR) en Afrique subsaharienne est fondamentalement entravé par la « pauvreté des données de santé »<sup>1</sup>. Si de nombreux pays à revenu élevé ont réalisé des progrès significatifs dans le renforcement de leurs systèmes de données de santé, l'Afrique subsaharienne continue de faire face à d'importantes lacunes<sup>1-3</sup>. Malgré le besoin crucial de pratiques fondées sur des données probantes, le paysage régional des données est caractérisé par une méconnaissance généralisée de la valeur intrinsèque de données exactes. De nombreux pays de la région ne disposent pas de recensements de population réguliers, de dossiers de santé fiables ni de systèmes fonctionnels d'état civil et de statistiques vitales.

L'exactitude des données est souvent compromise par une réticence profondément ancrée des populations à fournir des informations personnelles. Dans de nombreux contextes africains, les tabous culturels, les croyances religieuses et la méfiance envers les « étrangers » entraînent des taux de refus élevés lors des enquêtes menées auprès des ménages et dans les établissements de santé. Par exemple, une étude menée en Afrique du Sud a mis en évidence comment des femmes peuvent refuser de parler de santé reproductive en raison d'une opposition religieuse ou par crainte d'être jugées par les chercheurs<sup>4</sup>. Les données sont parfois sujettes à la falsification et au biais de désirabilité sociale. Les personnes interrogées « apprennent » souvent à répondre de manière à minimiser la longueur des questionnaires, par exemple en déclarant moins de partenaires sexuels pour éviter les questions complémentaires.<sup>5</sup>

Plus grave encore, la crainte de répercussions juridiques ou sociales conduit à la dissimulation active d'informations sensibles par les individus et les établissements de santé. Des personnes ont déclaré avoir menti sur leur statut sérologique ou sur les violences sexistes qu'elles ont subies par crainte d'une intervention policière ou de la stigmatisation sociale.<sup>4</sup>

Même lorsque des données sont disponibles, on observe une minimisation et une non-utilisation systématiques des informations factuelles pertinentes pour la prise de décision et la planification stratégique. L'institutionnalisation du suivi fondé sur les données demeure faible et les plans annuels sont souvent élaborés sans tenir compte des informations sanitaires courantes.<sup>6</sup> Dans de nombreux cas, la planification fondée sur des données probantes est supplantée par l'ingérence politique et le népotisme, où les intérêts politiques — plutôt que les données empiriques — déterminent quels programmes de santé sont mis en œuvre et qui est nommé pour les diriger.<sup>7</sup> Sans s'attaquer à ces barrières culturelles et structurelles, les systèmes de données continueront de produire des informations de mauvaise qualité qui ne permettront pas d'améliorer significativement les résultats en matière de santé sexuelle et reproductive dans la région.<sup>1,8</sup>

Depuis la Conférence internationale sur la population et le développement (CIPD) du Caire en 1994 et jusqu'aux Objectifs de développement durable (ODD) pour 2030, la santé sexuelle et reproductive est reconnue comme un droit humain fondamental.<sup>9-11</sup> Ce droit est désormais inscrit dans les politiques nationales de santé et les cadres juridiques de nombreux pays.

Le droit à la santé sexuelle et reproductive comprend l'accès à la contraception, aux soins de fertilité et d'infertilité, aux services de santé maternelle et périnatale, à la prévention et au traitement des infections sexuellement transmissibles, à la protection contre les violences sexuelles et sexistes, et à l'éducation à des relations saines et sans risque.<sup>12</sup> comprend également le droit à l'information et la capacité de faire des choix éclairés concernant sa vie reproductive.

Lorsque cet accès est retardé ou refusé, les conséquences peuvent être graves, notamment le décès, un handicap permanent et des difficultés socio-économiques. Pour que ces droits se concrétisent, les systèmes de santé ont besoin de systèmes de données robustes. Des données précises, actualisées et

## ORIGINAL RESEARCH ARTICLE

# Mobile phone accessibility, health information needs, and willingness to receive maternal health information via mobile applications among pregnant women attending antenatal care in Oshana Region, Namibia

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## Abstract

Mobile technologies have proven to be effective in disseminating health information and improving health outcomes. This study assessed mobile phone accessibility, health information needs and the willingness to receive health information via mobile application among pregnant women attending antenatal care in the Oshana Region, Namibia. A cross-sectional study was conducted among 337 pregnant women. Statistical significance was set at  $p < 0.05$ . Most of the participants (91.7%) reported having access to mobile phones. The top five maternal health information needs identified were: activities during pregnancy, antenatal care visits, emergency preparedness, breastfeeding, and nutrition during pregnancy. Notably, 97.5% of the participants expressed willingness to receive health information via mobile applications. Mobile phone ownership was significantly associated with the willingness to receive health information through mobile applications ( $p = 0.022$ ). Given the high level of mobile access among pregnant women in Namibia, there is a need to develop and disseminate health information via mobile application platforms. (*Afr J Reprod Health* 2026; 30 [12]:73-80).

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**Keywords:** health information needs, mobile application, mobile phone accessibility, pregnant women, willingness

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## Résumé

Les technologies mobiles se sont révélées efficaces pour diffuser des informations de santé et améliorer les résultats sanitaires. Cette étude a évalué l'accessibilité des téléphones mobiles, les besoins en information sanitaire et la volonté de recevoir des informations de santé via une application mobile chez les femmes enceintes consultant en soins prénatals dans la région d'Oshana, en Namibie. Une étude transversale a été menée auprès de 337 femmes enceintes. Le seuil de signification statistique a été fixé à  $p < 0,05$ . La plupart des participantes (91,7 %) ont déclaré avoir accès à un téléphone mobile. Les cinq principaux besoins d'information en santé maternelle identifiés étaient les suivants : activités pendant la grossesse, consultations prénatales, préparation aux situations d'urgence, allaitement et nutrition pendant la grossesse. Il est à noter que 97,5 % des participantes se sont déclarées disposées à recevoir des informations de santé via des applications mobiles. La possession d'un téléphone mobile était significativement associée à cette volonté ( $p = 0,022$ ). Compte tenu du niveau élevé d'accès aux téléphones mobiles chez les femmes enceintes en Namibie, il est nécessaire de développer et de diffuser des informations de santé via des plateformes d'applications mobiles. (*Afr J Reprod Health* 2026; 30 [12]: 73-80).

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**Mots-clés:** besoins en information sanitaire, application mobile, accessibilité des téléphones mobiles, femmes enceintes, volonté

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## Introduction

Maternal health problems pose challenges to many countries, especially to developing nations.<sup>1</sup> The World Health Organisation (WHO) indicated that

99% of all maternal deaths occur in developing countries.<sup>1</sup> In Namibia, the maternal mortality ratio is 215 per 100 000 live births.<sup>2</sup> According to six months maternal near miss surveillance report in Namibia, there were about 298 maternal near misses

and 23 maternal deaths recorded among 37106 live births. This translates to 8.0 per 1000 live birth near miss and a maternal mortality ratio of 62.0 per 100 000 live births.<sup>3</sup> Some of the maternal health problems can be addressed through the provision of health information, because pregnant women experience challenges in accessing health information. One of the barriers to accessing health information during pregnancy includes insufficient interaction between women and health care providers.<sup>4</sup>

Pregnant women in Namibia, particularly in the Oshana Region, are mostly given health information only when they visit a health facility. Outside of these visits, pregnant women have limited opportunities to interact with midwives or healthcare providers. A major concern arises when some pregnant women experience health problems but choose to wait until their scheduled follow-up dates.

Delays in seeking prompt medical attention result in late detection of potential complications, increasing maternal morbidity and mortality.

To improve maternal health outcomes and address these challenges, there is a pressing need to establish additional avenues for pregnant women to access vital health information and communicate with healthcare providers beyond their health facility visits. The use of mobile technologies improves maternal health care, whereby in some countries, midwives use mobile phones to contact pregnant women to promote healthy pregnancy and childbirth.<sup>1,5</sup> Hence, there was a need to assess mobile phone accessibility, health information needs and willingness to receive maternal health information via mobile applications among pregnant women attending antenatal care in Oshana Region, Namibia.

## Methods

### *Research design, population, and sampling*

A quantitative cross-sectional study design was employed to assess mobile phone accessibility, health information needs, and willingness to receive maternal health information via mobile applications.

The target population comprised pregnant women attending their first antenatal care visit at five selected health centres in the Oshana Region during the data collection period. Inclusion criteria

comprise all pregnant women from 12 to 36 weeks of gestation who are 15 years and above, both primigravida and multigravida, coming for their first antenatal care visit at the selected health facilities. The sample size was determined using Yamane's formula, based on a total population of 2,459 pregnant women attending initial antenatal care visits in Oshana Region, resulting in a required sample size of 344 participants. The calculation was performed at a 95% confidence level with a 5% margin of error. The total sample size was proportionately allocated to each health centre using stratified proportionate sampling to ensure adequate representation from all selected facilities. A convenience sampling technique was then applied, whereby pregnant women who attended their first antenatal care visit during the data collection period and met the inclusion criteria were invited to participate in the study.

### *Data collection*

Data were collected using a structured questionnaire consisting of four sections: (1) socio-demographic characteristics, (2) access to smart mobile phones and internet connectivity, (3) maternal health information needs, and (4) perceptions and willingness to receive maternal health information via mobile phones. The last two sections employed a four-point Likert scale, with response options ranging from strongly agree to strongly disagree. The reliability of the research instrument was assessed using Cronbach's alpha, and the questionnaire was considered reliable, as the alpha coefficient exceeded 0.70.

The questionnaire was initially developed in English and subsequently translated into Oshiwambo, the predominant local language in the Oshana Region, to enhance comprehension. Questionnaires were administered according to participants' language preferences after obtaining written informed consent. For participants who were unable to read or write, the questionnaires were completed by trained researchers through face-to-face interviews. Data collection was conducted at the five selected health facilities following approval from facility management. Interviews were carried out in private rooms to ensure confidentiality and privacy. Data were collected over a six-month

period, and each questionnaire required approximately 15–20 minutes to complete.

### **Data analysis**

The data were analysed using the IBM SPSS Statistics Version 27. A simple binary logistic regression was employed to identify the factors associated with women's willingness to receive health information via mobile applications. Crude odds ratios (COR) with 95% confidence interval (CI) were computed to demonstrate the strength of association between the independent and dependent variables. Multiple binary logistic regression analysis and adjusted odds ratio estimation could not be performed due to the small number of women categorised as not willing to receive health information.

### **Ethical consideration**

The ethical clearance certificate was obtained from the University of Namibia Ethical Clearance Committee (DEC OSH0023). The study was also approved by the Ministry of Health and Social Services, National Health Research Unit (REF 22/4/2/3). Participants signed an informed consent, and anonymity and confidentiality were ensured throughout the study.

### **Results**

A total of 344 women who were attending antenatal care in five health centres of Oshana Region, namely, Ou Nick, Oshakati, Ongwediva, Ondangwa, and Okatana Health centres, were enrolled in the study from November 2022 to April 2023. Only 337 questionnaires were returned, and only 325 of the responses were analysed in this study because the rest were either partly incomplete or missed the key variables of the study, i.e., the response rate was 94.5%.

#### **Demographic profile of women attending antenatal care in Oshana Region**

The study was conducted among pregnant women starting from the age of 15 years, because these are mature minors able to give consent on their own, according to the Namibian Child Care and Protection

**Table 1:** Demographic profile of pregnant women attending antenatal care at health facilities in Oshana Region, Namibia, 2022-2023 (n=325)

Variable	Number (%)
<b>Age (Years)</b>	
15-18	23 (7.1)
19-24	107 (32.9)
25-34	134 (41.2)
35-49	59 (18.2)
Unknown*	2 (0.6)
<b>Employment status</b>	
Unemployed	221 (68.0)
Self-employed	44 (13.5)
Employed (Private)	38 (11.7)
Employed (Government)	12 (3.7)
Unspecified/Unknown*	10 (3.1)

\*Respondents did not document their age or employment status.

Act 3 of 2015. The table 1 indicates the demographic information of the respondents.

#### **Access to smartphones among pregnant women attending antenatal care in Oshana Region**

Out of the 325 respondents, 298 (91.7%) had their own mobile phones, and 194 (65.1%) of the 298 women were using smart mobile phones. Some of those who did not have mobile phones or smartphones could also access smartphones and the internet from someone else. Some mobile applications, such as WhatsApp or telegram were installed in most of the accessible smartphones. The table below indicates access to smartphones and mobile applications. Table 2

#### **Health information needs of women attending antenatal care in Oshana Region**

The 325 respondents respond on 16 health information needs they would like to receive during pregnancy (e.g., danger signs, medications given during antenatal care, emergency preparedness, importance of antenatal care visits, alcohol, nutrition, daily activities, labour, as well as postpartum care like breastfeeding, breast care, and family planning). (Figure 1) The health information needs of the women were assessed using a Likert Scale that has four ratings: strongly agree, agree, disagree, and strongly disagree.

**Table 2:** Access to smartphones, applications (WhatsApp and Telegram), and willingness to receive health information among pregnant women attending antenatal care at health facilities in Oshana Region, Namibia, 2022-2023 (n=325)

Variable	Number (%)
<b>Own mobile phone</b>	
Yes	298 (91.7)
No	27 (8.3)
<b>Smart mobile phone (n=298)</b>	
Yes	194 (65.1)
No	103 (34.6)
Unspecified	1 (0.3)
<b>Access to smart phone (n=130)</b>	
Yes	54 (41.5)
Sometimes	54 (41.5)
No	22 (16.9)
<b>Can access smart phone from (n=108)</b>	
Spouse/Partner	21 (19.4)
Parent	16 (14.8)
Sibling (Brother/Sister)	34 (31.5)
Other Relative	15 (13.9)
Friend/Colleague	17 (15.8)
Unspecified	5 (4.6)
<b>Access to internet (n=321)</b>	
Yes	197 (61.4)
Sometimes	78 (24.3)
No	46 (14.3)
<b>WhatsApp installed on self or accessible mobile (n=320)</b>	
Yes	260 (81.3)
No	60 (18.8)
<b>Telegram installed on self or accessible mobile (n=312)</b>	
Yes	112 (35.9)
No	200 (64.1)
<b>Willing to receive health information via mobile</b>	
Yes	317 (97.5)
No	8 (2.5)
<b>Prefer WhatsApp for health information</b>	
Yes	304 (93.5)
No	21 (6.5)
<b>Prefer Telegram for health information</b>	
Yes	210 (64.6)
No	115 (35.4)

The “strongly agree” and “agree” responses of the women were aggregated and presented in the figure below.

**Perception of using mobile for health information provision**

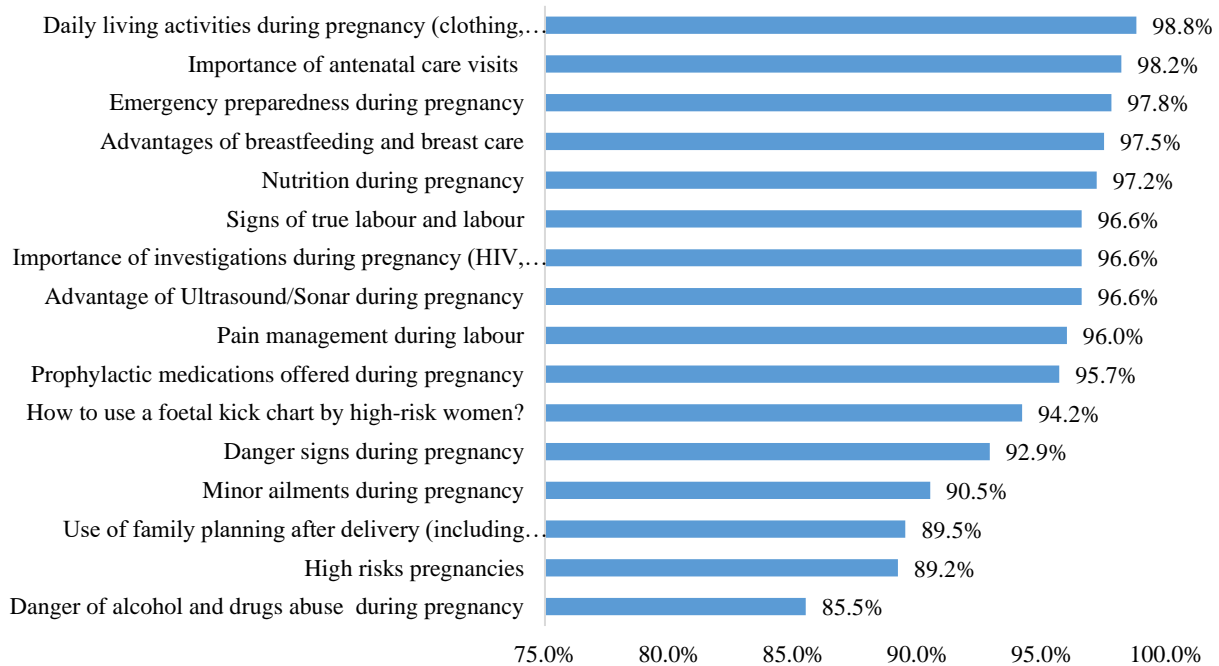
In this study, six questions were used to assess women’s perceptions regarding the use of mobile applications for the provision of maternal health information or as a means of communication. We used the four-point Likert Scale: strongly agree, agree, disagree, and strongly disagree. The majority of the respondents agreed and strongly agreed that receiving health information through a mobile application would be beneficial to themselves and would increase accessibility to health information services. The table below shows the perception of health information provision via mobile applications.

**Willingness to receive maternal health information and preferred application**

Most of the women (317, 97.5%) attending antenatal care at health facilities in the Oshana Region were willing to receive maternal health information (HI) via mobile applications. The majority of the respondents prefer to receive health information via WhatsApp; however, there are those who prefer to receive information using both WhatsApp and Telegram. [Table 2]

**Factors associated with willingness to receive health information**

To determine the factors associated with the willingness of the women to receive health information, we used the simple binary logistic regression analysis and computed the crude odds ratio (COR) with 95% confidence interval (CI) of the relevant variables. Accordingly, mobile ownership was the only factor that was significantly associated with willingness to receive maternal health information.



**Figure 1:** Aggregate “strongly agree” and “agree” responses of health information needs among pregnant women attending antenatal care at health facilities in Oshana Region, Namibia, 2022-2023 (n=325)

**Table 3:** Perception of health information provision via mobile among pregnant women attending ANC clinics at health facilities in Oshana Region, Namibia, 2022-2023 (n=325)

Perceptions of Health Information	Responses			
	Strongly Agree n (%)	Agree n (%)	Disagree n (%)	Strongly Disagree n (%)
Receiving health information through mobile applications will be beneficial to me.	205 (63.1)	99 (30.5)	17 (5.2)	4 (1.2)
Interested to use mobile if I can ask questions through mobile applications.	179 (55.1)	102 (31.4)	13 (4.0)	31 (9.5)
Using mobile applications to share health information could be as effective as face-to-face information sharing and can become an alternative.	175 (53.8)	99 (30.5)	25 (7.7)	26 (8.0)
Using mobile applications to share maternal health information will increase accessibility to health information services.	186 (57.2)	102 (31.4)	14 (4.3)	23 (7.1)
I would like to reach a midwife through mobile application.	174 (53.5)	102 (31.4)	25 (7.7)	24 (7.4)
I would like to interact with other pregnant ladies through mobile applications.	163 (50.2)	111 (34.2)	29 (8.9)	22 (6.8)

Women who had mobile phones were seven times more likely to be willing to receive maternal health information [COR=7.33; 95% CI: (1.65, 32.52)] compared with those who did not have mobile phones. However, because of the small number of women who were under the category of not willing

to receive health information or having zero cells in the tables, the analysis could not be run for other variables (e.g., employment status). Multiple binary logistic regression analyses and adjusted odds ratio estimation could not be done for the same reason. (Table 4).

**Table 4:** Association between willingness to receive health information and mobile ownership among pregnant women attending ANC clinics at health facilities in Oshana Region, Namibia, 2022-2023 (n=325)

Variable	Willing to receive health information via mobile		Crude Odds Ratio (COR)	P-value
	Yesn (%)	Non (%)		
<b>Age (Yeas)</b>				
<25	126 (96.9)	4 (3.1)	0.67 (0.16, 2.71)	0.719
25+	189 (97.9)	4 (2.1)	Reference	
<b>Employment status</b>				
Employed	213 (96.4)	8 (3.6)	Not calculated**	
Unemployed	94 (100.0)	0 (0)	Not calculated	
Others	10 (100.0)	0 (0)	Reference	
<b>Mobile ownership</b>				
Yes	293 (98.3)	5 (1.7)	<b>7.33 (1.65, 32.52)</b>	<b>0.022*</b>
No	24 (88.9)	3 (11.1)	Reference	

\*Significant at  $p < 0.05$ . \*\*Odds ratio could not be computed because of the zero cells.

## Discussion

This study assessed mobile phone accessibility, health information needs, perceptions, and willingness to receive maternal health information via mobile applications among pregnant women attending antenatal care in the Oshana Region of Namibia. The findings demonstrate a high level of mobile phone ownership, substantial access to smartphones and internet services, strong health information needs, and an overwhelmingly positive willingness among pregnant women to receive maternal health information through mobile platforms. These findings suggest that mobile health (mHealth) interventions are both feasible and acceptable in this setting.

The study found that about nine in ten pregnant women owned a mobile phone, and nearly two-thirds of those with phones owned smartphones. Additionally, a considerable proportion of women without personal smartphones could still access one through family members or friends. These findings indicate that mobile phone penetration among pregnant women in the Oshana Region is high, aligning with trends reported in other countries in Africa, where mobile phone ownership among women of reproductive age continues to increase.<sup>7,8</sup> Similar study conducted in low- and middle-income countries have reported mobile phone ownership ranging from 80% to over 90% among pregnant women, supporting the potential scalability of mHealth interventions in resource-limited settings.<sup>9</sup>

The high prevalence of internet access, either consistent or intermittent, further strengthens the viability of mobile-based health communication. However, the fact that some women reported only occasional or no internet access highlights the persistent digital divide, which may be related to the affordability of data, network coverage, or access to electricity. These barriers should be considered when designing mHealth interventions to ensure inclusivity.

WhatsApp emerged as the most preferred mobile application for receiving maternal health information, with over 90% of respondents expressing a preference for this platform. This finding is consistent with previous studies showing that WhatsApp is widely used in African settings due to its low data consumption, ease of use, and familiarity among users<sup>10</sup>. Telegram, while less preferred, was still acceptable to a significant proportion of women, suggesting that multi-platform approaches could be considered. The strong preference for commonly used social messaging applications indicates that integrating health information into platforms already embedded in daily communication may improve uptake and engagement.

The findings reveal extensive health information needs among pregnant women, particularly regarding danger signs, medication use, nutrition, emergency preparedness, labour, and postpartum care. These needs reflect critical gaps in maternal health education that are not fully

addressed during routine antenatal care visits. The results support earlier evidence that pregnant women in resource-limited settings often receive insufficient or inconsistent information due to short consultation times, high patient loads, and limited opportunities for follow-up communication with healthcare providers<sup>4</sup>. Mobile-based information delivery could complement facility-based education by reinforcing key messages, improving knowledge retention, and enabling timely access to information when women are at home, as reported by other researchers<sup>5</sup>. Addressing these information gaps may contribute to earlier recognition of complications and prompt care-seeking, thereby reducing maternal morbidity and mortality.

The majority of participants perceived mobile applications as a beneficial and effective means of receiving maternal health information. Many women expressed interest in using mobile platforms to ask questions, communicate with midwives, and interact with other pregnant women. These findings suggest that mobile platforms could facilitate not only one-way information dissemination but also two-way communication and peer support. Notably, over half of the respondents believed that mobile-based information sharing could be as effective as face-to-face communication. While in-person care remains essential, especially for clinical assessments, mobile communication may serve as an effective supplementary approach, particularly for health education, reminders, and follow-up support, as reported by other researchers.<sup>1</sup>

An overwhelming majority of women (97.5%) reported willingness to receive maternal health information through mobile applications. This high level of acceptance is comparable to findings from other African countries, where willingness to use mHealth services among pregnant women often exceeds 85%<sup>11, 12</sup>. The near-universal willingness observed in this study underscores strong demand for alternative and more accessible channels of maternal health communication. Mobile phone ownership was the only factor significantly associated with willingness to receive maternal health information via mobile applications. Women who owned a mobile phone were more than seven times more likely to be willing to receive health information compared to those who did not own a

phone, as reported by other researchers<sup>13,14</sup>. This finding is intuitive and highlights ownership as a critical enabling factor for mHealth engagement.

The inability to assess associations with other variables, such as employment status and age, due to the small number of women unwilling to receive health information, represents a methodological limitation. However, the uniformly high willingness across socio-demographic categories suggests broad acceptability of mobile-based maternal health interventions, regardless of age or employment status.

### ***Implications for maternal health practice and policy***

The findings of this study have important implications for maternal health service delivery in Namibia. The high level of mobile access and willingness among pregnant women suggests that mHealth interventions, particularly those using WhatsApp, could be integrated into antenatal care services to enhance health education, improve communication between women and midwives, and support continuity of care beyond clinic visits. Health authorities and policymakers could leverage existing mobile infrastructure to develop cost-effective, scalable maternal health communication strategies. However, efforts should be made to ensure that women without personal smartphones or consistent internet access are not excluded, possibly through SMS-based alternatives or shared-device approaches.

A key strength of this study is its relatively large sample size and inclusion of multiple health facilities, enhancing the generalisability of the findings within the Oshana Region. The use of a reliable, translated questionnaire also improved data quality.

Nevertheless, the study has limitations. The cross-sectional design limits causal inference, and self-reported data may be subject to social desirability bias. Additionally, the very high willingness to receive health information limited the ability to perform multivariable analysis. Future studies could employ longitudinal designs or qualitative methods to explore the actual use, engagement, and impact of mobile-based maternal health interventions.

## Conclusion

This study demonstrates high mobile phone accessibility, substantial health information needs, positive perceptions, and strong willingness among pregnant women in Oshana Region to receive maternal health information via mobile applications. Mobile phone ownership significantly influences willingness to engage with mHealth services.

The study findings support the integration of mobile-based maternal health communication strategies into existing antenatal care services to improve access to timely health information and potentially enhance maternal health outcomes in Namibia.

## Acknowledgement

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## Data availability

All data analysed during this study are included in the manuscript. Additional information is available from the corresponding author and may be shared upon reasonable request.

## Conflict of interest

All authors declare that there are no personal or financial conflicts of interest that could have influenced the conduct of the study or the writing of this manuscript.

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