Kabale University Interdisciplinary Research Journal (KURJ)

OPEN ACCESS

A mobile based technology to improve male involvement in antenatal care

*Muhoza B. Gloria, Ssemaluulu Paul Mukasa and Mabirizi Vicent

Kabale University, Uganda

*Corresponding Author
gmuhoza@kab.ac.ug

KURJ
ISSN 2790-1394

pp. 79 - 86
Vol 1. Issue 4.
Dec 2022

ABSTRACT

The World Health Organization Technical Working Group on maternal health unit recommended a minimum level of care to be four visits throughout the pregnancy for pregnant mothers [1]. The first visit which is expected to screen and treat anaemia, syphilis, screen for risk factors and medical conditions that can be best dealt with in early pregnancy and initiate prophylaxis if required (e.g., for anaemia and malaria) is recommended to be made before the end of the fourth month of pregnancy. The second, third and fourth visits are scheduled at 24–28, 32 and 36 weeks, respectively. Male involvement in Antenatal health care has been described as a process of social and behavioural change that is needed for men to play more responsible roles in maternal health care with the aim of ensuring women and children's wellbeing. A study by Okoth [1] reported that, in Uganda male involvement in antenatal care stands at only 6% and this has been attributed to social, economic and cultural related factors. The situation worsens with the lack of effective coordinated platform for males sharing their experience in taking part in ANC and this has affected the process of antenatal care service delivery. Objective. To assess the role of mobile technology to improving male involvement in antenatal care by developing a mobile based technology which sends SMS reminders to male partners encouraging them to escort their pregnant wives for antenatal care services. Research questions. What are the challenges towards the limited antenatal care seeking behaviours among pregnant mothers? What are the causes of limited male involvement in antenatal care? What roles do ICTs play in enhancing Antenatal Care seeking behaviours among pregnant mothers and in increasing the male involvement in Antenatal Care? Method. We purposively selected pregnant mothers who phones, had been receiving antenatal care services from Kabale general hospital and reported staying with her male partner. The recruited participants were interviewed together with their male partners. STATA 13 software was used to define participants' demographic while qualitative data were analysed using content analysis to come up with classes describing participants' perceptions. Results. Participants reported that reminding them of their next antenatal visit via SMS reminder plays a significant role towards their antenatal care seeking behaviour. Conclusion. Mobile health could be a potential approach to improving male involvement in antenatal care through sending timely SMS reminders to both the expectant mother and her male partner remaining them of their next antenatal visit.

Keywords: *Antenatal care male involvement, Mobile health care, Digital health*

Introduction

In most African countries, pregnancy and childbirth have long been regarded as exclusively women's affairs [1]. Men generally do not accompany their partners to antenatal or postnatal care services and are not expected to attend the labor or birth of their children. However, male dominance socially and in sexual relations can put women at serious risk of unwanted pregnancy and infections.

In pregnancy, male sexual behavior can affect the health outcomes of both the mother and the baby [1]. A study by Okoth [2] reported that, in Uganda male involvement in antenatal care stands at only 6% and this has been attributed to social, economic and cultural related factors. The situation worsens with the lack of effective coordinated platform for males sharing their experience in taking part in ANC and this has affected the process of antenatal care service delivery.

Lack of male participation at antenatal consultations means that they do not benefit from any information given by health providers, regarding the health of the mother and baby, or about their role in it [2]. This is also supported by a study which reported that throughout sub-Saharan Africa, the area of pregnancy and childbirth is considered the responsibility of the woman [3]. Therefore, it is rare to see men accompany women to antenatal care and be present for delivery.

Sensitization of male partners through educating and encouraging them to get involved in antenatal care can improve the pregnant mothers' adherence towards antenatal care seeking behaviors [4]. Much as there are some existing systems like [5]–[8] that involves ICT in solving improving maternal health, there is still lack of male involvement in those systems. Thus, we develop mobile-based application using Short Message Service (SMS) mobile technology fully customized to remind and encourage male partners to escort their female partners for antenatal care services.

Literature review

M-Health

M-health is described as the use of mobile phones to improve quality of care and enhance efficiency of service delivery in health care systems [9]. This has been geared by the demand and increased affordability which has led to rapid spread of mobile phones in developing countries, according to [10] mobile communication refers to the use of mobile communications technologies to promote health by supporting health care practices (e.g., health data collection, delivery of healthcare information or patient observation and provision of care).

Mobile technologies cannot physically carry drugs, doc-tors, and equipment between locations, but they can carry and process information in many forms. Wide variety of people and products, as well as the actions that connect them. The crux of these connections is the exchange of information such as coded data, text, images, audio, and video [10].

Men involvement in reproductive healthcare and antenatal health care

The programme of action globally endorsed at the Inter-national Conference on Population and Development (ICPD) emphasises the need for equity in gender relations with a special focus on men's shared responsibility and active involvement to promote reproductive and sexual health [11].

It is claimed that, if men are brought into a wide range of reproductive health services in such a way that they are supported as equal partners and responsible parents as well as clients in their own right, better outcomes are expected in reproductive health indicators such as contraception acceptance and continuation, safer sexual behaviours, use of reproductive health services and reduction in reproductive morbidity and mortality [12].

The 1994 International Conference on Population and Development [11] advocated for the active inclusion and shared responsibility of men in reproductive health and antenatal health care. Male involvement, an all-encompassing term which refers to "the various ways in which men relate to reproductive health problems and programs, reproductive rights and reproductive behaviour", is considered an important intervention for improving maternal health.

In a further demonstration that male dominance affects utilisation of ANC services and delivery care, a Ugandan study showed that some pregnant women dropped out when asked by the healthcare providers to come with their partners during the next ANC visit. Male involvement in maternal health has been recognized as a promising strategy in improving maternal and child health outcomes [13].
Developing countries account for 99% of global maternal deaths [14]. In Sub-Saharan Africa, for example, a woman's lifetime risk of dying from preventable or treatable complications of pregnancy and childbirth is 1 in 39, compared to 1 in 3800 in the developed regions.

In many developing countries, men are the key decision-makers and chief providers, often determining women's access to economic resources. This practice has implications for maternal health as it determines the nutritional status of women during pregnancy. Women's access to maternal health services since healthcare systems in most develop-ing countries require out-of-pocket payments; and women's chances of receiving emergency obstetrics care, which is vital in averting maternal mortality [15]. For instance, study by [16] reported positive benefits of male involvement in maternal health in developed and developing countries, including but not limited to: (i)increased maternal access to antenatal and postnatal services, (ii) discouragement of unhealthy maternal practices such as smoking, (iii)improved maternal mental health, (iv) increased likelihood of contraception usage and allayment of stress, and (v)pain and anxiety during delivery. This imply that male involvement may be beneficial to maternal health; however, the magnitude of the association is not clear.

In addition, improved maternal health is one of the Millennium Development Goals in which progress is falling short [17] thus, necessitating research on alternative interventions by and this study hence force to establish whether an SMS intervention can increase male partner involvement in Antenatal health care.
In developing countries including Uganda, several factors impede accessibility to ANC and reproductive services, including cost of services, distance to health services, lack of available transportation, high transportation costs, poor road conditions and uneven distribution of health care facilities and lack of independence by women to make decision on matters that directly affect their health [18]. All of these factors increase travel time and the difficulty in accessing health service facilities.

According to [19] couples counselling and use of special education material targeting the increase of male involvement during pregnancy, both at facility and community level. Mass communication campaigns as well as house-visits targeting pregnant women and their partners are examples of interventions that aim to increase community knowledge and change traditional perceptions of male involvement [20]. Various types of interventions appear to positively contribute to increasing male involvement during ANC, however, little is showed on the SMS intervention a need for this study to establish in depth its impact on male involvement in ANC.

While the benefits of male involvement have been acknowledged, there continues to be a challenge in creating a space for and engaging men in maternal health and antenatal health care [21]. This is problematic due to the role of men as heads of households in many countries especially developing countries, which suffer high rates of maternal mortality [22]. Furthermore, men are important as partners and fathers. Therefore, it's important to involve and engage them in maternal health education as well as antenatal care [3]. Several other researchers including [3], [23] have re-searched about male partnership involvement in antenatal care. However, all the studies concluded that more measures need to be put in place to increase male partnership involvement in antenatal care.

Increased technology penetration especially mobile based has given hope towards improving maternal health through M-Health program which involves using mobile phones to deliver health services to both pregnant mother and the infants [24].

Among the mobile based platforms that have been put in place include developed mobile applications which run on various mobile smart phones such as Android based, IoS, windows phones and others [25]. However, majority of the individuals have not benefited from these platforms especially those living in rural settings with limited access to technology infrastructure [26]. This is because they cannot afford buying the smartphones required plus subscribing for data connectivity which are essential for one to use the existing platforms [27]. It is against this background that we developed a mobile based technology for increasing male involvement in antenatal care while addressing the gaps identified in the existing methods.

Methodology

Setting

A total of 40 participants including 20 pregnant mothers and their male partners were recruited from Kabale referral hospital in Kigezi sub-region Uganda. The hospital serves patients from of Kabale District, Rubanda district, Rukiga district, Kanungu District, Kisoro District, Rukungiri District among others.

Participants

The study recruited two categories of participants including pregnant mothers who were getting their antenatal care from Kabale referral hospital and their male partners. Inclusion criteria for pregnant mother study participants were: being 18 years and above, go for antenatal care services at Kabale referral hospital, her male partner is willing to be enrolled in the study, has a personal cell phone. Inclusion criteria for male study participants were: willing to escort his wife for antenatal care, has a personal cell phone.

Procedure

A mobile-based platform was developed and deployed on a remote server that runs on a cloud architecture. Participants (pregnant mothers and her male partner) were enrolled by registering their details including their registered phone numbers, this is done to track statistics, design follow-up schedules. Participants were asked to provide their mobile phones with a registered sim card of any telecom company. To support message triggering, AfricasTaking application programming interface was integrated. The hosting computer (Where the system is installed) requires internet connection during message triggers this is because AfricasTaking API can only be accessed online. After integration of the of the tool, weekly SMS reminders were sent to

20 pregnant mother and 20 male partners for a period of 9 months while monitoring their antenatal care seeking behaviours. SMS was automatically in the interval set in the tool settings i.e., the scheduled date for the participants to come for the next antenatal visit for example between 24-28, 32 and 36 weeks for the second, third and fourth visit respectively.

RESULTS

Results for RQ1 and RQ2

From study findings, six factors were identified as the major challenges responsible for low male involvement in antenatal care visiting. These include;

1. Long distances moved by pregnant mothers to seek for antenatal care: Majority of the participants (mother- 75%, nurses and midwives - 80% and male partners - 80%) agreed that long distances hinder husbands from getting involved in antenatal care visiting.
2. Cultural beliefs: 80% of male participants said that in African traditional society there was no antenatal care visits since pregnant mothers used local herbs therefore there is no need for antenatal care visiting.
3. Too busy with work: 90% of male partners claimed to always being busy thus they do not have time escort their wives for antenatal care.
4. Non coordinated campaign and inappropriate implementation of government programs for boosting male involvement in antenatal care: 60% of nurses and mid- wives that participated in the study indicated that lack of proper implementation (of) and non-coordinated campaign for boosting male involvement in antenatal care.
5. Forgetfulness: 88% of male partners who participated in the study indicated that most husbands forget the schedules for antenatal care visit yet even their wives who would have reminded them sometimes forget and they end up not attending all visits.
6. Unfair treatment by nurses: 40% of male partners' participants indicated that the unfair treatment by nurses dis-courage husbands from escorting their wives for antenatal care visits due to fear to be miss treated by nurses and midwives.

Study participants suggested measures including (i) establishing affordable approaches to engage male partners encouraging them to escort their wives for antenatal care visits (ii) the government should conduct sensitization campaign to inform male partners the benefits of escorting their wives for antenatal care and (iii) sending SMS reminders to both pregnant mothers and their male partners reminding them about the antenatal care visitation dates so as improve maternal health thereby reducing maternal mortality rate in the region.

Results for RQ3

To ascertain the roles played ICTs in enhancing antenatal care seeking behavior among pregnant mothers and in increasing the male involvement in antenatal care, a mobile application platform was designed as illustrated in figure one and deployed to cloud server to send reminders for pregnant mothers and their male partners.

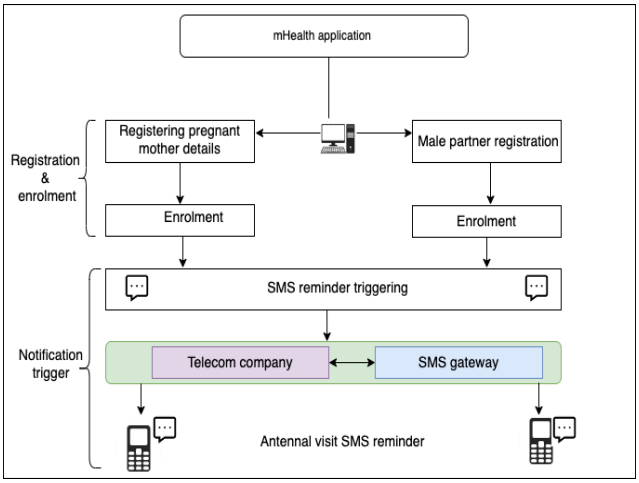

Figure 1: Architecture design of the developed mobile based technology

Architectural description

Registration and enrolment: at this level pregnant mother's details and those of her male partner are registered in the system during their first antenatal care visit, information captured include bio data and other health related information. This information is used to monitor antenatal care adherence and schedule follow up as well as engaging the male partner about his responsibility towards maternal health.

Notification trigger: upon successful enrolment, weekly SMS antenatal visitation reminders are triggered automatically to remind the pregnant mother and her male partner about their next visit. The reminders require possession of a cell phone with a registered sim card and an SMS gateway. **SMS Alerts**: Through the study period, a total of 1440 SMS were triggered. Out the 1440 SMS, only 1395(96.9%) SMS were successfully received by the intended recipient whereas 45(3.1%) SMS were never received by the recipient due to technical issues.

Male partner adherence to antenatal care: The percentage adherence was 50% for four visits i.e., 10 male partners escorted their female partners for four consecutive antenatal visits, 2 (10%) escorted their wives for three consecutive antenatal visits, 5 (25%) escorted their wives for two consecutive antenatal visits whereas 3 (15%) attended only one antenatal visit.

From the survey a number of roles played by ICT in enhancing antenatal care seeking behaviors among pregnant mothers and in increasing the male involvement in antenatal care. These include; (i) Creating affordable opportunities for continuous engagement between the nurse/midwife and the expecting mother, this was observed during the study investigation where nurses sent weekly SMS alerts reminding mothers about their next visit, (ii) promotion of health well-being for both the expecting mother and the foetus via timely sensitization sent in via remote interaction between the pregnant mother and the health worker, (iii) ensures continuous reminders to the male partners thus, bringing him closer to his expectant partner which improves male support during the gestation period.

Conclusion

There is remarkable technology penetration rate in Uganda due to its outstanding benefits and its potential to enhance communication and access to information. This has manifested in rate at which Ugandans are adopting mobile based communication. However mobile communication has been more utilized for business, social life especially social media platform yet it can play a significant role in improve human health. Therefore, a mobile based technology has been developed to improve male involvement in antenatal care by addressing gaps identified in existing system used for boosting antenatal care seeking behaviors among pregnant mothers and their husbands.

Future work

The study has ascertained utilizing customized, low-cost SMS based notification engagement for antenatal care involvement by male partners, the following future research studies are recommended; a study on the impact of SMS based notification to boost male involvement in antenatal care and study on factors affecting technology penetration rate and its adaptability towards maternal health in rural settings

References

[1.] S. Mullick, B. Kunene, M. Wanjiru, Involving men in maternity care: health service delivery issues, Agenda Special Focus 6 (2005) 124–135.
[2.] K. F. Kariuki, G. K. Seruwagi, Determinants of male partner involvement in antenatal care in wakiso district, uganda, Br J Med Med Res 18 (7) (2016) 1–5.
[3.] D. Singh, M. Lample, J. Earnest, The involvement of men in maternal health care: cross-sectional, pilot case studies from maligita and kibibi, uganda, Reproductive health 11 (1) (2014) 1–8.
[4.] O. Mweemba, C. Zimba, B. H. Chi, K. F. Chibwe, W. Dunda, K. Freeborn, S. Maman, T. F. L. Matenga, T. Phanga, N. Rosenberg, et al., Contextualising men's role and par-ticipation in pmtct programmes in malawi and zambia: A hegemonic masculinity perspective, Global Public Health 17 (9) (2022) 2081–2094.
[5.] S. Ouedraogo,´ M. Accrombessi, A. Ouattara, A. Massoug-bodji, E. D. Dabira, M. Sarigda, I. Diallo, A. Zida, M. Nico-las, L. Ouedraogo,´ et al., Impact of mobile phone intervention on intermittent preventive treatment of malaria during preg-nancy in burkina faso: A pragmatic randomized trial, Revue d'epidemiologie et de sante publique 70 (5) (2022) 209–214.
[6.] W. Zhang, Y. Ming, G. Li, Research on application of computer big data and mobile communication technology in intelligent nursing service platform, in: 2022 IEEE Interna-tional Conference on Electrical Engineering, Big Data and Algorithms (EEBDA), IEEE, 2022, pp. 1–5.
[7.] F. Ngabo, J. Nguimfack, F. Nwaigwe, C. Mugeni, D. Muhoza, D. R. Wilson, J. Kalach, R. Gakuba, C. Karema, A. Bi-nagwaho, Designing and implementing an innovative sms-based alert system (rapidsms-mch) to monitor pregnancy and reduce maternal and child deaths in rwanda, The Pan African Medical Journal 13 (2012).
[8.] E. Larsen-Cooper, E. Bancroft, S. Rajagopal, M. O'Toole, A. Levin, Scale matters: a cost-outcome analysis of an m-health intervention in malawi, Telemedicine and e-Health 22 (4) (2016) 317–324.
[9.] R. Istepanian, S. Laxminarayan, C. S. Pattichis, M-health: Emerging mobile health systems, Springer Science & Business Media, 2007.
[10.] M. Gutierrez, R. Moreno, M. Rebelo, Information and com-munication technologies and global health challenges, in: Global health informatics, Elsevier, 2017, pp. 50–93.
[11.] R. A. Fincher, International conference on population and development, Envtl. Pol'y & L. 24 (1994) 309.
[12.] J. Clark, L. Sweet, S. Nyoni, P. R. Ward, Improving male involvement in antenatal care in low and middle-income countries to prevent mother to child transmission of hiv: a realist review, PloS one 15 (10) (2020) e0240087.
[13.] P. Gopal, D. Fisher, G. Seruwagi, H. B. Taddese, Male involvement in reproductive, maternal, newborn, and child health: evaluating gaps between policy and practice in uganda, Reproductive Health 17 (1) (2020) 1–9.

[14.] J. Yargawa, J. Leonardi-Bee, Male involvement and maternal health outcomes: systematic review and meta-analysis, J Epidemiol Community Health 69 (6) (2015) 604–612.
[15.] M. R. Dudgeon, M. C. Inhorn, Men's influences on women's reproductive health: medical anthropological perspectives, Social science & medicine 59 (7) (2004) 1379–1395.
[16.] M. Redshaw, J. Henderson, Fathers' engagement in pregnancy and childbirth: evidence from a national survey, BMC preg-nancy and childbirth 13 (1) (2013) 1–15.
[17.] D. Griggs, M. Stafford-Smith, O. Gaffney, J. Rockstrom, M. C. Ohman, P. Shyamsundar, W. Steffen, G. Glaser, N. Kanie, I. Noble, Sustainable development goals for people and planet, Nature 495 (7441) (2013) 305–307.
[18.] L. Treacy, H. A. Bolkan, M. Sagbakken, Distance, accessibil-ity and costs. decision-making during childbirth in rural sierra leone: a qualitative study, PLoS One 13 (2) (2018) e0188280.
[19.] E. Vermeulen, A. Solnes Miltenburg, J. Barras, N. Maselle, M. Van Elteren, J. Van Roosmalen, Opportunities for male involvement during pregnancy in magu district, rural tanzania, BMC pregnancy and childbirth 16 (1) (2016) 1–9.
[20.] F. Midhet, S. Becker, Impact of community-based interven-tions on maternal and neonatal health indicators: Results from a community randomized trial in rural balochistan, pakistan, Reproductive health 7 (1) (2010) 1–10.
[21.] R. Byamugisha, J. K. Tumwine, N. Semiyaga, T. Tylleskar,¨ Determinants of male involvement in the prevention of mother-to-child transmission of hiv programme in eastern uganda: a cross-sectional survey, Reproductive health 7 (1) (2010) 1–9.
[22.] R. Musarandega, R. Machekano, S. P. Munjanja, R. Pattinson, Methods used to measure maternal mortality in sub-saharan africa from 1980 to 2020: A systematic literature review, International Journal of Gynecology & Obstetrics 156 (2) (2022) 206–215.
[23.] R. Tweheyo, J. Konde-Lule, N. M. Tumwesigye, J. N. Sekandi, Male partner attendance of skilled antenatal care in peri-urban gulu district, northern uganda, BMC pregnancy and childbirth 10 (1) (2010) 1–9.
[24.] A. C. Benski, N. C. Schmidt, M. Viviano, G. Stancanelli, A. Soaroby, M. R. Reich, Improving the quality of antenatal care using mobile health in madagascar: Five-year cross-sectional study, JMIR mHealth and uHealth 8 (7) (2020) e18543.
[25.] P. R. Sama, Z. J. Eapen, K. P. Weinfurt, B. R. Shah, K. A. Schulman, An evaluation of mobile health application tools, JMIR mHealth and uHealth 2 (2) (2014) e3088.
[26.] C. B. Aranda-Jan, N. Mohutsiwa-Dibe, S. Loukanova, Sys-tematic review on what works, what does not work and why of implementation of mobile health (mhealth) projects in africa, BMC public health 14 (1) (2014) 1–15.
[27.] A. C. Benski, G. Stancanelli, S. Scaringella, J. L. Herinaina-solo, J. Jinoro, P. Vassilakos, P. Petignat, N. C. Schmidt, Usability and feasibility of a mobile health system to provide comprehensive antenatal care in low-income countries: Panda mhealth pilot study in madagascar, Journal of Telemedicine and Telecare 23 (5) (2017) 536–543.