

論文の内容の要旨

論文題目 The effectiveness of a behavioral science and design intervention for family savings on increased use of maternal health services and male involvement: a randomized controlled trial
(ウガンダにおける家計貯蓄・行動デザイン介入による母子保健サービス利用率及び配偶者関与への効果：ランダム化比較試験)

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Introduction

Maternal mortality is a common problem worldwide despite high levels of investment and effort over the last several decades, especially in low and middle-income countries (1). The maternal mortality ratio (MMR) is 211 per 100,000 live births worldwide, and sub-Saharan Africa (SSA) carries two-thirds of the global burden of MMR (1). Educational attainment, a well-functioning health system, and economic factors are all associated with maternal mortality particularly in SSA (1). Financial and opportunity costs are often cited as a demand side access barriers for women and families (2).

Lack of financial preparedness for pregnancy can lead to adverse outcomes during childbirth. Demand-side interventions that increase antenatal care (ANC) visits before childbirth and skilled birth attendance (SBA) are widely known to improve maternal health outcomes (3). Being able to discover high-risk pregnancies before delivery and encourage the mother to return for delivery at a health facility is important to prevent birth complications or death (4). Because a mother and her partner have not accounted for the costs of the pregnancy, they are less prepared if they encounter an emergency during childbirth (5).

Male heads of household are often the primary decision maker when it comes to family decisions in sub-Saharan Africa (SSA), particularly decisions surrounding finances or healthcare (6). Furthermore, men's attendance with their partner to ANC can affect the quality or ability to access ANC in SSA. Male involvement can also include financial support for transport or appointments in SSA, in alignment with "traditional gender roles" (7).

Behavioral science interventions have been shown to influence savings behavior in SSA and results show that text messages that sound like they are from their child had a marked improvement on savings behavior (8). Although central banking systems are in place, digital financial services such as mobile money offer people living in remote the opportunity to access and store funds without holding cash. In SSA, mobile money is a widely used service that telecommunication companies provide to customers, whereby a user with a phone number and SIM card can access a digital account linked to their phone number that enables them to store, save, send, and receive money (9). When considering the efficacy of financial interventions, mobile money has not been as widely tested (10).

In Uganda, the MMR stands at 336 per 100,000 live births, last measured in the 2016 Demographic and Health Survey (11). The government contributes approximately 16% of the total cost of health expenditure with no social health insurance programs. Expectant mothers also might be expected to contribute up to 100,000 Ugandan Shillings (approximately USD 30) when delivering at a facility, which many families cannot afford due to the subsistence nature of their income earnings (12). The Government of Uganda promotes birth preparedness by purchasing a birth-kit or related items even if an expectant mother is planning to deliver at a public health facility, as these items are not provided at delivery (13).

Financial savings interventions can be adapted for the purpose of encouraging individuals to save towards maternal healthcare costs. In this study, I assessed the effectiveness of an intervention formulated with a behavioral science approach on the use of maternal health services through increased savings for birth preparedness and maternal healthcare costs among pregnant women or their partners in Kampala and Wakiso districts in the central region of Uganda.

Methods

I conducted a randomized controlled trial between June 1 – December 1, 2022. The study area was selected due to the high population density (Kampala: 1,507,080; Wakiso: 1,997,418) and mobile phone ownership (11,14). Two hundred ninety-three (293) pregnant women and 90 men were recruited during the pregnancy period (12-35 gestational weeks) at 77 health facilities for an intervention period of 2-6 months depending on gestational weeks at enrollment, and they were allocated at a 1:1 ratio. Both intervention and control group participants received access to a committed mobile money health savings account provided by a local organization that also offers savings targets, reminders for antenatal care appointments, and health tips. In addition, the intervention group received behaviorally designed messages encouraging savings behavior through short-message service (SMS) text messages from the day of enrollment until two weeks after the delivery date.

The primary outcomes were (1) usage of maternal health services, measured by level of birth preparedness and skilled birth attendance and delivery at a health facility, and (2) expenditures on healthcare, assessed using the validated amount of withdrawals in participants' accounts at the end of the intervention period. Secondary outcomes included male involvement in maternal healthcare and total savings for healthcare assessed using the validated amount of deposits in participants' accounts at the end of the intervention period. Mixed-effect generalized linear models based on Poisson distribution and generalized linear models based on Poisson and Gaussian distributions were used to examine the effects of the intervention.

Results

Among 180 total participants (87: intervention, 93: control) who completed the endline survey by

December 2022, the percentage of participants who completed four or more ANC visits by delivery was 95% higher in the intervention group than in the control group (RR = 1.95, 95% CI 0.65 – 5.87). However, the change in percentage of participants who purchased a birth kit by the intervention was 29% lower in the intervention group than the control group, adjusted for the baseline level (RR = 0.71, 95% CI 0.33 – 1.50). There was no significant improvement of skilled birth attendance or delivery at a health facility by intervention group; nearly all participants across both groups delivered with a skilled birth attendant and at a health facility. The percentage of participants who exercised a high male involvement was higher in the intervention by 10% over the control group, adjusted for baseline level (RR = 1.10, 95% CI 0.60 – 2.03).

The percentage of participants that reported they saved for their pregnancy was 17% lower in the intervention group compared to the control group, adjusted for baseline level (RR = 0.83, 95% CI 0.51 – 1.35). For validated deposits in the clinicPesa accounts, the amount saved by the intervention group was 19,458 UGX less than the control group (95% CI -69,191 – 30,275). When measured by the 100,000 UGX threshold to account for outliers, deposits were higher in the intervention by 12% compared to the control group (RR 1.12, CI 0.68 – 1.86). For validated withdrawals for expenditures, the amount withdrawn by the intervention group was 13,511 UGX less than the control group (95% CI -51,873 – 24,851). When measured by the 100,000 UGX threshold to account for outliers, withdrawals were lower in the intervention group by 3% (RR 0.97, CI 0.54 – 1.76).

Conclusion

There was no evidence of the behaviorally informed messaging intervention in improving ANC attendance completion, male involvement in maternal healthcare, and savings for maternal healthcare among pregnant women or their partners in Kampala District, Uganda, though there was a positive tendency. There was also no evidence of the behaviorally informed messaging intervention was not effective on improving birth preparedness and financial savings for healthcare costs among pregnant women or their partners in Uganda. With further research and caution, the behavioral science approach could be a potential option to promote other behavioral changes that incorporate mobile money savings accounts towards healthcare in SSA.

Keywords

Maternal health service, Healthcare cost, Pregnancy, Antenatal care, Birth preparedness, Male involvement, Behavior change, Mobile Money, Savings, Global health

References

1. Trends in Maternal Mortality 2000 to 2017: Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division [Internet]. WHO, UNICEF, UNFPA, World Bank Group and

- theUnited Nations Population Division. Geneva; 2019 Sep [cited 2022 Mar 6]. Available from: <https://www.unfpa.org/featured-publication/trends-maternal-mortality-2000-2017>
2. Mgawadere F, Unkels R, Kazembe A, van den Broek N. Factors associated with maternal mortality in Malawi: Application of the three delays model. *BMC Pregnancy Childbirth*. 2017 Jul 12;17(1):219.
 3. Singh K, Story WT, Moran AC. Assessing the Continuum of Care Pathway for Maternal Health in South Asia and Sub-Saharan Africa. *Matern Child Health J*. 2016 Feb 1;20(2):281–9.
 4. Guliani H, Sepehri A, Serieux J. What impact does contact with the prenatal care system have on women's use of facility delivery? Evidence from low-income countries. *Soc Sci Med*. 2012 Jun;74(12):1882–90.
 5. Johns B, Hangoma P, Atuyambe L, Faye S, Tumwine M, Zulu C, et al. The costs and cost-effectiveness of a district-strengthening strategy to mitigate the 3 delays to quality maternal health care: Results from Uganda and Zambia. *Glob Health Sci Pract* [Internet]. 2019 Mar 11 [cited 2021 Mar 10];7(Supplement 1):S104–22. Available from: www.ghsjournal.org
 6. Tokhi M, Comrie-Thomson L, Davis J, Portela A, Chersich M, Luchters S. Involving men to improve maternal and newborn health: A systematic review of the effectiveness of interventions. *PLoS One*. 2018 Jan 1;13(1).
 7. Greenspan JA, Chebet JJ, Mpembeni R, Mosha I, Mpunga M, Winch PJ, et al. Men's roles in care seeking for maternal and newborn health: A qualitative study applying the three delays model to male involvement in Morogoro Region, Tanzania. *BMC Pregnancy Childbirth*. 2019 Aug 13;19(1).
 8. Akbas M, Ariely D, Robalino DA, Weber M. How to Help Poor Informal Workers to Save a Bit: Evidence from a Field Experiment in Kenya. Bonn; 2016 Jun. Report No.: 10024.
 9. Ahmed H, Cowan B. Mobile money and healthcare use: Evidence from East Africa. *World Dev*. 2021 May 1;141.
 10. Fernandes D, Lynch JG, Richard G. Financial Literacy, Financial Education, and Downstream Financial Behaviors. *Manage Sci*. 2014;60(8):1861–83.
 11. Uganda Demographic and Health Survey 2016 [Internet]. Kampala; 2018 Jan [cited 2021 Mar 11]. Available from: www.DHSprogram.com
 12. Parkhurst JO, Ssengooba F. Assessing access barriers to maternal health care: measuring bypassing to identify health centre needs in rural Uganda. *Health Policy Plan* [Internet]. 2009 [cited 2021 Mar 10];24:377–84. Available from: <https://academic.oup.com/heapol/article/24/5/377/586073>
 13. Essential Maternal and Newborn Clinical Care Guidelines For Uganda. 2016.
 14. Market Performance Report 3Q20 [Internet]. Kampala; 2020 [cited 2021 Mar 24]. Available from: <https://www.ucc.co.ug/wp-content/uploads/2021/01/MARKET-PERFOMANCE-REPORT-Q3-2020-Final-compressed.pdf>