

The Impact of Moderated WhatsApp Text Messaging for Improving Maternal and New-born Referral Outcomes among Health Facilities in Luapula Province, Zambia

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Abstract

Technological advancement has continued to change patient care by progress in treatment and diagnostics. However, the paper-based referral communication method between the initiating and receiving facility in most developing countries has remained the same. In Zambia, Luapula Provincial Health Office (LPHO) decided to strengthen its referral system by means of moderated WhatsApp, a mobile telecommunication application, to arrest rising maternal mortalities. The current study assessed the impact of the intervention in maternal/neonatal outcomes. The study used a Mixed Method approach. The Quantitative-retrospective cross-sectional design, using a data extract from Mansa General hospital between 2017 and 2020. SPSS v. 25 was used to analyse data. Demographic traits were analysed using descriptive statistics. The impact was assessed using mortality figures from 2016- to 2020 for referrals that did or didn't use WhatsApp across 8 districts. Two focus group discussions explored the factors leading to the maternal or neonatal patients receiving inadequate and inappropriate care at the receiving facility prior to the intervention. Findings showed that maternal mortalities resulting from referrals (used the intervention) reduced by 99.4% from 2017 to 2020, with only 0.5% mortalities, compared to a 78.5% reduction, with 21.2% recorded mortalities from referrals that did not use WhatsApp. Moderated WhatsApp messaging application had a positive impact in improving maternal and neonatal referral outcomes in Luapula Province.

Keywords: *Moderated WhatsApp, Maternal Mortality, Neonatal Mortality.*

Introduction

Advancements in technology has changed and continue to change patient care by progress in treatment and diagnostics. However, the communication method among healthcare workers has remained as before the advent of the smartphone. Hospitals continue to use paper-based communication channels for referrals and general patient care between and within facilities. Studies have shown that these types of communications hinder timely patient care and that most hospitals are now adopting mobile

communication technology to enhance effective communication in the health system [1].

In Zambia, upon realisation of the potential that mobile health (Mhealth) platforms can offer to improve health outcomes, Luapula Provincial Health Office (LPHO) on 25th December 2016, decided to strengthen its referral system by means of mobile telecommunication applications, using WhatsApp groups to arrest the rising maternal mortalities. It was agreed that each district within the province creates a linked WhatsApp group with Mansa General hospital (The main referral Hospital for OBS/GYN).

Despite significant progress in maternal and child health (MCH) globally, the burden of poor maternal and new-born health accounts for over a quarter of healthy years of life lost [2]. Worldwide, over 300 000 women die from maternal causes, 3.3 million are stillborn, and an additional 3.3 million mortalities within the first month of life every year, with a vast majority of these deaths occurring in sub-Saharan Africa (SSA) and South Asia [3, 4]. The World Health Organisation (WHO) defines maternal death in International Classification of Diseases version-10 (ICD-10) as; the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. Similarly, the organisation asserts that Maternal deaths are subdivided into two groups: direct obstetric deaths and indirect obstetric deaths. Direct obstetric deaths are defined as those resulting from obstetric complications during pregnancy, labour, and the puerperium or from interventions, omissions, and incorrect treatment. The cause of direct obstetric deaths is further classified as: pregnancies with an abortive outcome, hypertensive disorders, obstetric haemorrhage, pregnancy-related infection, obstructive labour, and unanticipated complications.

Maternal mortality differs vastly between high-income and low-income countries; the latter account for 99% of deaths, and SSA alone accounts for two-thirds [5]. Global efforts to improve maternal outcomes spearheaded by the United Nations continue to be pursued with limited success. While maternal deaths decreased by 45% between 1990 and 2015, short of the 75% target set through the Millennium Development goals, now succeeded by Sustainable Development goals (SDGs) which aim to reduce mortalities in every country to <140 per 100 000 live births by the end of the decade [6].

With Zambia's fertility rate of 4.98 births per woman aged 15-49 years (7), it is a notorious fact that on the one hand, the population will continue to grow steadily, while on the other hand, maternal death will continue to be a major cause of death for women. The ZNPFI further observed that associated maternal deaths were a 4th leading cause of death among women of childbearing and accounted for 17.2% of deaths in women aged 15-49 in Zambia. Similarly, between 1990 and 2013, Zambia's rate of maternal decline was 0.56% per annum [8]. The study further posited that, at its current rate, Zambia is likely not to reach the third SDG's goal of a maternal ratio of less than 70 maternal deaths per 100 000 live births by 2030. While there are no size fits all solutions to maternal and neonatal mortalities, digital technologies if aligned properly, can prove useful in arresting the upward trend in mortalities. This is because social media has transformed communication and has provided innovative strategies for information transfer. Additionally, quality, and timely information is critical to patient management and improving health outcomes.

Thus, the Luapula Province Medical office in Zambia envisaged that improving communication between initiating facilities and receiving facility for Obstetrics and Gynecology (OBGYN) emergencies via a moderated WhatsApp platform would aid the receiving facility to prepare adequately in advance to improve maternal and neonatal outcomes. However, 4 years down the line, there has not been any study conducted to assess the efficacy of moderated WhatsApp text messaging for improving maternal and new-born referral outcomes in the province. Hence, the current study will assess the impact and effectiveness of the intervention in maternal outcomes.

Methodology Of Study

Study Design

The study used a Mixed Method approach involving both Quantitative and Qualitative.

The Quantitative used a retrospective cross-sectional design from 2017 to 2020 on OBGYN data stored at Mansa General Hospital. Included Clients who were referred from facilities within Luapula Province to Mansa General hospital, OBS/GYN department. The sample size was calculated using the Sample Size Calculator, an electronic platform (15). The following parameters were used. A total population of 8688 patients were referred to Mansa General Hospital from 2017 to 2020. Confidence Interval at 95%, the sample size required was 368. The study used stratified random sampling. The patient records were grouped into strata based on years, that was 2017, 2018, 2019 and 2020. In each year, a total of 92 patients were selected randomly. The Data was extracted from DHIS2 and referral registers from the period 2017 to 2020. On the other hand, an open-ended questionnaire to medical staff were administered on two focus group discussion (FDGs) with each member only in each group. Data Analysis for the quantitative approach used SPSS version 25. Demographic traits were analysed using descriptive statistics and presented in form of tables and graphs. In addition, the impact was assessed using health outcomes from referrals that used WhatsApp messaging from those that did not during the period under review.

Qualitative Approach

The study used a Phenomenology study design. The focus group participants' interviews focused on subjective experiences and understanding the structure of those lived experiences while working in OBGYN. Phenomenology is used to describe, in-depth, the common characteristics of the phenomena that have occurred. The study population constituted of Health Care workers at Mansa General Hospital who works or worked in the OBGYN department during the period under study and participated in the Focus Group Discussion. The sample included two (2) Focus Groups. Each focus group comprised of 8 participants that were selected through purposive sampling. The

data was collected through in-depth interviews, and a questionnaire with open-ended questions was used to conduct the interviews. The focus group interview lasted between 40-45 minutes per session. The data was collected using Recorders and paper and later decoded for analysis. The data was analysed using the Thematic Analysis approach. The study closely examined the data to identify common themes, topics, ideas, and patterns of meaning that came up repeatedly. Suffice to mention that the thematic approach followed a six-step approach which included the following.

1. Familiarization.
2. Coding.
3. Generating themes.
4. Reviewing themes.
5. Defining and naming themes.
6. Writing up.

Data Management & Control

The following measures were used to ensure data quality; Extracted data showed that the woman was referred. Data showed that the woman was pregnant at the point of referral. FDG participants were medical personnel in OBS/GYN.

Ethical Consideration

The ethical clearance was sought through the Mulungushi University School of Medicine and Health Sciences Research Ethics Committee (MUSoMHS-REC), the Provincial Health Office and the District Health Office. In addition, all the data that was abstracted from the DHIS2 was de-identified. Similarly, consent was sought from FDG participants before they can participate in the interview, and participants were allowed to opt-out of the session any time they felt like. All the FDG participants were provided with Covid-19 protective gear (Mask, Hand Sanitizer, Head shield), and interviews were conducted in a spacious environment that allowed for social-distancing.

Results

Socio-demographic Traits

The demographic traits revealed that Mansa district, cumulatively, had the highest total number of referrals 74.2% (N=273), while Kawambwa district had the lowest recorded number of referrals 0.3% (N=1), recorded and communicated via the WhatsApp platform. Additionally, only Luwingu and Chembe

districts recorded maternal mortalities within the period under review, 1 in each district. On the other hand, Mansa district, cumulatively, recorded the highest number of neonatal deaths, 80.4% (N=37), while Milenge and Kawambwa had recorded no deaths.

Table 1. Social-Demographic Traits

Variable		District								Total
		Mansa	Samfya	Chiengi	Kawambwa	Chipili	Milenge	Chembe	Luwingu	
Referral Year	2017	66	5	1	1	4	3	12	0	92
		71.7%	5.4%	1.1%	1.1%	4.3%	3.3%	13.0%	0.0%	100.0%
	2018	115	1	0	0	9	1	24	1	151
		76.2%	0.7%	0.0%	0.0%	6.0%	0.7%	15.9%	0.7%	100.0%
	2019	64	5	1	0	8	0	10	4	92
		69.6%	5.4%	1.1%	0.0%	8.7%	0.0%	10.9%	4.3%	100.0%
2020	28	0	0	0	2	1	2	0	33	
	84.8%	0.0%	0.0%	0.0%	6.1%	3.0%	6.1%	0.0%	100.0%	
Total		273	11	2	1	23	5	48	5	368
		74.2%	3.0%	0.5%	0.3%	6.3%	1.4%	13.0%	1.4%	100.0%
Maternal Outcome	Alive	273	11	2	1	23	5	47	4	366
		74.6%	3.0%	0.5%	0.3%	6.3%	1.4%	12.8%	1.1%	100.0%
	Dead	0	0	0	0	0	0	1	1	2
		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%	100.0%
Total		273	11	2	1	23	5	48	5	368
		74.2%	3.0%	0.5%	0.3%	6.3%	1.4%	13.0%	1.4%	100.0%
Neonatal Outcome	Alive	236	9	1	1	22	5	44	4	322
		73.3%	2.8%	0.3%	0.3%	6.8%	1.6%	13.7%	1.2%	100.0%
	Dead	37	2	1	0	1	0	4	1	46
		80.4%	4.3%	2.2%	0.0%	2.2%	0.0%	8.7%	2.2%	100.0%
Total		273	11	2	1	23	5	48	5	368
		74.2%	3.0%	0.5%	0.3%	6.3%	1.4%	13.0%	1.4%	100.0%

Impact of Moderated Whatsapp Messaging in Improving Maternal and Neonatal Referral Health Outcomes

Maternal Mortalities

Figure 1 below shows that more maternal mortalities were recorded from cases referred

with no prior WhatsApp messaging than cases referred with prior communication. With 2017, recording the highest number of mortalities, 32.9% (N=26). On the other hand, cases referred with prior WhatsApp messaging, texting or phone call had recorded no mortalities except for 2019 which had 2 (two) mortalities.

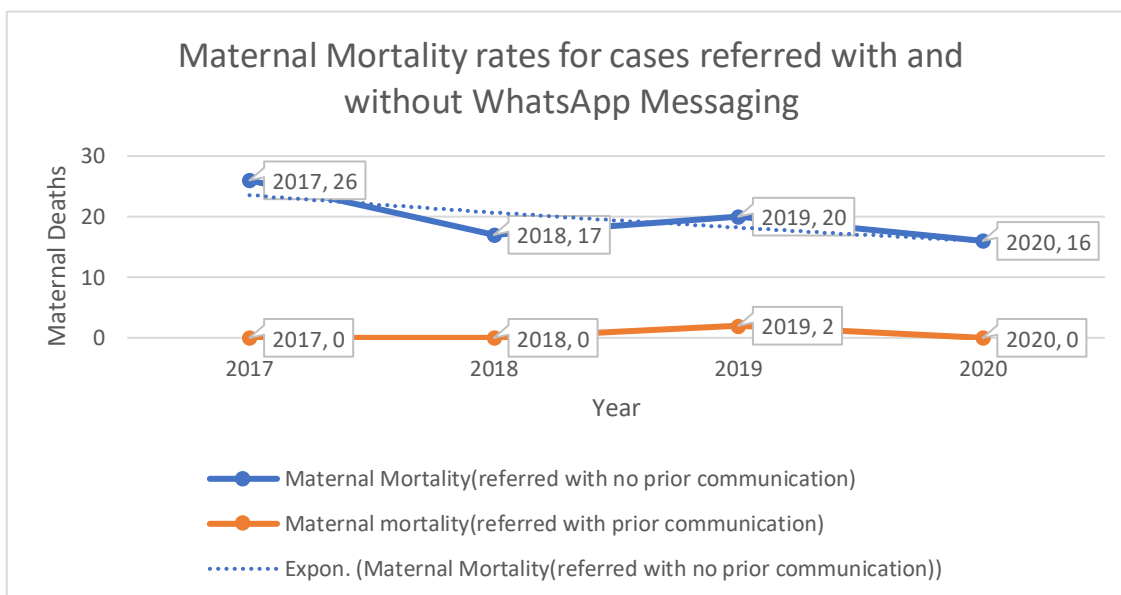


Figure 1. Maternal Mortality Rates for Cases Referred with and without WhatsApp Messaging

Neonatal Mortalities

Figure 2 below indicates that a total of 250 and 46 neonatal mortalities were recorded from cases referred without and with the

communication intervention, respectively. It is also important to that mortalities were the communication intervention was applied dropped from 39.1% (N=18) in 2017 to 10.9% (N=5) in 2020, respectively.

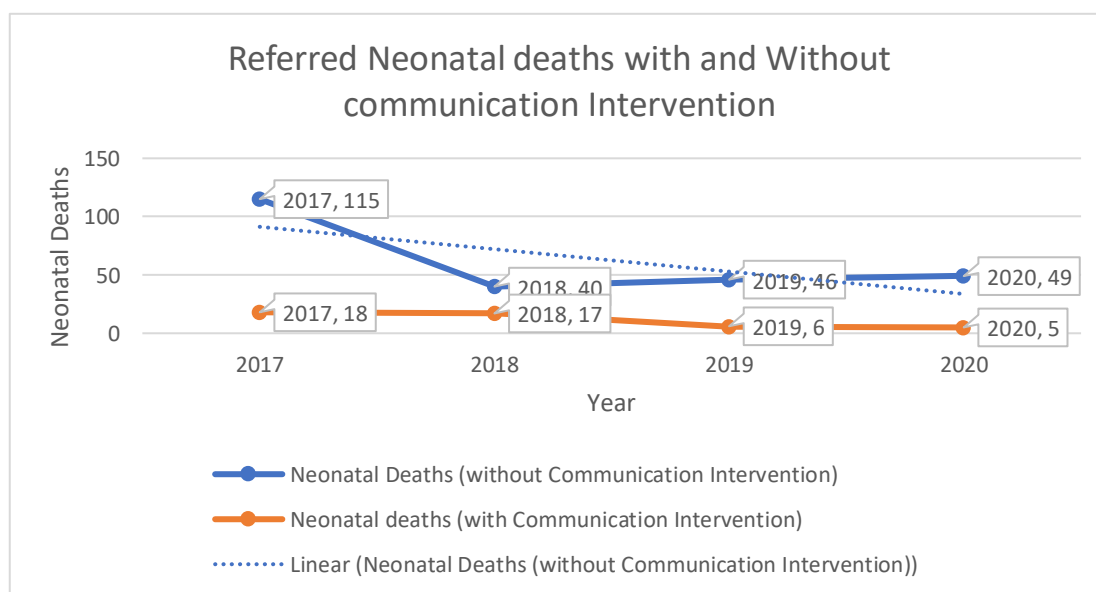


Figure 2. Referred Neonatal Deaths with and without Communication Intervention

Factors Leading to Maternal or Neonatal Patient Receiving Inadequate and Appropriate Care at the Receiving Facility

Most FGD members observed that prior communication via moderated WhatsApp by the

sending facilities was critical in adapting care to each specific case. It was reported that the mode of emergency communication before the intervention was poor; FGD1/FGD2/FGD5/FGD6/FGD7 asserted that emergencies communicated via phone calls only, which made it difficult to reference what

was said if the narrative escaped memory. Similarly, FDG3/FDG10 intimated that while referral letters sometimes accompanied the patient, often, the quality of handwriting made it difficult to comprehensively understand the message. Additionally, in FDG4 and 9, members of staff at the receiving facility, shared their experience by noting that ‘there was very minimal to no communication prior to a referral. That in many cases, we would just receive patients with no prior communication’.

With the introduction of moderated WhatsApp as an intervention of choice to improve communication since 2016, FDG2, staff at the receiving facility observed that the intervention was a good move as it helped staff with sufficient referenced information to prepare adequately prior to receiving the emergency. In adding their voice, FDG3/FDG9 intimated that; ‘it was a good move that has led to significant maternal and neonatal mortalities as it has arrested the malaise of poor communication, a huge contributor to poor outcomes. In the same vein, FDG4/FDG6/FDG8 said,’ WhatsApp messaging has really helped us a lot, in the sense that it allows us to prepare effectively well in advance before the patient arrives on the other hand, FDG7 made a very good observation that, while moderated WhatsApp was very useful, it should be accompanied by a phone call, just in case someone is offline

Factors Affecting Maternal Outcomes with Respect to Mortality, Postpartum Infection, Postpartum Haemorrhage and 3rd Or 4th Degree Tear

The analysis of submissions from all the 16 Focus Group Members highlighted the following factors: medical mistakes, delay in making the decision for a referral, inadequate medication stock and stockouts and delay in providing adequate and necessary care at the receiving facility. Similar findings were observed by Jean B, and friends, where they observed medical mistakes and delayed in

making a referral decision were major contributors of negative maternal outcomes [6].

Discussion

A mixed-methods convergent study was conducted to assess the Impact of Moderated WhatsApp Text Messaging for improving maternal and newborn referral outcomes among health facilities in Luapula Province, Zambia. It was premised that improvement in communication using moderated WhatsApp messaging between the sending and receiving facility for Obstetric and Gynaecological referrals would lead to the reduction of maternal and neonatal mortalities. In this vein, the study assessed the impact by looking at referral outcomes with and without prior WhatsApp messaging between the sending and receiving facilities.

The research findings in the Eight (8) districts in which the sending facilities were located showed that there were fewer maternal and neonatal deaths among referrals that used the communication intervention platform compared to those that did not.

Maternal mortalities resulting from referrals (used the intervention) reduced by 99.4% from 2017 to 2020, with only 0.5% mortalities with the sample population. On the other hand, maternal mortalities from referrals (without the intervention) were only reduced by 78.5%, with 21.2% recorded mortalities within the same period. Similarly, in terms of neonatal mortalities, the findings showed that there were fewer recorded mortalities from referrals that used the intervention compared to those that did not.

The improvement in the maternal and neonatal outcomes at the receiving facility could be attributed to improved communication as expressed by the focus group members. Prior studies as to how Woods J and friends, in their descriptive analysis of the role of a WhatsApp clinical discussion group in Eastern cape, asserted that; the use of WhatsApp in a medical setting as an effective means of communication

is very important in improving medical outcomes of complicated clinical cases [17]. As already alluded to in the focus group discussion, improved outcomes can be attributed to the fact that the intervention affords the receiving facility sufficient time to prepare effectively well in advance before the patient arrives.

On the other hand, potential impediments to the intervention as reported by FGs included poor and intermittent internet connectivity in certain health settings, loss of communication tools (cell Phones) and the cost of bundles and airtime. Similar studies had observed that the effectiveness of WhatsApp messaging hinged upon overcoming the afore-mentioned barriers [3,18]. Additionally, these barriers could be addressed as suggested by FGs that WhatsApp messaging should instead re-enforce the multiple referral communication package that should include referral letters and phone calls. That these should be incorporated as a combo to improve effectiveness and efficiency.

Conclusion

Maternal and neonatal health continue to be national and global priorities, given the fact that

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both are still touted as public health challenges. They remain aspirations in the sustainable development goals; therefore, interventions that seek to promote maternal and neonatal outcomes should be supported and extensively researched for their efficacy. The research findings showed that moderated WhatsApp messaging applications had a positive impact on improving maternal and neonatal referral outcomes in Luapula Province.

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Competing Interest

The author currently serves as the District Health Director for Milenge district in Luapula, and these data were included in the dissertation that was written as part of a Master's Degree program at Texila American University.

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