Reduction of Home Deliveries in Kaoma District: Impact of Safe Motherhood Action Groups from 2020 to 2021

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Abstract

Community-centered interventions, such as safe motherhood action groups (SMAGs), that focus on community members' involvement and participation are likely to be more accepted by local communities than vertical top – down interventions. Furthermore, community-based interventions are more likely to lead to desired health behavioral change and favorable health outcomes. Inadequate human resource for health where practically a patient may never see a physician, has prompted Zambian Ministry of Health (MOH) in 2003, to establish Safe Motherhood Action Groups (SMAGs) as part of a national safe motherhood program in view to increase the utilization of maternal healthcare services (MHS). Currently, in Kaoma district of Western Province, it is unknown how the SMAG program effectively impacts on reduction of home deliveries. Therefore, our study aims to assess the impact of safe motherhood action groups on home deliveries from 2020 to 2021. The study was quantitative in design and used standard data collection tools. A Causal Comparative method was used to establish the impact of safe motherhood action groups on home deliveries. The overall results indicate tremendous decrease of 198% in home deliveries. Following our results, we concluded that SMAG program, as a community intervention, effectively impacts on the reduction of home deliveries in Kaoma district.

Keywords: Hospital Utilization, Safe Motherhood Action Groups, SMAGs.

Introduction

General Information on the Research Topic

Limited access to and low utilisation of skilled health care workers are some of the major reasons for the high maternal mortality ratio (MMR) in Zambia, standing at 183 per 100,000 in 2018 (**WHO: Zambia**) [19] but maternal mortality still accounts for 10% of all deaths among women between 15 and 49 years of age . Despite the decrease, maternal mortality is still high in absolute terms, In relation to Target 3.1 of the Sustainable Development Goal (SDG) 3, which is to reduce global MMR to less than 70 per 100,000 live births by 2030; the estimated MMR still remains relatively high in Zambia.

Several factors including women's lack of decision-making capacity, low socioeconomic status and dependency on their husbands for financial support, long distances to health care facilities, high transportation costs, logistical challenges and low quality of care in rural Zambia limit access to facility-based delivery services and cause many women (53%) to give birth at home.

Institutional delivery has been found to be one of the key predictors of neonatal mortality prevention, and is a recognized intervention mechanism for decreasing maternal death. Timely institutional delivery assisted by skilled attendants can significantly reduce maternal and neonatal mortality by preventing delivery complications. Nonetheless, a large number of women in developing countries,

particularly in rural areas, lack access to institutional delivery settings, meaning that birth occurs in unsafe and unhygienic conditions.

According to 2018 Zambia Demographic and Health Survey (ZDHS 2018), the percentage of deliveries assisted by skilled birth attendants in Zambia increased from 44% in 2002 to 84% in 2018. Despite this increase, it is clear from the SDG 3 target level that more needs to be done. Access to healthcare services and utilization of available skilled birth attendance can contribute to minimizing the risk of delivery complications and to preventing maternal and neonatal mortality.

In Zambia, maternal health indicators have remained constantly below national set targets: for example, Antenatal care coverage at least 4 times (55.5% versus 85%), skilled attendant at birth (64.2% versus 85%), Institutional delivery (67.4% versus 75%) and Postnatal care of mothers within 2 days (63.4% versus 80%) [15].

To increase access and utilization of maternal healthcare services (MHS), in 2003 the Zambian Ministry of Health (MOH) established Safe Motherhood Action Groups (SMAGs) as part of a national safe motherhood program. SMAGs exist to help foster safer pregnancies to women in their villages, and go further in promoting women within communities.

Each group serves a cluster of villages and is encouraged to meet regularly in a communal area. The aim was to mobilize communities to improve the health of women, men and children and reduce the number of human immunodeficiency virus infections. In Kaoma, district of Western Province in Zambia, Safe Motherhood Action Groups (SMAGs) were further additionally trained in advanced essential newborn care in view to achieve the alluded goals. The aim was to incorporate new evidence based information and other emerging issues to enhance the skills and knowledge of the Community Based

Volunteers in the delivery of health services, especially in the rural areas where skilled health workers may not be readily available.

Research has shown that community-centered interventions, such as SMAGs, that focus on community members' involvement and participation are likely to be more accepted by local communities than vertical top – down interventions, which are planned by health workers at the national level and "imposed" on the community for adoption and implementation. Furthermore, community-based interventions are more likely to lead to desired health behavioral change and favorable health outcomes [14, 17, 18].

Nevertheless, few studies have explored the effectiveness of SMAGs in improving access to maternal health care services in low-income countries, including rural Zambia [1, 4, 7]. Currently, in Kaoma district of Western Province, it is unknown how the SMAG program effectively impacts on reduction of home deliveries. Therefore, our study aims to assess the impact of safe motherhood action groups on home deliveries from 2020 to 2021.

Overview of Research and Research Gaps

In Zambia, the problem of dragging behind maternal health indicators has probably been exacerbated by a counter-urbanization trend, with people moving to more remote areas [12]. Although most of the rural population of Zambia lives less than 8 km from a health centre, the average distance to a health-care facility equipped for safe delivery is more than 15 km [16]. The 2007 Demographic and Health Survey (DHS) in the country reported that 57% of women in rural areas regarded distance as a barrier to accessing health care when sick [20].

To increase access to maternal healthcare services (MHS), in 2003 the Zambian Ministry of Health (MOH) established Safe Motherhood Action Groups (SMAGs) as part of a national safe motherhood program.

SMAGs exist to help foster safer pregnancies to women in their villages, and go further in promoting women within communities.

Their first task involves identifying those women in the community who are pregnant and logging information in two registers: the pregnancy register and the birth register. The SMAGs will then refer pregnant women to health facilities for antenatal check-ups. Along the way, the SMAGs hold community education sessions where they educate not only the women in the community, but also men, who often use their power in the highly patriarchal Zambian culture to prevent women from seeking care that would lead to their children's wellbeing.

In Kaoma, district of Western Province in Zambia, Safe Motherhood Action Groups (SMAGs) were further additionally trained in advanced essential new born care. Training was conducted in eight health centres with participants selected from their respective communities: Longe HP, Mulamba RHC, Namaloba HP, Lunyati RHC, Shibanga HP, Mayukwayukwa 1&2 RHC.

Overall Purpose of the Research and Research Site

The aim of this study is to assess the impact of safe motherhood action groups on home deliveries in Kaoma district.

The study was conducted in Kaoma district situated west of Lusaka but east of Mongu town the district lays 400 km from Lusaka and 200 km east of Mongu. The district surface area is 8742 square kilometres. The district has no international boundaries but shares boundaries with Mongu, Limulunga to the West, Luampa to the south, Lukulu and Mufumbwe to the North and Nkeyema to the east.

Kaoma district population for 2021 was 125,508 with an average density of 13.66 per square kilometre (2010 CSO projection) and an annual growth rate of 1.68%. Majority of the population are women and children. The annual expected pregnancies are 6,777 and expected live births are 6,401. Teenage pregnancies are common and fertility rate is high.

Kaoma is a developing district with its township and Mangango areas connected to the National Electricity Grid, though most of the health facilities are not yet connected to the power supply; being a rural district, the health centres depend on solar power for lighting and running medical equipment. Inadequate social amenities have limited availability and retention of skilled labour posing challenges in health service provision. The District has two hospitals, Kaoma District Hospital and Mangango Mission Hospital, one Mini Hospital, 18 Health Centres and 9 Health Posts. District health services are essentially centred on provision of the primary health care services with first referral services provided at the two hospitals and basic health care in the frontline health facilities.

Statement of the Problem

Background of the Problem

For geographic, economic, and religious reasons many women do not go to deliver in facilities. Geographically, while most of Zambia's rural population lives less than 8 kilometres from a health centre, the average distance to a safe delivery equipped health-care facility is more than 15 kilometres, and some women need to travel 40 kilometres over sandy, flooded or gravel roads [16]. Economically, many of these women have direct or indirect fiduciary family responsibilities that prevent them from going to health centres for prenatal or ante natal check-ups, or even for delivery. Lastly, some local religious and traditional leaders discourage women from going to health facilities, and instead encourage prayer or traditional medicine.

The SMAGs are community-based volunteer groups that aim to reduce critical delays − including the delay for women to

seek maternal health services, delay to reach the healthcare facility, and delay to access or receive quality maternal health services from a skilled provider. These prevent women from seeking and accessing life-saving maternal health services provided at health facilities.

SMAGs comprise various community volunteers such as traditional birth attendants (TBAs), community health workers (CHWs), neighbourhood health committee (NHC) members, and women and husbands who are involved in maternal health programs in the community.

The SMAG members are specifically selected and trained to function as health promoters to deliver essential information on maternal health services to men and women in the community in order to create awareness and personal risk perception of pregnancy, labour and new born health complications. Moreover, they encourage pregnant women to go for regular antenatal care (ANC) visits, delivery, and postnatal care (PNC) in a health facility. They are also trained to identify maternal and new born complications during pregnancy, delivery, and the postnatal period, and to refer women with complications to health facilities for management. Furthermore, the SMAG program attempts to ensure involvement of husbands in maternal health services by encouraging men to participate as SMAG members. Since SMAG members are selected by community members, specifically trained by healthcare staff to serve their local communities, and interact with both community members and healthcare facility staff, the SMAG program aims to strengthen relationships between pregnant women and the healthcare facility staff.

The aim of this study is to assess the impact of safe motherhood action groups on home deliveries.

Importance of Relevance of the Research

The study will provide evidence based for the design of national public health program and community interventions that focus on reduction of home deliveries and subsequently increasing use of facility-based delivery services and improving maternal and new-born health outcomes in the country.

Rationale/Justification

Contribution of the Study to Body of Knowledge

The SMAG program, as community intervention, might provide insights into barriers and drivers of home or facility delivery and help the Zambian government and relevant stakeholders formulate a more effective strategy to increase facility deliveries and reduce maternal and neonatal deaths.

Changes to be Made by the Study

Findings of the study might provide a basis for the design of community centred interventions focusing on increasing pregnant women's access to facility-based skilled maternal health services in rural Zambia.

Evidence Supporting the Justification

Limited access to and low utilisation of skilled health care workers are some of the major reasons for the high maternal mortality ratio (MMR) in Zambia, standing at 183 per 100,000 in 2018 (WHO: Zambia) [19].

Conceptual Framework

We used facility-based evaluation with standard approaches and comparable indicators to measure outcome and impact, and to allow comparison at baseline and after training of SMAGs in selected health facilities. Key maternal indicators for this study included home deliveries and institutional deliveries.

Materials and Methods

Study Design

The study was quantitative in design and used standard data collection tools. The quantitative approach provided an in-depth understanding of the acceptability and use of SMAGs in their respective communities which would in turn provide detailed understanding of the outcome under investigation.

In our study, we used a causal-comparative design which is a research design that seeks to find relationships between independent and dependent variables after an action or event has already occurred. The researcher's goal is to determine whether the independent variable affected the outcome, or dependent variable, by comparing two or more groups of individuals. The relationship between the independent variable and dependent variable is usually a suggested relationship (not proven) because the researcher doesn't have complete control over the independent variable.

The Causal Comparative method seeks to establish causal relationships between events and circumstances. In other words, it finds out the causes of certain occurrences or non-occurrences. This is achieved by comparing the circumstances associated with observed effects and by noting the factors present in the instances where a given effect occurs and where it does not occur.

In our study, collected data included information on women attending antenatal visits from 01st January 2020 to 31st December 2020 prior to SMAG's training, data extracted from Kaoma district Health Information Management System (HIMS).

This data was compared with similar data extracted from the same HIMS but for the following year starting 01st January 2021 to 31st December 2021 after training of SMAGs. Data was collected from eight health facilities of Kaoma district (Longe HP, Mulamba RHC, Namaloba HP, Lunyati RHC, Kasimba RHC, Shibanga HP, Mayukwayukwa 1 RHC and Mayukwayukwa 2 RHC). We used standard approaches with country standard data collecting tools: Health Centre service aggregation form (HIA2) (Appendix 1). Our focus in this study was on section 2: Maternal Health and New-born Care. Collected data was aggregated in the district health information management system (HIMS).

Key maternal indicators for this study included first antenatal booking and antenatal revisits.

Furthermore, we calculated first antenatal visits coverage using first antenatal visits against expected deliveries. An average antenatal visit was equally calculated for each facility. Comparison was in term of frequency of visits in perinatal period at specific gestational age, proportion of women reaching recommended WHO standard antenatal visits in selected facilities.

Study Site and Population

The study was conducted in Kaoma district situated west of Lusaka but east of Mongu town the district lays 400 km from Lusaka and 200 km east of Mongu. The district surface area is 8742 square kilometers. The district has no international boundaries but shares boundaries with Mongu, Limulunga to the West, Luampa to the south, Lukulu and Mufumbwe to the North and Nkeyema to the east.

Kaoma district population for 2021 was 125,508 with an average density of 13.66 per square kilometer (2010 CSO projection) and an annual growth rate of 1.68%. Majority of the population are women and children. The annual expected pregnancies are 6,777 and expected live births are 6,401. Teenage pregnancies are common and fertility rate is high. Based on these estimates, maternal and child health services constitute the bulk of health services provision in the district.

Selection of Participants, Sampling Methods and Sample Size

The study population consisted of SMAGs, nurses/midwives, clinical officers, pregnant women and mothers in their respective community areas.

First, all health centres which had trained and functional SMAGs were identified with the help of the district managers at the District Health Office (DHO). Only eight out of twenty-six health centres in the district had functional SMAGs and all eight health centres were purposefully selected and included in the study.

Next, health centre in-charges were then tasked to fill in the data reporting tool (health centre service aggregation form) timely, accurately and complete as guided by Ministry of health. The forms were to be submitted monthly to district health office for aggregation and compilation of the report and onward submission to Provincial health office (PHO) and Headquarter (HQ-MoH).

Inclusion criteria

1. Every pregnant woman attending ANC visit
2. Every delivery (institutional and home delivery)
3. Every post-natal mother attending any PNC visit till 42 days
4. Pregnant women, perinatal and postnatal mothers residing in communities of the eight selected health facilities

Exclusion criteria

1. Non pregnant woman
2. Post- natal mother not attending PNC visit
3. Pregnant women, perinatal and postnatal mothers residing in communities other than the eight selected health facilities

Data Management: Collection Plan and Tools

The study used Health Management Information System (HMIS) platform for data collection. The HMIS was established in the Ministry of Health (MoH) in 1996 and at the moment it covers all the health facilities that are found in all the 116 districts of Zambia. The HMIS currently captures data on disease morbidity and mortality, maternal and child health services, service delivery (staff workload, health facilities utilization, availability of essential drugs etc.), surveillance and financial services. Environmental health and administrative data are also captured on an ad hoc basis. HMIS data collection is conducted at the health facility level using a paper based system and is aggregated and computerized from district to national level. It has mainly four (4) sections as follows:

1. **Child Health nutrition**
   1.1. Children under-five attendance
   1.2. Growth monitoring and nutrition
   1.3. Vaccination
2. **Maternal health and newborn care**
   2.1. Antenatal care
   2.2. Post-natal care
   2.3. Family planning
   2.4. Obstetric care
   2.5. Outcome of delivery
3. **HIV prevention care and treatment**
   3.1. HIV testing services
   3.2. Elimination of mother-to-child transmission of HIV
   3.3. Care and treatment
   3.4. Voluntary medical male circumcision
   3.5. Gender based violence
   3.6. Exposure prophylaxis
4. **General and curative care**
   4.1. Malaria services and cases
   4.2. Ophthalmology services
   4.3. Out patients
   4.4. In patients
   4.5. In patient utilization
   4.6. Cancer screening and diagnosis

Our focus in this study was on section 2: maternal health and new-born care.

Data Analysis Plan

For this study we have one predictor variable which is categorical whilst the outcome variable is quantitative and groups come from the same population. Hence we proceeded as follow:

1. Construct frequency polygons.
2. Means and standard deviations
3. T-test (Paired T-test) for differences between means.
4. Analysis of covariance

Data Set

Table 1. Basic Data for 2020

	Inst. Deliv.	Home Deliveries
Mulamba RHC	0	68
Kasimba	123	8
Longe	80	23
Lunyati	84	12
Mayukwayukwa 2	95	11
Mayukwayukwa 1	88	13
Namaloba	135	9
Shibanga	95	10

Kaoma district - (HIMS) [20]

Table 2. Basic Data for 2021

	Inst Deliv	Home Deliveries
Mulamba RHC	0	92
Kasimba	117	
Longe	104	11
Lunyati	98	12
Mayukwayukwa 2	119	7
Mayukwayukwa 1	88	3
Namaloba	119	5
Shibanga	88	21

Kaoma district - (HIMS) [20]

Results

A total of 700 and 733 deliveries were conducted respectively in 2020 and 2021 in facilities under study as shown on table 4 below. Data show an increase in institutional deliveries in three facilities (Longe HP, Lunyati RHC and Mayukwayukwa 2 RHC) out of eight (37.5%). Mulamba RHC doesn't conduct deliveries due to limitations on infrastructure space and proximity with Kaoma district hospital where all pregnant women are directed to for safe delivery. Mayukwayukwa 1 RHC has not recorded a difference in institutional deliveries between the two years of study. Out of the three remaining facilities, Namaloba HP has recorded the highest drop in institutional deliveries from 135 to 119 giving an absolute value of 16 as negative difference. Nonetheless, the overall picture reflects an increase in institutional deliveries with a percentage of change of 0.1932639 whilst the calculated P value was at 0.838541.

Table 3. Institutional Deliveries

Institutional deliveries					P-Value
Health Center	2020	2021	Difference	%Change	0.838541
Kasimba	123	117	-6	-0.025	
Longe	80	104	24	0.1304348	
Lunyati	84	98	14	0.0769231	
Mayukwayukwa1	88	88	0	0	
Mayukwayukwa2	95	119	24	0.1121495	
Mulamba RHC	0	0	0	0	
Namaloba	135	119	-16	-0.062992	
Shibanga	95	88	-7	-0.038251	
Grand Total	700	733	33	0.1932639	

Kaoma district - (HIMS) [20]
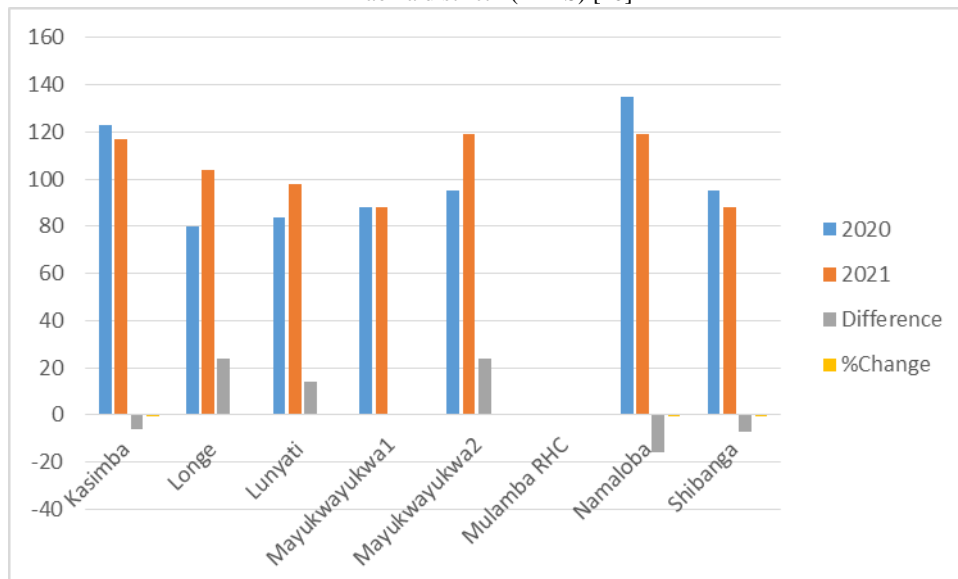
Figure 1. Institutional Deliveries

Table 4 below describes institutional deliveries coverage. Mulamba rural health center doesn't conduct deliveries for the same reasons already alluded to, hence all pregnant women are directed to maternity ward at Kaoma district hospital for safe delivery. Mayukwayukwa 1 RHC had the same coverage for both years hence the difference of change came to zero. The remaining six facilities show minimal changes in term of increase and decrease of institutional delivery coverage with an overall of 0.00033057 as difference, 0.024158 as percentage of change and a P value at 0.998549.

Table 4. Institutional Deliveries Coverage

Sum of Inst_Del_cov					P-Value
Facilities	2020	2021	Difference	%Change	0.998549
Kasimba	0.349289	0.33225	-0.0170385	-0.025	
Longe	0.280946	0.36523	0.08428387	0.1304348	
Lunyati	0.331497	0.386746	0.05524949	0.0769231	
Mayukwayukwa1	0.209834	0.209834	0	0	
Mayukwayukwa2	0.263816	0.330464	0.06664815	0.1121495	

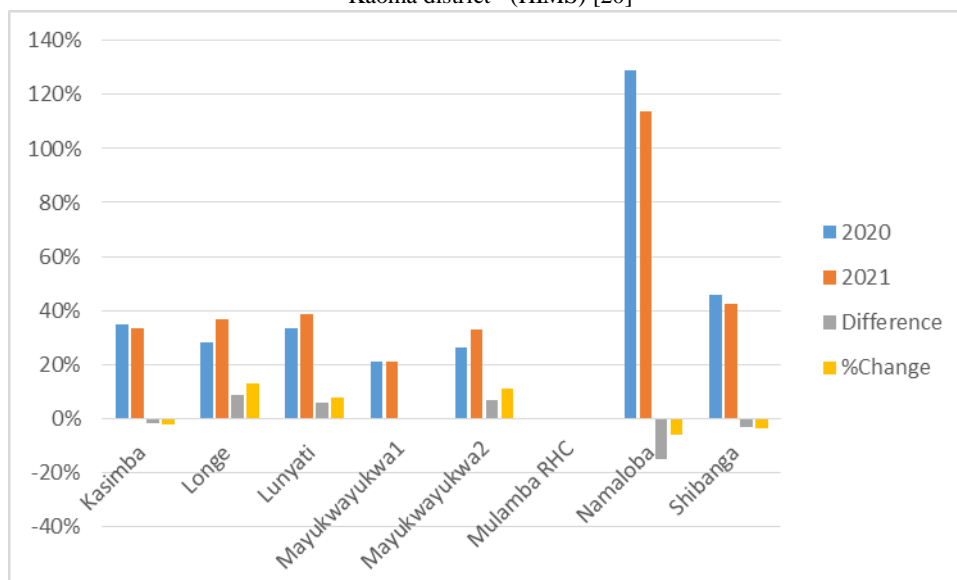|					
Mulamba RHC	0	0	0	0	
Namaloba	1.290335	1.137406	-0.1529286	-0.062992	
Shibanga	0.455592	0.422022	-0.0335699	-0.038251	
Average	0.397663	0.397994	0.00033057	0.024158	

Kaoma district - (HIMS) [20]

Figure 2. Institutional Deliveries Coverage

Home deliveries in all facility catchment areas under study are displayed on table 5 below. Five facilities out of eight (62.5%) have recorded a decline in home deliveries; these are Kasimba RHC, Longe HP Namaloba HP and Mayukwayukwa 1& 2 RHC. Lunyati RHC didn't report any difference between the two years (12.5%) whilst Mulamba RHC and Shibanga HP have reported an increase in home deliveries (25%). Absolute figures show an overall decline in home deliveries from 154 to 151. The overall difference in all facility catchment areas under study shows a minimum decline of 3 in home deliveries giving a negative percentage of change of -1.981039 and P value of 0.977219.

Table 5. Home Deliveries

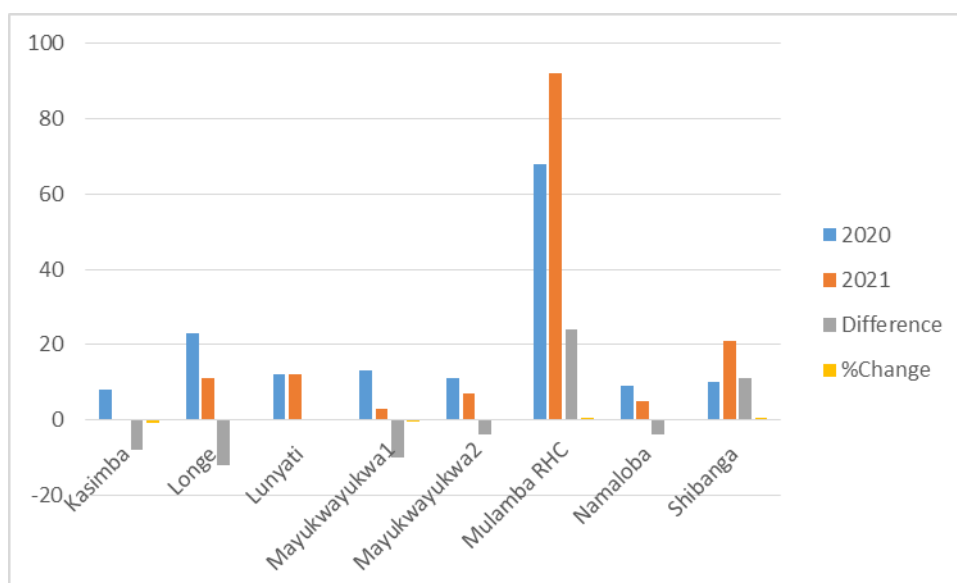| **Home deliveries**					**P-Value**
Health Center	2020	2021	Difference	%Change	0.977219
Kasimba	8	0	-8	-1	
Longe	23	11	-12	-0.352941	
Lunyati	12	12	0	0	
Mayukwayukwa1	13	3	-10	-0.625	
Mayukwayukwa2	11	7	-4	-0.222222	
Mulamba RHC	68	92	24	0.15	
Namaloba	9	5	-4	-0.285714	
Shibanga	10	21	11	0.3548387	
Grand Total	154	151	-3	-1.981039	

Kaoma district - (HIMS) [20]

Figure 3. Home Deliveries

Home deliveries coverage has shown on table 6 below displays the Sum of home deliveries against expected deliveries in the respective catchment area. It shows a decline in five out of eight (62.5%) facility catchment areas (Kasimba RHC, Longe HP Namaloba HP and Mayukwayukwa 1& 2 RHC) with an overall negative percentage of change evaluated at -0.2476299 whilst the difference of change and P value are respectively -0.00614 and 0.762345.

Table 6. Home Deliveries Coverage

| Sum of Home Deliv./Exp. Deliv.					P-Value
Facilities	2020	2021	%Change	Difference	0.762345
Kasimba	0.022718	0	-1	-0.022718	
Longe	0.080772	0.03863	-0.3529412	-0.042142	
Lunyati	0.047357	0.047357	0	0	
Mayukwayukwa1	0.030998	0.007153	-0.625	-0.023845	
Mayukwayukwa2	0.030547	0.019439	-0.2222222	-0.011108	
Mulamba RHC	0.102484	0.138654	0.15	0.0361707	
Namaloba	0.086022	0.04779	-0.2857143	-0.038232	
Shibanga	0.047957	0.10071	0.35483871	0.0527527	
Average	0.056107	0.049967	-0.2476299	-0.00614	

Kaoma district - (HIMS) [20]
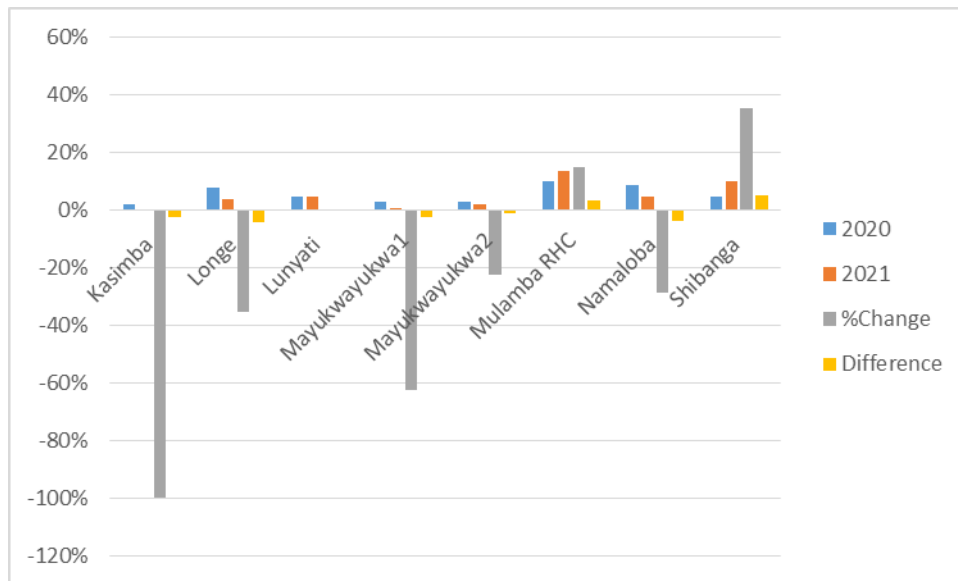
Figure 4. Home Deliveries Coverage

Discussion

The research aim of this study was to explore the impact of SMAG program in increasing utilization of maternal health services and subsequently reduce home deliveries in the rural areas in general and Kaoma district in particular where skilled health workers may not be readily available.

The specific objective was to increase the rate of institutional deliveries to 75% as national standards.

Institutional and Home Deliveries

Institutional deliveries have shown an overall increase of 19% comparatively between the two years of study. Disaggregated by place of delivery, our study found that Longe HP, Mayukwayukwa 2 RHC and Lunyati RHC reported an increase in institutional deliveries respectively at 13%, 11% and 8%. However, Namaloba HP, Shibanga HP and Kasimba RHC reported a reduction at 6%, 4% and 3% respectively. Mulamba RHC had not conducted any delivery due to its geographical location close to the district hospital, all pregnant women were advised to go deliver at the hospital. In Mayukwayukwa 1 RHC, our study did not report any difference in term of institutional

deliveries both before and after training of SMAGs.

These findings are similar with studies conducted in different communities within the country or outside [5, 8, 10, 13]. The difference may be attributed to the fact that births delivered in a health facility are attended to by skilled.

Our study further revealed a tremendous decrease in home deliveries with an overall of 198%.

Kasimba RHC had recorded 100% change in reduction of home deliveries followed by Mayukwayukwa 1 RHC, Longe HP, Namaloba and Mayukwayukwa 2 RHC respectively at 63%, 35%, 29% and 22%. However, Shibanga HP and Mulamba RHC have recorded an increase in home deliveries at 35% and 15 %. Lunyati RHC did not record difference before and after the training of SMAGs during our study period.

This finding is supported by similar studies elsewhere [5, 11].

Conclusion

This study demonstrates that SMAG program, as a community intervention, effectively impacts access to facility-based maternal health services. The current findings show that SMAG program has led to an

increase of institutional deliveries whilst home deliveries were decreased tremendously.

Conflict of Interest

The author declares no conflict of interest.

Acknowledgements

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