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Effectiveness of a training intervention in increasing the use of misoprostol in postabortion care in Malawi: a quasi-experimental study

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ABSTRACT

Objectives The study was conducted to determine effectiveness of a training intervention in increasing use of misoprostol in management of incomplete abortions.

Design A quasi-experimental study with training intervention on use of misoprostol in treatment of incomplete abortion.

Setting Five secondary-level public hospitals in Malawi, one in urban and four in semiurban settings. Three intervention and two control sites.

Participants Records of women treated for first-trimester incomplete abortion from March to May 2020 (baseline) and April to June 2021 (endline). Clinical data were collected from 865 records, 421 before and 444 after the intervention in all study sites.

Intervention Three-hour theoretical training sessions for 81 healthcare workers were conducted in July 2020 at the three intervention sites.

Primary and secondary outcome measures Proportion of women with incomplete abortion treated with misoprostol before and after the intervention. The proportion of women treated with sharp curettage at the study sites.

Results At the intervention sites, there was a significant increase in use of misoprostol from 22.8% (95% CI 17.9% to 28.0%) to 35.9% (95% CI 30.5% to 41.6%) and significant reduction in use of sharp curettage from 48.1% (95% CI 41.9% to 54.3%) to 39.4% (95% CI 35.3% to 42.6%) p<0.01 at baseline and endline, respectively. The use of misoprostol was significantly higher at the intervention sites with OR of 5.02 (95% CI 1.7 to 14.7) p<0.05 compared with control sites at the endline in multivariable models, and there was a difference in the difference of 14.4% ((95% CI 10.4% to 18.2%) p<0.001) between the intervention and control sites after the intervention.

Conclusions A training intervention effectively increased the use of misoprostol in the treatment of incomplete abortions. Increasing misoprostol use will make treatment of incomplete abortion cheaper, easier and more easily accessible. Making quality postabortion care accessible to more women may reduce maternal morbidity and mortality. Further training interventions are recommended.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The study was conducted in different clinical settings—one city and four peripheral towns in the central region of Malawi. The relatively large sample size of 865 records, made the results generalisable for this region.

⇒ The validity of the results was enhanced by the use of two control sites, which minimised effects from confounders such as other initiatives undertaken by the ministry of health or non-governmental organisations during the same time period.

⇒ A quasi-experimental design was used; hence, it lacked randomisation, limiting the study's ability to conclude an association between intervention and outcome. However, the patient groups were comparable.

⇒ The training was conducted once during the intervention period. Hence, healthcare workers allocated to the ward after the training took place lacked knowledge of the use of misoprostol in postabortion care.

⇒ The study used convenience sampling to identify the treatment records that were included in the analysis; this limits the ability to generalise the findings to the population as a whole.

INTRODUCTION

Maternal morbidity and mortality rates in low-income and middle-income countries (LMICs) in sub-Saharan Africa are among the highest in the world. Complications after abortion are a major cause of maternal morbidity and mortality.[1–4] The most common complication after an abortion is retained products of conception—referred to as an incomplete abortion—which can lead to haemorrhage, sepsis and death if left untreated.[5] Malawi is a landlocked, low-income country (LIC) located in sub-Saharan Africa with a population of about 19.1 million.[6] The country has a high maternal mortality ratio of 439 per 100 000 live births, and it is estimated that

up to a quarter of these deaths are due to unsafe abortions.[5 7] In Malawi, inducing an abortion is only legal to save a pregnant woman's life.[8] Still, it is estimated that around 140 000 abortions are performed in the country every year, and most of these are likely to be unsafe.[4] As a consequence of this, Malawi has one of the highest treatment rates for abortion complications in the world; this represents a significant burden on the national health system.[8]

Incomplete abortions can be treated surgically or medically. The WHO recommends the use of electrical or manual vacuum aspiration (MVA) or medical treatment in the management of first-trimester incomplete abortions.[9 10] With medical treatment, the drug, misoprostol, is used to evacuate the retained products of conception.[9] Misoprostol is locally available, cheap, easy to store, and requires no intensive training for one to be able to administer it.[11] A transition from surgical to medical treatment has taken place in the Scandinavian countries and is increasing in many parts of the world.[12] Even though many LMICs, such as Malawi, have a high rate of abortion complications,[13–16] they have not fully embraced the use of medical management in the treatment of incomplete abortions.[17 18] Lack of knowledge and confidence in the use of misoprostol, fear of loss to follow-up and fear of drug misuse have contributed to the common use of sharp curettage in the treatment of incomplete abortions in Malawi.[4 17] Misoprostol is one of the essential drugs in Malawi; in the treatment guidelines for Malawi in 2014, it was included as the recommended treatment of incomplete abortion, together with MVA.[19] Despite being included in the Malawi treatment guidelines, the maternal and neonatal policy statements and strategies only recognise and encourage the use of MVA as the main method of management.[20 21] The recommended surgical method of MVA was widely used in Malawi following its promotion. MVA is provided by both nurse-midwives and physicians and is taught through classroom and in-service education. However, the use of the method is hindered by challenges such as inadequate equipment, insufficient number of trained staff and staff shortages. This led to a decline in MVA use from 31.0% to 4.9%, which was registered at some hospitals in the southern part of Malawi from 2009 to 2012.[5] This decline corresponded with an increase in the use of sharp curettage, even though sharp curettage has a higher risk of complications, is costly, and requires general anaesthetics and an operating theatre.[5 10 17] Sharp curettage can only be provided by physicians and is part of the content covered in preservice training.

To reduce maternal morbidity and mortality in LMICs, there is a need to scale up the use of misoprostol in the management of incomplete abortions. Misoprostol has been shown in the literature to be a safe and effective method of treating incomplete abortions in both low-income and high-income settings.[22] The treatment method has fewer complications than surgical management and is accepted and preferred by healthcare workers and patients.[23] In a previous study in Malawi, a training intervention was efficient in increasing the use of MVA,[17] but healthcare providers were still experiencing barriers to using the procedure.[5] This study was designed to determine if a similar intervention using misoprostol would be efficient and more suitable.

This study aimed at assessing the effectiveness of a training intervention in increasing the use of misoprostol in the management of incomplete abortions in selected hospitals in Central Malawi.

METHODS

Study design

This is a quasi-experimental study with non-equivalent control groups. A retrospective chart review using a pretested data extraction tool was done to evaluate the use of misoprostol before and after a training intervention. Baseline and endline results from the three intervention and two control sites were compared. Patient treatment records for a period of 3 months before and 3 months to a year after the intervention were reviewed to note the type of management offered to women with incomplete abortions.

Primary and secondary outcomes

The study hypothesis was that a training intervention could increase the use of misoprostol by 10%. The primary outcome of the study was to increase the proportion of women managed with misoprostol for treatment of first trimester incomplete abortion. The secondary outcomes were a decrease in the proportion of women treated with sharp curettage at the intervention and control sites and the increase in the proportion of middle-level healthcare workers (nurse/midwives and clinical officers) providing misoprostol at the intervention sites.

Study setting

The study was conducted in the central region of Malawi, in the gynaecological wards of five public hospitals: Bwaila, Salima and Mchinji district hospitals as intervention sites; Ntcheu and Dedza district hospitals as control sites. Bwaila has an average of 40 first-trimester incomplete abortions per month, and the other four hospitals have an average of 20 first-trimester incomplete abortions per month. A list of nine potential sites in the central region was generated, and the sites were visited to ascertain the availability of appropriate clinical population (women with incomplete abortion), adequacy of staff, geographic location, availability of space for research staff, flexibility to allow study interventions and lack of competing demands. All the district hospitals met the selection criteria.

Inclusion and exclusion criteria

Treatment records from women treated for first-trimester incomplete abortions at the study sites were included. Records of women treated for incomplete abortion beyond the first trimester; records missing relevant data

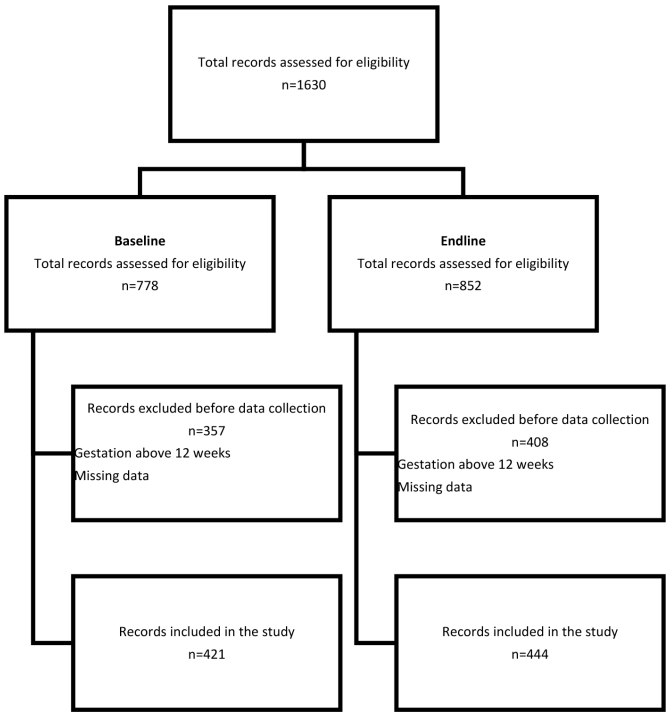

Figure 1 Identification of records included in the study.

such as gestational age or uterine size; and records missing almost all demographic data were excluded (figure 1).

Sampling and sample sizes

A two-stage sampling technique was used. Since all the district hospitals in the central region met the selection criteria, we did a simple random sampling using the fishbowl method to select three intervention sites and two control sites.

Convenience sampling was used to identify the treatment records that were available for data extraction. Data were collected from 865 records.

Data collection

A pretested data extraction tool was used to collect data from 865 treatment records of women who were managed for first-trimester incomplete abortion: 421 before the intervention; and 444 after the intervention (figure 1). Of the 865 records, 285 were from the two control sites (n=139 at baseline; n=146 at endline) and 580 were from the three intervention sites (n=282 at baseline; n=298 at endline). The baseline data were collected between June and July 2020, and client records from March to May were sampled. Endline data were collected in July 2021 (figure 2), and client records from April to June were used. Data collection was carried out by five trained data collectors.

Intervention

The intervention was implemented to improve postabortion care in Malawi by increasing the use of misoprostol in the treatment of incomplete abortions. Training on the use of misoprostol in postabortion care (PAC) was conducted in the three study sites. No training was offered to healthcare workers from the two control sites at any point during the study period. Preintervention data were collected in June and July 2020; postintervention data were collected in July 2021. The in-service training sessions were conducted in July 2020. The intervention was implemented for one year. The training sessions targeted physicians (doctors and clinical officers) and nurse-midwives who were involved in the management of women with first-trimester incomplete abortions. Eighty-one healthcare workers in the three intervention sites were trained in the use of misoprostol in PAC. Of the 81 healthcare workers, 28 were clinical officers, 47 were nurse-midwives and 6 were doctors. One session took place at each of the three sites. The training sessions lasted about 3 hours and were mainly theoretical. The in-service training was facilitated by a local consultant in gynaecology together with the research team. The training was offered at each hospital once, at the commencement of the intervention. This was a cheap and efficient way of delivering the content.

The healthcare workers were informed on how to examine the patient, in order to determine if medical treatment is appropriate. Any woman with an incomplete abortion and a uterine size of less than 12 weeks' gestation by examination, or who had expelled the fetus and was experiencing minor bleeding, was given three tablets of misoprostol (600 µg) orally or two tablets (400 µg) sublingually.[9] Misoprostol, a prostaglandin E1 analogue, binds to myometrial cells to cause strong myometrial contractions, leading to the expulsion of retained products of conception.[24] Pain relief was achieved by the administration of ibuprofen or paracetamol. The women were also given prophylactic antibiotics: metronidazole 400 mg 8 hourly and doxycycline 100 mg 12 hourly for 5 days. Women coming from a distance were offered a hospital stay for four to 6 hours while waiting for the effect of the drug. After the observation period, the women were discharged if they showed no sign of heavy bleeding and/or the retained products had been expelled. Those with severe bleeding were managed by surgical evacuation and observed further until stable. Women experiencing minor bleeding and those living not far from the hospital were treated as outpatients; they could go home and wait for the products to be expelled.

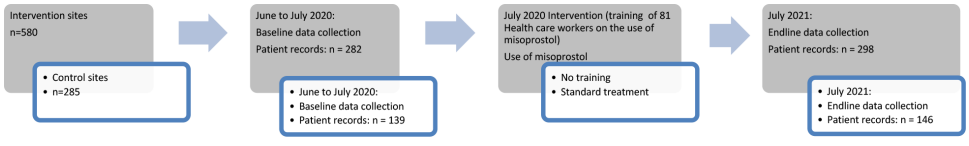

Figure 2 Phases of data collection.

The women were given clear instructions to return if they experienced continuous heavy bleeding, a feeling of light-headedness, dizziness, severe abdominal cramps and signs of infection (fever, chills and offensive vaginal discharge). All women were scheduled for a clinical check-up after 1 week to make sure the uterus was empty. The women were offered family planning counselling immediately after treatment; they were advised to abstain until the bleeding stopped.

Data analysis

Data from maternal treatment records were collected using Android devices with the use of forms generated by CSPro V.7.0. Data were then synced to a Dropbox account in real time. STATA V.16.0 was used for detailed statistical analysis after data were exported.

Basic descriptive analysis was done to determine the distribution of data. Frequency tables were generated to reveal trends in data, check for any potential anomalies and provide descriptive characteristics using proportions with 95% confidence interval (CI). Differences in proportions of women treated with misoprostol for incomplete abortions at baseline and endline, and between the intervention and control group, were compared by using χ^2 statistics. Binary logistic regression was used to determine the use of misoprostol at the intervention and control sites after the intervention in multivariable models adjusting for marital status, education, employment, parity and gestational age. A p<0.05 was considered statistically significant.

Patient and public involvement

Patients were not involved in the planning of this study, but district health officers responsible for the study sites were involved in order to gain permission to access patient records.

RESULTS

We reviewed 865 treatment records of women who were managed for first-trimester incomplete abortion: 421 before and 444 after the intervention. Of the 865 records, 285 were from the two control sites; 139 of these were at baseline and 146 at the end of the intervention. The remaining 580 records were from the three intervention sites; 282 were at baseline and 298 at the end of the study (table 1). Altogether 765 records were excluded due to; gestational age above 12 weeks, missing data on gestational age or uterine size, and missing demographic data (figure 1).

The demographic data obtained from the records indicated that most of the women who reported to the hospitals with first-trimester incomplete abortions were married, in the age group of 20–24 years, and had some form of education. The gestational age of the pregnancies ranged from 9–12 weeks. In the patient records, gestational age was shown as weeks of amenorrhoea. Demographic characteristics of women at the intervention and control sites were similar at both baseline and endline (table 1).

There was a significant increase in the use of misoprostol from 22.8% (95% CI 17.9% to 28.0%) to 35.9% (95% CI 30.5% to 41.6%) p<0.001 at the intervention sites (figure 3), while there was no significant difference in the use of the drug at the control sites during the same period (table 2). During the same time, the intervention sites also showed a significant reduction in the use of sharp curettage from 48.1% (95% CI 41.9% to 54.3%) to 39.4% (95% CI 35.3% to 42.6%) p<0.01.

The use of misoprostol in two intervention sites (Salima and Mchinji) showed statistically significant changes: 2.9% (95% CI 0.7% to 11.2%) at baseline to 38.4% (95% CI 27.7% to 50.2%) p<0.001 at the endline for Salima, while Mchinji was 0% at baseline and 36% (95% CI 25.8% to 47.7%) p<0.001 at the endline. Bwaila hospital showed no significant changes in the use of the drug. There were no significant differences in the use of misoprostol from baseline to endline in the two control sites of Dedza and Ntcheu (p>0.05).

An increase was observed in the use of misoprostol by clinical officers from 15.3% (95% CI 11.5% to 20.0%) at baseline to 28.8% (95% CI 24.1% to 34.2%) at the end of the intervention sites (p<0.05). A similar trend was seen with nurse/midwives where the use of the drug increased from 42.2% (95% CI 33.1% to 51.8%) at baseline to 48.6% (95% CI 33.0% to 64.4%) at endline (p=0.50). The results showed a different trend for the doctors, as their use decreased from 50% at baseline to 25% at endline. The use of the drug by nurse-midwives was at 49.1% (95% CI 39.8% to 58.5%) at the intervention sites and 17.4% (95% CI 7.5% to 35.3%) in control sites (table 3). At the endline, there was a similar trend, but the results were not significant.

At endline, the intervention sites had a significantly higher OR of 5.02 (95% CI 1.7 to 14.7, p<0.05) using misoprostol compared with the control sites after adjusting for marital status, occupation, parity and education (table 4).

DISCUSSION

In this quasi-experimental study, we have shown that a training intervention was successful in increasing the use of misoprostol in the management of first-trimester incomplete abortions in Central Malawi. In the intervention sites, drug use increased significantly. The peripheral hospitals accounted for the majority of this increase as they had not been using the drug before. The intervention sites also had significantly higher use of misoprostol compared with the control sites a year after the intervention.

These results are similar to what has been previously found in Malawi and in Cameroon looking at the use of MVA.[17 25] In these studies, the use of MVA increased following training interventions provided to staff.[17 25] On the other hand, training and supply of equipment did not show an overall improvement in the use of MVA in

Table 1 Demographic characteristics of participants who received PAC following a first-trimester incomplete abortion in five public hospitals in Malawi (March–May 2020 and April–June 2021)

Characteristics of women	Intervention (n=580)		Control (n=285)	
	Baseline (n=282)	Endline (n=298)	Baseline (n=139)	Endline (n=146)
	n (%) (95% CI)	n (%) (95% CI)	n (%) (95% CI)	n (%) (95% CI)
Age groups				
15–19	57 (20.2) (15.9 to 25.3)	61 (20.5) (16.4 to 25.6)	21 (15.1) (10.0 to 22.2)	26 (17.8) (12.2 to 25.2)
20–24	92 (32.6) (27.4 to 38.3)	101 (34.0) (28.6 to 39.4)	50 (36.0) (28.4 to 44.3)	45 (30.8) (23.8 to 38.9)
25–29	57 (20.2) (15.9 to 25.3)	61 (20.5) (16.1 to 25.2)	25 (18.0) (12.4 to 25.4)	35 (24.0) (17.6 to 31.7)
30–34	38 (13.5) (10.0 to 18.0)	45 (15.2) (11.5 to 19.8)	20 (14.4) (9.4 to 21.3)	19 (13.0) (8.4 to 19.6)
35 and above	38 (13.5) (10.0 to 18.0)	29 (9.8) (6.9 to 13.8)	23 (16.5) (11.2 to 23.8)	21 (14.4) (9.5 to 21.2)
Marital status				
Single	15 (13.4) (7.7 to 21.1)	48 (25.3) (19.3 to 32.1)	14 (13.1) (7.3 to 21.0)	21 (15.7) (10.0 to 23.0)
Married	97 (86.6) (78.9 to 92.3)	142 (74.7) (67.9 to 80.8)	93 (86.9) (79.0 to 92.7)	113 (84.3) (77.1 to 90.0)
Gestational age				
2–4 weeks	26 (9.2) (6.4 to 13.2)	23 (7.7) (5.2 to 11.5)	14 (10.1) (6.0 to 16.4)	16 (11.0) (7.6 to 14.5)
5–8 weeks	111 (39.4) (33.7 to 45.3)	141 (47.3) (41.3 to 52.7)	61 (43.9) (35.9 to 52.3)	51 (34.9) (27.6 to 43.0)
9–12 weeks	145 (51.4) (45.5 to 57.3)	134 (45.0) (39.6 to 51.0)	64 (46.0) (37.9 to 54.4)	79 (54.1) (45.9 to 62.1)
Level of education				
No education	0 (0)	6 (3.5) (1.3 to 7.5)	1 (3.0) (0.1 to 15.8)	10 (14.7) (7.3.25.4)
Any education	77 (100.0) (95.3 to 100.0)	165 (96.5) (92.5 to 98.7)	32 (97.0) (84.2 to 99.9)	58 (85.3) (74.6 to 92.7)
Occupation				
No employed	34 (54.8) (41.7 to 67.5)	131 (63.9) (56.9 to 70.5)	15 (30.0) (17.9 to 44.6)	44 (34.9) (26.7 to 43.9)
Any employment	28 (45.2) (32.5 to 58.3)	74 (36.1) (29.5 to 42.7)	35 (70.0) (55.4 to 82.1)	82 (65.1) (56.1 to 73.4)
Parity				
0	56 (33.1) (26.1 to 40.8)	112 (39.4) (33.7 to 45.4)	21 (23.3) (15.1 to 33.4)	39 (31.2) (23.22 to 40.1)
1	49 (29.0) (22.3 to 36.5)	66 (23.2) (18.5 to 28.6)	26 (28.9) (19.8 to 39.4)	34 (27.2) (19.6 to 35.9)
2	28 (16.6) (11.3 to 23.1)	47 (16.5) (12.4 to 21.4)	19 (21.1) (13.2 to 31.0)	21 (16.8) (10.7 to 24.5)
3	11 (6.5) (3.3 to 11.4)	25 (8.8) (5.8 to 12.7)	11 (12.2) (6.3 to 20.8)	14 (11.2) (6.3 to 18.1)
4 or more	25 (14.8) (9.8 to 21.1)	34 (12.0) (8.4 to 16.3)	13 (14.4) (7.9 to 23.4)	17 (13.6) (8.1 to 20.9)

Marital status: 322 missing; occupation: 422 missing; level of education: 516 missing.

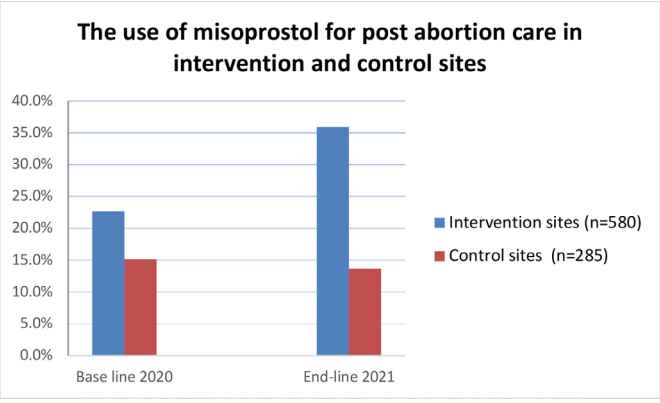

Figure 3 Medical management of patients with first-trimester incomplete abortion in the central part of Malawi (March–May 2020 and April–June 2021) in control and intervention.

Honduras.[10] However, in the Honduras study, healthcare workers were trained on pain management, and trainers of trainers were trained first and later given the responsibility to train others.[10] While in Malawi and Cameroon the training on the use of MVA was offered directly to the providers, which may have increased staff motivation. As we had two control sites for comparison, it may be alleged that in our study, the increase depicted was a result of the training and not the influence of other national health initiatives implemented at the same time of the study. The rate of increase in drug use, though significant, may have been negatively affected by staff rotation and the movement of some healthcare workers out of the facilities.[17] During the study period, trained healthcare workers were replaced by untrained staff that were not familiar with the use of the drug. The training would have been more effective had it been repeated after staff rotation which usually takes place once a year depending on hospital

Table 2 Medical management of patients with first-trimester incomplete abortion in the central part of Malawi in control and intervention hospitals at baseline and endline

Intervention groups	Misoprostol usage	Total	Baseline	Endline	Differences	P value
Combined	N	**865**	**421**	**444**		**0.004**
	No	653 (75.5%)	336 (79.8%)	317 (71.4%)		
	Yes	212 (24.5%)	85 (20.2%)	127 (28.6%)	8.4% (2.71%;14.09%)	
Control	N	**286**	**140**	**146**		**0.754**
	No	245 (85.7%)	119 (85.0%)	126 (86.3%)		
	Yes	41 (14.3%)	21 (15.0%)	20 (13.7%)	–1.3% (–9.4%; 6.8%)	
Intervention	N	**579**	**281**	**298**		**<0.001**
	No	408 (70.5%)	217 (77.2%)	191 (64.1%)		
	Yes	171 (29.5%)	64 (22.8%)	107 (35.9%)	13.1% (5.8%; 20.5%)	
Difference in differences			**(Intervention control)**		**14.4% (10.4%; 18.2%)**	**<0.001**

Total numbers and p-values are in bold

policy. Regular training would ensure that all healthcare workers providing PAC are up to date on the use of misoprostol in the treatment of incomplete abortions, which would be beneficial to the improvement of PAC.[17]

The proportion of nurse-midwives and clinical officers using misoprostol was higher in the intervention sites at the end of the study. This shows that the training had some impact on practice. However, the difference in use by nurse-midwives at intervention sites was not significant at the endline, which could be due to low numbers and lack of power. The fact that nurse-midwives can administer misoprostol reduces the workload for physicians (clinical officers and doctors) because only physicians can perform curettage. Nurse-midwives are the first ones to see patients and are in contact with the women for a longer period of time. Increasing the number of nurses and midwives using misoprostol means that patients can be managed immediately instead of waiting for physicians. This could reduce complications that may occur due to long waiting times, and it also means that women can get back to their usual commitments and responsibilities sooner. There is a need to empower more nurse-midwives with knowledge and skills through training in the use of misoprostol, as our results showed that the use of misoprostol is practical and accepted by nurse-midwives. Malawi, like most LICs, has a problem with staff shortages as it does not have enough physicians to reach out to all women seeking their services on time.[23 26] Using more medical treatment in the management of incomplete abortions would enhance task sharing, make PAC accessible to more women, and would curb the problem of staff shortages in areas where physicians are few or not available.[11] This is echoed by Klingberg-Allvin *et al*, who found that the use of misoprostol by midwives is equally as safe and effective as when provided by physicians and would increase access to safe PAC in Uganda.[23] Use of misoprostol would also help address the problems of long waiting times for women who want to access PAC and the shortage of MVA equipment. As most of these women are treated as outpatients, this will also help in reducing congestion and workload in hospitals.[11] A reduction in the use of the drug by doctors was noted. This may have been a result of the task sharing. More clinical officers and nurse-midwives were using the drug to manage women with first-trimester incomplete abortions, giving time to doctors to attend to other patients. Increased task sharing would help improve the efficiency of PAC services in Malawi.[26]

The results of the study showed the importance of training in order to effect positive change in operations. This may help improve the quality of PAC in Malawi. More training sessions should be planned and delivered to healthcare workers. This should be coupled with effective monitoring systems and supportive supervision in order to achieve an increased uptake of medical management.[10 25] Incorporating medical management of

Table 3 Postabortion care providers n (%) (95% CI) using misoprostol at the intervention and the control sites

Provider	Intervention site	Control site	Difference	P value
Doctor	5 (38.5)*	0 (0)	38.5	0.103
Clinical officer	95 (24.5) (20.6 to 29.0)	28 (18.7) (13.3 to 25.5)	5.8	0.150
Intern clinical officer	15 (23.4) (14.2 to 36.2)	9 (8.3) (4.4 to 15.3)	15.1	0.007
Nurse/midwife	56 (49.1) (39.8 to 58.5)	4 (17.4) (7.5 to 35.3)	31.7	0.005

*n too small for 95% CIs and test statistics.

Table 4 Odds ratio (OR) of having medical treatment of patients with first-trimester incomplete abortion a year after intervention (endline)

		OR	95% CI		P value
Facility	Control sites	Reference	Reference	Reference	Reference
	Intervention sites	5.02	1.71	14.73	0.003
Marital status	Single	Reference	Reference	Reference	Reference
	Married	1.15	0.41	3.26	0.786
Education	No education				
	Any education	0.37	0.07	1.86	0.225
Employment	No employment	Reference	Reference	Reference	Reference
	Any employment	0.79	0.34	1.85	0.585
Parity	Para 0				0.195
	Para 1	2.14	0.57	8.09	0.261
	Para 2	3.29	0.88	12.38	0.078
	Para 3	1.21	0.33	4.49	0.772
	Para 4 or more	5.29	0.88	31.81	0.069
Gestation age	Week	0.97	0.84	1.11	0.620

incomplete abortion in the maternal health policy statements and strategies for Malawi and preservice curricula of nurse-midwives and clinical officers would also facilitate the use of misoprostol, thereby improving PAC services in the country. This would help to reduce maternal morbidity and mortality, which is currently very high, as many maternal deaths are caused by unsafe abortions and their complications.[7] There was a statistically significant reduction in the use of sharp curettage in the intervention sites. As literature has shown, sharp curettage is costly and is associated with an increased rate of complications as compared with MVA and medical management. Hence, the reduction of its use is of medical importance.[8 27] It is noteworthy that there was no significant change in the use of the drug at Bwaila hospital, a larger facility based in the capital city of Malawi. This is probably because Bwaila is the only hospital that was using the drug considerably prior to the intervention. In addition, it also had the lowest number of healthcare workers trained during the intervention phase of the study because the training was offered only to staff who were allocated to the gynaecological ward at the time of training. Due to staff rotation, those trained were moved to other wards, and those newly deployed to the gynaecological ward were not trained. Recurrent training after each staff rotation would help address this problem. The baseline results showed a higher usage of the drug in the central region (20.2%), than what was previously reported in the southern region of Malawi (less than 2%).[5] Therefore, encouraged by the promising results from the central region, we suggest that the study be expanded to other regions in Malawi.

This study had several limitations; a quasi-experimental design was used, and therefore, lacked randomisation. However, the patient groups were comparable, as seen in table 1.

Another limitation was the delivery of the intervention; the training was only carried out once. Some healthcare workers were not available on the day the training was conducted and, coupled with the rotation of healthcare workers, this meant that some healthcare workers that had been trained were replaced by new staff that had not received the training. Hence some healthcare workers had no knowledge or skills in the use of misoprostol. It would have been better if the training had been repeated following staff rotation during the period of the study. This should be included in future studies. At one of the study sites, the drug was already in use at the start of the study period. We can postulate that the increase would have been greater at a site where the use at baseline was lower. In addition, the use of retrospective chart review had its drawbacks because the records had a sizeable amount of missing data making the analysis difficult. The missing data reduced the statistical power and may have caused bias in estimation of parameters hence reducing the representativeness of the sample. It would have been different if we used a prospective method because the amount of missing data could be minimised. In addition, the convenience sampling method used, limits generalisability of the findings.

To our knowledge, this is the first study conducted to assess the effectiveness of a training intervention in increasing the use of misoprostol in the management of first-trimester incomplete abortions in Malawi. The study was conducted in different clinical settings—city and peripheral towns in the central region—making the results generalisable in this region. In addition, the validity of the results was enhanced by the use of two control sites, which minimised effects from confounders such as other initiatives undertaken by the ministry of health or non-governmental organisations during the time period of the study.

CONCLUSION

Based on our findings, a training programme on the use of misoprostol in the management of incomplete abortions may increase the use of medical treatment in the management of incomplete abortions in Malawi and, consequently, increase access to safe PAC services in the country. Given the impact of abortion complications on maternal morbidity, mortality and national resources, and considering the current challenges in the use of MVA, misoprostol is the best appropriate alternative for treating incomplete abortions. Misoprostol is cheaper and safer than surgical management with curettage and should be considered as the way forward when improving PAC services in LMICs with high rates of abortion complications. Regular low-dose high-frequency training sessions in the use of misoprostol are recommended in order to improve PAC services in Malawi and other countries with similar challenges.

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