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Improving access to lymphatic filariasis MMDP services through an enhanced evidence-based, cascaded training model for health worker capacity strengthening in Ghana: an evaluation study

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Introduction: Ghana has made significant progress in reducing the transmission rate of lymphatic filariasis. However, very little progress has been made in the provision of morbidity management and disability prevention (MMDP) services, which is one of the key requirements for certification of elimination as a disease of public health importance. This study was designed to compare pre-post-intervention to determine the feasibility and effectiveness of a cascade training model for health worker capacity strengthening in Ghana, using the WHO recommended minimum intervention package to improve access to MMDP services.

Methods: This study used a quasi-experimental design to assess the impact of evidence-based training of patients with lymphatic filariasis (LF) in the Upper West region of Ghana. All lymphedema patients who were available at the time of data collection participated in the study before and after the training.

Results: The mean age of respondents was 54.67 years (SD ± 16.89 years) at baseline and 54.70 years (SD ± 15.80 years) at evaluation. The majority (i.e., 76.30% at baseline and 80.50% at evaluation) of the respondents were female. Most of the respondents had not completed primary school (83.82% at baseline and 85.40% at evaluation). We found an improvement in the quality of life among LF patients, that is, the proportion of respondents who reported having a high quality of life increased from 2.9% at baseline to 20.12% at evaluation ($p < 0.001$). The lymphedema management practice of "hygiene/washing and drying of affected limb" was reported by 73.17% of respondents at evaluation compared with only 32.95% of respondents at baseline ($p < 0.001$). The acute attack management technique of "cooling the affected limb in cool water/cold compress" was reported by 70.15% of respondents at evaluation compared with 23.70% of respondents at baseline ($p < 0.001$).

Conclusion: The research confirmed that LF-related perceptions remained generally the same at baseline and evaluation among community members. The implementation of the LF-related morbidity management (MMDP) project has led to a significant improvement in the morbidity management practices among patients at evaluation compared with baseline. Our findings also showed that self-care led to an improvement in patients' quality of life. This justifies the need for investment in morbidity management interventions in endemic communities.

KEYWORDS

cascaded training, lymphatic filariasis, morbidity management, disability prevention, MMDP, capacity-strengthening, Ghana

Background

Notwithstanding the effort of WHO's Global Program to Eliminate Lymphatic Filariasis (GPELF), approximately 1.1 million people worldwide were reported to have clinical manifestations presenting as lymphedema in 2019 (1, 2). Because this disease may be underreported, especially for mild cases (3), many affected people do not have adequate access to morbidity management and disability prevention (MMDP) services, and this results in social stigmatization and loss of productivity. Approximately one decade ago, lymphatic filariasis (LF) constituted 5.9 million disability-adjusted life-years globally (4); however, this reduced significantly to 1.63 million disability-adjusted life-years in 2019 (5).

Lymphatic filariasis, or elephantiasis, is a debilitating neglected tropical disease, which leads to disfigurement and eventually disability, affecting individuals' ability to work, their access to services, and leading to their social exclusion, often with catastrophic economic consequences for them and their families (6). LF is endemic in Ghana, with the disease being present in 12 out of 16 regions (7, 8). Since 2000, the Ghana Health Service, through the LF control program, has implemented the strategy of the GPELF, which is based on (i) interrupting the transmission of the disease through the yearly treatment of entire endemic communities and (ii) alleviating the suffering resulting from LF-related morbidity and disability (7, 8).

Ghana has made significant progress in reducing the transmission of the disease. By 2017, 83 out of 98 endemic districts had achieved interruption of transmission and have thus stopped mass drug administration (MDA) (9). At the beginning of 2022, 109 out of 114 endemic districts had achieved interruption of transmission and stopped MDA. Despite the progress being made in disease interruption, the access to MMDP services is lacking (4, 6). It is, however, worth noting that the neglected tropical diseases (NTDs) control program usually takes advantage of the annual MDA rounds to collect information on the number of suspected hydrocele and lymphedema cases in endemic communities. Thus, approximately 5,000 cases of elephantiasis and 10,000 cases of hydrocele have been registered in endemic communities since the beginning of the GPELF, many of which have gone unattended due to financial constraints (6). Due to the limited capacity of the healthcare system to respond, coupled with the lack of access to LF-related healthcare services, many suspected cases are not confirmed by healthcare professionals and therefore remain hidden in endemic communities, largely due to individuals' fear of being stigmatized. It must be mentioned that the Ghana NTD program has made some efforts at capacity-building to provide service and care for LF patients, including lymphedema management, but this has not been integrated into the routine healthcare system, especially at periphery care facilities. This lack of access through the routine healthcare system led to the national program running morbidity management clinics from the central office in Accra, with patients who could afford to travel from far and near to seek care. However, this is not sustainable both for patients and the NTD program.

Chronic lymphedema is a lifelong condition predominantly occurring in LF-endemic areas with a high level of poverty and poor access to healthcare services, making the burden of care fall heavily on patients and their family members. This therefore requires some training in self-care strategies to empower patients to handle some basic but important self-care protocols, especially those with moderate to severe lymphedema (3, 10, 11). The proposed self-care protocol covers areas such as:

Abbreviations: CDD, Community-based Drug Distributors; COR-NTD, Coalition for Operational Research on Neglected Tropical Diseases; GPELF, Global Program to Eliminate Lymphatic Filariasis; LF, Lymphatic Filariasis; MDA, Mass Drug Administration; MMDP, Morbidity Management and Disability Prevention; NTD, Neglected Tropical Disease; WHO, World Health Organization.

hygiene (which incorporates washing and drying, attending to skin lesions, use of medicated cream, and trimming nails), exercise (which includes standing, seating, and laying exercises; day- and night-time elevation of the affected limb, walking, and deep breathing), and massage (which includes mobilizing skin and tissues through lymphatic massage). The package also includes the management of acute attacks and accessing referral services. These are known interventions for the self-management of LF-related morbidity in resource-poor settings (12, 13). In Nepal, for instance, good self-care of lymphedema due to LF was found to reduce stigma because of those involved having an increased sense of self-respect and feeling of empowerment (14, 15).

While the aim of the project was to develop and implement a cascaded training program to promote better access to MMDP services for lymphatic filariasis patients suffering from lymphedema and adenolymphangitis, this paper also assessed the effectiveness and impact of an enhanced evidence-based, cascaded training model in enhancing access to MMDP services in the targeted area. The specific objectives and focus of the paper were to:

1. Assess the feasibility and impact of the intervention on access to, and the acceptability of, MMDP services.
2. Evaluate the effect of the intervention on patients' self-care practice.
3. Examine the effect of the intervention on patient outcomes, including morbidity and quality of life.

By addressing these objectives, the study aims to provide valuable insights into the potential benefits of the enhanced evidence-based, cascade training model for improving access to MMDP services in the study area.

Methods

Project setting

The MMDP intervention evaluated was implemented in all 11 districts of the Upper West region of Ghana, which is one of the 12 LF-endemic regions in Ghana. The Upper West region has the highest burden of lymphedema cases in Ghana, which has successfully interrupted transmission in eight out of the 11 endemic districts of the region and is now focused on providing MMDP care services to affected people with lymphedema (3).

Study design

A quasi-experimental design was utilized in this study, incorporating a before-and-after comparison within the same group. All registered individuals with lymphedema were recruited from the regional register. Data were collected from participants at two distinct time points: before and after undergoing the enhanced evidence-based, cascade training.

Study population

The study population comprised patients with lymphatic filariasis-related lymphedema in the Upper West region. The selection of the Upper West region was because it has the highest burden of LF-related lymphedema cases in Ghana (3).

Sampling

In the study, the sampling approach was based on the availability of all patients with LF-related lymphedema, and all units in the selected region were included in the study. A census or complete enumeration technique was utilized in this study.

Sample size

Given that all units in the selected region were used for the study, there was no need for a sample size calculation. The census approach ensures that data were collected from the entire population, providing a comprehensive view of the Lymphedema patients on the usefulness of access to selfcare service through training in the context of MMDP.

Baseline data collection

Baseline data were collected to identify capacity gaps and needs among healthcare supervisors, frontline providers, patients, and their support groups. Data collection tools included in-depth interviews (IDIs) and a structured questionnaire survey. However, this paper presents only the results of the questionnaire survey of patients with lymphedema. The respondents for the questionnaire survey were all patients with lymphedema registered in the Upper West region. The results at baseline informed the final design of the implementation to increase access to MMDP services for lymphatic filariasis patients suffering from lymphoedema, adenolymphangitis, and hydrocele, through an enhanced evidence-based cascade training model.

Intervention implementation

The cascaded capacity-building intervention implemented has been reported elsewhere (3), but in brief, it was a cascaded training program designed to promote better access to MMDP services for lymphatic filariasis patients suffering from lymphedema and adenolymphangitis. The trainees were purposively selected to include healthcare supervisors and frontline providers who were currently or previously involved in MMDP service provision, community drug distributors, community leaders, and patients. Even patients' support groups who are their family members were trained (3). This paper presents data collected from patients only.

Evaluation

The intervention was evaluated to determine its effectiveness in terms of access to the MMDP services in the region and its effect on patient quality of life. Similar to those at baseline, the questionnaire survey participants were all lymphedema patients registered in the Upper West region. The evaluation data were collected in June 2020 to compare outcomes, including access to care, acceptance of the services, self-care practice among patients, morbidity, and quality of life of patients at baseline and evaluation, respectively.

Data analysis

The data analysis for this study was conducted using EpiInfo 3.5.4 (Centers for Disease Control and Prevention, Atlanta, GA, USA). The continuous variables were assessed for normality through both the skewness test and the visual inspection of histogram graphs. The categorical variables were described using frequency and percentages. In the case of multiple-response categorical variables, the percentage of responses was used to compare the frequency of each outcome selected, while the percentage of cases represented the proportion of participants who chose each outcome variable.

To examine the impact of the training intervention on categorical variables, a chi-squared test was employed to analyze the frequency distribution of the outcome variables before and after the intervention. This statistical analysis was chosen to determine whether there was a statistically significant change in the distribution of categorical outcomes due to the intervention. By comparing the pre-intervention and post-intervention frequencies, we aimed to assess the effectiveness and influence of the intervention on the categorical variable in question. Furthermore, McNemar's test was utilized to compare the paired proportions, allowing a more comprehensive assessment of the intervention's effect on specific outcomes.

Results

Sociodemographic characteristics of respondents

There was no statistical difference in the socio-demographic characteristics of the respondents at baseline and evaluations, and this was to be expected since data were collected from the same respondents. The mean age of respondents was 54.67 (SD±16.89) years at baseline and 54.70 (SD±15.80) years at evaluation. Majority (76.30% at baseline and 80.49% at evaluation) of respondents were females. Most of the respondents had no education or were not able to complete primary school (83.82% at baseline and 85.40% at evaluation). Christianity was the dominant religion practiced by the respondents, 69.94% at baseline and 64.63% at evaluation (Table 1).

TABLE 1 Sociodemographic characteristics of respondents.

Variables	Baseline (*n* = 173)	Evaluation (*n* = 164)
	Frequency	Frequency
Sex		
Female	132 (76.30)	132 (80.49)
Male	41 (23.70)	32 (19.51)
Age		
Mean ± SD	54.7 ± 16.89	54.7 ± 15.80
Marital status		
Divorced	7 (4.05	3 (1.83)
Married	97 (56.07	89 (54.27)
Single	12 (6.94	10 (6.10)
Widowed	57 (32.95	62 (37.80)
Education		
No education/not completed primary school	145 (83.82)	140 (85.40)
Primary school	19 (10.98)	10 (6.10)
Secondary school or above	8 (4.62)	11 (6.71)
Other (non-formal)	1 (0.58)	3 (1.83)
Religion		
Christianity	121 (69.94)	106 (64.63)
Islam	13 (7.51)	14 (8.54)
Traditional religion	39 (22.54)	44 (26.83)
Occupation		
Agricultural	118 (68.20)	125 (76.22%)
Other (retired, etc.)	13 (7.50)	3 (1.83%)
Petty trader	14 (8.12)	7 (4.27%)
Unemployed	28 (16.18)	29 (17.68%)
Household average monthly income*		
< GH¢ 250	148 (85.55)	136 (82.93%)
GH¢ 250–499.99	9 (5.20)	3 (1.83%)
GH¢ 500–999.99	3 (1.73)	–
Do not know	13 (7.51)	25 (15.24%)

*(USD1 to GH¢5.768).

Fishing and farming, including poultry and animal rearing, were the dominant occupations among the respondents (performed by 68.20% of respondents at baseline and 76.22% of those at evaluation). The majority of households (85.55% at baseline and 82.93% at evaluation) of the households earned an average monthly income of less than 250.00 Ghanaian cedis, which is equivalent to $43.34 (USD1 converted to GH¢5.768 at the time of data collection); see Table 1.

Respondents' attitude toward healthcare

To determine the attitude of respondents toward the management of lymphedema at the nearest health facility, a three-item statement (Appendix 1, questions 28–30) was used. The respondents could "agree", "disagree", or remain "neutral". A score of one was awarded for disagreeing, two for neutral, and three for agreeing. That is, a respondent could achieve a minimum score of 3 and a maximum of 9. The total scores were then grouped into three groups to determine whether an individual had a "low", "medium", or "high" acceptance of the LF management services provided at the healthcare facilities in their community. It came to light that more people (51.44%) at baseline had highly positive attitudes toward the nearest available health services compared with 42.68% at evaluation, but this result was not statically significant (Table 2).

A three-item statement was used to assess the acceptability of the available healthcare service among LF patients. We found that a higher proportion of patients (67.64%) at baseline had highly positive attitudes toward the acceptance of available healthcare services provided at the nearest facility than at evaluation (51.83%; $p = 0.004$). On the other hand, more respondents (37.20%) at evaluation had moderate positive attitudes toward the acceptance of available services provided at the health facility than at baseline (23.12%; $p = 0.007$; see Table 2). A follow-up investigation revealed that patients' preference for the community-based MMDP that was introduced into their communities had caused the shift in their attitudes from the high acceptance of services at the nearest healthcare facility to a preference for home-based or community-based MMDP care.

A five-item statement was used to assess the accessibility of the available healthcare facilities among LF patients, and significantly more respondents at baseline (66.47%) than at evaluation (51.83%) had highly positive attitudes toward accessing the nearest available healthcare facility. On the other hand, more respondents at evaluation (51.22%) than at baseline (28.30%) had moderate attitudes toward accessing the nearest healthcare facility ($p < 0.001$; see Table 2). Again, similar to what was found for "acceptability", a follow-up investigation revealed that patients' preference for the community-based MMDP that was introduced into the communities had caused a shift in attitudes from accessing care at the nearest healthcare facility to receiving home-based or community-based MMDP care.

A two-item statement (Appendix 1, questions 39–40) was used to assess the affordability of the available healthcare facilities among LF patients. Interestingly, there was no significant change (31.21% at baseline and 28.65% at evaluation; $p = 0.693$) in the attitude of patients toward the affordability of services provided at the nearest healthcare facility. The interesting point to note is that more respondents at evaluation (56.10%) had a moderately positive attitude toward the affordability of healthcare than at baseline (42.77%) ($p = 0.019$; see Table 2).

A three-item statement (Appendix 1, questions 41–43) was used to assess the attitude of LF patients toward the quality of the engagement/interactions with care providers when they visited healthcare facilities. Interestingly, more respondents at baseline (68.21%) than at evaluation (54.88%) ($p = 0.016$) reportedly had highly positive attitudes toward the quality of engagement/interactions with care providers at the healthcare facility available to them (Table 2).

TABLE 2 Respondents' attitudes toward healthcare and engagement with care providers.

Attitudes	Baseline (*n* = 173)	Evaluation (*n* = 164)	*p*-value
	Frequency (%)	Frequency (%)	
Service availability in community			
Low positive attitude to available service	33 (19.08)	34 (20.73)	0.808
Moderate positive attitude to available service	51 (29.48)	60 (36.59)	0.203
High positive attitude to available service	89 (51.44)	70 (42.68)	0.133
Acceptability of service			
Low acceptance of available service	16 (9.25)	18 (10.97)	0.731
Moderate acceptance of available service	40 (23.12)	61 (37.20)	0.007
High acceptance of available service	117 (67.64)	85 (51.83)	0.004
Accessibility of healthcare facility			
Low level of access to healthcare facility	9 (5.20)	26 (15.85)	0.002
Moderate level of access to healthcare facility	49 (28.30)	84 (51.22)	<0.001
High level of access to healthcare facility	115 (66.47)	54 (32.93)	<0.001
Affordability			
Low affordability	45 (26.01)	25 (15.25)	0.021
Moderate affordability	74 (42.77)	92 (56.10)	0.019
High affordability	54 (31.21)	47 (28.65)	0.693
Quality of engagement with providers			
Low-quality provider engagement	12 (6.94)	22 (13.41)	0.073
Moderate-quality provider engagement	43 (24.85)	52 (31.71)	0.201
High-quality provider engagement	118 (68.21)	90 (54.88)	0.016

Quality-of-life assessment

We assessed the quality of life among patients from their own perspectives using a 27-item statement. For analysis, the number of response categories was reduced from five to three by merging 1 and 2 as low/poor/dissatisfied with a score of 1; 3 as moderate/neither satisfied nor dissatisfied with a score of 2; and 4 and 5 as high/good/satisfied with a score of 3. A maximum score of 81 could be attained from responding to all the 27 statements, so those who scored 27 or below were classified as having a "poor quality of life", those who scored between 28 and 54 were classified as having a "moderate quality of life", and those who scored between 55 and 81 were classified as having a "high quality of life".

There was an improvement in the quality of life among lymphedema patients, with the proportion of those who reported high quality of life increasing from 3.0% at baseline to 20.12% at evaluation ($p < 0.001$). It was somehow surprising to note that the proportion of those reporting a poor quality of life increased from 5.78% at baseline to 9.76% at evaluation, though this was not significant ($p = 0.244$). As was expected, due to the significant movement of people reporting a moderate quality of life at baseline to high quality of life at evaluation, more people at baseline (158, 91.32%) than at evaluation (148, 70.12%) reported having a moderate quality of life ($p < 0.001$).

Morbidity management logistics

Although the majority of the respondents at baseline (77.46%) and evaluation (67.07%) reportedly did not have appropriate footwear for their lymphedema, there was a significant improvement in the number of patients who reported having appropriate footwear at evaluation (54, 32.93%) compared with that at baseline (39, 22.54%) ($p = 0.044$).

The availability of resources for LF morbidity management, measured in terms of bandages and antibiotic ointments, soap, and water improved significantly after the implementation of the MMDP intervention in the Upper West region. Bandages and antibiotic ointments were always available to 40 (23.12%) out of 173 respondents at baseline compared with 181 (49.39%) out of 164 respondents at evaluation ($p < 0.001$). Thus, more respondents, that is, 133 (76.88%) out of 173 at baseline compared with 83 (50.61%) out of 164 at evaluation did not have bandages and antibiotic ointments available most of the time ($p < 0.001$). The availability of water and soap for LF-related morbidity management also improved significantly after the implementation of the MMDP intervention in the study communities. Most of the respondents, that is, 112 (68.29%) out of 164 at evaluation compared with 86 (49.71%) out of 173 at baseline ($p < 0.001$) said they had water and soap available always. Thus, the rest, that is, 87 (50.29%) at baseline and 52 (31.71%) at evaluation, did not have water and soap available most of the time.

Health-seeking behaviors

It came to light that more respondents at evaluation (157, 95.7%) than at 139 (80.35) at baseline ($p < 0.001$) reported that they had sought medical help for their conditions from a biomedical care provider. It was, however, surprising to find that the proportion of respondents using traditional medicine for managing their lymphedema significantly increased from 54.33% at baseline to 71.95% at evaluation ($p = 0.001$). When this was investigated further, it was revealed that after the implementation of the MMDP intervention, patients were eager to have something to smear on the affected limbs, and the traditional herbal preparations became handy in the absence of antibiotic ointments, which had been introduced to them during MMDP training. This may provide psychological satisfaction to patients as they believe in the saying that "doing something is better than doing nothing" after washing the lymphedema with soap and water. The danger associated with this practice is the possibility of the already-ulcerated wounds becoming contaminated.

Home management of lymphedema and acute attacks

The MMDP intervention implemented brought about significant improvements in the adoption of appropriate lymphedema management behaviors among patients at home. This led to an improvement in the proportion of patients following the recommended practice of washing the limbs at least once daily, which increased from 49.71% at baseline to 79.88% at evaluation ($p < 0.001$).

Lymphedema management and prevention techniques

Various lymphedema morbidity management and prevention techniques were reported by respondents at baseline and evaluation. However, significantly more respondents at evaluation reported the appropriate morbidity management and preventive measures than at baseline. For instance, significantly more respondents at evaluation (73.17%) than at baseline (32.95%) mentioned "hygiene/washing and drying the affected limbs" ($p < 0.001$) and the proportion of those who mentioned "elevation of affected limbs" was 42.68% at evaluation compared with 11.56% at baseline ($p < 0.001$), among others. In addition, an inappropriate practice of the abuse of prophylactic/systemic antibiotics reduced significantly from 26.59% at baseline to 9.76% at evaluation ($p < 0.001$; see Table 3). We believe that these differences were largely due to the implementation of the MMDP intervention.

Acute attacks management and prevention

Various acute attack management strategies were reported by respondents at baseline and evaluation. However, similar to lymphedema management techniques, more people at evaluation reported appropriate management measures than did at baseline. For instance, the practice of "cooling affected limb in cool water/cold compress" was reported by 70.15% of respondents at evaluation compared with 23.70% at baseline ($p < 0.001$). In addition, the practice of "elevation of the affected limb" was

TABLE 3 Lymphedema morbidity prevention/management techniques among LF patients*.

Variables	Baseline (*n* = 173)	Evaluation (*n* = 164)	*p*-value
	Frequency (%)	Frequency (%)	
Hygiene/washing and drying the affected limbs	57 (32.95)	120 (73.17)	< 0.001
Use of herbal ointments	94 (54.33)	118 (71.95)	0.001
Wound care/care for lesions	43 (24.86)	84 (51.22)	< 0.001
Elevation of the affected limbs	20 (11.56)	70 (42.68)	< 0.001
Exercise	15 (8.67)	53 (32.32)	< 0.001
Prophylactic creams	16 (9.25)	37 (22.56)	0.001
Prophylactic/systemic antibiotics	46 (26.59)	16 (9.76)	< 0.001
Use of shoes/sandals	8 (4.62)	10 (6.10)	0.718
Do not know any prevention means	58 (33.53)	0 (0.00)	< 0.001

*Multiple choices allowed. Sorted in column 3 in descending order.

reported by 31.71% of respondents at evaluation compared with 14.45% at baseline ($p < 0.001$). We also observed that at baseline, more respondents reported behaviors that were targeted to change or reduce among patients through the implementation of the MMDP intervention. For instance, more respondents (42.20%) at baseline reported “taking antibiotics orally” than at evaluation (1.22%; $p < 0.001$; see Table 4). These differences could also be attributed to the introduction of morbidity management services in the communities.

Discussion

This is a pre- and post-intervention evaluation study, designed to determine the effectiveness of cascade training of lymphedema patients, their support groups, and CDDs on MMDP in improving the health and life of lymphedema patients in the Upper West region of Ghana (3).

The education level among respondents was very low in both surveys, and this calls for more sustained promotion of education in the study population in general, but more especially for girls (16, 17). This study showed that more women suffer from LF-related lymphedema than men, and this was also reported in another study from Ghana (17). The household income was very low, with over 80% of the respondents earning a monthly income of less than GH¢ 250.00, which is equivalent to $43.34 (USD1 converted to GH¢5.768 at the time of data collection). This confirmed earlier findings that LF usually affects poorer communities (16–23). The low level of the household income may be because of lymphedema, which impacts individuals’ work life, and the fact that majority of the main breadwinners of the households depend on subsistence farming activities for their livelihood (16, 17).

The acceptance of healthcare services remained high among the study participants. However, in proportionate terms, there was a decrease in the proportion of those reporting high acceptance at evaluation compared with those reporting it at baseline, and this was because respondents (patients) were able to manage their own lymphedema at home with the support of their family support groups and CDDs. This has effectively reduced their reliance on healthcare facilities for care.

Despite the satisfaction expressed by patients with MMDP self-care, we found that the proportion of those using traditional medicine for managing lymphedema significantly increased from 54.58% at baseline to 72% at evaluation ($p = 0.001$). However, this could be explained in two ways: the first one is that, when the patients ran out of the antibiotics and other ointments given to them after training, they resorted to procuring traditional herbal preparations, mainly ointments, which were readily available and applied in a similar manner on the affected limbs. The other is that patients were responding to their causal beliefs that their lymphedema was caused by the supernatural forces and therefore required some local treatments to ward off the spirits behind the disease (16–18). As much as these may provide some psychological satisfaction to patients, the danger associated with the practice cannot be overlooked, especially the possibility of contaminating the already-ulcerated wounds in some cases, presenting some risk to the patients (16–19, 24).

We found that the proportion of respondents who reported having a high quality of life increased by 17 percentage points from 3.0% to 20% ($p < 0.001$). This is a significant improvement in the quality of life among respondents after they were trained on MMDP, which has built their confidence in managing their

TABLE 4 Acute attacks treatment strategies*.

Variables	Baseline (*n* = 173)	Evaluation (*n* = 164)	*p*-value
	Frequency (%)	Frequency (%)	
Placing affected limb in cool water/applying cold compress	41 (23.70)	115 (70.15)	< 0.001
Visiting the healthcare facility	87 (50.29)	82 (50.00)	0.952
Having enough rest	48 (27.75)	67 (40.85)	0.015
Elevation of the affected limb	25 (14.45)	52 (31.71)	< 0.001
Drink more fluids	20 (11.56)	37 (22.56)	0.011
Apply antibiotics on affected skin	36 (20.81)	16 (9.76)	0.007
Avoid exercise during acute attacks	12 (6.94)	10 (6.10)	0.927
Take antibiotics orally	73 (42.20)	2 (1.22)	< 0.001
Visiting traditional healers	27 (15.61)	0 (0.00)	<0.001
Do not know any acute attack treatment	17 (9.83)	0 (0.00)	<0.001

*Multiple choices allowed. Sorted in column 3 in descending order.

lymphedema condition without the fear of being stigmatized at a healthcare facility and made them confident that they are able to do something about their health. Studies have established that lymphedema has a considerable negative repercussion on the quality of life of the patients (21, 23), so it was reassuring to find that there was an improvement in the quality of life among respondents at evaluation.

Our findings showed that training patents to engage in MMDP self-care improves their quality of life. This confirms what was reported in other studies (10, 12, 13, 22, 24), showing a high level of self-care among patients, with some indicating that patients who practiced self-care were more likely to attain the highest average of quality-of-life score (17). The NTD program policy makers and implementers should therefore promote self-care among lymphedema patients, especially as we work toward LF elimination, bearing in mind that victims of LF clinical manifestations such as lymphedema will be with us even after the disease is eliminated.

Lymphatic filariasis-related morbidity is a major problem in endemic areas that requires serious attention (16, 25). It is therefore important to implement interventions that will relieve patients from the pain and discomfort associated with the disease, which can linger long after the interruption of the disease transmission (1–6). It was for this reason that the GPELF incorporated MMDP into the elimination agenda in endemic communities (1, 6, 21).

The improvement found in the appropriate management of lymphedema and acute attacks after the implementation of the MMDP intervention shows that, when trained appropriately and empowered with the needed logistics, patients and their support groups could manage these morbidities at home and must be encouraged in endemic areas (3). This may also take away or reduce the number of healthcare system-related barriers that patients face when they seek help from healthcare facilities (18–20, 26).

Conclusion

The findings of this study indicate that tailored approaches to addressing the challenges of MMDP at the community level involving patients, their support groups, and community-based volunteers under the supervision of the nearest primary health facilities, have the potential to improve access to, and acceptance of these services through the means of self-care. The cascade MMDP training led to a significant improvement in quality of life among lymphedema patients, affirming the fact that it is feasible to adapt the WHO MMDP management training manual for cascade training at all levels of the health system, and at community level. The implementation of the MMDP interventions in the context of community-based self-care has led to significant improvements in morbidity management practices, especially the appropriate treatments for lymphedema and acute attacks. The findings showed the effectiveness of the intervention to increase access to MMDP services, which have clearly justified the need for more investment in MMDP interventions in LF endemic communities, especially training patients and community members to perform some basic MMDP services at home. This will be very critical as we move toward LF elimination, which may lead to less LF-related activities being implemented in formerly endemic communities that have attained elimination, as lymphedema patients will live beyond elimination. This calls for investment in community-based MMDP services which train community members and patients and provide them with logistics to take charge of their own health through the means of self-care.

Study limitations

This was a survey targeted at patients living in one region of Ghana, so the findings must be interpreted within that context. Although our findings, similar to other findings across the country, can to a substantial extent, be generalized for Ghana, care must be taken when doing so for other countries. We acknowledge that the results presented here are from survey data, which may have inherent biases and limitations. Though the data collection tool was validated through pretesting in a similar environment, the data remain self-reported, which is a weakness. Finally, while the chosen research design is straightforward and practical, its lack of a comparative group introduces complexities in attributing observed changes exclusively to the intervention.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

This pre- and post-intervention evaluation study was carried out as part of an implementation project titled “A capacity-strengthening program to promote self-care practices among people with lymphatic filariasis-related lymphedema in the Upper West region of Ghana”. The project was reviewed and approved by the Ghana Health Service Ethics Review Committee with reference number GHCERC011/11/18. All participants interviewed provided written consent for their participation. Study methods were performed in accordance with the relevant national and international regulations and guidelines. All respondents were above 18 years of age and signed a written informed consent form. Community consent was also sought for the study from the chiefs and elders of each participating community, and community norms were strictly observed during data collection.

Author contributions

CA: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing, Resources. SA: Conceptualization, Data curation, Investigation, Project

administration, Resources, Supervision, Validation, Writing – review & editing. KS: Data curation, Formal analysis, Investigation, Software, Supervision, Validation, Writing – review & editing. BA: Investigation, Project administration, Resources, Supervision, Validation, Writing – review & editing. DS: Conceptualization, Data curation, Investigation, Methodology, Project administration, Supervision, Validation, Writing – review & editing. KA-M: Conceptualization, Investigation, Project administration, Resources, Supervision, Validation, Writing – review & editing. JO: Conceptualization, Investigation, Project administration, Resources, Supervision, Validation, Writing – review & editing. PS: Conceptualization, Funding acquisition, Project administration, Resources, Supervision, Validation, Writing – review & editing. SW: Conceptualization, Funding acquisition, Project administration, Resources, Supervision, Validation, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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