


The Care for Life Family Preservation Program: Outcome Evaluation of a Holistic Community Development Program in Mozambique

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Abstract

Objective: In 2016, Mozambique ranked 13th worldwide in infant mortality (67.9 deaths/1,000 live births) and 20th worldwide in maternal mortality (489 deaths/100,000 live births). This study's objective was to determine whether a comprehensive program, incorporating the International Association for Community Development's recommended holistic elements was effective in a country such as Mozambique. **Method:** Over a 5-year period (2012–2017), an independent, randomized between-group outcome study was conducted to determine whether the holistic *Care for Life (CFL) Family Preservation Program* was effective in reducing infant mortality ratios (IMRs) and maternal mortality ratios (MMRs) in Mozambique. **Results:** At preintervention assessment, intervention and comparison villages were statistically equivalent in both IMR and MMR. After 5 years, intervention villages were significantly below the comparison villages in both IMR (odds ratio = 2.3) and MMR (odds ratio = 4.6). **Conclusion:** The use of comparison groups demonstrated the CFL program comprehensive, holistic, and sustainable approach is effective.

Keywords

Mozambique, randomized between-group comparison, maternal mortality ratio (MMR), infant mortality ratio (IMR), holistic community development

At the end of 2016, all 10 of the poorest and most underdeveloped countries in the world were found in sub-Saharan Africa (Gregson, 2017). Each of these countries lack the social infrastructure and economic development required to create the sustainable economic growth needed to provide a basic standard of living for their people. One of these countries, Mozambique, at the time of its independence from Portugal in 1975, was considered to be one of the poorest countries in the world. As was true for many former colonies in Africa, colonial Mozambique was marked by inequalities between a small number of wealthy Portuguese and the large number of mostly illiterate, rural indigenous Africans who faced significant discrimination in education and employment (Bowen, 2000). Independence was followed by a 15-year brutal civil war and governmental mismanagement that further impoverished the country. After government reforms in 1994, international investment and support allowed for several years of economic growth, particularly in aluminum, coal, and gas development. Nevertheless, the gains of the economic growth benefited select groups of individuals. For instance, in 2016, the International Monetary Fund and international donors ordered a halt to direct budget support of the Mozambique government after it was found US\$2 billion (over 10% of GDP) in illegal loans to state-owned defense and security companies (CIA, 2016; Gregson, 2017).

Therefore, the benefits of that increased economic activity failed to result in significant poverty reduction in Mozambique, with 46.1% of the Mozambican population living below the poverty line (World Bank, 2016). Consequently, Mozambique is currently ranked as the seventh poorest country with the average citizen's annual income at US\$1,228 per year (CIA, 2016; Gregson, 2017). Furthermore, in 2016, Mozambique was ranked 13th worldwide in infant mortality rate (IMR; at 67.9 deaths/1,000 live births) and 20th worldwide in maternal mortality ratio (MMR; at 489 deaths/100,000 live births; CIA, 2018b; World Health Organization, 2018).

On September 25, 2015, the United Nations (UN) General Assembly ratified the 2030 Agenda for Sustainable Development, listing 17 sustainable development goals (SDGs), in the

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recognition “that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development” (p. 3). In response, the International Association for Community Development (IACD, 2016) outlined the eight required elements that a community development program should incorporate in order to achieve the effective community and societal-level changes needed to address poverty and inequality. According to the IACD, these elements are summarized as follows: (1) A broad array of social, economic, and environment work at the local level must be conducted in a holistic and coordinated manner. (2) It must be recognized that the causes of economic and social problems do not lie within the most vulnerable communities. (3) It should be further recognized that while the poor are victims in many situations, they could become active players in designing and developing solutions. (4) Although there will always be conflicts of interest in any society, effective community development practices seek to find ways of building consensus and partnership at the local level. (5) Both agencies and community representative who collaborate and plan at a local level must recognize that sustainable development takes time. (6) Vulnerable communities need freely available technical assistance to address these challenges, including money and expertise not available within their communities. (7) The goal of community development is to design a collective response to the challenges that people face in common. And, (8) recognizing that without community development, there is no sustainable development. The IACD (2016) further asserts that although community development programs often contain elements of the SDG and the eight required points, most program interventions typically are “not in a holistic or coordinated [manner, which is] now called for” (p. 6). Therefore, the question arises regarding the degree of effectiveness that can be expected of holistic programs that successfully incorporate the IACD principles in carrying out community development to achieve SDGs within the poorest communities within developing countries. In particular, does an approach that is comprehensive and that includes such diverse interventions (e.g., education, health and hygiene, food security and nutrition, sanitation, income generation, home improvement, and psychosocial well-being), as suggested by the IACD, prove more effective than separately provided interventions? In other words, is there a synergistic benefit by providing interventions in a holistic manner? This study seeks to determine the effectiveness of a holistic community development program by providing the findings of an independent, 5-year outcome evaluation. This evaluation examined the effectiveness of one such holistic approach, the *Care for Life (CFL) Family Preservation Program (FPP)* in assisting communities in Mozambique to increase their health and well-being through community development.

Nonconflict of Interest Statement

The authors of this study did not participate in any manner in the development or implementation of the CFL program, which

they independently evaluated. More specifically, the authors declare they have no conflicts of interest.

Description of the CFL Agency

A number of nongovernmental agencies (NGOs), as well as various Mozambican government programs, currently engage in numerous community development programs throughout the country of Mozambique. Nevertheless, as stated previously, CFL (<http://careforlife.org/index.html>) is one of the few agencies to employ a holistic approach to ending poverty in support of the UN’s 17 SDGs as well as in accordance with the IACD’s eight principles by engaging in comprehensive interventions (IACD, 2016; United Nations, 2015). The agency consists of 20 Mozambican field officers, who provide direct services to villages, as well as 12 Mozambican support staff. Additionally, various volunteers in the United States assist with such functions as fund-raising and web support. The CFL mission statement is as follows:

Care for Life is a global non-profit organization with a holistic approach to ending poverty in a sustainable way by preserving the family while encouraging and enabling the practice of self-reliance. Care for Life is not a handout or a give-away organization, but one that believes in working with people to help them take charge of their own destiny, realize their full potential, and create a culture of individual effort and responsibility.

In 2002, CFL received nongovernment organization (NGO) status in Mozambique, which provided the agency with increased access and permission to operate within the country. For the last 15 years, its efforts have been primarily focused in the Northern Sofala Province, which the World Bank (2016) identified as one of the five provinces that contained 70% of the poor in Mozambique. The comprehensive approach to community development is formally contained in the FPP, which now will be described.

Description of the FPP

According to CFL, the FPP is a family-based development program, implemented at the community level. It uses a holistic approach that focuses on eight emphases areas simultaneously, with each area having specific objectives for each family. As more fully described in the *Guide to the FPP* (CFL, 2012), these eight emphasis areas of community development focus with their accompanying objectives are:

Education

1. Children will be registered in school and be attending regularly.
2. Families will have children registered with government for their identification cards.
3. All family members will become functionally literate.
4. Children will receive age-appropriate AIDS education.

Health and Hygiene

1. Mothers will develop the habit of bathing their children daily.
2. Parents will follow instructions for taking medications correctly.
3. Fathers and mothers will know advantages of always being clean.
4. Families will take measures to prevent diseases and their symptoms, like cholera, malaria, and vomiting.
5. Parents will ensure that children are current in their immunizations.
6. People will shower/bathe every day.
7. Families will avoid infections through cleanliness.
8. Families will take care of their own sick members when appropriate.
9. Families will visit health centers and hospital for consultation and treatment.
10. Pregnant women will have prenatal consultations and then follow instructions.
11. Toddlers will be taken to hospital for testing of growth patterns.
12. Families will drink only clean, treated water.
13. Families will keep dishes clean.

Food Security and Nutrition

1. Families will plant vegetable gardens.
2. Families will improve their diet using produce from their gardens.
3. Families will eat three nutritious meals a day.
4. Families will have proper containers for keeping food and water.
5. Parents and caregivers will learn to cook nutritious meals.

Sanitation

1. Families will have their own clean, properly functioning latrine.
2. Families will treat garbage properly, by burning or by burying it.
3. Families will have their own clean, properly functioning washing room.
4. Families will eliminate stagnant water from their property.
5. Families will keep their yard free of weeds and wild shrubs.
6. Families will have their own water well or easy access to a water well.
7. Families will eliminate pests such as rats, mice, cockroaches, and other insects.
8. Families who raise animals will have them properly housed.

Income Generation

1. Families/individuals will develop the capacity to start their own business, participate in a cooperative, or become employable.
2. Families will develop basic family financial management skills.
3. Families will qualify to receive credit.
4. Families will become economically self-reliant.

House Improvement

1. Roofs of family houses will be in good condition with no leakage.
2. Walls of family houses will be built of adequate material to make them safe, strong, and clean.
3. Family houses will have secure, locking doors.
4. Windows of family houses will be of adequate size and screened.
5. Floors of family houses will be made of cement or other improved material.
6. Family houses will have their own latrine and washing room outdoors.
7. Family houses will be clean inside.
8. Family yards will be clean and boundaries marked.
9. Family houses will have a dish shelf to keep dishes off the ground.

Psychosocial Well-Being

1. Families will prevent discrimination against orphans, widows, and those living with HIV.
2. Families will prevent sexual abuse.
3. Families will prevent domestic violence.
4. Families will reduce use of alcohol, cigarettes, and drugs.
5. Families will reduce marital infidelity.
6. Families will reduce family conflicts.
7. Families will increase quality time between parents and children.
8. Families will increase their religious commitment.

Community Participation

1. The community will develop more unity.
2. The community will develop a more altruistic attitude.
3. Families will help each other more frequently and will be more willing to serve.
4. Community leadership will be better organized.
5. Community capacity to manage conflicts will increase.
6. The community leadership will promote and participate more actively in community events.

As described previously, the methods CFL uses to achieve these objectives with communities are strongly founded within the UN's SDG and IACD's eight required elements. In particular, the overarching goal of the FPP is to create sustainable development within the community, independent of CFL, through comprehensive community participation and leadership development. Consequently, appropriate selection of communities with which to partner is critical.

Selecting a community. The FPP is designed to organize and intervene with individual families living with marginalized villages. The CFL agency seeks out the poorest communities of about 180–250 families in size (or approximately 1,000 individuals) in which to introduce FPP villages within the Sofala Province of Mozambique. Once possible villages are identified based upon size and lack of development, CFL leaders meet with local leaders to introduce and explain FPP and ask whether they would like to have the program brought to their community. In order to participate in the FPP, all leaders must be in agreement and be willing to hold a community meeting at which CFL explains the program to all in attendance and asks the population to agree with the proposed program's principles, strategies, and activities. If the community population or leaders are not interested, CFL selects another community.

In both the leadership and community meetings, the focus is upon establishing partnerships within the community. It is explained that CFL is committed to teaching developmental principles contained in the FPP, if, in return, the community is willing to commit to applying those principles. It is explicitly explained that FPP will not give food, jobs, or handouts of any kind; rather, FPP consists of providing comprehensive education and mentorship that will help each member of families within the community to learn skills that will improve their overall well-being. As described in CFL (2012) literature, it is expected that adults will attend community classes that teach the eight areas of emphasis; children will become involved in a club that teaches HIV/AIDS prevention and vocational training; parents will be given income generation education to increase their abilities to provide for their families; and women and girls will learn basic literacy and math. In particular, CFL will provide the knowledge and mentorship, if the community will participate in the program and apply the developmental principles that they learn. It is emphasized that FPP will not do for the community or families what they are capable of doing for themselves. Currently, CFL works with four villages at any given time.

Organizing and developing community leadership. As stated by the IACD (2016) in elucidating the eight elements for effective and sustainable community development, "Community development is about designing ways in which vulnerable people have voice and can be authentic partners around the table, designing the programmes that can address the SDG challenges at the local level" (p. 7).

To maximize community participation, in the first month after beginning the program, CFL focuses on the election and

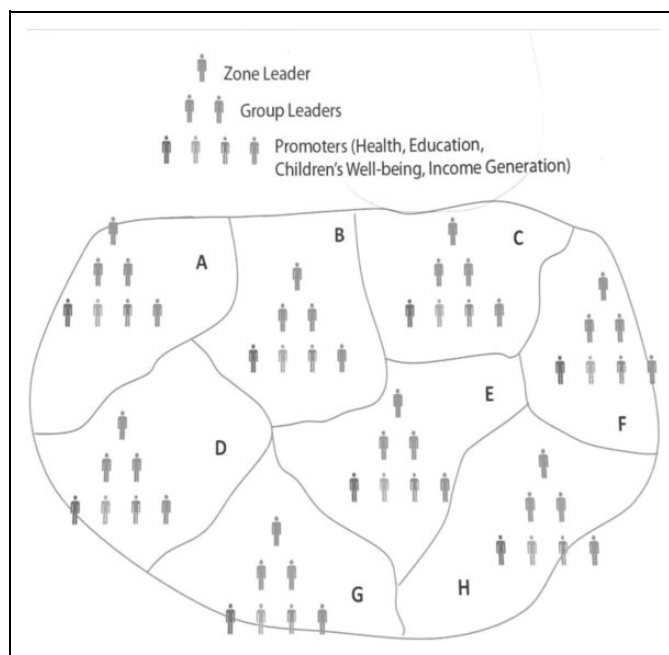


Figure 1. Care for Life (2012) community organization.

training of community leadership. The objective is to ensure the community develops its own resources and abilities needed to work independently of CFL and to actively participate in the implementation of FPP. To achieve this aspect of development, CFL divides the community into eight zones (consisting of approximately 25–30 families) and each zone into two groups. The community then elects a zone leader from the population of each zone. Then, two group leaders are elected, one for each group. Next, the zone leadership and CFL will select four promoters in each zone who will concentrate on the following areas encompassing the eight areas of focus: health, education, children's well-being, and income generation/agriculture. This group of seven community volunteer leaders (one zone leader, two group leaders, and four promoters) constitutes the Zone Support Group. At the community level, the combined leadership from each zone constitutes the Community Support Group (see Figure 1). Given that each village has eight zones, there are a total of 56 community leaders that are trained and mentored to work with the rest of the community. This group is comprehensively called the Community Support Group. Throughout the process, the chosen leadership is continually reminded that they are neither working for nor being paid by CFL; rather, they are working for the community and their own families. Initially, these chosen leaders are provided four 2-hr trainings regarding how to use FPP, how to work with families, and how to support development within their communities. Furthermore, these leaders hold a community leadership meeting every 2 weeks that lasts for approximately 1 hr. At these meetings, FPP field officers provide further training and direct mentorship. Additionally, these meetings are used to discuss the situation of individual families, as well as other aspects of the community's development. After the community leadership meeting, FPP field

officers accompany zone and group leaders to visit each family in the village within their homes. In addition to the meeting with families after the community leadership meeting every 2 weeks, the Zone Support Group will meet with each individual family in their zone on their own on the alternate weeks. With support from the field officers and Zone Support Group, each family selects 10 goals that address the objectives within each of the eight FPP areas of emphasis, which they work toward over a 6-month period. During the weekly visits by the Zone Support Group, progress toward the goals is monitored, appropriate support is given, and the concepts that are taught in community classes are reinforced. Active participation by family members in FPP community activities, classes, and programs is also encouraged and tracked during leadership home visits.

Community activities, education, and programs. According to the IACD (2016), any effective and sustainable community development must include “educational programmes that raise awareness and develop skills and confidence” (p. 9) of community members. Consequently, a major focus of FPP is to provide age appropriate skills and knowledge through the use of community classes, followed by community-wide initiatives to implement programs addressing specific issues introduced by those classes. More specifically, the general curriculum for FPP is taught through 31 individual lessons that cover all eight areas of emphasis. In addition to teaching knowledge and skills, each lesson contains specific key behavioral change objectives, which are reinforced and supported by community leaders during their weekly visits with individual families. For instance, a community health class may teach the importance of proper sanitation, followed by basic instructions for building a simple, properly functioning latrine. During their weekly visits, community leaders will encourage a family to construct a simple latrine for their household, using proper techniques learned in the community class to ensure adequate sanitation. Additionally, the community leaders will help the family to problem-solve any individual challenges they may have in carrying out the construction, as well as coordinate cooperation with other families within the zone.

Behavioural reinforcement of change. Sustainable community development requires long-term behavioral change where community members implement new skills and knowledge to improve their lives in an ongoing fashion. The goal is to develop and increase the capacity of the community to provide for its own needs. Therefore, it is critical for behavioral change to be reinforced, so that community members can experience immediate improvement in their lives. Consequently, FPP is structured so that families, groups, zones, and the community can earn the resources they need in order to make the changes they desire.

During the first visits with field officers and Zone Support Group, each family sets 10 goals within each of the eight areas of emphasis, which they will work toward achieving over a 6-month period. In subsequent visits, the leadership team monitors the family progress, helps problem-solve difficulties, and reinforces achievement of goals. The majority of goals encourage families to use no cost or low-cost natural materials that are easily

obtained. When choosing their goals, the families also choose rewards for relatively more expensive items requiring purchase (e.g., chlorine for purifying water) that they can earn if they achieve 80% (8 of 10) of their goals. Typically, these earned rewards consist of construction materials or other “starter kit” supplies (e.g., bags of cement, roofing materials, farming utensils) to improve their homes and lives. Families are also encouraged to pool resources to decrease costs. Goals typically consist of engaging in work in which all families, regardless of their economic situation, can participate, for example, putting up barriers and preparing their land for cultivation. In situations when a family is unable to physically participate (e.g., the head of household is too sick or elderly), the village leaders organize support and assistance from other members of the village. At the end of the 6-month period, rewards are given and new goals are identified.

Some examples of goals are:

- drink water treated with chlorine,
- build a latrine,
- remove stagnant water from yard,
- register children with the government for identification,
- attend literacy classes,
- plant a family garden,
- sleep under mosquito nets,
- start a small business, and
- take children to the health center.

In the same manner that families can earn rewards, groups, zones, and the community can also work toward achieving communal goals that provide for resources necessary to improve their village’s infrastructure. For example, if 80% of the goals in a zone are achieved, materials needed for a well or electricity can be earned, thus increasing community cooperation and unity.

Because education and leadership development is a foundational aspect of the FPP, one of the first rewards that a community can earn are the resources needed to build a Community Meeting Center or “machessa.” If the community can achieve the consensus needed to participate in the FPP, then CFL will provide construction materials needed to complete a machessa. The machessas are 10 m × 6 m (33 foot × 20 foot) structures that hold up to 150 people. The construction of the machessa is the first activity that requires the active organization by the community leaders and participation by community members to provide labor. It is in the machessa that community classes, Children’s Club meetings, leadership meetings, and training sessions all take place.

Assessments. In order to monitor the progress that each family is making, a 52-item comprehensive assessment covering the eight emphasis areas is conducted with each household to determine every family’s current living condition (see Appendix). This survey was developed and refined with the assistance, as part of a service project conducted, by the Harvard College Consulting Group (see <https://www.harvardconsulting.org/>) in 2012 shortly before the study began. This assessment allows for a reliable and comprehensive measure of a family’s overall performance and living condition and is conducted

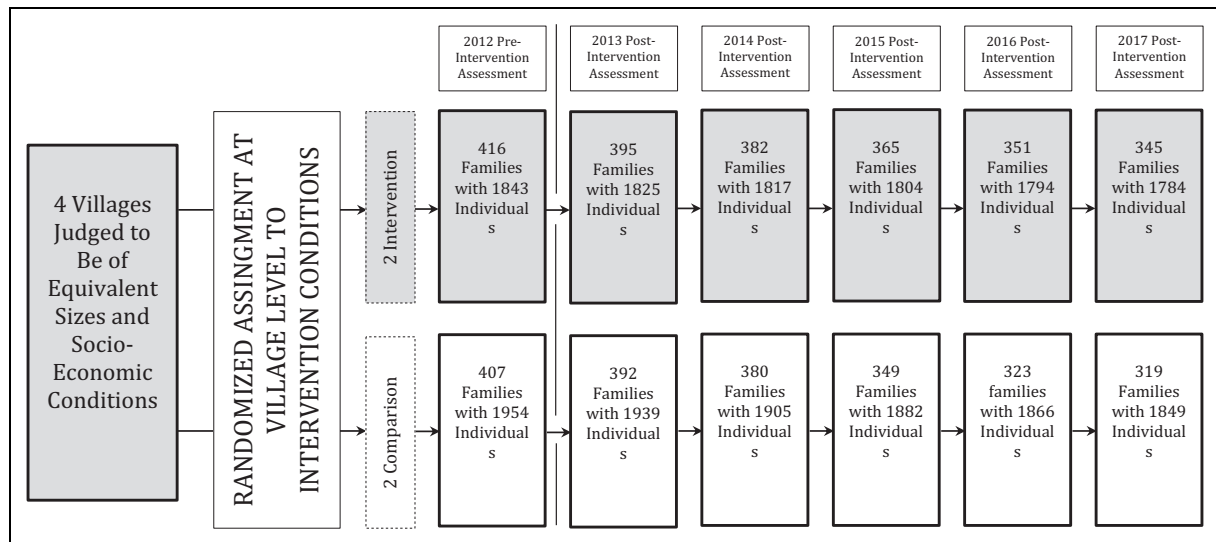


Figure 2. Randomized, pre–post, between-group outcome comparison design showing attrition over time.

every annually. Additionally, information regarding pregnancies, births, maternal deaths, and infant deaths were collected for each family when the survey assessment was administered

Exit strategy. The CFL field officers work with a chosen community for approximately 2 years. The objective is to develop community leadership sufficiently that the FPP will continue without CFL presence. At the end of 2 years, it is expected that families have experienced the benefits of their community development and will be self-motivated to improve their lives and community. Additionally, community leaders will have the experience and knowledge necessary to carry on FPP into the future as their community grows and develops. In order to foster a sense of achievement and independence, CFL gives each household a laminated certificate with the family’s picture. The leaving of CFL from a village is done with a community celebration. After leaving a community, CFL will monitor the community for up to 5 years to measure the sustainability of progress, using the same assessment measure given previously throughout the program.

Outcome evaluation. The primary objective of this study was to conduct an independent, randomized, pre–post, between-group outcome comparison study to determine whether the holistic CFL FPP is effective in reducing both IMRs and MMRs in the poorest areas of Mozambique. Within public health, both IMRs and MMRs are typically considered to be strong general indicators of community health and well-being (Muldoon et al., 2011).

Cost of the program. In addition to the 2- to 2½-year investment of time by CFL, it is estimated that the cost of the program is approximately US\$80 per year per person. This means that the cost of the program within a village of 1,000 people is approximately US\$80,000.

Materials and Methods

Study Design and Setting

In order to ensure the true independence of the study, the researchers conducted impartial tracking of the mortality rates within the villages by employing outside evaluators from the local Universidade Pedagógica Moçambique in Beira. By using local students, the researchers ensured not only the language proficiency of the evaluators, but cultural responsiveness and racial equity were also appropriately addressed (U.S. Department of Health and Human Services, 2008).

In conducting the evaluation, this study used an independent, randomized, pre–post, between-group outcome comparison design (see Figure 2). Specifically, CFL was asked to follow their normal procedures to identify and approach four villages of equivalent sizes and composition. All villages were separated by distances from one another to prevent cross contamination. During village community meetings, consensus permission was obtained to participate in the CFL program. The researchers then randomly chose two villages to act as the intervention villages by the literal picking out of a hat. The other two villages defaulted to becoming comparison villages.

In 2012, at the beginning of the study, the identified comparison villages were comprised of 407 families (households) with 1,954 individuals. The intervention villages were comprised of 416 families (households) with 1,843 individuals. In 2017, at the end of the study, the comparison villages were comprised of 319 families (households) with 1,849 individuals. Additionally, intervention villages were comprised of 345 families (households) with 1,784 individuals. Figure 2 also shows the attritions of participating families and individuals over the course of the study.

Outcome Assessment Procedures

Students from the Universidade Pedagógica Moçambique were trained as evaluators. They worked for a small stipend for their

participation, as well as being provided T-shirts, caps, water bottles, and lunch for their services. In order to ensure the reliability of the data that they collected, the completion of an annual half-day training was required of all evaluators, in which FPP comprehensive household assessment questions were examined in-depth and an explanation of how different responses should be recorded. Next, the evaluators observed role-plays specific to the administration of the survey, after which questions about process, perceived challenges, and so on, were discussed. By the end of the training, an interrater reliability of .90 or greater was obtained between all raters for each household assessment item. To maintain the fidelity of the assessment process, the evaluator training was conducted annually.

In entering the villages, the evaluators identified themselves as researchers working for the University of Utah and Universidade Pedagógica Moçambique, and they stated that they were gathering public health data on IMRs and MMR, and they did not identify the study as having any relationship with CFL. Consequently, villagers were blind to the fact that their responses were associated with the CFL program. The evaluators also completed the FPP comprehensive household assessment within each household. In an attempt to also keep the evaluators blind, they were not informed which villages were receiving the CFL interventions. Nevertheless, because of the changes that they could observe as they worked within the villages, they expressed suspicions regarding which villages were the controls and intervention villages. These suspicions were neither confirmed nor denied. Table 1 shows the pre-post survey results for both the intervention and comparison villages.

Ethical Considerations

Prospective participants were read verbatim statements that clearly stated that the sharing of data was voluntary and that there was no consequence for refusal to participate at any point during the survey. It was also clearly stated that no incentive was to be given for participation in the survey. Responding to the survey questions was considered to be the granting of permission for the participants' data to be used. Since the researchers were not involved in providing any interventions to village members, and the research involved only the collection of survey data independent from the CFL agency, both the University of Utah Institutional Review Board (IRB) and the Universidade Pedagógica Moçambique IRB granted "Exempt" status to the project.

Statistical Analysis

All quantitative analyses were conducted using SPSS Version 24 (IBM, New York, NY). Data were collected during the 5-year-long study that began in fall of 2012. IMRs and MMRs within each village before program introduction and the fourth annual survey after program initiation were the primary end points. We used a α level of .05 for all statistical tests.

Results

Program Effectiveness

IMR. The IMR for both the comparison and intervention villages was also assessed at the preintervention phase. The IMR is standardly defined as the number of deaths of infants under 1-year-old in a given year per 1,000 live births in the same year (Organization for Economic Cooperation and Development, 2018). Given that this study was conducted in the one of the poorest provinces within Mozambique, it was not surprising that at preintervention, we found that the comparison villages had an IMR of 220 infant deaths per 1,000 births (20 deaths of 91 births). Additionally, the intervention villages were found to have an IMR of 286 deaths per 1,000 births (26 deaths of 91 births) at preintervention. Once again, these IMRs were comparable to rates associated with colonial times, both being over 3 times Mozambique's national ratio of 77 deaths per 1,000 births (CIA, 2018a; World Health Organization, 2018). Consequently, it is not surprising that at preintervention, we found both the IMR in the comparison village, $\chi^2(1) = 26.12, p < .001$, and the intervention village, $\chi^2(1) = 55.87, p < .001$, were significantly above the national IMR. A Pearson χ^2 analysis was conducted to ensure the equivalency of the IMRs between groups at preintervention. We found, $\chi^2(1) = 1.05, p = .306$, that there was no statistically significant difference in IMRs between the comparison and intervention villages (see Table 2).

In 2017, at the end of the study, we found that the comparison village had an IMR of 105 deaths per 1,000 births (22 deaths of 209 births), while the intervention village had had an IMR of 90 deaths per 1,000 (10 deaths of 207 births). Using a Pearson χ^2 analysis, we then found, $\chi^2(1) = 4.75, p = .029$, that the intervention villages had a significantly lower IMR when compared to the comparison villages. Specifically, the difference in IMRs resulted in a calculated odds ratio of 2.3, which means, after the intervention by CFL, infants were 2.3 times more likely to die in their first year of life in the comparison villages as compared to the intervention villages. Furthermore, the IMR in intervention villages was below but statistically equivalent to the 2017 national IMR, $\chi^2(1) = 1.23, p = .268$, whereas the IMR in the comparison villages remained statistically above the national IMR, $\chi^2(1) = 4.90, p = .027$.

MMR. At preintervention, the MMR for both the comparison and intervention villages was assessed. The MMR is defined as the annual number of female deaths per 100,000 live births, from any cause related to or aggravated by pregnancy or its management. As commonly defined, the MMR includes deaths during pregnancy, childbirth, or with 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, for a specified year (World Health Organization, 2018). At preintervention, we found that the comparison villages had an MMR of 879 deaths per 100,000 births (8 deaths of 91 births) in 2012. Furthermore, the intervention villages were found to have an MMR of 659 deaths per 100,000 births (6 deaths of 91 births) at preintervention. As stated previously, this study was conducted in the Northern Sofala Province, which is one of the poorest within Mozambique. Consequently,

Table 1. Pre–Post Survey Results.

Household Profile	Preintervention				5-Year Postintervention			
	Intervention Villages		Comparison Villages		Intervention Villages		Comparison Villages	
Housing								
House has electricity	161	38.7%	266	65.4%	182	52.8%	231	72.4%
Adequate roof	141	33.9%	134	32.9%	218	63.2%	169	53.0%
Adequate walls	177	42.5%	179	44.0%	234	67.8%	199	62.4%
Adequate door	249	59.9%	248	60.9%	294	85.2%	260	81.5%
Covered floor	193	46.4%	197	48.4%	246	71.3%	196	61.4%
House has a kitchen	108	26.0%	112	27.5%	179	51.9%	86	27.0%
Sanitation								
Family has latrine	92	22.1%	128	31.4%	250	72.5%	187	58.6%
Family has bath house	301	72.4%	321	78.9%	318	92.2%	239	74.9%
Inside of house clean	330	79.3%	326	80.1%	342	99.1%	299	93.7%
Clean yard	364	87.5%	346	85.0%	343	99.4%	285	89.3%
Pest free	72	17.3%	59	14.5%	49	14.2%	76	23.8%
Garbage is burned or buried	315	75.7%	340	83.5%	332	96.2%	145	45.5%
Tarimba (table)	157	37.7%	134	32.9%	265	76.8%	71	22.3%
Pond free—no standing water	279	67.1%	248	60.9%	306	88.7%	284	89.0%
Food and nutrition								
Daily meal with vegetable and/or protein	315	75.7%	334	82.1%	331	95.9%	292	91.5%
Harvest from farm field	233	56.0%	196	48.2%	216	62.6%	163	51.1%
Home garden	64	15.4%	52	12.8%	125	36.2%	34	10.7%
Family member eats three meals a day	962	52.2%	1,130	57.8%	717	40.2%	809	43.8%
Income generation								
Small family business	125	30.0%	123	30.2%	187	54.2%	119	37.3%
Reg. activity to generate income	194	46.6%	167	41.0%	254	73.6%	178	55.8%
Family in credit/savings	37	8.9%	49	12.0%	195	56.5%	13	4.1%
Psychosocial spiritual								
Cases of physical violence	24	5.8%	34	8.4%	17	4.9%	4	1.3%
No excessive alcohol use	373	89.7%	379	93.1%	332	96.2%	275	86.2%
Family active in any religion	351	84.4%	329	80.8%	306	88.7%	272	85.3%
Belief that family life will be better	243	58.4%	215	52.8%	313	90.7%	270	84.6%
Belief that community will be better	269	64.7%	233	57.2%	329	95.4%	275	86.2%
Health and hygiene								
Treats drinking water	135	32.5%	133	32.7%	314	91.0%	61	19.1%
Wash hands after latrine use	1,586	85.5%	1,779	91.0%	1,735	97.3%	1,713	92.6%
Wash hands before eating	1,451	78.3%	1,615	82.7%	1,599	89.6%	1,443	78.0%
Family member wear footwear	1,783	96.2%	1,935	99.0%	1,780	99.8%	1,711	92.5%
Family member brush teeth daily	1,541	83.1%	1,794	91.8%	1,665	93.3%	1,493	80.7%
Family member eats three meals a day	978	52.8%	1,130	57.8%	1,430	80.2%	1,293	69.9%
Family member tested for HIV	389	93.5%	520	26.6%	544	30.5%	229	12.4%
Sleeps under mosquito net	733	39.5%	793	40.6%	1,675	93.9%	1,231	66.6%
Sick within the last 30 days	359	19.4%	411	21.0%	258	14.5%	377	20.4%
Education								
People registered with government	1,457	78.6%	1,645	84.2%	1,577	88.4%	1,624	87.8%

it was not surprising that these MMRs were comparable to rates associated with colonial times, and both were well above Mozambique's national MMR of 489 deaths per 100,000 births (CIA 2018b; World Health Organization, 2018). A Pearson χ^2 analysis was conducted to ensure the equivalency of the MMRs between groups at preintervention. We found, $\chi^2(1) = .310$, $p = .578$, that there was no statistically significant difference in MMRs between the comparison and intervention. Because of the small cell size of four expected deaths among the controls and intervention groups, a comparison with the national rate was not possible using a single sample χ^2 test (see Table 1).

In 2017, at the end of the study, we found that the comparison village had an MMR of 430 deaths per 100,000 births

(9 deaths of 209 births), while the intervention village had an MMR of 90 deaths per 100,000 (2 deaths of 207 births). Using a Pearson χ^2 analysis, we then found, $\chi^2(1) = 4.51$, $p = .034$, that the intervention villages had a significantly lower MMR when compared to the comparisons. Specifically, the difference in MMRs resulted in a calculated odds ratio of 4.6 between the comparison and intervention villages. This means that after the intervention by CFL, women were 4.6 times more likely to die in childbirth or by associated complications in the comparison villages as compared to the intervention villages. In other words, there was a 78.3% lower MMR in the intervention village as compared to the comparison village. Furthermore, the MMR in intervention villages were significantly below the

Table 2. χ^2 Analyses of Infant Mortality Ratios and Maternal Mortality Ratios.

Household Profile	χ^2 Value	df	p Value
Infant mortality rate comparisons			
2012			
Comparison villages versus intervention villages	1.05	1	.306
Comparison villages versus Mozambique	26.12	1	<.001
Intervention villages versus Mozambique	55.87	1	<.001
2017			
Comparison villages versus intervention villages	4.75	1	.029
Comparison villages versus Mozambique	4.90	1	.027
Intervention villages versus Mozambique	1.23	1	.268
ORR = 2.3			
Maternal mortality rate comparisons			
2012			
Comparison villages versus intervention villages	0.310	1	.578
Comparison villages versus Mozambique	Insufficient cell size		
Intervention villages versus Mozambique	Insufficient cell size		
2017			
Comparison villages versus intervention villages	4.51	1	.034
Comparison villages versus Mozambique	0.105	1	.746
Intervention villages versus Mozambique	6.73	1	.010
ORR = 4.6			

national MMR, $\chi^2(1) = 6.73$, $p = .010$, whereas the MMR in the comparison villages was also below but statistically no different than national MMR, $\chi^2(1) = 0.105$, $p = .746$.

Discussion

It is important to note that over the course of the evaluation, significant economic, education, social welfare, and public health interventions were occurring both within the nation and the province, which undoubtedly had clear impacts upon all villages evaluated in this study. Consequently, the importance of a randomized between-group comparison study design was critical in determining the effectiveness of the holistic CFL program in reducing IMR and MRR. As described above, whereas the intervention and comparison villages were statistically equivalent in regard to IMR and MMR, 5 years after the beginning of the study, the intervention villages were significantly below the comparison villages in regard to IMR (odds ratio = 2.3) and MMR (odds ratio = 4.6). Furthermore, it should be highlighted that, in regard to IMRs, the intervention and control changed relative positions between in regard to IMRs, with the intervention village rates moving from being above comparison villages at preintervention to being below at the end of the study (see Figure 3). The findings regarding the MMRs are more difficult to interpret, in that change within the intervention and comparison villages appeared to parallel one another (see Figure 4). Nevertheless, a closer inspection of Figure 4 shows the drop in rates actually diverged by more than 50 deaths per 100,000 births. Thus, the data do indicate a substantial greater improvement in MMR within the intervention villages. Nonetheless, a replication of this study is warranted in order to more precisely document the degree to which the holistic CFL

program improves MMR, given the initial differences between the intervention and comparison villages at preintervention.

Overall, the findings of this study support the assertion by the IACD that effective community development program needs to contain eight elements. In particular, the CFL's FPP contained these elements. These elements included providing local-level interventions in a holistic and coordinated manner; directly addressing structural inadequacies faced by the communities; making the villages active players in designing and developing solutions; the building of consensus and partnership at the local level; ensuring the provision of interventions over extended time periods; providing the resources, technical assistance, and expertise that were not available within the communities; supporting a collective response to the challenges that the community faced in common; and focusing on making the community development sustainable.

In observing the CFL over 5 years, the researchers wish to highlight a critical component that significantly enhances the effectiveness of the FPP, which is the development of local leadership. As described above, CFL divides the community into eight zones (consisting of approximately 25–30 families each), and seven community volunteer leaders (one zone leader, two group leaders, and four promoters) are chosen to assist the families within their zones. This means that CFL mentors and develops a total of 56 community leaders that are trained to work with the rest of the community. The development of leadership in the villages that sustain and maintain the program interventions is key to long-term success. However, more research is needed to fully understand how successful leadership in the communities is developed and maintained and how challenges are managed long term. Nevertheless, local leadership development should be considered a critical element of any holistic community development program.

Finally, future research should examine how holistic interventions potentiate outcomes beyond the individual pieces. As Green (2016) stated, "To keep pace with these developments, increasing attention should be directed toward the characteristics of these spaces that are assumed to matter and why. This is an area in which community development scholarship is well positioned to make contributions" (p. 606).

Conclusion

Based upon obtained results, it is clear that the CFL program was effective in reducing both MMR and IMR in Mozambique. The use of comparison groups demonstrated that the CFL program effectiveness is above and beyond any possible changes that occurred because of possible governmental public health changes made at the provincial or federal level. The CFL's comprehensive, holistic, and sustainable approach is an effective approach to improved public health and community development. Obtained results indicate that holistic community development is a powerful intervention to improve the lives and health of individual community members.

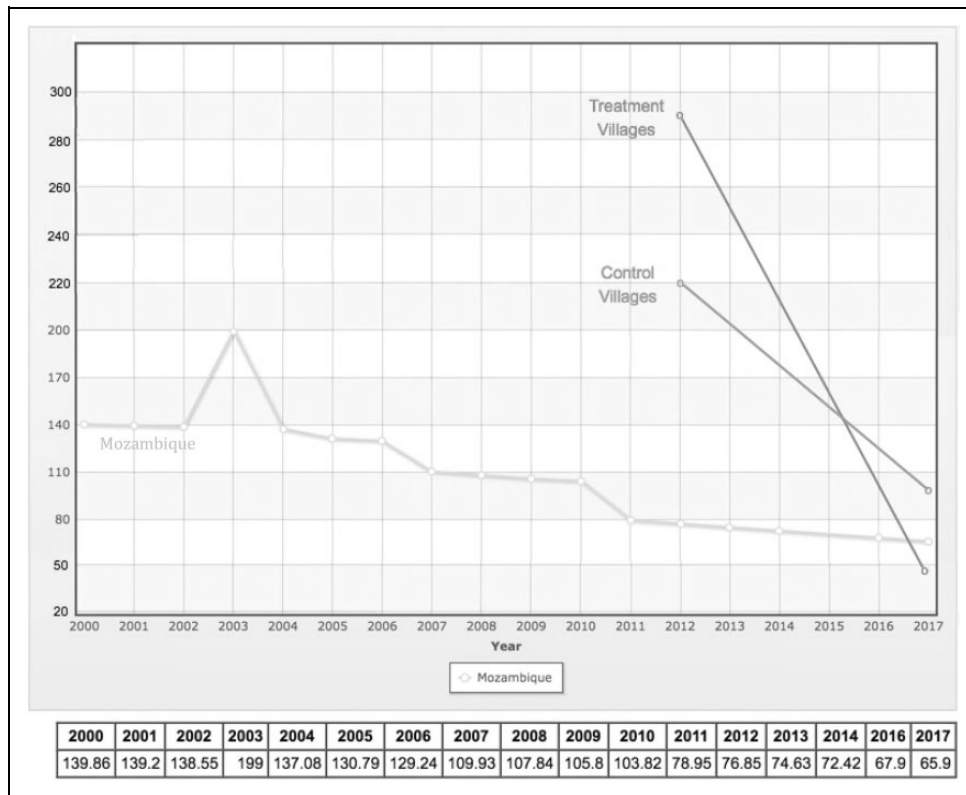


Figure 3. Changes in infant mortality rates compared by year.

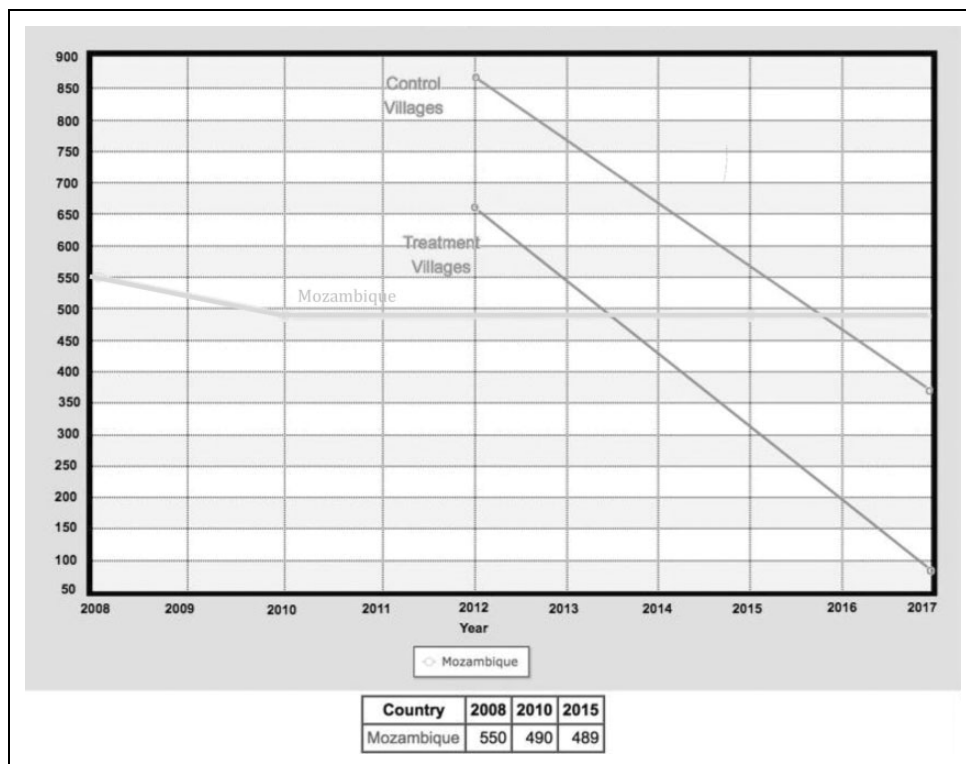


Figure 4. Changes in maternal mortality rates compared by year.

Appendix: FPP Comprehensive Household Assessment

Care for Life – Survey Form – Version 2012-06	
Community: _____ Zone ____ Survey# 1 2 3 4 5 6 7 8 9 10 11 Interviewer: _____ Date: _____ Own home <input type="checkbox"/> Renter <input type="checkbox"/> Guest <input type="checkbox"/> New Family <input type="checkbox"/> Previously surveyed family <input type="checkbox"/>	Office Use Only FPP No.: _____ Head of Household: _____ Age _____ M/F
Family Profile	
1. Is it a family with orphans?	Y <input type="checkbox"/> N <input type="checkbox"/>
2. Is this a family with vulnerable children?	Y <input type="checkbox"/> N <input type="checkbox"/>
3. Is this a family led by children (without adults)?	Y <input type="checkbox"/> N <input type="checkbox"/>
4. # of births since the last survey	
# of deaths in the last 6 months:	
5. birth to 11 months: _____	
6. 1 to 4 years old: _____	
7. Above 5 years: _____	
8. Was any death due to labor or childbirth? Y <input type="checkbox"/> N <input type="checkbox"/>	
9. Total # of persons that live in the house?	
Home Improvement and Sanitation	
10. Does the roof need repair?	Y <input type="checkbox"/> N <input type="checkbox"/>
11. Do the walls need repair?	Y <input type="checkbox"/> N <input type="checkbox"/>
12. Does the house have a safe/secure door?	Y <input type="checkbox"/> N <input type="checkbox"/>
13. Does the floor have cement or another covering?	Y <input type="checkbox"/> N <input type="checkbox"/>
14. Does the family have a latrine? (maximum of 3 families per latrine)	Y <input type="checkbox"/> N <input type="checkbox"/>
15. Does the family have a bathhouse?	Y <input type="checkbox"/> N <input type="checkbox"/>
16. Is the yard clean?	Y <input type="checkbox"/> N <input type="checkbox"/>
17. Does the family burn or bury all trash?	Y <input type="checkbox"/> N <input type="checkbox"/>
18. Does the house have some type of pest (e.g. cockroaches, mice, worms) ?	Y <input type="checkbox"/> N <input type="checkbox"/>
19. Does the family have a table for cooking dishes?	Y <input type="checkbox"/> N <input type="checkbox"/>
20. Is the yard free of stagnant water?	Y <input type="checkbox"/> N <input type="checkbox"/>
21. Does the house have a kitchen?	Y <input type="checkbox"/> N <input type="checkbox"/>
Income Generation	
22. Does the family have a small business?	Y <input type="checkbox"/> N <input type="checkbox"/>
23. Does the family have an income generation activity?	Y <input type="checkbox"/> N <input type="checkbox"/>
Food Security and Nutrition	
24. Did at least one meal everyday have vegetable or egg or fish or peanuts or meat?	Y <input type="checkbox"/> N <input type="checkbox"/>
25. Did the family harvest from the farm field last planting season?	Y <input type="checkbox"/> N <input type="checkbox"/>
26. Did the family harvest from the family garden last planting season?	Y <input type="checkbox"/> N <input type="checkbox"/>
27. If the family has a garden, what is the main produce? (mark just one answer) No garden <input type="checkbox"/> Lettuce <input type="checkbox"/> Tomatoes <input type="checkbox"/> Kale <input type="checkbox"/> Beans <input type="checkbox"/> Onions <input type="checkbox"/> Peppers <input type="checkbox"/> Cucumbers <input type="checkbox"/> Other <input type="checkbox"/>	
28. If the family has a farm field, what is the main produce? (mark just one answer) No farm <input type="checkbox"/> Rice <input type="checkbox"/> Sweet potatoes <input type="checkbox"/> corn <input type="checkbox"/> Cassava <input type="checkbox"/> Other <input type="checkbox"/>	
29. If the family has a farm field/ garden, what is the purpose? (mark just one answer) Don't have <input type="checkbox"/> Consumption <input type="checkbox"/> Sale <input type="checkbox"/> Both <input type="checkbox"/>	
30. If the family raises animals, what is the purpose? (mark just one answer) No animals <input type="checkbox"/> Consumption <input type="checkbox"/> Sale <input type="checkbox"/> Both <input type="checkbox"/>	
31. Where does the family get water? (mark just one answer) Well <input type="checkbox"/> River <input type="checkbox"/> Spring <input type="checkbox"/> Tap <input type="checkbox"/> Other <input type="checkbox"/>	
32. How does the family treat drinking water? (mark just one answer) No treatment <input type="checkbox"/> Chlorine <input type="checkbox"/> Boil <input type="checkbox"/> Filter <input type="checkbox"/>	

Psycho-Social-Spiritual						
33. Have there been any cases of violence in the family?	Y <input type="checkbox"/> N <input type="checkbox"/>					
34. Does any member of the family drink alcohol?	Y <input type="checkbox"/> N <input type="checkbox"/>					
35. Is the family active in any religious denomination?	Y <input type="checkbox"/> N <input type="checkbox"/>					
36. How do you think the life of your family will be next year? (mark just one answer) Worse <input type="checkbox"/> Stay the same <input type="checkbox"/> Better <input type="checkbox"/>						
37. How do you think the life of the community will be next year? (mark just one answer) Worse <input type="checkbox"/> Stay the same <input type="checkbox"/> Better <input type="checkbox"/>						
Health - Education - Income Generation (Ask each person in the family the questions below. Answer each question with yes or no, except # 38, 48, 55)						
Age and Gender	Person 1 ____ M/F	Persona 2 ____ M/F	Persona 3 ____ M/F	Person 4 ____ M/F	Persona 5 ____ M/F	Persona 6 ____ M/F
Full Name						
38. Relationship to head of household	Head of house					
39. Drinks treated water?	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
40. Washes hands after using latrine?	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
41. Washes hands before eating?	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
42. Sleeps under a mosquito net?	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
43. Eats 3 or more meals a day?	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
44. Registered with government?(Has gov ID)	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
45. Employed if over 18?	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
46. Attends school?	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
47. Literate if over 15 year old?	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
48. Marital status						
49. Tested for HIV?	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
50. Recieve health care from family members?	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
51. Had diarrhea in the last month?	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
52. Had headaches in the last month?	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
53. Had skin sores in the last month?	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
54. Person been coughing in the last month? 55. If yes, how many days?	Y <input type="checkbox"/> N <input type="checkbox"/> _____	Y <input type="checkbox"/> N <input type="checkbox"/> _____	Y <input type="checkbox"/> N <input type="checkbox"/> _____	Y <input type="checkbox"/> N <input type="checkbox"/> _____	Y <input type="checkbox"/> N <input type="checkbox"/> _____	Y <input type="checkbox"/> N <input type="checkbox"/> _____
56. Coughed up blood in the last month?	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>

Authors' Note

Angelea Panos conceived of the study, carried out the literature review, assisted in the drafting of the manuscript, and established initial relationships with Care for Life to do the outcome evaluation. Patrick Panos conducted the statistical analyses and assisted in student training, collection of data, and editing of the manuscript. Ruth Gerritsen-McKane participated in the training of students, collection of data, and drafting of the manuscript. Tiago Tendai participated in student training, data collection, and student recruitment and supervision. All authors have read and approved the final manuscript.

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