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Research Paper

Social outcomes of a community-based water, sanitation and hygiene intervention

Rossanie Malolo, Save Kumwenda, Kondwani Chidziwisano, Christabel Kambala and Tracy Morse

ABSTRACT

Social benefits of water, sanitation and hygiene (WASH) interventions are less documented compared to health benefits such as the reduction of diarrheal diseases. Although most decisions in WASH investments are based on potential health outcomes, interventions may also lead to social benefits, such as income generation, increased school enrollment, improved levels of dignity, self-esteem and civic pride, which can have a significant value both personally and to the wider community. This qualitative case study was used to assess the perceived social outcomes of purposively selected stakeholders from a WASH intervention study in Malawi. In-depth Interviews ($n = 10$), focus group discussions ($n = 4$) and key informants interviews ($n = 10$) were conducted with caregivers (male and female), community leaders, traditional leaders and community coordinators. Thematic analysis identified eight social outcomes: formation and strengthening of relationships ($n = 32$), becoming role models to community members ($n = 23$), women empowerment ($n = 20$), time-saving ($n = 17$), change of status ($n = 12$), receiving awards ($n = 12$), reduced medical costs ($n = 11$) and obtaining new skills ($n = 7$). Social capital among caregivers was also found to be high. No negative outcomes from the intervention were reported. WASH interventions have multiple, important, but difficult to quantify social benefits which should be measured, reported and considered in WASH investment decision-making.

Key words | community, hygiene, Malawi, sanitation, social outcomes, water

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HIGHLIGHTS

- Cluster-based and community-led WASH interventions can lead to positive social impacts, particularly for primary caregivers.
- Social benefits included improved relationships, role modeling, female empowerment, increased household funds, and skills development.
- WASH and other development programs should consider and evaluate the social impact of interventions routinely.

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BACKGROUND

For decades, public health specialists have advocated the importance of effective water, sanitation and hygiene (WASH) for the reduction of fecal-oral disease transmission (Cairncross *et al.* 2010). It is upon this basis that WASH investments have been primarily centered on the measurement of disease outcomes. However, WASH interventions do not always demonstrate the intended health impact, as seen recently in studies based in Kenya, Zimbabwe and Bangladesh (Pickering *et al.* 2019), and as such their cost-effectiveness has been called into question.

Despite the obvious value of improved health outcomes, there are less tangible social outcomes of improving WASH infrastructure and practices which should be considered. Studies related to the provision of both water and sanitation have reported an economic value from time saved in water collection and seeking safe places in which to defecate (Bartram & Cairncross 2010). Educational, developmental and gender-related benefits of WASH investments have also been highlighted as justifications to merit progress in this sector (Carter 2012; Schmidt 2014). Despite the recognition of these potential benefits, there is a dearth of information regarding such social outcomes, thus inadequate evidence to make their value visible to decision makers.

Resources are limited globally, and investments in WASH have to be cost-effective. The World Bank estimates that an additional USD 1.7 trillion is required to achieve Sustainable Development Goals (SDG) 6 (ensure the availability and sustainable management of water and sanitation for all) by 2030, and that some countries need to increase their financing in the sector by six times (Hutton & Varughese 2016). This is also the case in Malawi, where less than 0.5% of the national budget is allocated to WASH, falling far short of the eThekwini Declaration which obligates African governments to spend at least 1.5% of their Gross Domestic Product on the sector (UNICEF 2018). With these financing gaps, WASH governmental, non-governmental organizations and all other concerned bodies must carefully prioritize investing in WASH interventions that generate the greatest impact, including health benefits and beyond.

As such, this qualitative study explored social outcomes from a community-based WASH intervention to provide evidence to address this existing knowledge gap and to ensure informed decision-making by investors.

METHODS

Study design, setting and population

This qualitative study used a case study design to ensure that findings were grounded in participants' experiences and to allow the exploration of social outcomes within the study context (Kosinski *et al.* 2016). The study was conducted in Traditional Authority (TA) Ngowe, in Chikwawa District, southern Malawi (Supplementary Material, Figure S1). The study used a population from within a treatment group which participated in the 'Hygienic Family' intervention from January to October 2018 (Morse *et al.* 2019). This treatment group received a behavior-centered intervention that focussed on handwashing with soap at critical times, food hygiene, human and animal feces management and collection, storage and the use of household water (Morse *et al.* 2020). The intervention was implemented through cluster meetings and household visits facilitated by study and community coordinators with support from government community health workers known as Health Surveillance Assistants (HSAs). The study population (treatment arm) had 400 households, which were grouped into 20 clusters of 15–25 caregivers. Activities in the cluster meetings (fortnightly) included demonstrations, joint learning, social support and commitments, while household visits took place on alternate weeks for verification and one-to-one support. Households received prompts and nudges to support behavior change activities (e.g. bracelets, posters, and buntings) and were rewarded with hygiene consumables for good performance (e.g. soap).

Participant selection and data collection

Using the RANDBETWEEN function in Microsoft Excel, the researcher randomly selected five out of 20 clusters from TA Ngowe. A total sample of 62 participants were purposively selected from the selected five clusters. Twenty-two child caregivers (female) who had participated in the

intervention, and 20 men (husbands to the child caregivers) were selected to participate in four focus group discussions (FGDs), which were split by gender with 8–11 participants in each (Guest *et al.* 2017). FGDs participants were from two of the five selected clusters. Subsequently, 10 child caregivers from the selected clusters participated in the in-depth interviews (IDIs), to drill down on issues identified in the FGDs, and enhance the richness of the discussion findings. Ten community stakeholders participated in key informant interviews (KIIs), which included chiefs ($n = 4$), community coordinators ($n = 5$) and one HSA, all of which were associated with the selected cluster group areas. FGDs and interviews conducted were deemed as sufficient as they reached the saturation of responses (Dworkin 2012). Data were collected in December 2018 by four experienced and independent qualitative facilitators who had not participated in the intervention. Interview and FGD guides in Chichewa (local language) were used, and discussions were recorded using voice recorders. The interviews lasted 30 min to 1 h. All interview and FGD guides focussed on perceived social outcomes and negative outcomes of the WASH intervention. In addition to social outcomes and negative outcomes, data collection also sought to measure social capital among the child caregivers, through thematic analysis and the use of the Schutte scale (Schutte 2018). Social capital was only measured among caregivers to determine if the structure of the intervention with cluster meetings and households' visits had impacted these individuals. Five social capital indicators were measured: the strength of the relationship among child caregivers and common interest, willingness to help one another, trust, child caregiver satisfaction with their friendships and sharing of the same values. Social capital indicator-containing statements were read aloud one by one by the facilitator, and child caregivers were asked to rate each one between 1 and 11 by moving the pointer to their opinions using a visual scale (Schutte 2018).

Data analysis

Audio-recorded data from FGDs, IDIs and KIIs were transcribed, translated from the local language to English and checked for accuracy by the researcher. Over the course of multiple listens, analytical notes and thoughts were noted down for later reference during analysis. Subsequently, all full English transcripts underwent deductive coding using the NVivo software (V12, QSR International). Themes were identified, reviewed and examined further. Frequencies of identified social outcome themes were visualized in Microsoft Excel V16 and supported with contextual quotations and representative of key discussion points. Social capital was analyzed in two ways: (1) by the existence of three social capital indicators or proxies (unity, trust and working together) through thematic analysis of IDIs, FGDs and KIIs and (2) data from social capital questions associated with the Schutte scale were entered to Microsoft Excel (V16) for analysis. The child caregivers' social capital was calculated by finding the individual and overall means for the five social capital questions in each group. Mean figures between 1–4, 5–8 and 9–11 meant low, medium and high levels of social capital, respectively, among caregivers. These data were visualized in radar charts for further interpretation. Findings from the Schutte scale were compared to social capital indicators identified in the interviews and discussions to ensure consistency.

Ethics

The study (P.11/18/2551) was reviewed and approved by the University of Malawi College of Medicine Research Ethics Committee (COMREC). Informed consent was obtained from respondents to voluntarily take part in the study.

RESULTS

In total, we conducted 10 IDIs, 10 KIIs and 4 FGDs ($n = 44$ participants) across two clusters. Three clusters did not participate due to accessibility constraints during data collection in the rainy season. Overall, eight social outcomes were reported by child caregivers who participated in the intervention (Figure 1). Female child caregivers reported more social outcomes ($n = 8$) followed by the male participants ($n = 6$). Furthermore, community coordinators and chiefs reported five social outcomes each, and HSAs identified three (Figure 1). The majority of respondents indicated improved relationships, being role models and female empowerment as social outcomes. Study participants also described the building of social capital, with no negative or null outcomes reported.

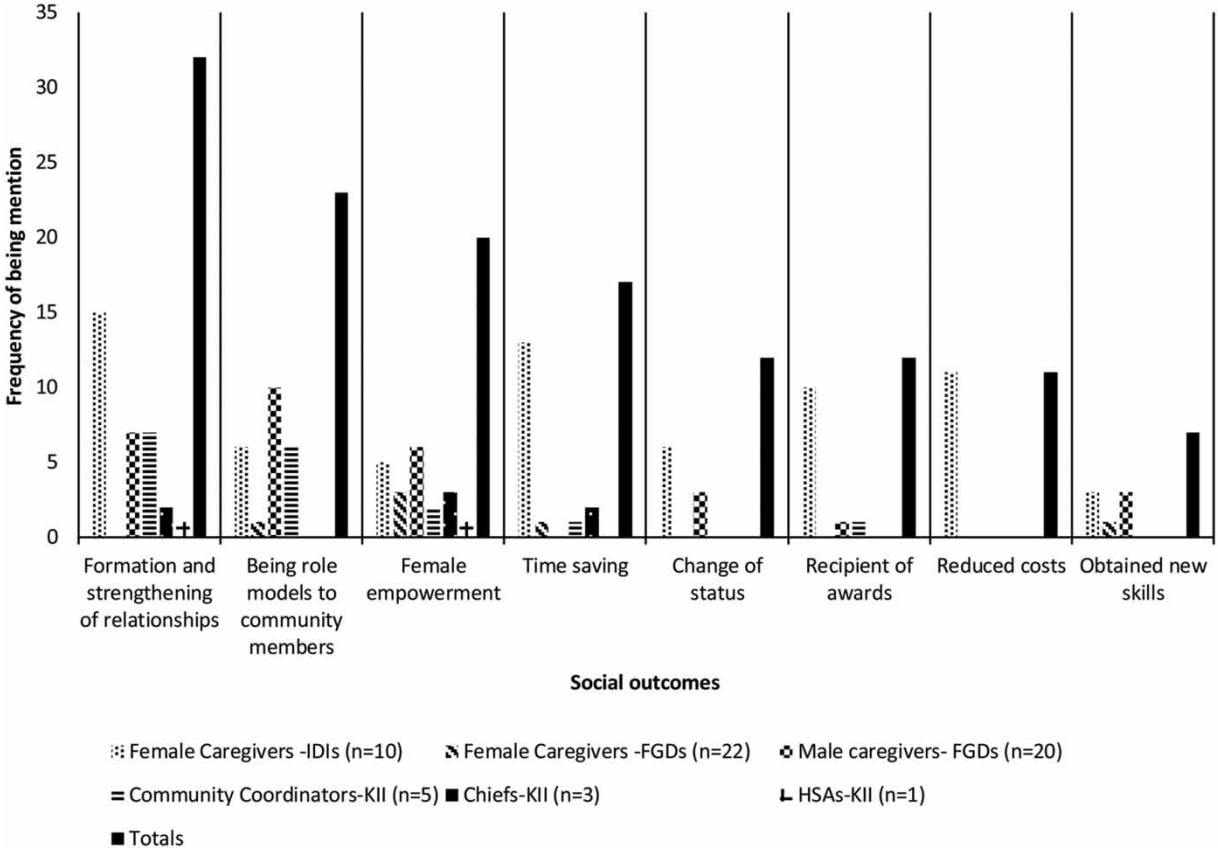

Figure 1 | Summary of reported social outcomes from participation in WASH intervention.

Formation and strengthening of relationships

All groups mentioned the formation and strengthening of relationships as a social outcome of the study. They described how the project enabled them to make new friends and to strengthen existing relationships, giving caregivers the chance to associate with, as well as learn from one another. Friendships play a huge role in mental health; it can prevent people from having mental stress, support them to live with or recover from mental illnesses. It also provides support during difficult periods for community members, prevents loneliness as well as increases their sense of belonging and purpose.

> '*Before this project came, I used to stay alone and chat with my family only but now I am able to go to meetings and chat with other women as well as teaching each other.*' (IDI, female caregiver – Mwananjobvu 1 cluster).

The strengthening of relationships among caregivers was also highlighted by the HSA who stated that '*women have benefited a lot; some were not in good terms with their friends but that has helped them reconcile because they were working together*' (KII, HSA– Malikopo cluster).

Relationships were established and strengthened because of the additional time caregivers spent together, communicating and sharing what they had learnt during cluster meetings.

Being role models to community members

Five out of the six groups mentioned being role models to other community members as another perceived social benefit. It was reported through the IDIs, female and male FGDs and KIIs with the community coordinators, that other community members who were not recruited in the WASH intervention were inspired by the actions and hygienic practices of

households who did participate in the intervention. This led to nonparticipating households learning from them and implementing some hygienic practices as well.

Participants gave examples such as the following:

'*… this project is happening only in this area but if we can go around other households, which are not in the project, you will see that a lot of the hygienic things which we are doing here are happening there also despite the fact that they are not being taught.*' (FGD, male participant – Malikopo cluster).

Female empowerment

Despite that the intervention activities focused on all household members, women were motivated to undertake activities that they previously thought were too difficult to do on their own or that could only be done by men. For example, women were able to construct hygiene facilities, such as dish racks, toilets and handwashing facilities, which were previously perceived as 'a man's job'.

'*Through this project, I was able to mould bricks on my own, my friends helped me with water, and I did the moulding of bricks for my toilet. I also made my own dish rack.*' (IDI, female caregiver – Mwananjobvu cluster 2).

Some male participants and leaders acknowledged that women were able to build infrastructure, which is traditionally seen as a man's role. Despite the fact that the intervention targeted the whole family, some men refused to build infrastructure or were not around to do so:

'*As for me, it's my wife who constructed the dish rack, I was away.*' (FGD, male participant – Mwananjobvu 1 cluster).

Time-saving

Intervention beneficiaries reported that the project allowed them to save time. They reported that due to changes in their behavior, diarrheal disease in children had reduced. As a result, the time that would have otherwise been spent taking care of sick children or going to the hospital was used for other activities such as farming. Time-saving was not mentioned by HSAs or husbands, which may be indicative of the fact that the majority of household chores and caring fall on female household members.

'*It has brought me the opportunity of time because when a person has diarrhea you can't be able to work, you won't have the time to work, even the farm stops functioning and all household chores stop, and so after the start of this project am free to do so much because I can go to the farm and come back in good time.*' (IDI, female caregiver – Mwananjobvu 1 cluster).

There were no comments inferring that undertaking hygiene activities took up additional time at the household level.

Change of status

Caregivers indicated that they had gained a position of prestige as a result of participating in the WASH intervention. Fellow community members see them as hygienic people now; they were being called by the project's name, i.e. 'Hygienic family'.

'*… they gave us a name when I go to the borehole, they say "a hygienic family lady" we are just famous with that name.*' (IDI, female caregiver -– Mwananjobvu cluster 1).

'*They call us "a Hygienic family" because they see our homes are clean every day now.*' (IDI, female caregiver – Khukhumba cluster).

Male participants reported that as a result of the hygienic behaviors at home, they feel proud of their houses to the point that they would welcome visitors or allow them to stay over:

'*With the coming of SHARE (Hygienic Family) things are very good now in my house. In the past receiving visitors would make me feel uncomfortable but nowadays I feel proud of it because now I have everything starting from toilet to tippy taps.*' (FGD, male participant – Malikopo cluster).

Recipient of awards

Study participants identified awards from the implementing partners as a social benefit. They reported receiving various awards, such as spoons, cups, plates and baskets, during project implementation; all this motivated them to perform the recommended behaviors. These 'awards' were associated with progress made by caregivers and were only provided to those who attended meetings and were making progress on hygiene practices at home. These items were selected to support specific hygiene improvements. Awards were mentioned by caregivers involved in IDIs, Community Key Informants (CKI) and husbands.

'*It (the project) has been giving women awards such as baskets, cups, plates, spoons and soap. Another thing was also the time the women were being visited in their households; this has also been an encouragement to them to work hard in their daily hygiene practices.*' (KII, CKI – Mwananjobvu 1 cluster).

Reduced costs

Costs associated with obtaining medical care were reduced because of the reduction in diarrheal disease in their children. The money for medical care through buying drugs and transportation was saved and used for other activities as well as for purchasing items such as bicycles. Only caregivers mentioned this benefit:

'*This project has helped me to use my money wisely because before the project started money was being misused, when the child gets diarrhea it means the money will be used to go to the hospital, but when the project came the money is being used in a better way.*' (IDI, female caregiver – Mwananjobvu 1 cluster).

'*It has helped me, I didn't have a bicycle, with the elimination of the diseases I have been saving money to the point I now have a bicycle. … household development is improving, because of this project. We are able to be saving money and develop ourselves.*' (Female caregiver – Mwananjobvu 2 cluster village).

New skills

Study participants indicated that they have gained new skills through the project activities, which they were exposed to, and particularly gained skills associated with the construction of hygiene facilities as well as empowering peers.

'*… I am able to make an indoor dish rack for storing utensils, food and storing things on raised surfaces. I didn't know how to do this before. Even these tippy taps, I have learnt how to construct them through the SHARE (Hygienic Family) project. We have really learnt a lot.*' (FGD, female caregiver – Mwananjobvu 1 cluster).

Social capital among caregivers

Study participants reported three social capital indicators as some of the perceived social outcomes: unity, trust and working together. Caregivers indicated that the cluster meetings gave them time to interact, develop trust and realize that they were stronger working together than individually.

'*… most of the times we are together, we meet often. We don't consider our differences. Actually, when we are having our discussions, we give each other varying ideas and correct each other if need be.*' (IDI, female caregiver – Mwananjobvu 1 cluster).

This sense of unity between participants was also noted by extension workers. The government extension worker stated: 'the other thing is that many people's lives have been changed, it has brought unity among the people, and they know that they need to be working together. If possible, you should take this project to other areas so the people can learn also' (KII, HSA – Malikopo cluster).

Trust among caregivers has also improved:

'*In the past I wouldn't leave my child with anyone in this group. But now I can because things have changed, I don't doubt them.*' (IDI, female caregiver – Mwananjobvu 1 cluster village).

Furthermore, improved cleanliness and a relief from sickness have also brought happiness among study participants:

> '*This project has helped me a lot, I am living a happy life now. Our health is good now, no more frequent diseases no diarrheal diseases and we are living happily.*' (IDI, female caregiver – Khukhumba cluster).

As a result of disease reduction, there is unity in their families and marriages have been strengthened: 'When a child is sick in a household, there is no unity. Often, we blame each other when a child gets sick. Now my child is healthy and is not getting sick often. Even my marriage is stronger now' (IDI, female caregiver – Malikopo cluster).

In both villages where social capital was measured, all indicators obtained a score above 9 (Mwananjobvu = 9.5; Malikopo = 9.3) Figure 2). Caregivers shared the same values, were willing to help each other, were satisfied with their friendship and were in a supportive relationship. Trust among them was also revealed to be high, which correlated with the findings of the thematic analysis.

Negative outcomes of the WASH intervention

Study participants were asked if they had experienced any negative social outcomes from their participation in the WASH intervention; however, none were raised.

> '*There are no negative effects that we have experienced from this project, everything is good. For example, teaching us baby feeding and washing hands with soap.*' (FGD, female caregiver – Malikopo cluster).

> '*Speaking the truth, I don't think this project has brought any bad outcome, if it was so we would have heard from the women. This project has brought several good things. I shouldn't lie about the bad consequences, if they were there I would have said.*' (KII, Male Group Village Head – Mwananjobvu cluster).

DISCUSSION

This study was exploring social outcomes of participating in a WASH intervention. Findings indicated eight social outcomes and identified high levels of social capital among caregivers.

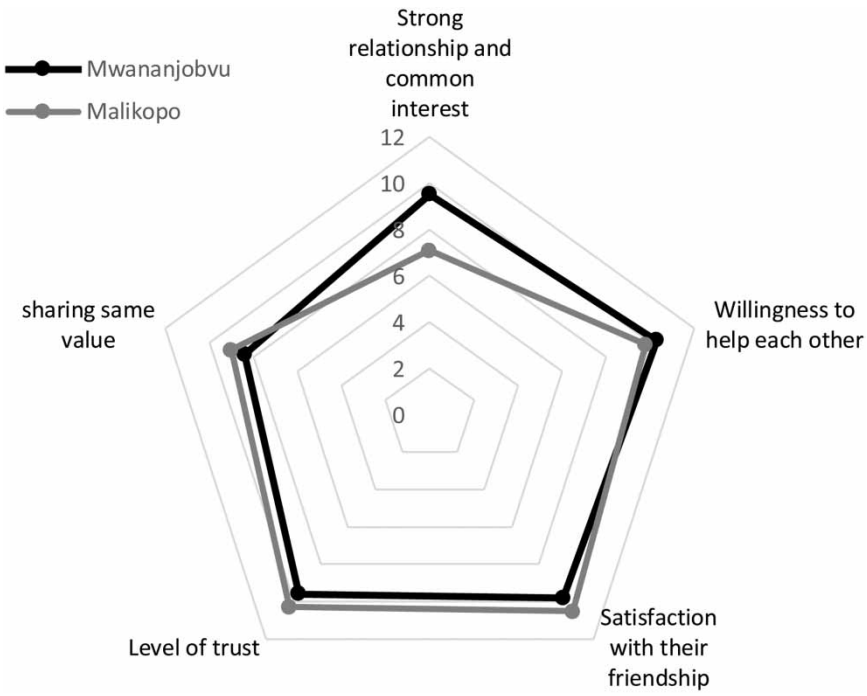

Figure 2 | Mwananjobvu and Malikopo clusters mean social capital scores (mean figures 1–4, 5–8 and 9–11 represent low, medium and high social capital, respectively).

No negative outcomes were reported. This could be attributed to the approach of intervention delivery used (inclusive behavior-centered design with social support), as reported unintended or harmful outcomes of WASH interventions are usually related to the approach of implementation (Divon & Bergstrøm 2012; Chowns 2015; Loevinsohn *et al.* 2015). Findings from the current study identified some perceived social outcomes arising from the intervention delivery approach used. We found that attending cluster meetings facilitated caregivers to find new friends and strengthen existing relationships. Similar sentiments were noted in another study, where group activities allowed people to know each other better (Gugglberger *et al.* 2017). Such friendships in the community are likely to prevent associated indirect health consequences which contribute to mental health issues (e.g. depression), as people tend to rely on and support each other.

The Hygienic Family intervention motivated community members who were not recruited in the study to also adopt other practices and construct WASH facilities promoted by the intervention such as tippy taps and dish racks. This shows that behaviors are transferable and can be learnt, and it agrees with a school WASH study in Cambodia which found that healthy hygiene habits were transferred from children to their families, friends and wider communities (Duijster *et al.* 2017). It also suggests that the use of behavior change-centered approaches, such as Risk, Attitudes, Norms, Abilities, and Self-regulation (RANAS) (Mosler 2012) (as used in this intervention), can bring about community-wide behavior change and sustain hygienic behaviors.

Community development programs can have long-term impacts on female empowerment, particularly in taking decision-making roles at the household and community level (Bashir & Zafar 2018). As we have documented in this study, women felt empowered when they had control over their resources to meet their WASH needs. Caregivers obtained skills and were able to undertake traditionally male-allocated tasks, such as the construction of WASH facilities, where men were not willing or able to support household improvements. Although small, this empowerment of women in daily aspects of life enables them to make choices and transform these into desired actions and results, and in so doing, they take control of their own lives, gain skills, develop confidence in themselves and solve problems (Jong & Sultana 2015). Women's ability to make WASH facilities on their own was also one of the potential solutions to harassment or violence; the use of shared toilets or practising open defecation makes women vulnerable to harassment or violence. On the other hand, other authors have argued that empowerment of women may lead to 'improper behaviors' (from the male perspective) in the family, while their power of decision-making distorts the balance of power in the family (Gholipour *et al.* 2009). These negative perceptions were not raised in our sample; however, even with the potential downside of female empowerment, the ability of both male and females to take action could help in increasing the availability and accessibility of WASH facilities.

Also, the results of this study revealed that due to the reduction in diarrheal disease (both real and perceived), participants were less burdened with the time needed to take family members to the hospital or care of them when sick and were able to spend more time on other activities such as farming. The burden of caring for relatives made sick by poor WASH infrastructure and practices primarily falls to women, thereby reducing their access to opportunities (United Nations Water 2018). Hence, women are likely to use the freed time for other activities, such as childcare, domestic hygiene, food preparation, carrying out income-generating activities or relaxing (Jansz & Wilbur 2013). Having time to relax is likely to reduce stress and contribute positively to mental health. Furthermore, previous studies have indicated that in rural areas, an episode of diarrhea illness (excluding lost time) can cost a household more than their monthly income: $19.16 and $1.81 for inpatient and outpatient treatment, respectively (Hendrix *et al.* 2017). As such reduced medical care costs for household members and women's opportunities for income generation can lead to improvements in household finances allowing for economic development and control (Jansz & Wilbur 2013). Such financial implications contribute to not only their livelihood but also wider community development.

WASH interventions also have the potential to change people's status in a society (Mosler 2012). Improved household hygiene resulted in an increased status within their communities, a result which has been recorded elsewhere (Sida 2015). Because of the status change to 'Hygienic Families', caregivers felt comfortable hosting visitors in their houses and gained confidence from friend and visitor compliments. Poor

hygiene can play a significant role in how we feel about our homes, can leave us feeling anxious and can affect us mentally (Carter 2012). As such caregiver's mental health is likely to improve with improvements in hygienic practices.

During the intervention, participants were given various tools to encourage hygienic practices in the form of nudges, prompts and awards. These items, such as bracelets, certificates and buntings, contributed to significant changes in hygiene practices like handwashing with soap, as they supported and prompted caregivers to undertake target activities (Chidziwisano *et al.* 2020). Various WASH interventions have also used competitions and awards as ways of delivering the intervention and motivating participants to adopt healthy behaviors by reinforcing norms and supporting habit formation (Biran *et al.* 2014).

In the Hygienic Family WASH intervention, caregivers belonged to specific clusters based on their place of residence and were meeting once a fortnight, a format which was developed to help develop social capital and maintain networks between caregivers. The social capital seen in these groups is higher than previously reported in Chikwawa District, where women were reported to have lower social capital with regard to willingness to support each other and felt they had little influence over decisions at the household and community level (Rippon *et al.* 2018). The current study indicated that building caregiver networks improved their trust levels, unity and ability to work together. Trusting relationships and social support networks create benefits for community members, giving women the confidence to promote behavior change, and providing communities with coping strategies to address the daily challenges (Rippon *et al.* 2018; Morrison *et al.* 2019). This suggests that group interventions can work to build social capital in communities.

Our study has limitations: having no baseline data for existing social outcomes means that there was no basis for comparison. However, as these results are based on community members' perceived benefits, we believe this does not affect the findings. Social capital baseline measurements would have been preferable. However, we have utilized the same tools as a previous social capital insight study implemented in the same District and are therefore confident of drawing the comparisons outlined. We also acknowledge that we only sampled a small proportion of the households who took part in the intervention. However, our in-depth discussions with this population and data analysis found consistent themes and reached a point of saturation with responses. As such are confident that the data presented here are robust and representative of the wider study population.

CONCLUSIONS

WASH interventions have social outcomes which can have economic, developmental, and societal implications. The use of group-based intervention models, which create social capital, can contribute to female empowerment, supporting not only an increase in the accessibility of WASH facilities but also bringing about positive social norms and sustain hygienic practices. Therefore, impact evaluations of interventions should always assess social outcomes, and WASH decision makers should consider them as a valuable factor in WASH investment decision-making. Further studies should consider assessing the social benefits before and after intervention implementation.

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AUTHOR CONTRIBUTIONS

Planning of the study and development of methodology were done by R.M. with supervision from T.M. and S.K. The data analysis and writing of the original draft was done by R.M. Reviewing and editing were done by T.M., K.C., S.K. and C.K.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

All relevant data are included in the paper or its Supplementary Information.

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