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Article

Community Engagement and Collaboration between Researchers and Community Stakeholders for Schistosomiasis and Malaria Projects in Ingwavuma, uMkhanyakude District, KwaZulu-Natal

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Abstract: Community engagement involves five phases: informing, consulting, involvement, collaboration, and empowerment. This study explored the experiences of community stakeholders during the collaborative phase of community engagement co-developed by researchers and community members for the implementation of projects. The study was carried out in uMkhanyakude District, South Africa. A qualitative case study approach was used to explore the collaboration phase. Data was collected from key community stakeholders through key informant interviews, focus group discussions, and direct observations. The findings indicated that village headmen, community advisory board members and community research assistants can collaborate as trustworthy partners to address community health challenges. Community research assistants complement the role of participatory-based research appropriately, as they get to be involved hands-on together with the researchers. However, despite the significant role community research assistants played in the projects implemented by the KwaZulu-Natal Ecohealth Program, maintaining collaborative relationships was marred with unforeseen difficulties due to many barriers which included stretched work hours, lack of breaks, miscommunication around compensation, inappropriate behavior from the research team, and humiliation/oppression over language. Initiatives for community-based participatory research have proven to be effective as a collaborative approach that combines methodical research, involvement, and action to address health-related problems. However, it is necessary to consider the local socio-cultural aspects that could lead to barriers and misunderstandings between the locals and the researchers. Collaborative partnerships should ultimately result in community empowerment.

Keywords: community engagement; collaboration; KEP researchers; headmen; community advisory boards

1. Introduction

Community engagement (CE) on health issues is more than community participation. It is a process of developing relationships that enable stakeholders to work together to address health-related issues and promote well-being to achieve positive health impact and outcomes [1,2]. CE is also defined as a process of working collaboratively with groups of people who are affiliated by geographic proximity, special interests, or similar situations, with respect to issues affecting their well-being [3]. Therefore, successful community engagement requires goals that are based on community needs, beliefs, and values; external financial and technical resources; women's

involvement; and positive relationships between the community and professionals/researchers [4].

However, quite often some community partners rely on researchers to address their problems. This may present challenges related to ethics, trust, and cultural sensitivity. Many projects fail due to the non-involvement of community stakeholders which causes a lack of basic knowledge about the project and communities become a bit more docile and apathetic [5]. Engagement and collaboration between researchers and community stakeholders is crucial for the success of projects as researchers can gain valuable insights, local knowledge and support that can enhance the effectiveness and impact of their interventions [6]. Hence a critical engagement method is preferred to improve collaboration in engagement projects [7]. This critical engagement method resides in a critical theory paradigm that enables the researcher to examine a social phenomenon and establish what is wrong and who can solve it in bringing about change in society [8]. This concept advocates for social justice and equality.

Building formal partnerships for frequent collaborative work between rural communities and researchers can be difficult. On the other hand, engaging the community to participate in projects is particularly challenging due to the nature of projects with complex methodologies such as conservation which is a type of work that requires specific skills, a lengthy experience, particular infrastructures, and arguably extensive time and money [4]. The collaborative arrangements therefore require the pooling of various resources, knowledge and expertise [9].

In this context, the term 'collaboration' is an active relationship between the community and academic investigators on funded research. WHO defines collaboration as partnering with the community in each aspect of the decision-making process, including the development of alternatives and the identification and delivery of the preferred solution [1]. These definitions are related to other authors who define collaboration in relation to governance "*as a governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or management public programs or assets*" [9].

In collaborative partnerships, challenges are mostly observed in the academic research process as well as in fulfilling research roles and issues of rurality and culture [10]. However, a collaboration between researchers and community members, many of whom benefit from the research, and involving community partners in every stage of the study is essential for the success of community-based participatory research (CBPR) [11]. A study revealed that communities that are not actively involved in the initial stage of the project can create a high rate of resentment, suspicion and conflict during implementation. This means that community stakeholders may lack trust and be skeptical of the project initiatives and outcomes, and this may also hinder effective collaboration and community engagement [5].

It is well recognised that CBPR is a part of the ongoing social research initiative to move beyond disciplinary borders and towards interdisciplinary collaborations [12]. Health researchers and practitioners have used CBPR to address health inequities and community empowerment for health promotion [13]. Various limitations such as budget, deliverables, and milestones set with funders and project investigators can affect how and to what extent these collaborations can be implemented in practice [14]. There are concerns regarding top-down methodologies used by researchers while conducting research projects in rural settings, as well as the lack of community collaboration and involvement in studies intended to improve their circumstances [15].

In community collaboration, many things are taken for granted such as knowledge, know-how and methods to use. This is likely to occur in terms of social status and power relations between researchers and community members, which could also potentially harm these relationships [14]. For instance, it should not be assumed that power structures might not impede community engagement and collaborative relationships. Although hierarchies between researchers and communities can be broken down, research project decisions can be democratic, and community expectations can be fulfilled [14].

There is limited empirical evidence regarding the factors that contribute to the success of CE in biomedical research [16]. Little is known about how communities in rural settings collaborate on research projects. Previous research has suggested in order to establish effective policies concerning vector-borne diseases, there must be a collaboration between multiple agencies and communities at risk [17]. Furthermore, these authors argued that further evidence through research is needed in the form of reflections from researchers and community members engaging in participatory approaches [17].

Therefore, this article presents the experiences of community stakeholders who partnered with KwaZulu-Natal Ecohealth Program (KEP) researchers to plan and execute research projects intended to reduce the burden of schistosomiasis and malaria. The article may be useful to researchers and community members who are interested in forming, sustaining, and enhancing collaborative partnerships with community members for the purpose of research to address priority community concerns through community-based participatory research.

2. Materials and Methods

Theoretical framework

As shown in Table 1, this paper is based on a CE framework comprised of i) a community-oriented approach ii) a community-based approach iii) a community-managed approach v) a community-owned approach in line with the Community Engagement

Vancouver Coastal Health framework (www.vch.ca/ce). The stages include a) Informing the community, b) Consulting the community, c) Involving the community, d) Collaborating with the community and e) Empowering the community.

Table 1. Approaches to community engagement. Adapted from WHO [1].

Level 1	Level 2	Level 3	Level 4
Community-oriented approach	Community-based approach	Community-managed approach	Community-owned approach
The community is informed and mobilized to participate in addressing immediate short-term concerns with external support.	The community is consulted and involved to improve access to health services and programmes by locating interventions inside the community with external support.	There is a collaboration with leaders of the community to enable priority settings and decisions from the people themselves with or without external support.	Community assets are fully mobilised, and the community is empowered to develop systems for self-governance, establish and set priorities, implement interventions and develop a sustainable mechanism for health promotion with partners and external support groups as part of a network.

Using this framework, we actively engaged the community at various levels of participation, ranging from informing, consulting and involving to collaborating and empowering, ensuring that everyone had a voice and a role to play in the project. The Vancouver framework emphasizes the importance of community engagement, highlighting the value of public participation and the right for everyone to have a voice in decisions that impact their healthcare [18].

Study setting

The study was conducted in five villages (Ndumo, Mbadleni, Mgedula, Madeya and Makhane) in the Ingwavuma area of uMkhanyakude District, the second largest District in the KwaZulu-Natal province, South Africa. This underdeveloped area is near the Ndumo game reserve and shares a border with Mozambique and Swaziland. This area has relatively little infrastructure; the road system is currently being developed, and most of the area is only accessible by gravel roads. Schools in the villages are widely spaced and provide the barest necessities, with the majority lacking access to running water. The town of Ingwavuma is located in a low-lying area that is characterized by hot temperatures, still and slowly moving water bodies, and low humidity [19]. Due to its geographic location, the area is vulnerable to vector-borne diseases (VBD), particularly schistosomiasis (bilharzia) and malaria. The area, which is endemic to many diseases and has poor levels of education is plagued by poverty [19]. These issues suggest that a broad and inclusive approach to community health education is required in this area. The study area is served by Mosvold, a district hospital, which also oversees two clinics (Mbandleni and Ndumo) that are part of Jozini Municipality. The five villages involved in MABISA research are depicted on the map (Figure 1) as having numerous primary schools nearby.

The KwaZulu-Natal Ecohealth Program (KEP) overview

The KwaZulu-Natal Ecohealth Program (KEP) has been working in Ingwavuma since 2014 when the MABISA (Malaria and Bilharzia in Southern Africa) project was initiated. The KEP conducted research projects, in uMkhanyakude, intended to lessen the impact of these VBDs. Previously KEP initiatives in the area included MABISA and TIBA-SA (Tackling Infections to Benefit Africa-South Africa) projects, which started in 2014. These two projects focused on bilharzia and malaria and adopted Ecohealth approaches. Key to KEP's success has been the establishment of a governance structure and operations strategy that involves the community to ensure that the community fully participates in MABISA/TIBA-SA projects. This was established during the first phase of CE, which is the Informing phase [18]. A 12-member Community Advisory Board (CAB) comprising one headman (induna), two community leaders, three school board members, three community caregivers and three ordinary community members was established at the inception of the MABISA project and is functional to date. The headmen (izinduna) are the elected gatekeepers with authority over villages and are accountable to the chiefs, the tribal council and their community [20]. Throughout this paper, the term Ecohealth will be used, which commonly involves promoting the health of humans, animals and ecosystems, including environmental sustainability and socioeconomic stability and conducting research that acknowledges the inextricable connections between the health of all species and their environments [21].

Design and sample

A cross-sectional design embedded with a mixed-methods approach was employed using In-depth Interviews (IDIs), Focus Group Discussions (FGD) and Direct Observations (DO) to critically analyse the experiences of community stakeholders in collaborative partnerships on CE processes during the implementation of KEP projects. These three approaches are common methods used and are appropriate, particularly in healthcare research [22]. It is advantageous to combine two or more qualitative methods for data collection as that allows complementarity and increases the trustworthiness of the study [23]. A total of 4 FGDs and 34 participants for IDIs, comprising Community Research Assistants (CRAs), Community Advisory Board (CAB), headmen (who are members of the tribal council), Community Caregivers (CCGs) which are currently known as Community Health Workers (CHWs) and school principals, as indicated in (Table 2) were purposively selected and interviewed based on their involvement in CE activities and their knowledge about Ecohealth projects implemented in the study area. The existing relationship between the KEP and the community of Ingwavuma was used to select study

participants. The authors identified possible important stakeholders using the stakeholder analysis matrix (SAM) method and categorised them into different segments according to their level of interest and influence to achieve the study objectives [24] (also see Table 3). FGDs consisted of 9 to 12 participants per group with a mix of genders and different age groups. There were no incentives or tokens (compensation) given to participants. FGDs and IDIs were conducted at Mosvold Hospital in Ingwavuma. The CAB and CRAs played a crucial role in promoting the concept of community change agents for the prevention and control of vector-borne diseases.

Table 2. Distribution of key informants and number of interviews conducted.

Key Informants	In-depth Interviews (IDIs)	Focus Group Discussions (FGDs)	Total Number of Participants (IDIs and FGDs)
Community Research Assistants (CRAs)	7	1 FGD = 8 participants (1 man, 7 women)	15
Community Advisory Boards (CABs)	6	1 FGD = 8 participants (3 men, 5 women)	14
Headmen	3	0	3
Community Health Workers (CHWs)	2	2 FGDs = 20 participants (6 men, 14 women)	22
School Principals	4	0	4
TOTAL	22	4	58

The researcher also used an observational protocol for recording participants’ information (such as portraits, a description of physical settings, and accounts of particular events, or activities) while observing. The researcher's personal thoughts, including "speculation, feelings, issues, ideas, hunches, impressions, and prejudices," were also recorded through reflective notes [25]. Author 1 was an independent researcher who collected the data with the assistance of CRAs. The two authors (Author 1 & Author 2) led the CE evaluation of this paper, Author 1 was the second author’s PhD student; Author 2 is the principal investigator of the KEP. Participants shared their experiences of engagement activities during the implementation of projects and indicated the opportunities and challenges they encountered. Ethical clearance was granted for this study prior to data collection. Data collection took place between May and December 2021. Written consent was obtained from each individual who participated in this study. Interviews were conducted in isiZulu and later translated into English by Author 1. For IDIs that lasted between 40-60 minutes, a semi-structured interview guide was developed. With the participant’s consent, the interviews were digitally recorded and/or notes written on paper.

Table 3. Stakeholder Analysis Matrix.

Stakeholder Name	Impact <i>How much does the project impact them?</i> (Low, Medium, High)	Influence <i>How much influence do they have over the project?</i> (Low, Medium, High)	What is important to the stakeholder?	How could the stakeholder contribute to the project?	How could the stakeholder block the project?	Role/function in collaboration
Village Headmen	High	High	Maintaining and sustaining collaborative partnerships that have been established with the KEP research team.	Organize community meetings and activities in villages to disseminate schistosomiasis research findings.	Rejecting the study and denying Gatekeeper approval.	Village headmen are the main points of contact for the entire community. They are in charge of all traditional matters pertaining health and safety of local people. The headman (Induna), who in turn reports to the great King (Isilo), provides reports to the Chief (Inkosi).
Community Advisory Boards (CABs)	High	High	Gather the community members for meetings and grant researchers' permission to enter their villages and conduct research.	Informs community members about new health trends and issues in their area by coordinating the dissemination of information to community members through the village headmen.	Discouraging the community from taking part in the KEP research projects.	CRA's are used to mobilize the community members on behalf of the researchers to come and participate in learning activities that can promote health and reduce the burden of the disease among the community members
Community Research Assistants (CRAs)	High	High	Mobilizing community members to participate in the KEP projects.	Assist researchers in collecting data.	Withdrawing from the study.	Collecting data with researchers. Assisting in transferring knowledge on health diseases in the local language.
Community Health Workers (CHWs)	Medium	High	Make the link between the community and the health system.	Conduct door-to-door visits in the community to educate the community about	Withdrawing from the study.	CHWs visit patients in their homes to provide support with health difficulties and help home-based patients with medicine. They

			Maximizing quality of care for patients. Supplying equipment and drugs for treating School children found with infections in the schools.	health-related infections occurring in the area.		engaged community members through home visits. Distributing pamphlets to the community on behalf of KEP.
School Principals	Medium	Medium	Educate schoolchildren and make sure that they are recruited for parasitology research by the KEP.	Mobilizing schoolchildren and making sure that the knowledge is transferred to school learners.	Rejecting the study and denying access to schoolchildren.	School principals are used to helping schoolchildren to learn about schistosomiasis in the classroom. Encourages learners to do screening and treatment for schistosomiasis on a regular basis. Make sure learners utilize books, booklets, and posters provided by researchers. Schools are great place to host meetings with parents to educate them about schistosomiasis

Data analysis

The Stakeholder Analysis Matrix was used to determine the best course of action for each key stakeholder who took part in the study (see Table 3). The recorded interviews were transcribed, and observational field notes were typed and organised, carefully read (getting a sense of the information and an opportunity to reflect on its overall meaning), and then coded into nodes for analysis using a computer-based software program (QSR International Pty Ltd, NVivo 12 Pro). Codes were created and then sorted into common themes. The codes were matched with the quotes associated with each theme based on similarities, differences, and meanings. Data interpretation was done through thematic analysis. This method was adopted in order to draw conclusions from the combination of data acquired from focus group discussions and in-depth interviews. Four broad themes derived from the thematic analysis are presented in detail in the results section.

3. Results

The role of stakeholders in the collaboration phase of the project is given in Appendix 1. This includes details about each stakeholder and what role they played in the project since its inception. The following themes emerged from the thematic analysis. Theme 1: *Formation of community advisory boards (CAB) and recruitment of community research assistants (CRAs)*; Theme 2: *role of Indunas in collaboration phase*; Theme 3: *opportunities of collaboration*; Theme 4: *challenges of collaboration*).

3.1. Formation of community advisory boards (CAB) and recruitment of community research assistants (CRAs)

During the consultation phase, community advisory boards (CABs) were established, and community research assistants (CRAs) were recruited in order to ensure that the ideas and inputs of the community are prioritised in decision-making. Therefore, the collaboration began by constituting a committee and joint (CAB and project management) recruitment of a group of fieldworkers who worked together with the research team. The KEP research team emphasized to the community during the introduction of MABISA (informing phase) in 2014 that they wanted to collaborate with a committee that would represent the community from all the villages. The committee served as a boundary partner between the researchers and the community and helped researchers periodically evaluate community perceptions of the project. The CAB is comprised of 12 members: one headman (known as induna in traditional Zulu society), two community leaders, three school board members, three community health workers and five community members who are representatives from each village. The community advisory board was formed during the first community meeting, as illustrated in the following quotes:

"...when MABISA people arrived, they wished that there could be a committee, so I formed the committee and selected people to serve on it. We initially had four people, but as the projects expanded to other villages, we ended up with two members in Mbandleni, four in Ndumo, four in Makhane, and four here in Mgedula. We have been working ever since as we move forward..." (induna #3, IDI).

Prior to the community meeting, the headman appointed additional community members. This implies that some community members attended the first community meeting hoping to be selected for a committee position. The Community Advisory Board (CAB) functions as a watchdog to ensure that ethical conduct is maintained within the communities and that the concerns and interests of the community are properly considered, addressed, and not ignored. One of the committee members stated that he joined the group in order to ensure that the local community was given the opportunity to provide input, gain expertise, and obtain information regarding the initiatives that were carried out in their area.

"...I wanted to see our community, getting assisted and impacted with knowledge, especially on malaria and bilharzia. It happens sometimes that people come with the goal of empowering the community, but the information gets distorted along the way due to poor communication. Now that CAB members exist, they can transfer the knowledge from the research team to the community..." (CAB member #6, FGD).

During an FGD a member stressed the necessity of having community research assistants working collaboratively with the research team in order to engage fully with the community and ensure that the community is empowered as they develop research skills. The presence of the CAB and CRAs has been instrumental in promoting the concept of community change-makers for the prevention and control of vector-borne diseases. In addition, CRAs collaborate with researchers to gather data, identify transmission sites in the study area, and mobilize the local community. Traditional leaders and the community at large generally supported the notion of CRAs working together and joining the research team. However, there was some misunderstanding that this would result in full-time employment for the CRAs, which was not the case. One of the CRAs had the following to say:

"...we were led to believe that the study team was from the Department of Health, that this would be long-term work with decent compensation, and we'd foreseen ourselves becoming millionaires, only to discover that it was not exactly what we had been told. Even people thought we are working well, and this job is paying us a lot..." (CRA #5, IDI).

This collaboration began with the village chief and headmen as community leaders who were informed about the study before the entire community was informed.

3.2. The role of indunas (headmen/local traditional leadership) in the collaboration phase

When the research team arrived at the research sites during the MABISA project, mistakes were made. Although the study was accepted by the tribal council of the Mgedula village some villages did not fully embrace the project as indicated by the statement of one of the indunas:

"...I saw people in the river called Umagwanga and I stop them and ask what they were doing here...they said they were doing research about bilharzia. I then asked them who gave them permission, and do they know the king, they said no. I asked them if they know me, and they said no. I told them I am a tribal council, and that they shouldn't just show up and head to the river without first consulting us..." (induna #2, IDI).

This implies that the research team may not have followed all expected protocols of the community as it is implicit that this particular induna was not aware of the project. Despite the fact that community entry had already been completed at the community level and approval had been acquired, the research team still needed to be aware of the uniqueness of villages and made sure that the proper entry procedures were followed when they visited each village. The traditional authority has a significant role in paving pathways for researchers. The Induna further mentioned that after he had interacted with the researchers, they made appointments with all the tribal councils, which led to a collaborative partnership. According to protocol, the study team was supposed to inform the village headmen in advance of their visit. Researchers came to a consensus after realizing how crucial the tribal councils were to the study projects. This study revealed that a person who is a leader in an area participates in every meeting organized by the research team. It is the responsibility of leaders to notify the community in advance if a research team plans to work in a certain village so that the leader can prepare the community.

The CAB's objectives, responsibilities, and duties were specified during the formation of the committee. The CAB members were not paid in terms of salary but were provided with meeting allowances and a limited budget to cover travel expenses and other necessary expenses. Their contribution to the study, however, is clear and well-documented: as induna #2, IDI stated, *"...since the study team does not reside permanently in our community, it is our responsibility to mediate between the research team and community members..."*. Other roles

were mentioned such as ensuring that rules and regulations made by the project are observed by the community members. Another role was indicated below:

"...the committee's role is to gather all the project-related information and disseminate it to the community. Also, to ensure people's well-being, explain to them what has taken place. Inform the community when the research team will be visiting their homes and give them assurance that there will be no harm by participating in the projects. We always remind them to cooperate..." (induna #3, IDI).

Some CAB members stated that whether the community accepts or rejects the research team depends on them, though they had benefited from their collaboration in research projects by acquiring certain research skills and learning from the project. This is what they expressed:

"...how we as CAB members present the research team to the community determines whether or not community people would accept or reject them. Even though they do not speak the local language, it is part of our responsibility to ensure they're acceptable in the community, by motivating and giving clarity on the humanity of the team..." (CAB member #3, FGD).

The CAB members have also acquired more knowledge of research and the purpose that it serves in the community. On behalf of the community, they discuss the pros and cons of the project with the research team. The local traditional leaders are often invited to participate in meetings and workshops conducted to map out strategies and plan for research activities. The presence of the village headmen and CAB members in the meetings created an opportunity to involve them in the planning and preparation for the projects currently running in the study area. This collaboration between the research team and the village headmen and CAB members was genuine and transparent because they are well-informed about the project and involved at every stage of planning. The CAB and Indunas also got an opportunity to understand the research activities and how they had an impact on their communities. One of the CAB members stated that the purpose of a committee is to protect young females from being exploited during the implementation of research projects, as has previously occurred, as well as to ensure that the interests of community members are not misled.

"...CAB members are also given the prerogative to investigate the project if there are underlying factors pertaining to the researcher's behaviour. For example, we have young girls in our community, if the researchers divert from what they came here for but decide to have love affairs with them, we should investigate such behaviours and report them to the headmen. We have observed some projects we once had in our area, whereby individuals come but end-up impregnating girls in the community..." (CAB member #6, IDI).

3.3. Opportunities of collaboration

The collaboration of the research team and the community enabled other CAB members to travel to attend workshops in other countries, which was their first-time experience. They had the opportunity to create new networks with a diverse set of people from various communities, which was highly valued by the respondent:

"...being in collaboration with the research team, I have gained a lot. I have been given an opportunity to go to Zimbabwe. Everything covered passport, flight tickets and accommodation. We trained every day from 7 am to 4 pm. There were presentations and I also had a chance to present my village, which is something I have never done before. I learned to communicate with other people who do not speak my language. I made connections in Zimbabwe. It was a wonderful and enlightening experience..." (CAB member #8, FGD).

Since the KEP objectives are not only to reduce infections and transmission of diseases but also to identify and address non-communicable diseases, malnutrition, and water, sanitation and hygiene (WASH) challenges through knowledge and learning. Therefore, vast community training and workshops were also provided in order to strengthen collaborations and help the community to understand the research information that the study intended to share with them. Community Health Workers (CHWs) acknowledged the acquisition of new knowledge and

skills in the field of health-related research which for others enhanced their own professional practices. This was expressed as follows:

"...during the MABISA project, we have also taken to Jozini for training, and the research managers booked us in a beautiful hotel. They taught us about stakeholders, malaria and schistosomiasis transmission and other research skills. Through KEP projects, I have been exposed to so many things..." (CHW #4, FGD).

"...In other meetings, the research team would teach us about stroke, diabetes, and blood pressure; this provided the community with a wealth of knowledge. We can apply the knowledge we learned in our daily work as caregivers..." (CHW #2, IDI).

The participants acknowledged that there were learning aspects for them throughout the projects. The KEP organized twice-yearly community feedback meetings to share study updates and project findings. This is typically accomplished through edutainment techniques including drama performances and poetry by CRAs, schoolchildren, and community youth members. These meetings also provide a platform for all villages to unite. The community change makers project of KEP was supported by CRAs, teachers, and learners in primary schools. Through their respective schools, teachers and learners were involved in edutainment activities that supported the community health education program for the area. Schools took part in an annual performance art competition where students actively contributed to the performance-based dissemination of study findings. Participating schools incorporated indigenous theatre practices and everyday activities, offering a rich source of relatable metaphors that aided in the formation of meaning, enhancing understanding and potential research uptake.

The KEP team invested over the years in capacitating CRAs through training on research. They were introduced to aspects of research ethics, the epidemiology of malaria and schistosomiasis, fundamental research techniques, quality assurance, and technical data-gathering skills. They became knowledgeable about parasitology and were actively involved in specimen collection and screening. Such experience was acknowledged by one of the CRAs:

"...I have benefited a lot since it was MABISA until it changed to TIBA, I am not going to lie. Now I have a lot of experience, which will be useful if I apply for another job. With the knowledge I have learned, I can succeed in various fields of work. I received this information for free, and the experience I have obtained is valuable to me because I may not have had the funds to pay for it otherwise. Also, receiving a certificate was a bonus..." (CRA #6, IDI).

The community initially viewed the research team with suspicion and mistrust. However, the KEP project had a significant impact on the community and altered the perception of males, who were often viewed as being obstinate when it comes to going to clinics for their health.

"...we always see the research team moving around with scales, weighing children and the elderly, so the community easily notices them when they are not present in the area. Men used to prefer not to visit clinics, but since the team began working in our community, this has changed. This shows that the door-to-door visits that they do make a positive impact on the community..." (CAB member #8, FGD).

3.4. Challenges of collaboration

The community indicated some challenges associated with their collaboration with researchers. Although CRAs were appreciative of the learning opportunity and skills they acquired through the project including collecting both qualitative and quantitative data, collecting stool and urine specimens, processing samples, and mapping vectors and geospatial basic techniques, they were not entirely satisfied with the way they worked with the research team. Specifically, they were not very happy with the working hours, and the limited cooperation and communication within the research team. The CRAs were much more grateful for the exposure they were receiving from collaborating and working together with the research team, participating in research activities, and all the training they were given. However, they were not pleased that the certificates of participation they were given did not have their ID

numbers and that could compromise authenticity. Below we present some of the challenges stated by the CRAs.

3.4.1. Poor working conditions

The CRAs cited poor working relations as one of the major barriers to their collaboration with the researchers. According to the CRAs researchers were not very organized in the way they managed time and allocation of working days. The CRAs complained that it was hard to work with the researchers since they did not get a chance to take lunch breaks or at least provide them with lunch. They also complained about the irregularities in the number of working days.

"...working relationships are bad, there is no cooperation at all. There is no job where you can't have a lunch break. I'm saying this because, if there was cooperation, they would take into account that some people don't eat in the morning, and there should be teatime and lunchtime in the workplace. Some of us can't eat in the early hours of the day. We receive none of these, and we end up conducting research at someone's home while hungry..." (CRA #1, IDI).

"...the only thing I have observed is that the team is not well organized. Our working days are not consistent. They would tell us in the morning that you are needed in the field. There are always disagreements among researchers. It is like the researchers do not plan their work on time and it is not right..." (CRA #4, IDI).

The issue with irregular working days was due to the fact the type of research which researchers were doing varied and, on some occasions, there was no need for many research assistants while on some days there was a need for more hands. During field trips that required a few people, the researchers would make the CRAs take turns so that all of them would get a chance to experience the type of work which was being done. Instead of just picking two CRAs to come throughout the week they would give each person at least two days and make them work in pairs or groups of three until everyone has had the chance to do that particular work. This was not viewed as appropriate by the CRAs, since this meant less stipend in total on that particular field visit.

This misunderstanding also extended to the issues of lunch breaks, which were caused by travelling long distances. The areas where the studies were being done were too far from the main shopping centre, hence the research team could not access shops where they could buy food. This resulted in the team having to go for the whole day without buying food. In addition to this challenge, the long distance travelled to get to study sites meant that the team had to depart early in the morning before the shops in the main centre opened, this resulted in CRAs having to spend the rest of the day without eating since they did not pack lunch and relied on money to buy food. Another issue was the nature of the work which was being done, it was so intense that the team could not afford to take breaks. For example, during stool collection, the team had to move from school to school collecting samples, this would stretch up to lunch hour and then the team had to travel from the last school and head towards the processing centre. The team could either have their lunch break during the time of driving to the centre. Once at the centre there was no time to delay since the urine samples had to be processed before the eggs expire. Such complications in the nature of the work led to complaints by the CRAs.

Certainly, these are not conducive working conditions, however, there were limited options for the team since the distance and the poor infrastructure in the community led to these poor conditions. We recognize that these issues were not pleasant for the CRAs and that there was a need to come up with solutions such as sending extra people to the processing centre to prepare food in advance. We also consider that it would have been worthwhile to enable all CRAs to work for more days, or to create a consistent roster of duties and working days, but the reasons for the irregularity were due to the irregular nature of the research work as well as the working conditions in the area. Consulting the CRAs on the best possible solution would have been a solution, but beyond this, there was no way around the problem.

3.4.2. Poor time management

The issue of time management created hardship for many community research assistants, which made it more difficult to sustain collaborative relationships. The CRAs had this to say during the focus group discussion:

"...there is a problem with not keeping up with the times. The timing for pick-up varies. The team leader will tell you that they will pick you up at 7 a.m., and you will wait for an hour or longer for them to arrive. Sometimes you go to bed not knowing what you're going to work on the next day. They would phone us in the morning and say, "You are working today; any plans you had for that day must be cancelled." (CRA #2, FGD).

"...as CRAs we stick to the time of resuming our duties, but the knock-off time is not always kept. Sometimes the research team releases us late at night, whereas I left home very early in the morning. The number of hours we will be working each day should be specified, and we should adhere to those hours..." (CRA#1, FGD).

Poor time management led to many difficulties in the work done by the researchers and the CRAs. Time management was not easy to handle mostly because of the distance travelled to data collection sites and the unavailability of transport in the area. For a long time, the team relied on one car to move around, picking up the CRAs at different points, then travelling to the data collection sites. After the work was complete one car had to drop everyone in their respective places, which led to some people being dropped off as late as 8 pm. This challenge was later resolved by availing two cars that would go in different directions to manage the transportation challenges. Despite the use of two cars, there was still a challenge with distance, and team members had to wake up very early to start the pick-ups.

The other misunderstanding with working days and being notified in the morning to come to work was a result of a lack of organization from the team leader's end. There is a need to ensure that field plans are prepared and communicated with the CRAs in advance so that everyone has a clear idea of what they have to do and when they are expected to be at work. Another thing that the team should have considered was planning all field trips together with the CRAs, this would enable them to understand why certain decisions are made and why the work often stretches. The greatest challenge was not that CRAs had to be dropped off late, but that they were not aware of the reasons for such problems. This raises another point which is the need to involve the CRAs in planning the field trips. Planning together may help the team resolve some of the issues that may hinder the productivity of the team.

3.4.3. Misbehaving of the research team leader

The CRAs also reported about bad behavior demonstrated by some researchers which made their work relations tough. Owing to drunkenness one of the researchers (team leader) failed to address the CRAs appropriately or resolve simple issues such as payment of stipends. This particular team leader would forget how much he had paid CRAs and this would lead to misunderstandings. This raises serious behavioral concerns on the part of the research team and it certainly affected the collaboration with the CRAs.

"...the project's team leader used to drink a lot and would pay us our stipend when he is drunk as we were getting paid daily. The next day, there would be a misunderstanding over whether or not he had given us extra money or whatsoever..." (CRA #5, IDI).

The issue of the team leader being drunk during working hours is not good at all, however, this particular team leader was released from the job as soon as the PI found out about his behavior. This information highlights the typical challenges that often go unspoken about in research projects. This behavior is often swept under the carpet and no one brings out such issues concerning community engagement projects. These findings showcase how team behavior plays an important role in ensuring that the communities are engaged in the most appropriate way. If team members are not disciplined and monitored, their behavior may paint

the whole project bad. One action from a researcher, especially the one in leadership may raise a lot of scrutiny from the community.

3.4.4. Insufficient allowance

There were also concerns regarding the insufficient allowance CRAs were receiving. This was a controversial issue owing to the rising cost of living in the country and the failure of the project to increase the payment as requested by the CRAs. The problem of the insufficient allowances came from the misunderstanding that the CRAs were employed by the project yet in fact they were involved on a voluntary basis, the stipend was a token of appreciation for the voluntary work. However, the communication on the stipend was not done properly at the onset of the project and the community worked on the assumption that the CRAs were employed.

"...the R170 allowance we are receiving is too little. The community has this perception that this is a full-time job (as we did when we joined the project), and we are getting decent salaries as we are dropped off by fancy cars. But this money is not even enough to buy cosmetics..." (CRA #3, IDI).

The amount that was paid initially was R150, this later increased to R170 after some years when the CRAs complained. The total number of days that the CRAs would be engaged with the researchers was usually 3-5 days. The best solution would have been to consider increasing the stipend; however, the project was limited by the budget that was available for such costs. This challenge emanates from the fact that research projects must submit budgets at the onset of projects that stipulate how the money will be used. These budgets are audited against the actual expenditures made by the project personnel. This type of monitoring makes it unlikely for stipends and salaries to be reviewed during the consequent years after the programs have started. This was the major hurdle faced by the PI in trying to review the amount. The increase from R150-170 was made possible by the introduction of new projects which enabled money to be shared towards the CRAs. These projects were aligned with work that the PI was already doing in the area.

3.4.5. Undermining CRAs due to English incompetence

Since the CRAs do not speak English well, language was a problem when they wanted to voice their opinions about the project. This may explain some of the negative impressions of community research assistants. The research assistants felt oppressed by the researchers who failed to accommodate their inability to speak in English, as a result, they did not voice their opinions because of fear of being ridiculed or the assumption that their voices would be ignored. This challenge presented a bigger issue than the language barrier, it showed the level of inequality experienced by the CRAs.

"...we struggle to communicate in English (our home language, is IsiZulu) during meetings with the research team, especially with the principal investigator (PI). We end up keeping our mouths shut and not bringing up the difficulties we have because we are afraid to speak English. Since most people can't pronounce it correctly, they tend to believe everything they are told. Some project administrators make fun of us when we try to speak English..." (CRA #8, FGD).

"...we feel oppressed when they expect us to express ourselves in English because we are not native English speakers, we already feel defeated..." (CRA #1, FGD).

Apart from the undermining and feeling oppressed we also note the issue of misrepresentation. The statement given by the respondents that they tend to believe everything they are told poses a risk of failure to understand what the project is all about. The inability of the research assistants to ask questions and also raise concerns creates a danger of ethical violations. This speaks to the researcher's inability to sympathize with the CRAs. It would have been appropriate to have the researchers try to understand and speak the local language. This would have placed the CRAs in a better position to communicate and express their concerns

and also to understand what was being spoken about during stakeholder meetings. In future projects, there needs to strive to have good representation of people who speak the local language among the researchers. The team of researchers should be comprised of people who are able to speak the local language fluently. These people could play the role of interpreters between the team members and the research assistants. Also, the researchers should ensure that they try to learn the local language so that they may be able to hear on their own what the issues on the ground are. Sometimes relying on a middleman to interpret may lead to misconceptions and loss of context. The Project leader may think things are going well yet, there are major grievances that subordinates are hiding.

4. Discussion

This study sought to investigate the experiences of the community during the CE collaborative phase of KEP projects. The findings revealed the value of establishing and sustaining collaborative partnerships with stakeholders. It is important for the collaboration to be strong particularly because of the length of the project timelines (particularly in this study which spanned from 2014 – to 2022). These findings are consistent with findings which suggest that the engagement process must be long-term and must allow time and space for diverse and divergent views while attempting to reach a consensus [26]. The study demonstrated that the research team has been collaborating with community stakeholders for a long time and that working groups such as CAB and CRAs, who were part of the decision-making in activities of the KEP projects had been established.

The study demonstrates a correlation between collaborative partnerships and mutual benefits as the community members were involved in designing the projects and data collection and disseminating the results. The involvement of village headmen (Indunas), together with CAB members and CRAs in the projects meant that goals were shared, and reciprocity and mutual benefit were achieved as evidence of deliberate intent and efforts of the project to benefit the community. These findings are consistent with those of authors who argue that community collaboration and partnerships should emphasize mutuality and reciprocity [27]. Therefore, when researchers and communities collaborate, they should have a shared vision and it should be mutually beneficial. Our findings agree with other research findings that distinguish between “transactional” partnerships and “transformational partnerships” [28]. The author claims that individual or institutional interests are met through the exchange in transactional partnerships where both parties benefit from the interchange [28]. Transformational partnerships on the other hand are distinguished by their comprehensiveness, collaborative planning, management, evaluation, mutuality, long-term commitment, strong leadership support, and university involvement in the process of community capacity building [28].

The duties of the traditional authority normally cover a variety of functions, all of which centred around the fundamental principle of guiding, protecting, defending, and providing for the needs of the society they serve [29]. The results of the current study also revealed, in addition, a progression on the part of community leadership toward health education through these collaborative partnerships. The impact of these relationships can easily be demonstrated through community knowledge uptake of vector-borne diseases, particularly schistosomiasis and malaria, research skills and numerous learnings from KEP projects. A comparable study showed that the community of Ingwavuma had minimal research experience, but collaborations enabled co-learning and engagement opportunities [18].

The stakeholders’ contributions to projects became increasingly obvious from the first interactions we had with them. The study confirms that traditional leaders are very strategic in successfully navigating the negotiating process for study approvals and successful implementation. These results are in accordance with the findings of authors which found that collaborating with traditional leaders can bring the entire community together in a “well-structured and serial manner,” which may increase the likelihood of the community embracing the research projects [16]. Our study indicates that community research assistants as well as

headmen and members of community advisory boards are perceived as community change-makers for the prevention and control of vector-borne diseases, particularly schistosomiasis and malaria. Traditional leaders play a key role in ensuring that initiatives are carried out without any problems and have the community's full acceptance and support. These results build on existing evidence for promoting community engagement through the establishment of a neutral place and leadership that encourages collaboration among varied participants to develop common goals that stimulate action and bring about social transformation [7].

The findings showed that CRAs and CAB members can be credible resources and partners in addressing community health issues. Providing workshops and training to both CRAs and CAB members using communication tools adapted to the local context assisted in strengthening collaborations and opened opportunities for them to build partnerships abroad. Capacitation of community members in data collection and in promoting the concept of community change for prevention and control of vector-borne diseases was also achieved through capacity development initiatives offered to community members through numerous trainings. It was evident that community members were fully equipped with both health knowledge and research skills through collaborative working with multidisciplinary teams. The main partners in this project were community leadership, with whom the research team worked closely to achieve all the objectives of KEP projects. The role of traditional leadership made it possible for the project activities to be recognized and accepted by the community. Local-level structures were enhanced to facilitate the co-designing of community-based projects by researchers and communities through genuine collaboration. Community-based participatory research projects have proven to be a potential collaborative approach that combines systematic investigation, participation and action in addressing health problems [30].

Community trust was also achieved through CAB members and CRAs. Their support allowed KEP to stay informed about the community's perception of the project and to remain socially and culturally relevant. This finding is in agreement with findings which showed that collaborating with community leaders and CBOs was helpful in reducing community reluctance and mistrust [31]. This implied that CRAs maintain the visibility of KEP and are boundary partners between the research team and the community. This strengthened the community research project implementation capacity.

Notwithstanding this, there were challenges to sustaining collaborative relationships, some of which were poor cooperation and communication among the researchers and the CRAs. Language issues hindered community members from fully voicing their opinions to the research team about the project. These findings are consistent with those of an author [32] who argued that language barriers are one of the many challenges of healthcare provision and initiatives in a multilingual and multicultural society. Apart from just the inability to communicate, our respondents alleged that the actions of researchers towards their inability to speak English were similar to mistreatment or misdemeanor. While it was evident that speaking in English was a challenge for the CRAs, it was also inappropriate for the researchers to ridicule or fail to sympathize with them over their inability. Ultimately, we noted that CRAs felt mistreated and undervalued by the fact that researchers could not bother themselves to try and understand them in their own language.

Another notable challenge included the issue of inconsistent work hours and lack of breaks during the data collection. These issues required that both parties come up with a resolution to the manner in which work was conducted. It seems it was inevitable for the researchers to want to stretch the hours for as long as possible so that they could achieve all the objectives of their work in the duration of the field visits. This was beneficial to the researcher but not so good for the CRAs whose concerns were beyond the completion of the work. They wanted to assist but they were worried more about working normal hours and were not very happy being pushed so much. In fact, they were worried about being abused and made to work for too long. In addition to this, there was a report about a team leader who came to work drunk and would mistreat the CRAs causing misunderstandings over payment of stipends. These are very

pertinent issues that could have potentially made the collaborations sour if they had gone on unresolved.

Still, on the point of stipends, we found issues around compensation that also arose from the interviews. The compensation received by CRAs was not much compared to what they were expecting. The amount was meant to be a token of appreciation, it was also meant to cushion them when they were in the field (buying food, paying for transport to get to pick-up points, etc.). But from what we gathered the CRAs and the community saw this work as actual work which was meant to pay the standard wage amount for a day's work. While the CRAs were fully made aware of the nature of their work and the reasons for the stipend, they still expected their concerns for a normal wage to be met. This was more of an issue of negotiation since the CRAs understood that the project had no obligation to pay salaries, but they had issues in their household that required them to have enough money. If the project expected them to avail themselves for the work, then it should have been able to acknowledge the needs of the CRAs and support them. Their point was simply that, they had to forgo other opportunities in the village because they were trying to serve the needs of the project, moreover, the community views them as employed people. Their only hope was to get something substantial from the project.

5. Conclusions

For community engagement to be successful, it is essential to collaborate with community stakeholders at all stages of the project. This study found that the formation the CAB and recruitment of CRAs created a conduit between researchers and the community, ensuring an avenue for transparent, democratic and equitable decision-making which resulted in the completion of projects. The KEP research team made a great effort to ensure that community members were involved in most aspects of the project, which led to community members developing new networks and gaining new skills. The study also ensured that local-level leaders were consulted and the right channels for community entry followed. The traditional authority which was consulted by KEP played an important role in laying the road for the researchers making the implementation of projects run smoothly. In addition to approvals and buy-in from local leadership, positive collaborative relationships among the members of the research team and the community were made possible by embracing partners such as CRAs and CABs. However, there were some noteworthy challenges to these working collaborations emanating from the researchers mostly. These challenges included extended working hours, low stipends, language barriers, researchers misbehaving and undervaluing the CRA's opinions. These challenges posed a great threat to the collaborative efforts and could potentially erase all gains achieved from the initiatives taken to involve the community in citizen science activities. This study points out the importance of respecting and valuing community members in collaborative partnerships and demonstrates how such values can transform relationships between researchers and communities.

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