

Community Engagement Prior to a Small-Scale Pilot of the Sterile Insect Technique in Kwazulu-Natal, South Africa 2018

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Abstract

Introduction: As South Africa moves towards malaria elimination there is a need for complementary vector control strategies. One method under consideration is the sterile insect technique (SIT). Key to the successful implementation of new health interventions, such as the SIT technology, is community participation and addressing of negative social perceptions. This work describes the engagement of a community targeted for a small-scale pilot sterile mosquito release programme with the objective of increasing awareness and creating positive attitudes towards the use of SIT.

Methods: Knowledge and information regarding malaria transmission and control strategies inclusive of the potential of using the SIT was disseminated through radio interviews, reading materials, road shows and lectures using indigenous language. The awareness campaign was done in collaboration with various stakeholders. Concurrently, consenting participants were tested for malaria using falciparum-specific rapid diagnostic tests.

Results: Approximately 165 000 listeners were engaged during two 30 minute radio interviews at a local radio station. Two hundred and fifty farm workers, several outpatients from primary health care facilities and 1400 secondary school pupils were given education on malaria transmission and control strategies including SIT. Furthermore, two road shows; one in areas around Mamfene and a second at KwaPhuza market, were done. In total, 447 falciparum-specific rapid diagnostic tests were conducted with 20 people testing positive. These patients were immediately treated for malaria.

Conclusions: The campaigns showed that the majority of community members are informed concerning malaria transmission and control. However, there is a lack of understanding regarding the SIT as a vector control option. A more extensive public awareness programme on SIT as a vector control strategy is recommended to prepare the community of Mamfene for future small field pilot sterile male mosquito releases.

Keywords: Sterile insect technique; Community engagement; Malaria elimination; Complimentary technique; Community empowerment; South Africa

Introduction

The South African government has set a mandate to eliminate malaria by 2023 [1]. Against this background the Sterile Insect Technique (SIT) is being investigated as an additional vector control strategy to complement the existing approach of indoor residual spraying (IRS) of insecticides [2]. Investigation into the use of this technology against the major malaria vector *Anopheles arabiensis* is at an advanced stage [3]. Significant progress has been made concerning the technical applicability of SIT in South

Africa under both laboratory and semi-field conditions [3-6]. Results of these studies have paved the way for a small-scale pilot mosquito release programme to demonstrate the feasibility of this technique under open field conditions [5]. A critical aspect that still needs to be addressed before initiating open field trials is community participation.

Community participation, mobilization and incorporation into a public health programme are key to its success. This is because communities are an integral component of any health intervention. Studies have shown that direct community engagement plays an important role in improving the acceptability and effectiveness of a programme [2,7]. Conversely, disregarding community concerns has been known to derail programme implementation [2]. Community engagement is thus critical in vector control approaches such as the sterile insect technique that are based on the release of laboratory-altered insects. Release of insects for vector control when the same are ordinarily perceived as disease transmitters raises social, ethical and regulatory concerns. It is therefore important that communities are sensitized to the principles behind such interventions and participate during their implementation. Such an approach can address negative social perceptions often associated with release of laboratory-reared mosquitoes into the environment [8].

In South Africa, the SIT feasibility project is in its 9th year and plans for a pilot mass release of sterile male *An. arabiensis* mosquitoes are underway. In terms of community engagement, a preliminary cross-sectional knowledge, attitudes and practices (KAP) survey on malaria transmission and use of SIT as a potential vector control tool showed that community knowledge of SIT technology was limited [9]. Furthermore, surveyed communities expressed their concerns and fear of releases of sterile male mosquitoes. Against this background, it was recognized that a more strategized community engagement component should be incorporated into planning of the pending pilot release programme to improve uptake of the technology and consequently increase success of future sterile male releases. In this study a community engagement exercise was done to: improve future community uptake of SIT technology; understand how local knowledge, belief and practice might influence the effectiveness of SIT; support health promotion; and add local knowledge on general malaria transmission and use of SIT as a vector control tool.

Methods

Setting

This study was done concurrently during a routine malaria control programme active case finding and detection and community engagement campaign. The malaria awareness campaign was conducted in the Jozini local municipality, UMkhanyakude district municipality, northern KwaZulu-Natal Province (Figure 1), between 23-27 April 2018, a period which covered the world malaria day.

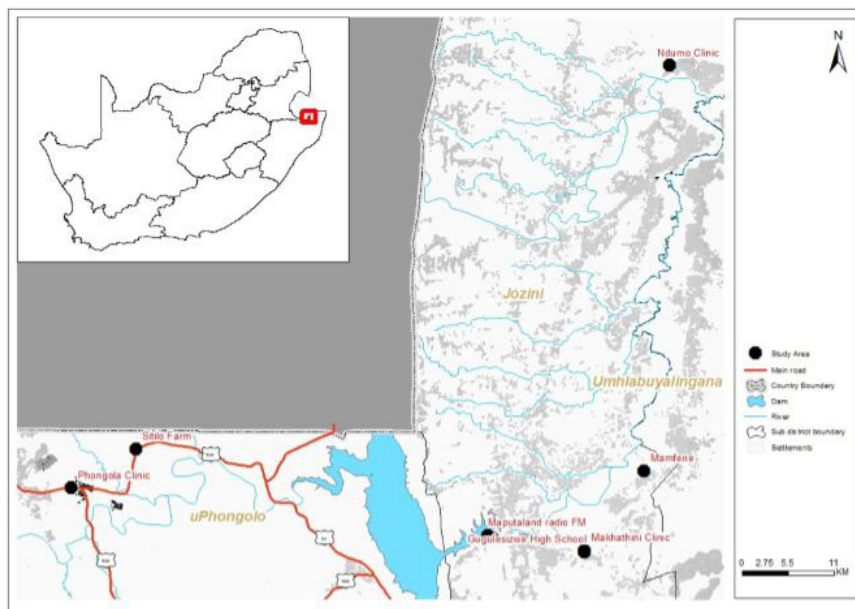


Figure 1: South African map showing UMkhanyakude District Municipality, northern KwaZulu-Natal Province and the geographical extent of Community Engagement Campaign activities conducted during 2018

Furthermore, a door to door campaign was done during August 2018 in the three sections where SIT pilot trials will be implemented. Jozini Local Municipality is one of five municipalities within the UMkhanyakude District Municipality. It shares borders with Mozambique to the north, Swaziland to the west, uMhlabuyalingana to the east, Hlabisa to the south and Nongoma and uPhongolo to the west. These areas were selected based on reduced number of reported malaria cases annually and the close proximity to the proposed SIT pilot site. The district has a population of approximately 625,846 people. The main economic activity is small-scale agriculture.

Study Design and Sampling Method

A cross sectional community engagement was used purposefully selecting places where people had already congregated and popular destinations to ensure that a larger group of participants were reached. Qualitative methods and social activities were used to engage and assess the views of the community using a question and answer sessions after presentation of the information.

Content and Validity of the Information

An information brochure was developed using available information on malaria and information on SIT with a focus on key topics which included (what is malaria, disease transmission, signs and symptoms, malaria control measures and the SIT strategy). Data for this study was collected by trained and experienced personnel and validated for accuracy before analysis.

Data Collection and Analyses

The research team engaged with the community on malaria transmission and control strategies inclusive of the potential of using the SIT through radio interviews, distribution of reading materials, road shows and lectures using indigenous language. The community engagement teams consisted of malaria control programme teams, Environmental Health Practitioners (EHPs), Information Education and Communication (IEC) teams, (authors: PM, GM) and three member of the community (Figure 2). The research teams were trained in conducting presentations and talking to the different community groups. The presentations were approximately 20 minutes long after which a question and answer session followed. The participants were asked if they had any question, concerns or thoughts about malaria and the SIT strategy. Data collected was summarized in tables using numbers and percentages.



Figure 2: A snap shot of the multi-stakeholder team used during the Community Engagement Campaign comprising of Environmental Health Practitioners (EHPs), Information Education and Communication (IEC) teams, and three member of the community

Results

Radio Interviews



Figure 3: Two members of the multi-stakeholder team undergoing an interview at Maputaland radio station

Two 30-minute radio interviews (one on the 2nd of April and a second on the 23rd of April 2018) were conducted at Maputaland radio station (Figure 3). Maputaland is a community radio station servicing a total population of approximately 555 000 with a

total number of 165 000 listeners. Fifty five percent of listeners are females aged between 25 and 49 years of age (broadcasting research council data). The interviews were conducted during the morning show that is one of the widely listened segments. Topics discussed during the interviews included malaria transmission, signs and symptoms, malaria control and prevention including Indoor Residual Spraying (IRS), Sterile Insect Technique (SIT), principles of SIT and its benefit including plans for a pilot sterile male releases (Table 1). Listeners were given an opportunity to ask questions (Table 2) through the radio station's short messaging services (sms) line. Additionally, after the interviews, SIT information brochures were given to the staff for distribution. Each member at the radio station who was on duty on the interview day was given a promotional branded t-shirt.

Number	Topic
1.	Malaria transmission
2.	Signs and symptoms
3.	Malaria control and prevention including Indoor Residual Spraying and the Sterile Insect Technique
4.	Principles of the Sterile Insect Technique and benefits of the technology
5.	Plans for the pilot sterile male mosquito release programme
Ultimate message	"As part of malaria control, our SIT team will be releasing large numbers of sterile male mosquitoes in Mamfene. It is important to note that male mosquitoes do not bite and therefore cannot infect you with malaria. The males instead will mate with local female mosquitoes resulting in death of their offspring thus bringing down the overall number of mosquitoes in the area".

Table 1: Topics discussed at each presentation during the Community Engagement Campaign, 2018

Lectures

Lectures were done at three primary health care facilities namely; Makhathini, Gedleza and Ndumo Clinics; a high school - Gugulesizwe High School and a farm - Sitilo farm. An opportunity to ask questions (Table 2) was given to participants. The three health facilities have each a daily average of 200 people consulting. Makhathini clinic and Gedleza clinic are less than a kilometre apart while Ndumo clinic is approximately 90km away from these two clinics. Gugulesizwe High School has approximately 1 500 learners. Sitilo farm is a lemon and orange factory farm with 250 workers employed. The community engagement activities at the Makhathini clinic, Gedleza clinic and Ndumo clinic covered (76%, n = 152), (30%, n = 60) and (75%, n = 150) respectively of outpatients who normally visit these facilities. Coverage at Gugulesizwe High School was 93% (n = 1400) of the school complement. At Sitilo farm all workers (n = 250) were reached. In all instance branded promotional t-shirts and water bottles were given to participants who responded correctly to questions asked regarding malaria and SIT. In total approximately 70% of those engaged correctly responded to the questions asked after the lectures.

Number	Question
1.	Why are we not killing the mosquito instead?
2.	How are we going to catch the mosquitoes?
3.	Do young mosquitoes also bite?
4.	Which age groups are mainly vulnerable to getting malaria?
5.	How the spray operators are supposed to be functioning, their schedule and processes for spraying?
6.	Are individuals allowed to come to the clinic and receive prophylaxis if planning on travelling to malaria endemic area?
7.	How can one tell a difference between a male and female mosquito?

Table 2: Questions raised by community participants after presentations during the Community Engagement Campaign, 2018

Roadshows

The greater community was engaged through two road shows. The first was done at a local market known as KwaPhuza (on the busiest day) which is situated near an informal border crossing from Mozambique. To engage the community, team members walked through the market to educate vendors on malaria transmission and SIT. The engagement sessions were repeated several times each time a different group came passing through the border. The second engagement was done within a 5 km radius of the proposed SIT pilot site in Jozini. We used a double cab van to drive around in the area where people normally do their farming using a loud hailer to communicate our awareness messaging (Table 1).

Door to Door, Campaign

House-to-house visits were conducted during August 2018 in the three sections where SIT pilot trials will be implemented using three local team members who were drawn from the community. Information brochures were distributed and members engaged in discussions relating to malaria transmission and control including the SIT (Table 1). In total 614 households were visited and out of these 2081 community members were engaged through face-to-face discussions. Branded promotional items were distributed to the household at the end of the education session (Figure 4). Furthermore, a community meeting was held in August where 17 community members attended. A presentation was conducted after the meeting followed by a question and answer session.



Figure 4: One of the community workers issuing a branded promotional item to a householder during the door- to- door campaign carried out in August 2018

Malaria Testing

As immigrants were moving into South Africa from Mozambique they were encouraged to undergo malaria tests. The importance of testing was explained to individuals including test procedure. Consenting participants were tested for malaria using *falciparum*-specific rapid diagnostic tests (Figure 5). In total 447 of these immigrants were tested for malaria infection and 4.5% (n = 20) tested positive and started immediately on treatment. In total over 500 promotional brochures were issued to individuals as they moved into South Africa.



Figure 5: Malaria testing using *falciparum*-specific rapid diagnostic tests to consenting participants at KwaPhuza market

Conclusion

The Community Engagement Campaign was a success and was well received by a large and diverse crowd of the Jozini community and surrounds. Discussions and questions from the community included malaria transmission, signs and symptoms, malaria control and prevention inclusive of Indoor Residual Spraying (IRS) and the Sterile Insect Technique (SIT). During these engagements, we learnt that people are well informed regarding malaria transmission and control. However, most community members had very little knowledge concerning the application of the Sterile Insect Technique as a malaria control tool. Collaboration with other stakeholders will result in an increase in the communities' awareness on malaria transmission and control because of continuous engagement activities and health promotion.

The majority of individuals who tested positive for *Plasmodium falciparum* (Pf) were immigrants travelling into South Africa from Mozambique. This study provided baseline information for future engagement activities designed to increase community acceptance of the pending mosquito Sterile Insect Technique pilot release programme. We now expect that the Mamfene community is more aware and better informed on malaria transmission and control including SIT. This will hopefully make them supportive and cooperative regarding SIT activities. More extensive public awareness (possible risks and benefits) engagement activities on malaria transmission and the use of SIT as a vector control strategy need to be conducted to prepare the Mamfene community for field releases of sterile male mosquitoes. Public comments and recommendations received during each community engagement activity will be incorporated into the development plan and will inform multiple aspects of the plan.

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