Seeing 'With my Own Eyes': Strengthening Interactions between Researchers and Schools*

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Abstract We describe a participatory action research (PAR) project aimed at initiating a schools project as a component of the wider Kenya Medical Research Institute (KEMRI)–Wellcome Trust Research Programme's (KWTRP) community engagement strategy in Kilifi. Students and teachers from three nearby secondary schools, and scientists from KWTRP, were involved in designing and implementing a set of interventions aimed at promoting school awareness of locally conducted research, and positive attitudes towards school science and health research. The project was evaluated using a mixture of pre- and post-intervention surveys and discussions with teachers, students, researchers and other stakeholders throughout the duration of the project. The project did appear to fill some knowledge gaps about research and contribute to enhancing students' educational experiences, as intended. However, the project also provided a forum where teachers and students could express their concerns and question research practices, and unexpectedly promoted learning among researchers themselves. Further work is needed to learn more about the potential of school engagement to provide benefits for research institutes, individual researchers and local schools.

1 Introduction

The need for research organisations to actively engage with their proximate communities to nurture mutual respect, understanding, inclusive participation and empowerment is increasingly emphasised (Benatar 2002; Newman 2006; Tindana *et al.* 2007). This is arguably particularly important in international research environments, where differences between research staff and communities in wealth, health and exposure to science can be very marked (Angell 1997; Krosin *et al.* 2006; Molyneux *et al.* 2004; Nabulsi *et al.* 2011). While there is widespread agreement that community engagement can potentially have both instrumental value (e.g. improved consent or quality of research) and intrinsic value (such as showing respect or ensuring a sense of inclusion), it is also clear that key elements of the term are complex and contested. For example, defining who the relevant communities are for a study or research institution, who represents the various communities, what the goals of community engagement are for those different communities, and most fundamentally who makes these decisions, is far from straightforward.[1] As a growing body of work is beginning to document experiences with community engagement, the range of goals for activities, and in some cases the tensions between the different goals that are identified, are beginning to be highlighted. Also highlighted is the need to recognise the limits to what community engagement itself can do in terms of solving all problems in research, including historical and background injustices and inequities, and unfair distribution of benefits in research.

The Kenya Medical Research Institute (KEMRI)–Wellcome Trust Research Programme (KWTRP) in Kilifi is an internationally recognised, multidisciplinary health research programme. The programme employs over 700 people, with researchers primarily from Kenya and elsewhere in East Africa, the UK, and other countries worldwide. Research conducted by KWTRP

IDS Bulletin Volume 43 Number 5 September 2012
Published by Blackwell Publishing Ltd, 9600 Garsington Road, Oxford OX4 2DQ, UK and 350 Main Street, Malden, MA 02148, USA

focuses on important health problems for Kenya, but research results are utilised throughout Africa and beyond. Social science studies since the early 2000s have documented that many community members have a range of questions and concerns about the research, sometimes expressed in rumours (Molyneux *et al.* 2004; Molyneux *et al.* 2005). Many community members and leaders argued for greater interaction and dialogue between community members and the research institution. In response, and in recognition of the range of arguments for community engagement noted above, a formal communication strategy was developed for the programme in 2005. The strategy was initially developed with inputs from a range of staff and community representatives, and has been evolving ever since. The overall goals are to build mutual understanding and trust between KWTRP and key local communities, including local residents, administrative leaders, Ministry of Health facility staff and KWTRP staff (Marsh *et al.* 2008).

KWTRP 's communication strategy to date has focused on increasing the numbers and types of channels for communication and discourse between the programme and key communities. During these interactions, community representatives have often suggested that the research centre should engage more with local schools to promote education, including in science, among the students. This suggestion is based on an appreciation of KWTRP's potential to enrich science education through drawing on its considerable personnel and facilities including a series of world-class laboratories, and a recognition of the serious challenges facing science education in Kenyan schools, and in Kilifi schools in particular. Kenyan schools are characterised by large class sizes and poorly resourced laboratories (Sifuna and Kaime 2007). A typical example of questions raised in community engagement fora is: 'What is KWTRP doing to advise our schoolchildren on what subjects to choose to become scientists?' (Roka village chief, annual debriefing workshop, 25 October 2007.) From a programme's point of view, involvement with existing school science activities was felt to be appropriate to available expertise and resources. In 2009 we therefore carried out a pilot study to explore the possibility of adding a School Engagement Programme (SEP) to the wider programme's community engagement activities.

In this article we report research staff, teacher and pupil perceptions of the intervention, and the impact of SEP on pupil's knowledge and attitudes towards science and KWTRP research. We discuss the plans for scale-up and the challenges of documenting and evaluating community engagement initiatives such as this.

2 Methods

2.1 Developing interventions activities for schools – a participatory approach

This project was coordinated by Alun Davies who is a British male researcher, fluent in Kiswahili, with 13 years of science teaching experience (including nine years teaching in Kenya's Coast Province) and by Bibi Mbete, a Kenyan female scientist with an MSc from Coast Province, with experience of interviewing youth groups in Kenya. The pilot involved 19 mid-level Kenyan researchers (i.e. degree (9), Masters (5) and PhD level (5)), the District Education Officer (DEO), school heads, Parent Teacher Associations (PTAs), students and 17 science teachers from three schools. The three secondary schools were selected in consultation with the DEO including single and mixed sex, and day and boarding schools. All researchers and the three schools volunteered to be involved in project.

We chose a PAR approach for the design of the intervention because of its potential to ensure that voices, perspectives and experiences of those other than researcher staff were included (Gaventa and Cornwall 2006; Park 2006). Discussions, meetings and workshops throughout the course of the process with all of those involved with the pilot allowed for feedback and reflection, and fed into lessons for future expansion. An initial three-day workshop aimed at brainstorming and planning intervention activities was informed by baseline data (described below). A range of activities identified through this participatory process were implemented, including: school tours of the KWTRP laboratories, visits to schools by KWTRP scientists to talk to students about their work and careers; an inter-school competition where 108 participants presented songs, dramas, posters and talks about science to an audience of 540 students; and support with a laptop, a projector and a subscription to a popular science journal.

To contribute to and supplement the information collected as part of the ongoing intervention

Table 1 **Baseline and post-intervention scores for attitudes towards physics, chemistry and biology**

	Baseline	Post	P
Attitudes towards physics index score	2.05	2.15	0.761
Attitudes towards chemistry index score	1.96	1.95	0.460
Attitudes towards biology	1.44	1.29	0.008*

* Statistically significant improvement in attitude towards biology

activities, self-administered questionnaires were completed at baseline and post intervention by two independent samples of 178 and 167 randomly selected 16–18-year-olds respectively. For both surveys, adolescents were selected from across the three schools in order to measure changes in knowledge and attitudes towards science and research.

3 Results

3.1 Scientists' views and experiences of school engagement

The scientists who took part in the planning and implementing of the project comprised of medical staff, clinical trials project managers, and Masters and PhD students aged between 25–35 years. In exploring their views and experience of being involved in the project, three themes emerged. The first reflected a feeling that the project helped scientists meet their responsibility of contributing to the development of the area, going beyond study-specific obligations to 'give back' or 'pay back to the community' through nurturing more up-to-date and positive attitudes towards science.

A second emerging theme was of benefits to the scientists themselves. Many described in our regular interactions that the intervention offered them an opportunity to reflect on and gain a better understanding of the context in which they work; to get out of their offices and laboratories, and into local schools.

> *You need to have a context for which your work is taking place in. Your work does not take place in a vacuum… We are an institute based in the community, we are not an institute in London where you can be very detached and removed* (Scientist #17).

The third theme emerged as a result of the impressive depth of questions that the teachers and students posed to researchers during presentations. Many scientists started to appreciate the positive contribution that non-research audiences could make to research ideas, and gained insights into their own knowledge gaps and communication skills needs.

> *They asked very basic and brilliant questions… particularly they asked about the interaction of HIV with malaria which there is little literature on… and there is still some controversy and still gaps that need to be filled. It made me want to know and read more on that and just understand the relationship, it was great* (Scientist #15).

> *I think I was a bit naive and thought that they [the teachers] would be passive about the work we do; I thought they would be less critical and analytical* (Scientist #17).

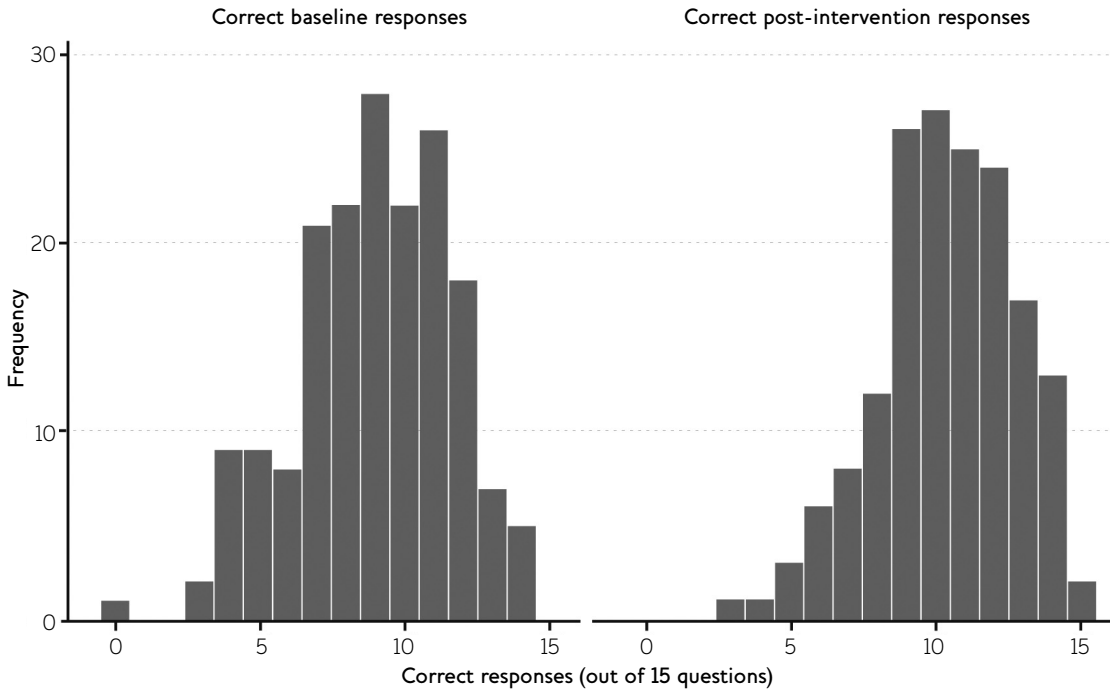
> *They were able to ask questions. There was actually a genuine appreciation* (Scientist #14).

These quotes highlight a change in scientists' perception of the capabilities of community members to appreciate, criticise, form opinions and make suggestions about biomedical research, following their interactions.

3.2 Change in knowledge and attitudes towards KWTRP and research

At baseline, 72 per cent of students gave correct answers to at least seven of the 15 key KWTRP knowledge questions. Three months after the intervention this increased significantly to 89 per cent ($p=0.0001$). This gain in knowledge is also represented by the graph in Figure 1 which shows students' responses to questions about knowledge of KWTRP at baseline and post-intervention. This change was supported by qualitative data where students and teachers gave more accurate descriptions of ethical approval procedures, voluntariness in research participation, and the purpose of conducting

Figure 1 **Frequency of correct responses to knowledge about research and KWTRP at baseline and post intervention**



biomedical research. The greatest knowledge gains were observed among students and teachers who had had the most exposure to the intervention activities.

Baseline discussions revealed mostly positive attitudes towards KWTRP but lack of clarity on the difference between research and health care, and a range of concerns including about the collection of blood samples and the presence of a snake on the institutional logo. These fears contributed to rumours – as described elsewhere – of the research programme being involved in 'devil-worship' (Molyneux *et al.* 2004). Students and teachers also described a '*remoteness*' between the worlds of researchers and the community, and a lack of knowledge about what goes on behind the compound walls of KWTRP. This was attributed to little interaction between staff and community members, and a difference in access to resources and salaries. As one teacher asked, 'How do you expect a person who is earning 100,000 Kenya shilling (£900) to interact with a person who is earning 8,000 (£70) salary [per month]?'

Post intervention quantitative data suggested there was a shift towards more positive attitudes over the duration of the SEP activities, with a decrease in negative attitude scores from 1.44 at baseline to 1.29 post intervention ($p=0.008$). Further evidence for these increasingly positive attitudes came in the form of an increasing willingness and enthusiasm for SEP activities by school participants throughout the intervention, and by the way in which feelings, opinions, concerns and questions were raised and discussed. This process appeared in turn to enable participants to transmit information concerning KWTRP to the rest of the community more confidently and in some cases to challenge rumours.

> *With me the best thing… is that KEMRI has demystified the existing myths about this organisation… People speculated that whatever happens there is something that is very bad. But when we interacted and had a word with you, we shared moments and also we visited the lab, when we came back we told people 'No, whatever you are saying is not true'. We have gone there and we have seen what actually happens at KEMRI is very different from what people discuss* (Teacher #17).

> *I just imagined that scientists are just people who are not normal. I used to think they were beings who [just want to] get blood from human beings. But later when I came to KWTRP I found that scientists are very ordinary and very helpful people* (Student #61).

3.3 Effects of the intervention on attitudes towards science subjects

Across all interviews and focus group discussions there was a perception that this pilot intervention was successful in raising students' attitudes towards science subjects more generally, although the surveys only show evidence of a modest but statistically significant improvement in biology (see Table 1).

Comparison of discussions with students before and after the interventions reveal a shift in the way students described scientists from being mostly male and European or as historical figures such as Isaac Newton or Charles Darwin, to an appreciation of the presence of female and African scientists. The increase in words such as 'ordinary', 'normal', and 'hard-working' in students' descriptions of scientists suggest a lessening in the remoteness previously expressed towards scientists.

According to teachers and students, exposure to scientists inspired confidence in some students to work harder in the science subjects and to make careers in science seem more plausible and attainable. Across the majority of post intervention Focus Group Discussions, teachers, students and stakeholders talked about the potential young scientists had to be role models for students. In addition, exposure to the KWTRP laboratory seemed to contribute positively to the credibility of science through allowing the students to witness scientific phenomena visually rather than 'from books'.

> *I got to see real things with my own eyes. This made me understand things better and it gives me motivation to continue working hard because I see the scientists have made it; and even the young scientists, especially African scientists. So now I know that I can be one of them, [or] even better than them!* (Student #22)

> *We saw carbon dioxide in solid form which we only read in the books. It also broke the monotony of sitting in the class just reading. We saw it in real life situation whereas in class you just cram the things not knowing what they really look like. You will think it's just writings in books but after seeing them we knew that these things are really there* (Student #77).

4 Discussion

Community engagement is increasingly promoted, particularly in international collaborative health research (Nuffield 2002; Tindana *et al.* 2007). In this article we describe the implementation and impact of a pilot participatory intervention involving schools, being considered as one potential component of a wider programme-wide set of community engagement activities. Through incorporating a range of methods, including surveys and qualitative work, and discussion and reflection throughout the project, this article offers a rare, albeit small-scale, documentation of implementation and impact of a community engagement programme.

The initial emphasis of the SEP project was to be an additional mechanism to the broader community engagement programme to demystify research and science and to '*give back*' in an appropriate way to the community. The focus on schools was in response to community member requests and informed by evidence that students can influence their family's health knowledge and behaviour (Christensen 2004; Mwanga *et al.* 2008; Onyango-Ouma *et al.* 2005). While these goals were realised to a certain extent, discussions with scientists and teachers highlighted that other outcomes not fully anticipated at the outset were at least as important, including regular meetings providing a forum for dialogue where concerns could be raised and opinions expressed. Office- and laboratory-based researchers were given an opportunity to appreciate these concerns and opinions and develop a respect for community members' ability to analyse and critique research practice. This may have allowed – as described elsewhere for other stakeholders (Gikonyo *et al.* 2008) – social relationships to develop, which in turn allow more critical discussion and debate of the issues raised at baseline. Ultimately it allowed for greater mutual learning about who the institution's staff are, how they are selected, what they are funded to do, and the potential value of research for Kenya.

Over the course of this intervention we have therefore understood it less as filling in deficits in students' and teachers' knowledge of research and science (Leach and Scoones 2005), and more as one of mutual learning and reducing our own deficits in information and understanding through being given an opportunity to be reflexive about the context in which we work (Leach *et al.* 2005). Thus, the SEP project appears to have had both instrumental value to researchers and community

members, but also intrinsic value. With regards to the latter, it is often described by all as a good and important thing to do, showing and building mutual respect and trust and an increasingly recognised component of the broader community engagement programme.

The understanding and experience young Kenyan scientists have of the issues at the interface between research centres and the communities involved in research is potentially crucial. As key research staff who it is hoped will become research leaders in the future, this cadre of staff are likely future decision-makers on community engagement strategies for studies and research institutions. This will include considering when and how to consult with communities and their representatives, and what depth of involvement communities can have. Engagement with schools is a particularly suitable place for scientists to begin to understand the issues and potential inputs from communities: young scientists have recently been in formal education themselves, there is a direct link to learning and a clear physical environment in which to interact. Schools engagement can also be organised in a way that is manageable to balance with other work requirements. However, there will always be a limit to what can be learned and shared in a school environment. Encouraging such scientists to be involved in other community engagement activities, particularly directly related to their studies (Gikonyo *et al.* 2008; Lang *et al.* 2012; Marsh *et al.* 2011) could also facilitate young scientists' learning.

With regards to school students' learning, the SEP study suggests that interaction and exposure may enable students to incorporate more accurate and current depictions of scientists into their own culture and perhaps enable them to visualise themselves in a future science-related role (Schreiner and Sjoberg 2007). More broadly the interactions may enable students to better identify with successful young local professionals, give an appreciation of what is required to achieve such positions and inspire the plausibility of having a successful career, be it in science or another profession. However, this potential to create role models needs further research.

5 Conclusion

Experience from this pilot study suggests that participatory engagement between researchers and schools not only raises awareness of research and promotes positive attitudes towards science, but also offers researchers an opportunity to appreciate and learn from the community. Expanding these activities to a larger number of schools presents new opportunities and challenges, including the need to carefully document implementation and impact over the longer term on both community members and research staff.

Notes

* We wish to thank the Wellcome Trust's International Engagement Award for funding this project and recognise the vital role played by Salim Mwalukore, Dorcas Kamuya and Vicki Marsh in establishing the Kilifi Schools Engagement Programme. Many thanks also to the numerous staff at the KEMRI–Wellcome Trust Research Programme (KWTRP) who gave their time generously to participate in SEP activities. Lastly we wish to thank the teachers and students of Bahari Girls, Shariani and Kilifi Township Secondary Schools, and to the Kilifi District Education Office for their support to the project. This work is published with the permission of the director of the Kenya Medical Research Institute (KEMRI).

1 See www.kemri-wellcome.org/engagement/community-engagement-workshop (accessed 15 June 2012).

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