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An Assessment of Community Intervention for Reduction of Waterborne Illnesses in Peshawar, Khyber Pakhtunkhwa, Pakistan

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ABSTRACT

Given the recent rise in the scarcity of clean drinking water in Pakistan and waterborne illnesses, a collaborative project between the Institute of Management Sciences (IMS) and Higher Education Commission (HEC) of Pakistan, took place in the city of Peshawar, Khyber Pakhtunkhwa. The aim of the study was to reduce waterborne illnesses by building knowledge and capacity of the communities to enable them to have clean drinking water without incurring high financial costs. A number of awareness seminars, along with health educational material, were delivered to the community through educational institutes. To analyse the effectiveness of the intervention, a pre-project and post-intervention phase through knowledge, attitude and practice (KAP) analysis was conducted to quantify the perceptions and knowledge of the community. The analysis showed that knowledge about waterborne illnesses increased from 52% to 87%, attitude change moved from 16% to 93%, whereas improvement in practices by adopting low cost measures for clean water increased from 15% to 68%. It can be concluded that awareness has positive impact on peoples' behaviour, knowledge and practice, especially when educational institutes are actively involved in community uplift projects. Effectiveness of such initiatives can be assured by widening their scope with involvement of government and non-government agencies as they play a pivotal role in social uplift of communities.

Key words: Waterborne illnesses, clean drinking water, healthcare costs, Peshawar.

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1. INTRODUCTION

Health is an important component of human capital as it enhances workers' productivity by increasing their physical capacities such as strength and endurance; as well as their mental capacities including cognitive functioning and reasoning ability (Bloom and Canning 2005). While socioeconomic status is clearly linked to morbidity and mortality, mechanisms responsible for the association between environment and health have also been explored (Eileen 2012). It is now a proven fact that focusing on the elimination of environmental threats such as access to safe water and sanitation can lead to better health status as well as economic growth (Bloom and Canning 2005).

There has been a decrease in the level of the watertable all around the world because of alarming increase in population and climate change (Pereira et al. 2002). Around the globe, more than a billion people do not have access to clean drinking water due to gradual increase in world population as well as other issues such as drought, overuse and rapid urbanisation. In some parts of the less developed countries (LDCs), the situation is even more conspicuous where water is more costly than milk (Azizullah 2010). Countries like Pakistan are facing great challenges in attaining social and economic growth, and in improving the quality of life of its citizens. The indicators related to the overall environment and its impact on social development indicators and health are still very poor. One of the major factors affecting these indicators is the lack of availability of clean drinking water (Ibid.).

Today, Pakistan is facing numerous health issues. According to a World Bank report, Pakistan is one of the 17 countries facing water shortage. It is pertinent to mention that along with the shortage of water, the quality of water is also deteriorating (CDWA 2016). However, water supply in rural areas is the worst in the province of Balochistan, followed by Khyber Pakhtunkhwa. The situation is much better in Punjab and Sindh (Rasheed 2015).

Lack of clean drinking water has made the lives of children much more vulnerable. Mortality rate of children under five years of age is 101 per 1000 children. Diarrhoeal infections kill 1.5 million children every year (O Reilly et al. 2012). According to estimates of a UNICEF study, 62% of Pakistan's urban, and 84% of Pakistan's rural population neither has access to clean drinking water nor do they treat it properly (Malik 2013). Given this scenario and estimates, more than 20% hospital beds within Pakistan are occupied by such patients (UNICEF 2010). Therefore, focusing on the use of clean drinking water by the communities can avert this situation. In fact, more than 3.5 million children who are at high risk from deadly waterborne diseases in Pakistan can be saved (Rasheed 2015).

Management Sciences (IMS) Peshawar, Pakistan. He has been an active in the fieldwork linked to the

In Pakistan, people mostly use groundwater for drinking and other activities. Unfortunately, rapid industrialsation, exploitation of natural resources and unplanned urbanisation have contaminated water to a great extent. Contaminated water is left untreated because of increased cost of water treatment, the cost of which is borne (directly and indirectly) by already impoverished people. Tackling health issues like diarrhoea, cholera, tuberculosis and other waterborne diseases has never been more imperative than before (Ibid.).

This research aimed at analysing the situation locally by targeting residential areas in Peshawar city of Khyber Pakhtunkhwa province. Water samples from communities were tested, and an efficient and effective awareness campaign was conducted to improve the knowledge, attitude and practices of the community for clean drinking water practices. This played a vital role in building capacity of the communities in a cost-effective manner to treat their water properly before use leading to improved health status and reduced health costs.

1.1. Rationale

Unsafe drinking water can lead to several diseases such as polio, hepatitis A, diarrhoea, typhoid, and intestinal worms. Around 250,000 people die within the country as a direct result of these waterborne diseases (Malik 2013). It is estimated that 1.6 million Disability Adjusted Life Years (DALYs) are lost annually as a result of death and ailment due to diarrhea; whereas almost 90,000 as a result of typhoid (Azizullah 2010). The most cost-effective way of changing this situation is to train targeted human resources who build the capacity of the community later on. For this purpose, considering limited time, resource availability and maximum benefit, the females were targeted. This was also meant to ensure sustainability of the intervention. Since these trained female graduates are the caretakers of their homes, training them and making them aware would result in a knowledgeable future generation.

1.2. Aim

The aim of the study was to reduce waterborne diseases by building knowledge and capacity of the females (and communities) of Peshawar to enable them to have clean drinking water without incurring high financial costs.

1.3. Objectives

1. Assessment of the water used for drinking by the communities through water testing.
2. Targeting and identifying the female graduates belonging to various areas in Peshawar and assessment of their perceptions regarding the use of clean drinking water through pre-project KAP analysis.

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community uplift project.

3. Providing them with knowledge and training regarding safe drinking water practices.
4. Enabling them to deliver this knowledge and training to the localities they belong to for the trickledown effect.
5. Assessment of outcomes through post-project KAP analysis.

2. METHODS

The following methodological framework was adopted in order to conduct this study which took place from September 2016 to July 2017.

2.1. Target Area

Water samples were taken from seven main residential areas of Peshawar. A total of 14 samples were taken from both the source of water and final consumption point at the household level. These samples were tested by the Pakistan Council of Research in Water Sources for 21 parameters broadly categorized as Physical and Aesthetic Parameters, Major Chemical Parameters, and Microbiological Parameters. Various schools and colleges of the same residential areas were targeted to deliver the awareness sessions for knowledge building.

2.2. Knowledge Testing

Before arranging awareness seminars, a pre-project phase was conducted to quantify the perceptions and knowledge of the community regarding this issue. For this purpose, data was collected through KAP questionnaires from all the female graduates of the institutes who were to be provided with knowledge at a later stage. After the awareness sessions, the same participants were approached for collecting data for post-project outcome analysis. This information was used to analyse the impact of the awareness campaign.

2.3. Capacity building of the Participants

Capacity of the female students of the targeted locality was done through seminars conducted at schools and colleges. Both public and private institutes were engaged or partnered to deliver knowledge and training to the target participants for clean drinking water practices. Hand-outs and brochures containing essential information were also distributed among the participants as self-learning material. Around 1000 graduates were reached out through these seminars.

2.4. Trickling down to the Communities

Basic health literature, including pamphlets and posters, which were provided to the participants were further delivered to the community they belonged to enabling trickling down of information at the ground level.

2.5. Analysing the Outcome

A second phase of KAP analysis was conducted with the same group of participants after the awareness seminars to analyse the improvement in the knowledge, attitude and practices of the community.

2.6. Beneficiaries

The beneficiaries of the project included:

1. Students of various institutes who were provided with knowledge and training.
2. Target communities benefitted from clean drinking water practices. They were able to save money that they, otherwise, would have spent on buying clean water, or on treating illnesses caused by using unclean or contaminated water.
3. Educational institutes which were provided with water filters.
4. Healthcare providers in the public sector who will be able to save money they have to otherwise spend on the treatment of patients who come with illnesses caused by drinking unclean water.

3. RESULTS

3.1. Target Area Water Testing

To assess the quality of drinking water, a total of 14 samples of water were collected from the source of water and final consumption point (household). These water samples were tested by following a very strict protocol for obtaining valid results. The water testing results revealed that all the water samples were clean at source, but contaminated at the household level, clearly making it unfit for drinking purposes. It was evident from the results that contamination was taking place through water supply pipelines in the area. Interestingly, even in well-off and planned residential areas in the city, it is alarming that the water supply is not safe with respect to minimal standards.[1] The situation is certainly far worse in other regions of Peshawar city. These results further supported the need of said interventions for community uplift to reduce healthcare costs.

3.2. Results of Pre- and Post-project KAP Analysis

The questionnaire was designed specially to assess the knowledge, attitude and practices of the participants towards safe drinking water. The average age group of the respondents was 16 years and the sample size was 1000 female students. Out of all the participants, 500 were selected randomly for pre- and post-project KAP analysis and Focus Group Discussions (FDGs).

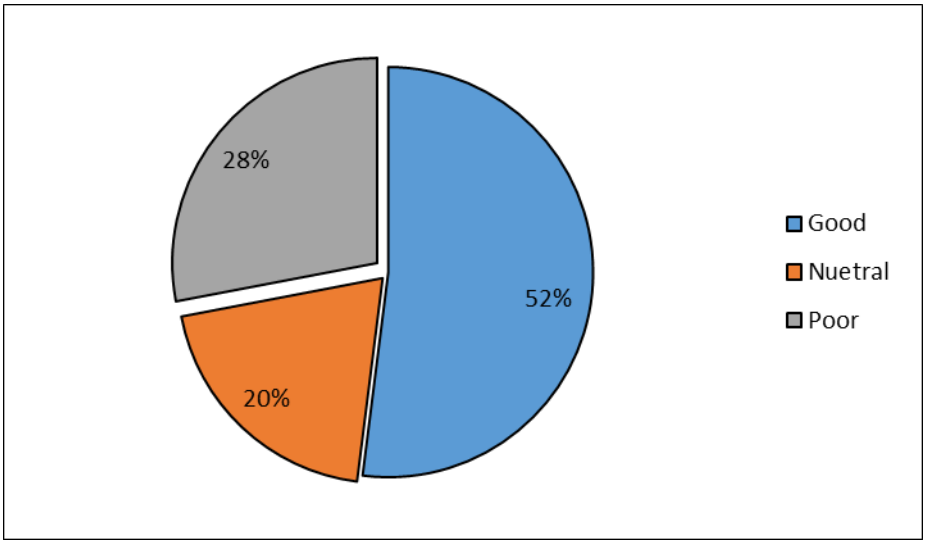
[1] A parametric value in this context is most commonly the concentration of a substance, e.g. 30 mg/l of Iron, a count such as 500 *E. coli* per litre or a statistical value such as the average concentration of copper is 2 mg/l (EPA National Primary Drinking Water Standards).

Given a few basic questions about the topic, 52% of the respondents claimed that waterborne illnesses are one of the main problems in their area; while 44% of the students showed complete dissatisfaction with the water quality they use domestically for drinking. The Municipal Corporation (MC) was revealed to be the only source of water supply for 76% of the respondents residing in these areas. Later, the same instrument was used to analyse the community. The details are as follows:

3.2.1. Knowledge Testing

The questions in the knowledge section of the research instrument comprised of knowledge regarding water borne illness and related health costs. The results of the pre-test revealed that a majority (52%) of the participants were not aware of the illnesses caused by unclean water. On the other hand, 28% of the participants were unaware about the risks and costs related to unsafe water. The result further showed that only 36% of the students were aware that unclean water can cause viral, bacterial and fungal diseases. Regarding the question about the most affected age group from drinking unclean water, 47% of the students selected age group 1 to 5 years, while the rest had no knowledge regarding this very basic question.

Figure 1: Knowledge Level of Participants before Intervention



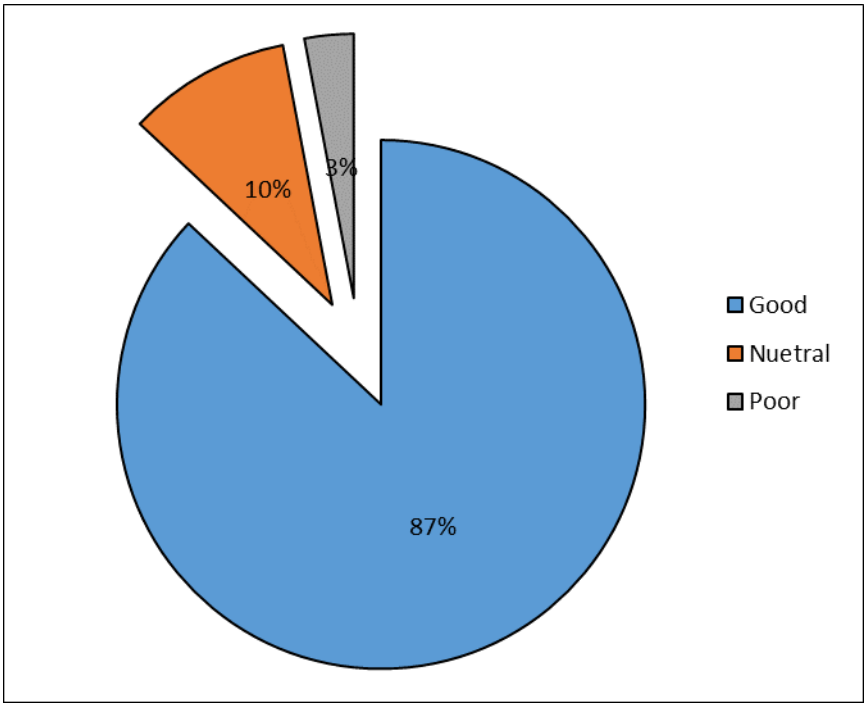
Source: Study findings.

While answering a question about causes of waterborne illnesses, 52% of the students pointed out poor sanitation as the main problem, while 3% and 7% of the students pointed out surface water, and rain and floods respectively as the main reasons for contaminated water.

After the awareness seminars, training and capacity building, the students were asked to give their responses to a number of questions related to knowledge, attitude and practices related to drinking water practices. A significant improvement was revealed in the post-KAP test: 87% of the respondents showed a significant increase in their knowledge related to waterborne illnesses, where 10% were found to be neutral. In the words of one of the participants:

> I had no idea about the very basic knowledge that I should have being an educated person. These seminars provided me with a great deal of information about why it is so important to clean water before drinking (Student ICMS, Peshawar).

Figure2: Knowledge Level of Participants after Intervention



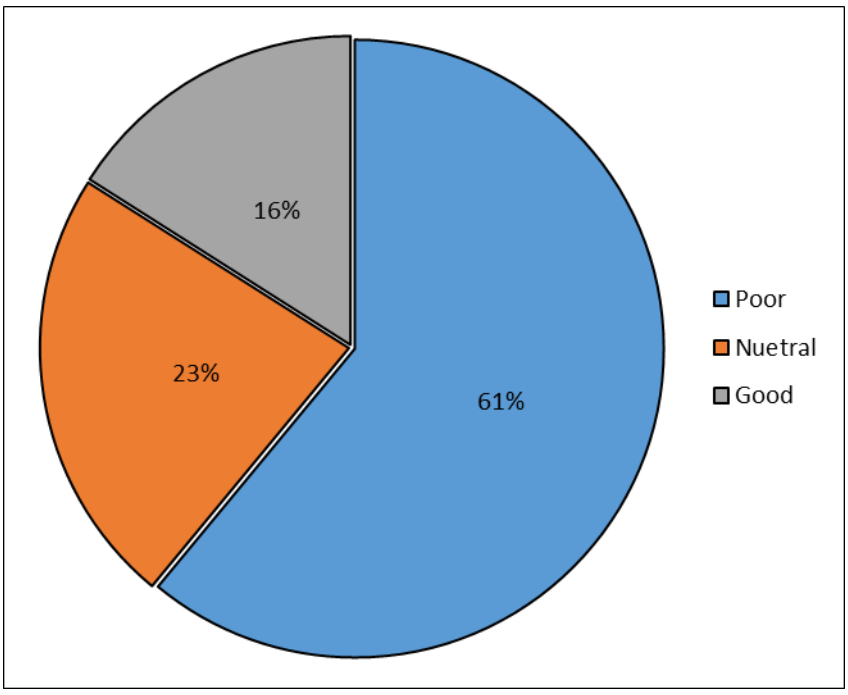
3.2.2. Assessing Attitude

Evidence from questions related to attitude showed a similar pattern where around 61% of the respondents showed poor attitude towards safe drinking water practices. Major reason behind the poor attitude was found to be lack of knowledge and a carefree attitude towards the issue. Interestingly, those students whose knowledge was found to be comparatively better also scored less in the domain of attitude indicating that majority of the respondents care less about the quality of their health. However, 49% of the students showed confidence that waterborne illnesses can be easily cured, whereas 27% were

uncertain and 10% strongly opposed the idea of easy solutions to the issue of waterborne illnesses.

Some 51% of the respondents supported the idea of having awareness and training sessions for the reduction of waterborne illnesses, while 39% of the students remained uncertain. Only 6.7% of the students claimed that such sessions cannot play an important role in the reduction of waterborne illnesses. 61% of the students highlighted the significance of the role government and NGOs can play for the supply of clean drinking water.

Figure 3: Attitude Assessment before Intervention



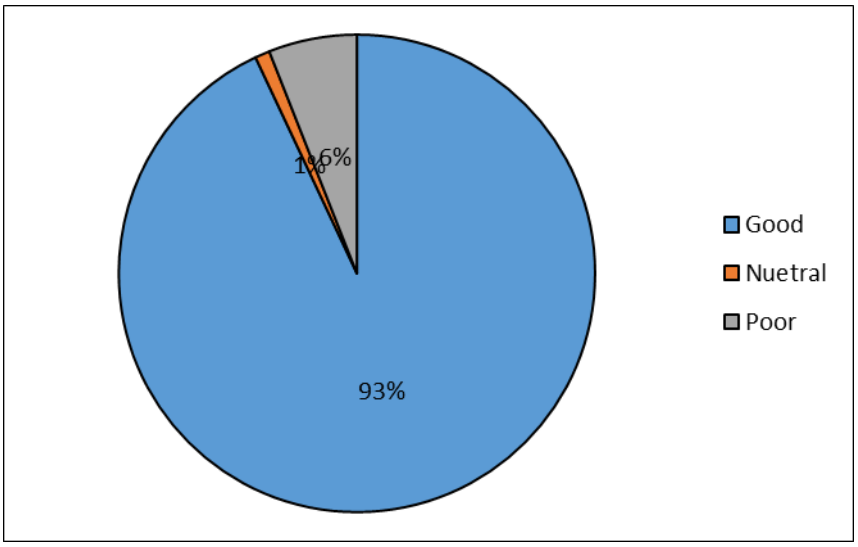
Source: Study findings.

The post KAP analysis revealed a significant improvement in the attitude of majority (93%) of the participants towards the issue. Only 1% remained neutral, whereas 6% still showed a poor attitude. According to one participant:

> I have good reading habits, therefore, I remain updated regarding various issues. My knowledge was good about waterborne illnesses, but I never paid much attention how to take measures in order to have clean water for drinking. After these sessions, I felt that I was lucky that I never caught any disease despite drinking contaminated water. Now after the sessions, I have decided not to take any chances. For

the sake of my own health and my family's, I will make sure to at least boil water properly before using it for drinking purposes (Student, Forward School).

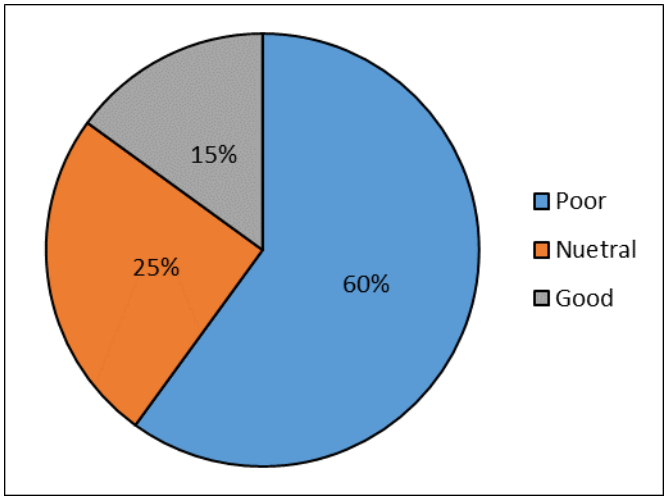
Figure 4: Attitude Assessment after Intervention



3.2.3. Assessing Practices

The pre-project analysis show that 60% of the respondents had poor practices regarding cleaning water before drinking, while 25% remained neutral.

Figure 5: Practice Assessment before Intervention

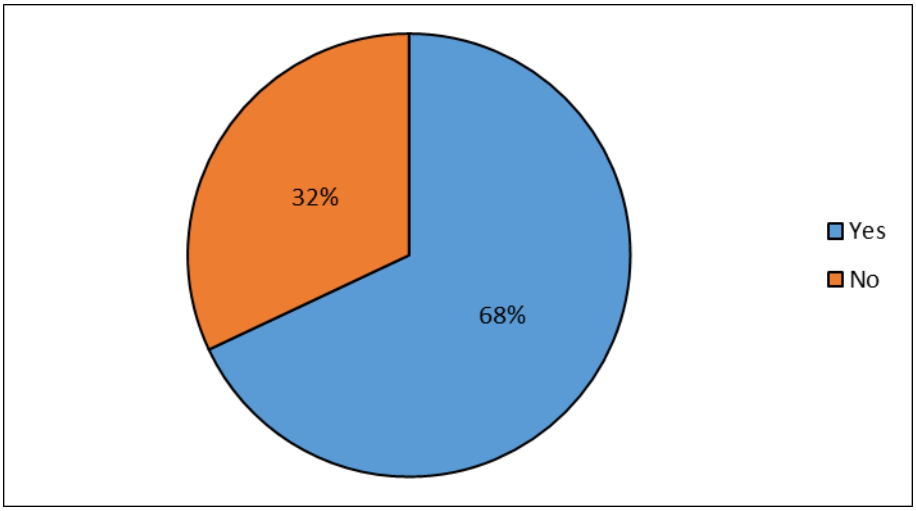


Source: Study findings.

The post-intervention KAP analysis showed that around 68% of the participants took some measures to clean water before drinking, while the rest did not take any measures. In the words of a participant:

> The awareness sessions taught us a lot of important things; most importantly they taught us how to clean water before drinking in simpler ways. Although we have not taken any measures yet to clean water before drinking, I have convinced my family members about the alarming situation related to drinking water quality and we have planned to install a filtration machine for drinking water (Student GGDC, Peshawar).

Figure 6: Practice Assessment after Intervention



Source: Study findings.

Some 56% of the respondents agreed to the fact that government and local community cooperation is necessary for the control of waterborne illnesses.

4. DISCUSSION AND CONCLUSION

Improving social indicators through awareness seminars has proved to be an important tool in literature (Gary 2013). The results of this study also found the same pattern. Since water in the target areas was being contaminated because of the poor maintenance of water supply through pipelines, major interventions from the authorities have to come into play. Contamination in water due to a poor supply system is a leading cause of poor quality drinking water throughout the world (United Nations 2003). Various studies have shown seepage which contains magnesium from the surroundings into rusted pipelines, to be a leading cause of stomach problems and many other stomach-related diseases (Shah

2008). Moreover, water storage tanks which are supposed to be cleaned after every three months are not cleaned.

The results of KAP analysis through the questionnaire revealed that majority (52%) of the participants stated waterborne illnesses as a main problem in their area, along with showing dissatisfaction with the quality of water available for drinking purposes. Contaminated water is major cause of many diarrhoeal diseases including cholera, typhoid and stomach worms (Azizullah 2010). In the absence of steps taken by authorities, it is important to improve community practices to take safety measures.

Pre- and post-project KAP analysis of the study revealed a significant rise in the knowledge, attitude and practices of the community. Where majority (52%) of the participants seemed to be aware about the diseases caused by contaminated water, after the awareness sessions, 87% of the participants had their knowledge increased showing encouraging results. Seminars and training sessions build the capacity of people. They serve as a first step towards awakening people towards a problem, and enabling them to work and understand it for their own betterment (Charles 2000). A similar outcome has been found in other designed interventions where awareness sessions played a vital role in improving target issues (Gary 2013). For example, in the rural community of Faqir Wala, Pakistan, the United Nations International Children's Emergency Fund (UNICEF) conducted seminars to enable the community in question to have better access to clean drinking water and hygiene practices. By the virtue of sessions and the water pumps installed for clean water, provided by UNICEF, they were successful in providing the village with clean drinking water and creating awareness among the villagers with regard to negative impacts of using contaminated water (UNICEF 2010).

However, it is rather difficult to assess the role knowledge uplift plays in changing attitudes over the long term. It also depends on the kind of knowledge that is being provided to the participants along with the way it is delivered. Awareness programmes which provide solutions to the problems mostly end up investing knowledge in people by changing their attitudes. In post-project analysis of attitudes, it was revealed that 73% of the participants showed a positive change in their attitude enabling them to prepare their family members regarding clean water drinking practices. This is a clear indication of a changing attitude which is persuasive not only for the participants, but also for the people working for this cause. Malik (2013) also found similar results. However, most participants stressed that the government and NGOs need to be involved in this matter to solve it.

Post-project practice assessment showed that 60% of the participants took practical measures to clean their drinking water. However, they recommended that the government should also provide clean drinking water. For example, initiatives have been taken by the Government of Punjab in which water filtration plants, with a capacity of 500/1000/2000

gallons per hour, were installed in parts of Lahore, Kasur, Okara, and Bahawalpur under the project 'Clean Drinking Water for All' providing clean drinking water to the people whose health has been affected by various diseases (CDWA 2016; Rasheed 2015). Collective efforts by the government, UN agencies and NGOs, will give additional impetus to this issue. At the community level, although awareness generation is a slow process, it does bear long-term and sustainable results (Falkenmark et al. 1989).This intervention specifically targeted females in order to ensure its sustainability since these trained female graduates are the caretakers of their homes; and training them and making them aware would result in a knowledgeable future generation. The post-project survey confirmed the above argument. In the post-project FGDs, the female participants shared that the knowledge they had learned from the sessions was shared by them with the rest of their family members; and that they were now taking necessary steps to ensure practicing what they had learned. While being an overall success, this study had the following limitations:

1. Due to limited time and finances, few areas were targeted. The contaminated water situation is far worse in other areas where similar interventions are needed.
2. Since educational institutes have a very rigid approach towards following their curriculum, educational activities providing knowledge other than from textbooks are not greatly supported. Due to the lack of positive response from schools/colleges, only a limited number of institutes could be accessed.

5. RECOMMENDATIONS AND THE WAY FORWARD

1. The government needs to play its role efficiently in providing clean drinking water. Such interventions will reduce the illness burden to a greater extent, further reducing the cost of health care particularly of the public sector.
2. Educational institutes must be involved in community uplift projects. This can be achieved by making such projects/campaigns an important part of their curriculum. A great number of people can be easily reached in a cost-effective manner by educating graduates in schools and colleges.
3. More interventions are needed to create awareness in other settings where the problem of availability of clean drinking water is worse. As a way forward, further research is needed in order to calculate the reduction in health care costs after the improved practices of community.

6. ACKNOWLEDGEMENTS

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