Original Article

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The household water usage Community awareness regarding water pollution and factors associated with it among adult residents in MOH area, Uduvil

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Abstract

Introduction: Water pollution is a one of the public health burdens and the consumption of contaminated water has adverse health effects and even affects fetal development. The objective was to describe the household water usage pattern, community awareness of water pollution and factors associated with it among adult residents in MOH area, Uduvil.

Method: A descriptive cross-sectional study was conducted on a community-based sample of 817 adult residents with multi stage cluster sampling method. The data was collected by an interviewer administered questionnaire. Statistically significance for selected factors and awareness were analyzed with chi square and Mann-Whitney U test.

Results: This study sample consisted of 85% (n=695) female, mean age of 47.8±16.2. Majority 97.5% (n=797) of the participants knew about the water pollution in their area. Only 23% (n=188) participants knew about all the characters of good water. Among the participants 48.6% (n=397) had noticed the organoleptic changes in their own well and only 1.5% (n=12) had confirmed the pollution by lab test. Among them 71.2% (n=582) were treating the water and 24.9% were boiling the water. The median knowledge score was 10.93. There is significant difference in knowledge related to water pollution among different educational levels (U= 53339.5, p<0.001) and the presence of water related diseases in the family (U=54146.5, P<0.01). There was a significant association with the age groups and their water treatment practices ($\chi 2$= 7.17, *P*<0.01), the presence of under 5-year age child in the family had significant association with water treatment practices ($\chi 2$=13.1, *P*<0.001).

Introduction

Water is the driving force of nature and most important natural resource that permeates all aspects of the life on Earth. It is essential for human health and contributes to the sustainability of ecosystems. Safe water access and adequate sanitation are two basic determinants of good health (1). Both of these are important to protect people from water related diseases like diarrhoeal diseases and typhoid (2).

Clean drinking water is important for overall health and plays a substantial role in health of children and their survival. Giving access to safe water is one of the most effective ways to promote health and reduce poverty. All have the right to access enough, continuous, safe, physically accessible, and affordable water. Globally 3 out of 10 people or 2.1 billion are facing difficulty in access to safe, readily available water at home according to a the report by World Health Organization (WHO) (3)

Increase access to improved drinking water is one of the Sustainable Development Goals of United Nations. The access to safe water drinking water by 2030, the fight to eradicate extreme poverty is the key concept. It includes following the targets by 2030, improve water quality by reducing pollution, and implement integrated water resources management at all level (4).

Sri Lankan people have access to the river water, springs, underground water, and pipe water. Jaffna district is in the northern part of Sri Lanka. Jaffna district is in the Northern part of Sri Lanka with extent of 1012.01 Sq.km. It is in the dry zone of Sri Lanka. Jaffna district in the dry zone of Sri Lanka and the groundwater is the major natural

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water resource in the Jaffna. The underground water is situated in the Miocene limestone as aquifers. There are four main aquifer systems in Jaffna district namely Chunnakam (Valikamam area), Thenmaratchi, Vadamaratchi and Kayts. Valikamam area aquifer is intensively used for cultivation purposes (5). The Uduvil MOH is one of the twelve MOH s in the Jaffna district.

These aquifers are recharged by the seasonal monsoon rains. A study done in Jaffna shown that the underground water of Jaffna district was facing many threats. The underground water resource quality had been deteriorating over the time and it is a limited resource. Time to time there were different types of threats to these aquifers. These threats have justified the needs for continuous water quality monitoring, investigation and community awareness. A major water quality problem, identified in the 1950s and highlighted in the 1960s, is seawater intrusion into the groundwater system. Later, the threat was the high nitrate problem related to high usage of fertilizers, and congested household soak-pit systems (6). The high concentration of nitrate in the water can cause adverse health effects.

The major reasons for this excess amount of nitrate in the ground water were the excess usage nitrogen containing fertilizers, high population density and shallow groundwater table. Chunnagam, Kopay and Kondavil areas are identified as most nitrate contaminated areas among other study areas, as well as the higher numbers of stomach cancer patients reported. (7) Fertilizer is now used freely after the war in the North and nitrogen-intense agricultural practices have polluted not just the Chunnakam aquifer but all other available freshwater resources as well .

There are few studies showed the underground water is contaminated with micro organisms and oil. The study done in MOH Kopay shows the majority (90%) of public water sources were microbiologically unsuitable for drinking. Coliforms and E.coli were found to be higher than the Sri Lankan Standard in 90% of the water samples collected from public water sources (8)

Also it is being realized that the ground water is polluted by oil waste in the Vallikamam area. During 2013 – 2014, a study was carried out by the water supply and drainage board with the samples of well water from a 1.5 km diameter area surrounding the Chunnakam power station, found that the great majority of wells (73%) were contaminated with oil (9).

It's clearly shown that Uduvil MOH area especially Chunnakam underground water was contaminated with nitrate, bacteria and oil. There are many evidences showed that water born diseases are high prevalence in Jaffna Distinct. A study has shown that the waterborne diseases such as diarrhoeal, dysentery and enteric fever were common in Jaffna District (10).The statistics from Jaffna RDHS has also shown clear evidence to prove that waterborne diseases were high in Jaffna District (11) .

The community awareness regarding the water pollution needs to be assessed as the clean water is the basic human right and important factor for good health. With the personal experience of the researcher as a Medical Officer of Health in Jaffna district, the community awareness regarding the water pollution is not adequate enough. Unfortunately, there were no researches done in Jaffna about the awareness of the community regarding this current burning issue.

Water insecurity is the main issue to be addressed. The fear of contamination and related health risks can lead to emotional distress and it can lead to psychological consequences. Finding the alternative methods for safe water and investments for them will affect their economical level.

This study was conducted to describe the community awareness on water pollution and the factors associated with it. The findings would help to prevent further pollution and to plan preventive activities.

Method

A community based cross sectional study was carried out undertaken to describe the community awareness of water pollution and associated factors among adult residents in MOH area, Uduvil.

The Uduvil MOH area has its boundaries with Thelipallai MOH area which forms the Northern side, Nallur MOH area which forms the South with Sandilipay and Kopay forming the Eastern and Western borders respectively (Divisional Secretariat, 2016). The data collection period was from 8th August 2016 to 12th September 2016.

The study population was all adults residing more than 5 years. Multi stage Cluster sampling method was used as the sampling technique for this study. One Grama-Niladari (GN) area was considered as a cluster.

The study instrument was an interviewer administered questionnaire consisting of main components including general information, water sources and safe water practices, knowledge related to water pollution, awareness related to water pollution and risk factors for water pollution.

The questionnaire was pre-coded for the convenience of data analysis using SPSS.

The significance differences on knowledge score with socio demographic characteristics of the study population and other factors were checked with the chi square tests and Mann-Whitney U test. For inferential statistical analysis to determine the associations between individual and other factors in the questionnaire were considered as dependent variables while the correlates of were considered as independent variables. Score was given to the questions related to knowledge on water pollution. The score was given to each response from 0 to 4 with a maximum score of 20.

Ethical clearance was obtained from the ethics review committee of the Faculty of Medicine, Colombo.

Result

This study sample consisted of 85% (n=695) female, mean age of 47.8±16.2 and all (100%) the participants were Tamils. The majority 530 (77.1%) of the study participants had the highest educational achievement of G.C.E O/L or above. The majority706 (86.5%) of the participants were married. The average members in the household among the participants were four with minimum of one and the maximum of nine. The majority of the participants were housewives 638 (78.1%).Among the participants 423 (51.8%) had household income between Rs.10001 to Rs.30000.

Household water source was mainly wells (73.9%). Table 1 shows types of the own household water sources of the participants

Table 1: Distribution of the household water sources among the participants

Types of water source	No	%
Type of own well		
Dug well	444	54.3
Tube well	160	19.6
Protected type (Dug well)		
Protected	231	28.2
Semi protected	125	15.2
Unprotected	88	10.7

Despite having own water source people used other sources too for drinking purposes. Table 2 shows the distribution of source of drinking water.

Table 2: Distribution of the household water sources among the participants for drinking purposes

Water sources	No	%
Drinking		
Own well (Dug well and tube well)	565	69.2
Common well	80	7.3
Common well	80	9.8
Neigbour well	20	2.4
Local Government supply	142	17.4

Bottle water	10	1.2
Other	0	
Total	**817**	**100**

Table 3 describes the reason given by the participants for not using their own well water for drinking purposes. Most 39 (4.8%) of them were suspecting the pollution in their well.

Table 3: Reason for not drinking from own well

Reason	No.	%
Suspected pollution	39	4.8
Taste is not good	20	2.4
Smell is not good	20	2.4
Lab value indicate pollution	8	1.0
Other	0	0

**participants selected multiple options*

Majority 97.5% (n=797) of the participants knew about the water pollution in their area. Only 23% (n=188) participants knew about all the characters of good water.

Among the participants, 25% (n=205) knew at least 4 diseases out of the 5 given diseases spread by contaminated water. Among the participants 48.6% (n=397) had noticed the organoleptic changes in their own well and only 1.5% (n=12) had confirmed the pollution by lab test.

The median knowledge score was10.93. Majority of the participants said that human waste (428) and garbage (413) contributed to the underground water pollution. Majority (n=420, 51.4%) of the participants responded that proper monitoring of Factory and monitoring the septic (n=410, 50.1%) tank is important. Majority (n=450, 55%) of the participants agreed that they gained the knowledge from newspaper. Nearly 409(50.1%) strongly agreed that they have gained knowledge from radio while 408 (49.9%) from TV and 408(49.9%) from website.

There is significant difference in knowledge related to water pollution among different educational levels (U= 53339.5, p<0.001) and the presence of water related diseases in the family (U=54146.5, P<0.01). There was a significant association with the age groups and their water treatment practices ($\chi 2$= 7.17, P<0.01) , the presence of under 5 year age child in the family had significant association with water treatment practices ($\chi 2$=13.1, P<0.001).

Discussion

The main purpose of this study was to understand the community awareness of water pollution among the adult residents in Uduvil MOH. Assessing the awareness of the females, especially housewives is important as they are the people mainly involved in the household safe water practices, fetching the water and look after the children in the family. Even though with the more female representation there is no statistical differences found.

The findings of this study showed that 604(73.9%) participants had own well out of them 444 (54.3%) of the participants were having dug well in their promises. Out of them only 231 (28.2%) were protected wells. Around 160 (19.6%) of the participants were having tube wells and 54.3% (n=444) of the participants were using their own dug well for drinking purposes. The study done in Nyeri town, Kenya showed that highest number of participants used municipal tap water. Education level is important for the awareness. Among the participant 70% stayed in the area more than 5 years. Our study had 40 to 60 age group as the majority (n=329, 40.2%), and 64.8% had highest educational achievement of G.C.E O/L or above (13).

Among the participants 80.8% (n=660) had access to the water within 30minutes walking distance. If a round trip to collect water takes 30 minutes or less, then it will be classified as a basic drinking water service. If water collection from an improved source exceeds 30 minutes it will be categorized as a limited service. Due to recent water pollution issues in few areas the local government was supplying the water via the vehicle. This may be the possible reason that more people can access within 30minutes of walking distance.

There was significant difference in knowledge scores between the educational categories O/L or above (-8.82, *P*<0.001) group had significantly high knowledge score than below O/L group. Due to their educational qualification they may be better aware of the water pollution.

Family with the experience of water related diseases within 2 years also had the high knowledge score ($Z=-4.76$, $P<0.01$). Also safe water practices like treating the water for drinking purposes and the water storage practices also influenced by following factors.

Conclusions:

Community awareness on water pollution among the participants and their safe water practices were not satisfactory. There is a clear need for improvement of the individual level capacity by conducting awareness programs and programs on attitudinal change among the community.

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