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Preferences of water purification techniques used at household level in rural and urban areas of Kangra district of Himachal Pradesh

Jatinder Kishtwaria and Sumita Katoch
Department of Family Resource Management
College of Home Science
CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur-176 062.

Abstract

The present study was conducted in Kangra district of Himachal Pradesh to study the preferences of water purification techniques used at household level. A total sample of 120 respondents 60 each from rural and 60 from urban area were selected. Assessment of drinking water quality included various aspects viz; sources of water distance from the house, devices used and preference of water purification techniques. Ranking technique was used for finding out the preferences for adoption of water purification practices. Preferences of water purification techniques at household level were classified into three groups namely high, medium and low on the basis of total assigned scores for daily routine and rainy season. It is concluded that the out of all practices the higher score was usage of candle filter by both rural and urban households.

Introduction

In most Indian villages, supply of safe drinking water is a serious problem; around 1.1 billion people globally do not have access to improved water supply sources. The most affected are the populations of developing countries, living in extreme conditions of poverty, normally peri-urban dwellers or rural inhabitants. Among the main problems which are responsible for this situation are: lack of financial resources, lack of sustainable water supply and sanitation services, poor hygiene behaviours, and inadequate sanitation in public places. Domestic water supplies are one of the fundamental requirements for the human life. Without water, life cannot be sustained beyond a few days and the lack of access to adequate water supplies lead to the spread of the diseases. Children bear the greatest health risk burden associated with poor water and sanitation. Gastrointestinal diseases attributed to poor water supply, sanitation and hygiene account for 1.73 million deaths each year and contributed over 54 million disability adjusted life years, a total equivalent to 3.7 per cent of the global burden of the diseases (Anonymous, 2002). This places diarrhoeal diseases mainly due to unsafe water, sanitation and hygiene as the 6th highest burden of diseases on a global scale. The importance of adequate water quality for human health has been recognized and there has been frequently several extensive debates about the relative importance of water quality, water sanitation and hygiene in protecting and improving health. Hence, it becomes pertinent to access the sufficient quantities of safe water, the provision of facilities for a sanitary disposal of excreta, and introducing sound hygiene behaviours are of capital importance to mitigate the burden of disease caused by these risk factors. An important fraction of the burden of water-related diseases (in particular; water-related, vector-borne diseases) is attributable to the water resources are developed and managed depend upon the development and their management. Therefore, present study was conducted to find out the preferences of water purification techniques used at household level both in rural and urban households.

Material and Methods

Two stage random sampling technique was used for achieving the objective of the present investigation. From the complete list of municipal wards of Palampur two wards were selected randomly. viz. *Vidyarthion and Janglat*. A separate list of villages, around Palampur town (periphery of 10 kms) was prepared. From this list, two villages viz., *Bundla* and *Chimbalhaar* were selected through proportional allocation method.

A total sample of 120 respondents, 60 from rural (villages) and 60 from urban (municipal council) area were selected through proportional allocation method. A well-structured and exhaustive interview

schedule was designed to record the complete data. The schedule comprised of general and specific statements or questions regarding drinking water sources, distance from the home, device used and water purifications techniques used for drinking water to fulfilling the objective of the study. The data were collected by the use of pre-tested interview schedule through personal interview method from the sampled respondents. The preferences of adoption of various water purification techniques were categorized into high, medium and low by awarding scores. The answers one ward of such statements was assigned a weightage 2 (yes) and 1(no) for responses. The data were analyzed in frequencies, percentages, mean and standard error to quantify the various variables under the study.

Results and Discussion

Personal and family characteristics

Majority of the respondents both in case of rural (30.1 per cent) and urban (36.6 per cent) areas belonged to age group of 35-44 years. Almost an equal percentage of rural respondents under study were reported to be either illiterate (28.3 per cent), or upto primary (26.7 per cent) level of education. However, in case of urban respondents, majority of them studied upto senior secondary level (35 per cent).

Table 1. Personal characteristics of respondents

S.No.	Particulars	Rural (N=60)	Urban (N=60)	Total (N=120)
1.	Age (Years)			
	Upto 24	6(10.0)	2 (3.3)	8(6.7)
	25-34	17 (28.3)	21 (35.1)	38 (31.6)
	35-44	18 (30)	22 (36.6)	40 (33.3)
	45-54	17 (28.3)	11(18.3)	28 (23.3)
	55 and above	2 (3.3)	4 (6.7)	6 (5.0)
	Mean	37.5	38.4	38.0
	Standard deviation	10.3	10.6	10.4
	Total	60 (100)	60 (100)	120 (100)
2.	Education			
	Illiterate	17 (28.3)	1(1.7)	18 (15.0)
	Primary	16 (26.7)	1 (1.7)	17 (14.1)
	Middle	17 (28.3)	-	17 (14.1)
	Matriculation	8 (13.3)	15 (25.0)	23 (19.1)
	Senior secondary	2 (3.3)	21(35.0)	23 (19.1)
	Graduation	-	16 (26.6)	16 (13.3)
	Post graduation	-	6(10.0)	6 (5.0)
	Total	60 (100)	60(100)	120 (100)

Figures in parentheses indicate percentages

Source of water and storage devices used

In rural areas, majority of respondents used (78.3 per cent) tap water. About 28.3 per cent also used *bauri water* and rest 3.3 per cent used hand pump water. In urban areas, cent per cent respondents used tap water but 61.7 per cent also preferred hand pump water for drinking purpose.

Multiple responses

Majority of respondents (96.7 per cent) in urban areas traveled less than 10 meters distance for fetching water followed by 30.0 per cent respondents who traveled between 115 to 220 mts. and least number of respondents (10 per cent) traveled 325-500 mts. for fetching water (Table 2).

The vessels are needed to collect, store and use water for washing, cooking and bathing purpose. Cent percent rural respondents preferred earthen pots for storage of drinking water. The observation of this study is also in consonance with findings of Mehta *et al.* (1991) They reported that in Kanpur, majority of respondents used earthen pots for storing drinking water because of its ability to keep water cool. However, 41.7 per cent respondents opined that pitchers were easy to handle while fetching and storing the water.

Stainless steel pitchers were also in vogue among 41.7 per cent rural households. The reasons for their use were economical in long run (41.7 per cent) and unbreakable (5.0 per cent) Buckets were another major device used by 48.3 per cent of the rural respondents because of the reason that they were easy to clean (45 per cent) and handle as opined by about 40 per cent respondents (Table 3).

Majority of respondents from urban areas (86.7 per cent) preferred to use filters for clarifying water while 80 per cent considered it good for health. It was considered easy to handle and easy to maintain by 48.3 per cent and 30 per cent respondents, respectively. Bhatti and Verma (1992) assessed the feasibility of water filter in context to field situations. A study in Hisar district of Haryana reported that highest percentage of respondents perceived that the water filters were feasible and only 20 per cent of the respondents found that the water filter were not at all feasible for continuation after they had been exposed to the innovation through action programmes.

Buckets were next popular vessel by 30 per cent urban respondents as they considered it easy to handle (21.7 per cent) as well as easy to clean (15 per cent). Thereafter twenty per cent urbanites preferred plastic containers including canny, bottles, mugs and the reason for the preference was easy to handle by 18.3 per cent, easy to maintain by 5 per cent respondents.

Table 2. Distribution of respondents according to source of water and distance travelled

Sr. No.	Water sources	Rural (N=60)	Urban (N=60)
1.	Water source		
	Bauri	17 (28.3)	-
	Handpump	2 (3.3)	37 (61.7)
	Tap	47 (78.3)	60 (100)
2.	Distance from house (mts.)		
	<10	4 (6.7)	56 (93.3)
	10-115	2 (3.3)	-
	115-220	40 (66.7)	18 (30.0)
	220-325	15 (25.0)	13 (21.7)
	325-500	1(1.7)	6(10.0)

Figures in parentheses indicate percentages

Table 3. Distribution of respondents according to devices used for storage of drinking water and their preferences for use

Sr. No.	Device used/preferences	Rural (N=60)	Urban (N=60)
1.	Earthen pitcher	60 (100)	-
	Easy	25 (41.7)	-
	Keep water cool	33 (55.0)	-
	Economical	12 (20.0)	-
2.	Brass pitcher	6 (10.0)	-
	Unbreakable	5 (8.3)	-
	Keep water cool	3 (5.0)	-
3.	Copper pitcher	2 (3.3)	3 (5.0)
	Easy to handle	2 (3.3)	-
	Unbreakable	1(1.7)	1 (1.7)
	Safe for health	-	3 (5.0)
4.	Stainless steel pitcher	25 (41.7)	3 (5.0)
	Economical	25 (41.7)	2 (3.3)
	Unbreakable	3 (5.0)	1 (1.7)
	Easy to handle	16 (26.7)	1 (1.7)
	Easy to clean	12 (20.0)	-
5.	Bucket	29 (48.3)	18 (30.0)
	Easy to handle	24 (40.0)	13 (21.7)
	Easy to clean	27 (45.0)	9 (15.0)
6.	Filter	2 (3.3)	52 (86.7)
	Easy to handle	1(1.7)	29 (48.3)
	Easy to maintain	1(1.7)	18 (30.0)
	Good for health	2 (3.3)	48 (80.0)
7.	Plastic containers and *lotta*	9 (15.0)	12 (20.0)
	Easy to handle	6 (10.0)	11 (18.3)
	Easy to maintain	4 (6.7)	3 (5.0)

Multiple responses, Figures in parentheses indicate percentages

Water purification techniques used at household level

The practice of water purification for daily routine usage in rural households was not at all in vogue. Only 3.3 per cent respondents possessed water filters while 5 per cent strained water through muslin cloth for clarification of solid particles, whereas, 86.6. Percent urban households used water filters (candle type) followed by use of bleaching powder by 20.0 per cent, only 5 per cent respondents used aquaguard for water purification. However, during rainy season 40 per cent of rural respondents used muslin cloth for

water purification and rest used candle filter and water boiling techniques were in practice by only 3.3 per cent in each case. Kusum *et al.* (2001) conducted a study in Muzaffarpur district, Bihar and reported that 28.16 per cent of the respondents possessed knowledge of filtration of water. The method of straining water through muslin cloth was known and practiced by majority of them but knowledge pertaining to branded water filters and Janta water filters was altogether lacking. In urban areas, each of 86.6 per cent of respondents used water filters as well as boiling of water, about 30 per cent of respondents disinfected water by adding bleaching powder in water tanks. Least percentage of respondents that is 10 per cent followed the practice of chlorination, while only 5 per cent respondents used aquaguard (Table 4).

Preference of water purification techniques at household level were classified into three groups namely high, medium and low on the basis of total assigned scores that is mean (x) and standard errors (S.D.) for daily routine and during rainy season. It was observed that out of all the practices, the higher score (174) was observed for both rural and urban combined in daily routine usage for candle filters followed by moderately preferred practices such as incorporation of bleaching powder, staining through muslin cloth, chlorination, and use of aquaguard during rainy season. It was further noticed that out of all categories, boiling and candle filters obtained higher score (174 of each), while remaining all other practices were moderately preferred, nevertheless, the least used practice was aquaguard (Table 5). Park and Park (1991) ascribed the standards of water samples according to W.H.O. international standard for drinking water.

Table 4. Distribution of respondents according to water purification techniques used at household level

Sr. No.	Purification techniques	Rural (N=60)	Urban (N=60)
1.	Daily		
	Boiling	-	-
	Filtration (with muslin cloth)	3 (5.0)	2 (3.3)
	Filteration(with candle filter)	2 (3.3)	52 (86.6)
	Chlorination	-	3 (5.0)
	Bleaching powder	-	12 (20.0)
	Any other (aquaguard)	-	3 (5.0)
2.	During rainy season		
	Boiling	2 (3.3)	52 (86.6)
	Filtration (with muslin cloth)	24 (40.0)	-
	Filtration (with candle filter)	2 (3.3)	52 (86.6)
	Chlorination	-	6 (10.0)
	Bleaching powder	-	18 (30.0)
	Any other (aquaguard)	-	3 (5.0)

Multiple responses, Figures in parentheses indicated percentages

Table 5. Distribution of sample according to preferences of adoption of water purification practices at household level

Sr. No.	Duration/Practices	Total score in descending order (rural and urban)	Group
1.	Daily		
	Candle filter (candle filter)	174	High
	Bleaching powder	132	
	Straing (Muslin cloth)	125	
	Chlorination	123	Medium
	Aqua guard	123	
	Boiling	120	
2.	Rainy season		
	Boiling	174	High
	Filtration (candle filter)	174	
	Filtration (with muslin cloth)	144	
	Bleaching powder	138	Medium
	Chlorination	126	
	Aqua guard	120	Low

Daily: Mean (X) = 132.8; Standard Error (S.E.) = 20.5; No of respondents= 120; Possible score range = 120-240; Actual score range = 120-174.

Rainy season: Mean (X) = 146.5; Standard Error (S.E.) = 22.6.; No. of respondents= 120; Possible score range= 120-240; Actual score range = 123-174.

VIR SOFTECH

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