Assessment of Citizens' Knowledge and Behaviors About Sterilizing Drinking Water in District and Sub-Districts at Kirkuk Governorate

Hewa Sattar Salih, Ph.D*

ABSTRACT

Introduction: Inadequate water supply, unsanitary behaviors, and sterile environments all have a role in the transmission of infectious diseases. The lack of knowledge, behavior, and practices (KBP) on WASH is one of the most common causes of infectious disease transmission.

Objective: To assess citizen knowledge and behavior about sterilizing drinking water in district and sub-districts at Kirkuk governorate.

Methods: "Cross-sectional study design" was used the study carried out Al-Hawija district. The study conducted at Alhawija district for 20 village. The study period from 3rd February 2021 to the 10th of June 2021. A non-probability (purposive) sample of (1200) citizen from village. With the end goal of information assortment, a survey design was built which contains (41) things Demographic information incorporate (9) things, general information about sterilizing water include (10) items knowledge of citizen about sterilizing water include (7) items and knowledge of citizen about effect unsterile water include (7) items finally behavior of citizen about sterilizing water include (8) items. Anova and T.test were used to assess the association between study variables and knowledge and attitude of citizen at level of association among variables at the significance level of $p<0.05$ by using SPSS version 24.0.

Result: (1200) participated complete the survey. The statistics suggest that citizens aged 20 to 29 years old account for a large percentage of the population (30.2 percent). Also the results show (56.5 %) were male. Most of the citizens were single and constituted (63.4%). Also, the result shows high percentage from citizen were Retired and constitute (33.1). With regard to education level most of the citizen were complete Primary school and constitute (30.2%). (30.2%) from citizen never have Concomitant diseases. With relation to smoking, the majority of the subjects (63.3 %) were nonsmoker. Also the result shows (73.6%) of the sample no family history for kidney stone, finally (40.3 %) from citizen was using river water. Also the result shows poor knowledge and negative attitudes of citizen toward using of sterile water .In addition, the data analysis revealed that there is a statistically significant relationship between citizen knowledge and attitudes and education level and water source in rural areas.

Conclusion: The results of this study showed that the citizen have poor knowledge and negative behaviors toward sterile water at rural area ,also the result shows a significant statistical association between knowledge and attitudes of citizen with education level, gender, marital state and source of water in rural area.

Keywords: Citizens knowledge, Behaviors, Sterilizing drinking water, District, Sub-districts

INTRODUCTION

The effects of unassisted water sanitization, disinfection, and cleanliness (WASH) have an impact on every aspect of wellbeing and progress, hinder financial and social outcomes, and are a substantial barrier to poverty alleviation[1]. Improved WASH practices can effectively manage a variety of communicable diseases. The three key WASH rehearses can help to reduce the spread of waterborne illnesses. Safe appearance removal and hand washing with cleanser at critical times can reduce the prevalence of waterborne infections by 30% and 40%, respectively. Furthermore, proper water treatment and capacity can reduce the prevalence of waterborne illnesses by 30–40%[2]. Around the world, 2.3 billion people require necessary disinfection (892 million people practiced open feces), 844 million people require basic drinking water, and 2.5 million people require enhanced sterilization[3]. WASH is likely to be one of the most pressing demands in non-industrialized countries in the twenty-first century. Nonetheless, every year, over 842,000 people die as a result of inadequate WASH, accounting for 58 percent of all diarrheal deaths[4-6]. Absence of information, disposition, and practice (KAP) on WASH is quite possibly the most basic foundations for transmission of irresistible infections[7,8].

OBJECTIVES

To assess citizen knowledge about sterilizing drinking water in districts and sub-districts at Kirkuk governorate.

1. To assess citizen behaviors about sterilizing drinking water in districts and sub-districts at Kirkuk governorate.
2. To identify the relationship between some socio demographic characteristics of citizen with knowledge and behavior.

METHODOLOGY

The study done at Al-Hawija district used a cross-sectional research methodology. Al Hawija is the main town of Al-Hawija District in

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* Assistant Professor in Health Nursing
  University of Kirkuk
  College of Nursing, Iraq
  E-mail: hewa –salih@uokirkuk.edu.iq

the Kirkuk Province of Iraq, 45 kilometers west of Kirkuk and north of Baghdad. The population of the town is estimated to be around 100,000 people. Hawija District is home to over 150,000 people, the most of whom are Sunni Arabs. The study conducted at Alhawija district for 20 village which includes (Almusanaa village, Shamlan vil, Alkhan vil, Alhalawa vil, Mahoz vil, Aleawa vil, Suliman Algharab vil, Qabzoaa vil, Alwaes vil, Tal ali vil, Shawook vil, Sharm vil, Tal hussein vil, Almahafef vil, Saderalnaher vil, Alkathemiavil, Altar vil, Menzla vil, Aljamalia vil and Agola vil). The study period from 3rd February 2021 to the 10th of June 2021. A non-probability (purposive) sample of (1200) citizen from village. With the end goal of information assortment, a survey design was built which contains (41) things Demographic information incorporate (9) things, general information about sterilizing water include (10) items knowledge of citizen about sterilizing water include (7) items and knowledge of citizen about effect unsterile water include (7) items finally behavior of citizen about sterilizing water include (8) items. Content legitimacy was dictated by introducing the survey to a board of (10) specialists. The information were gathered through the meeting. They were dissected through the utilization of clear measurable examination (recurrence and rate) and inferential factual information investigation T. test, (chi-square) and ANOVAs.

RESULTS

The socio-demographic characteristics of the entire study sample are shown in Table (4-1). The statistics suggest that citizens aged 20 to 29 years old account for a large percentage of the population (30.2 percent). In addition, the data suggest that the majority of the participants (56.5%) were men. Most of the citizens were single and constituted (63.4%). Also, the result shows high percentage from citizen were Retired and constitute (33.1). With regard to education level most of the citizen were complete Primary school and constitute (30.2%). (30.2%) from citizen never have Concomitant diseases. With relation to smoking, the majority of the subjects (63.3%) were nonsmoker. Also the result shows (73.6%) of the sample no family history for kidney stone, finally (40.3 %) from citizen was using river water.

Table 1: Shows the study sample's characteristics (n=1200)

Variables	N	Per
Age		
less than 20 y	405	33.8
20-29	398	33.2
30-39	397	33.1
Total	1200	100.0
Gender		
Male	678	56.5
Female	522	43.5
Total	1200	100.0
Marital status		
Single	761	63.4
Married	439	36.6
Divorced		
Total	1200	100.0
Job		
Retired	397	33.1
Civil work	199	16.6
Employed	79	6.6
house wife	365	30.4
Student	160	13.3
Total	1200	100.0
Education level		
"Unable to read and write"	281	23.4
"read and write"	279	23.3
"Primary school"	362	30.2
"Intermediate school"	79	6.6
"Secondary school"	80	6.7
"Institute and collage"	119	9.9
Total	1200	100.0
Concomitant chronic disease		
Never	398	33.2
heart disease	199	16.6
joint disease	119	9.9
Hypertension	283	23.6
kidney disease	201	16.8
Total	1200	100.0
Smoking		
Yes	440	36.7
No	760	63.3
Total	1200	100.0
Family history of kidney stone		
Yes	317	26.4
No	883	73.6
Total	1200	100.0
Source of drinking water		
Isala	318	26.5
River	484	40.3
Sterilize water	398	33.2
Total	1200	100.0

Part Three: The Knowledge of the Citizens

Table 2: Mean Scores for citizens knowledge about sterilize water with frequency, percentage and severity

No	Citizens knowledge about sterilize water	I know		Un certain		I don't know		MS	Level of assessment
		F	%	F	%	F	%		
1	Water is the secret of life	40	3.3	641	53.4	519	43.3	1.6	LS
2	Impure water is one of the causes of diseases in humans	160	13.3	559	46.6	481	40.1	1.7	LS
3	Pure water is a right for all people	279	23.3	478	39.8	443	36.9	1.8	MS
4	Chlorine is added to drinking water to prevent bacterial growth	363	30.3	677	56.4	160	13.3	2.1	MS
5	Drinking water should be colorless and odorless.	199	16.6	438	36.5	563	46.9	1.6	LS
6	Drinking water should be transparent	158	13.2	682	56.8	360	30.0	1.8	MS
7	Drinking water should be free of harmful microorganisms	640	53.3	80	6.7	480	40.0	2.4	HS
8	The drinking water must be free from suspended impurities	640	53.3	440	36.7	120	10.0	2.4	HS
9	Drinking water should contain some minerals and salts necessary for our body	560	46.7	120	10.0	520	43.3	2.0	MS
10	Water is made up mostly of minerals and other inorganic compounds, such as calcium.	440	36.7	120	10.0	640	53.3	1.8	LS

N =number, F = frequency, % = percent, low (mean score 1-1.66), Moderate (mean score 1.67-2.33), high level (mean score 2.34-3)
This table shows the mean of the scores for low significant items (1,2,5,10), moderately significant items (3,4,6,9), and high significant items (7, 8).

Table 3: Mean of Scores for citizens knowledge about sterilize water with frequency, percentage and severity

No	Citizens knowledge about method of sterilize water	I know		Un certain		I don't know		MS	Level of assessment
		F	%	F	%	F	%		
1	Sedimentation The precipitation process is one of the first processes to be used in water treatment	360	30.0	600	50.0	240	20.0	2.1	MS
2	Filtration is the process in which suspended materials are removed, by passing water through a named medium such as sand.	120	10.0	640	53.3	440	36.7	1.7	LS
3	Sterilization is the process used to kill disease-causing microorganisms	360	30.0	480	40.0	360	30.0	1.6	LS
4	Using chemicals Sterilization, and this process is done usingultraviolet rays	80	6.7	480	40.0	640	53.3	1.5	LS
5	Sterilization is the process used to kill disease-causing micro-organisms, similar to chemicals: bromine, chlorine	80	6.7	760	63.3	360	30.0	1.7	MS
6	Ozone sterilization operations	200	16.7	720	60.0	280	23.3	1.9	MS
7	Boiling sterilization processes	240	20.0	520	43.3	440	36.7	1.8	MS

N =number, F = frequency, % = percent, low significant (mean score 1-1.66), Medium significant (mean score 1.67-2.33), high significant (mean score 2.34-3)
The mean score was low significant in items (2,3,4) and moderate significant in items (1,5,6,7), according to this table.

Table 4: Mean of Scores for citizens knowledge about Effect of unsterilized water on human health with frequency, percentage and severity

No	Effect of unsterilized water on human health	I know		Un certain		I don't know		MS	Level of assessment
		F	%	F	%	F	%		
1	Hepatitis viruses such as A and E virus and poliovirus.	520	43.3	480	40.0	200	16.7	1.8	MS
2	Due to the presence of chemicals at high concentrations in the water, cancerous tumors develop.	360	30.0	560	46.7	280	23.3	2.0	MS
3	Dental cavities are caused by water with a fluorine concentration of less than 1 mg per liter.	160	13.3	680	56.7	360	30.0	1.8	MS
4	Cholera, typhoid fever, amoebic parasite, and schistosomiasis are some of the most common diseases.	80	6.7	600	50.0	520	43.3	1.6	LS
5	Tooth discoloration occurs when the fluorine compound in the water is increased to more than 1.5 mg per liter.	320	26.7	480	40.0	400	33.3	1.9	MS
6	Chemical poisoning due to the presence of chemicals with high concentration in drinking water.	320	26.7	600	50.0	280	23.3	2.0	MS
7	Goiter due to a lack of iodine in the water.	120	10.0	560	46.7	520	43.3	1.6	LS

N =number, F = frequency, % = percent, low significant (mean score 1-1.66), Medium significant (mean score 1.67-2.33), high significant (mean score 2.34-3)
The mean score was low significant in items (4,7) and moderate significant in items (1,2,35,6), according to this table.

Table 5: Shows the mean of scores for citizen behavior toward sterile water, along with the frequency, proportion, and severity

No	Behavior of citizen	Yes		Un certain		No		MS	Level of assessment
		F	%	F	%	F	%		
1	Citizens have positive trends for drinking water	280	23.3	480	40.0	440	36.7	1.8	MS
2	Do you have a desire to drink drinking water?	80	6.7	600	50.0	520	43.3	1.6	LS
3	Do you have any restrictions on your drinking water?	120	10.0	560	46.7	520	43.3	1.6	LS
4	Is there a physical obstacle that prevents you from drinking water?	200	16.7	640	53.3	360	30.0	1.8	MS
5	Do you think that good water is good for health?	160	13.3	520	43.3	520	43.3	1.7	LS
6	Do you have a rush to drink potable water?	200	16.7	560	46.7	440	36.7	1.8	MS
7	Focus on changing drinking water from non-sterile water to sterile water	360	30.0	560	46.7	280	23.3	2.0	MS

N =number, F = frequency, % = percent, low significant (mean score 1-1.66), Medium significant (mean score 1.67-2.33), high significant (mean score 2.34-3)

The mean score was low significant in items (2,3,5) and moderate significant in items (1,4,6,7), according to this table.

Table 6: One-way analysis of variation for the differentiation between information, resident behavior about sanitizing water, and age

Categories	S.O.V	S S	M S	F.Obs
General knowledge	Between Groups	395.398	197.699	.000 HS
	Within Groups	3877.361	3.239	
	Total	4272.759		
Method of water sterilization	Between Groups	14.083	7.041	.108 NS
	Within Groups	3773.917	3.153	
	Total	3788.000		
Effect of unsterilized water on people health	Between Groups	86.807	43.404	.000 HS
	Within Groups	3119.859	2.606	
	Total	3206.667		
Behavior of citizen toward of sterilize water	Between Groups	32.768	16.384	.008 S
	Within Groups	4095.232	3.421	
	Total	4128.000		

Df= 1199

Table of contents (4-6) Except for Method of water sterilization, this table demonstrates that there were high significant differences between General knowledge, Effect of unsterilized water on individuals, and citizen behavior toward sterilized water and their age at P value 0.05.

Table 7: One-way analysis of variance for the differentiation between information, resident behavior towards sanitizing water, and their educational level

"Categories"	"S.O.V"	"S S"	"M S"	"F.Obs"
General knowledge	Between Groups	196.462	39.292	.000 HS
	Within Groups	4076.297	3.414	
	Total	4272.759		
Method of water sterilization	Between Groups	126.471	25.294	.000 HS
	Within Groups	3661.529	3.067	
	Total	3788.000		
Effect of unsterilized water on people health	Between Groups	575.739	115.148	.000 HS
	Within Groups	2630.928	2.203	
	Total	3206.667		
behavior of citizen toward of sterilize water	Between Groups	785.501	157.100	.000 HS
	Within Groups	3342.499	2.799	
	Total	4128.000		

Df= 1199

Table of contents (4-7) At a P value of 0.05, this table reveals that there were significant variations between general knowledge, the effect of unsterilized water on individuals, the method of water sterilization, and citizen behavior toward sterilized water and their education level.

Table 8: T-Test for comparison significant for the difference in knowledge, conduct, and gender of citizens regarding water sterilization

"Categories"	"Sex"	"No"	"X"	"S.D"	"T.obs"	P≤0.05
general knowledge	Male	678	18.4233	1.87635	.021	NS
	Female	522	18.2797	1.90119		
Method of water sterilization	Male	678	13.3053	1.51399	.001	S
	Female	522	12.3736	1.94953		
Effect of unsterilized water on people health	Male	678	12.7965	1.73329	.020	S
	Female	522	13.6475	1.35682		
behaviorof citizen toward of sterilize water	Male	678	12.6313	2.01318	.000	S
	Female	522	12.5594	1.62907		

Df=1198

Table of contents (4-9) Except for General knowledge, this table reveals that there were significant differences between, effect of unsterilized water on individuals, method of water sterilization, and citizen attitude toward sterilized water and their gender at P value 0.05.

DISCUSSION

Water has been used by men since the dawn of time; nevertheless, recognition of its importance and, in some cases, its danger to health is a relatively recent development. Even today, this information isn't complete, especially when it comes to the apparent link between the amount of water available per person and the frequency of certain communicable diseases. During the last century, water-borne plagues and ensuing epidemiological investigations zeroed in consideration on water quality and on the job of the valuable fluid as a specialist for the transmission of disease. The Results shows in Table (1) the high percent from resident at age between (20-29 years), this study similar with (Younis, et. al., 2021; Ahmed et al., 2020) who find same mean age[9,10]. On constructed in study[11] who shows that the demographic factors, the majority of the participants were female, and comprise (30.2%) clarification of this outcome identified with a large portion of them acknowledge to partake in our examination there for discover high rate from resident at (20-39 years) This outcome is concurrence with study direct by UNICEF at Bangladeshi this investigation find the majority of respodnets between 21-31 years and address 40.% from complete example (Unicef,2018) Also the outcomes shows (56.5 %) were male .this outcome is comparable with another examination led by Unicef (2018) which find 73% from all out example were male[12]. The vast majority of the residents were single and established (63.4%) decipher of this outcome the greater part of individuals at country region later in wedded there for discover high percent from them was single, Likewise the outcome shows high rate from resident were Retired and establish (33.1). With respect to training level the vast majority of the resident were finished Primary school and comprise (30.2%). (30.2%) from resident never have Concomitant infections. With connection to smoking, most of the subjects (63.3 %) were nonsmoker translation of this outcome the majority of town decline awful custom, for example, smoking and liquor drink. Likewise the outcome shows (73.6%) of the example no family ancestry for kidney stone, at last (40.3 %) from resident was utilizing waterway water. Table (2) Mean of Scores for residents information about sanitize water with recurrence , rate and seriousness the table shows that the mean of score was low huge in things (1-Water is the mystery of life, 2-Impure water is one of the reasons for infections in people) and moderate critical in things (3-Pure water is an ideal for all individuals 4-Chlorine is added to drinking water to forestall bacterial development and high huge in things (7-Drinking water ought to be liberated from unsafe microorganisms, and 8-the drinking water should be liberated from suspended pollutants) things. This table shows helpless information on resident toward sanitization of water the primary driver for helpless information the vast majority of respondents don't have effective information toward disinfecting water. Hutton and others (2017)[13]. Table (4) shows the mean of the scores for the effects of unsterilized water on human health, together with the frequency, proportion, and severity of the effects. This table displays This table shows that the mean of score was low significant in items (4 - Cholera, typhoid fever, amoebic parasite, and schistosomiasis, and 7 - Goiter due to a lack of iodine in the water) and moderate significant in items (4 - Cholera, typhoid fever, amoebic parasite, and schistosomiasis, and 7 - Goiter due to (1- Goiter due to a lack of iodine in the water, 2- Cancerous tumors due to the presence of chemicals in a high concentration in the water). The explanation of this result refers to poor knowledge of respondents toward effects of sterile water on health because of most of them don't have enough education level also related to use of river water for drinking and bathing. Peloso (2018) referenced their examination to discover connect between Safe Drinking Water, Health and Hygiene the investigation clarified by two inquiries were posed to the family respondents to see whether they had an essential comprehension of the connection between safe drinking water and wellbeing-specifically, looseness of the bowels[14]. The vast majority of respondents in Ngoliba/Maguguni and 94 percent in Kangemi Gichagi recognized the runs as a real and potentially serious ailment. At the point when gotten some information about the reasons for the runs, among other causes[15,16]. Metwally and others (2016) referenced The impacts of absence of clean water and admittance to satisfactory sterilization are boundless. Youngsters kick the bucket from drying out and ailing health, because of diarrheal diseases that could be forestalled by clean water and great cleanliness[17,18].

CONCLUSION

The results of this study showed that the citizen have poor knowledge and negative behavior toward sterile water at rural area, also the result shows a significant statistical association between knowledge and behavior of citizen with education level ,gender ,marital state and source of water in rural area.

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