EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Coden USA: EJBPBO
Volume: 13
Issue: 1
Year: 2026

ASSESSMENT OF SANITATION METHODS UTILIZATION AMONG HOUSEHOLDS, IN EL-JALLABIYA, *EL-OBEID URBAN AREA, NORTH KORDOFAN STATE, SUDAN*

Halima B. G. Tigaidi*[1], Musa Adam Osman Mohammed[2], Magda E. Ahmed[3], Osman K. Saeed[4], Hiba A. A. Abdallah[5]

[1]Department of Environmental Health, Faculty of Public and Environmental Health, University of Kordofan.
[2]Department of Epidemiology, Faculty of Public and Environmental Health, University of Kordofan.
[3]Primary Health Care and Health Education Centre, Faculty of Medicine, University of Gezira.
[4]Wad Medani College of Medical Sciences and Technology.
[5]Department of Food hygiene and safety, Faculty of Public and Environmental Health, University of Kordofan.

***Corresponding Author: Halima B. G. Tigaidi**

Department of Environmental Health, Faculty of Public and Environmental Health, University of Kordofan.

DOI: https://doi.org/10.5281/zenodo.18094094

How to cite this Article: Halima B. G. Tigaidi*1, Musa Adam Osman Mohammed2, Magda E. Ahmed3, Osman K. Saeed4, Hiba A. A. Abdallah5 (2026). Assessment Of Sanitation Methods Utilization Among Households, In El-Jallabiya, El-Obeid Urban Area, North Kordofan State, Sudan. European Journal of Biomedical and Pharmaceutical Sciences, 13(1), 70–76.

Article Received on 28/11/2025 **Article Revised on 18/12/2025** **Article Published on 01/01/2026**

ABSTRACT

Background and Objective: Sanitation is essential for promoting community health. It reduces the spread of diseases through controlling vectors, ensures the safety of water and food, and improves the overall quality of our environment. **Material and Methods:** A cross-sectional community-based study was carried out to assess sanitation method utilization among El-Jallabiya Citizens in El-Obeid, North Kordofan State, Sudan. A total of 121 households were surveyed. For data collection a self-administered questionnaire was designed and distributed through a clustered sampling technique, and a simple random sampling technique was used to select the sample size, determined from each block. Data were entered, processed, and analyzed using the Statistical Package of Social Sciences (SPSS) version (23.0) software. Chi-square ($\chi 2$) was used to determine whether there is a significant association between different variables, and assessed the strength of correlation using Odd Raito (OR) with 95% confidence intervals (CI). **Results:** The findings showed that (16.5%) were males, whereas (83%) were females. (30.2%) of them are uneducated, and (40.9%) have a basic level of education. The level of knowledge towards hazards of latrines and sanitation-related diseases was poor in (61.1%) of participants. (93.4%) had latrines at home. Only (26.4%) of citizens had washed their hands after defecation, and soap for hand washing was available in (23.1%). Participation in sanitation campaigns was (35.5%). Utilization of latrines [p= 0.193, OR 0.823; 95% CI (0.756, 0.896)] wasn't significantly associated with gender and hand washing practice after defecation [p= 0.000, OR 0.375; 95% CI (0.240, 0.587)] was significantly associated with gender. There was highly statistically significant association between educational level and utilization of latrines (93.4%), and hand washing practice after defecation was (26.4%); (p= 0.000). **Conclusion:** Absence of a role for local and health authorities in waste disposal. There was a poor knowledge regarding the importance of sanitation methods and their hazards, and sanitation-related diseases. Therefore, there need for health education programs to be conducted among the population to increase their awareness regarding personal hygiene, such as hand washing after defecation.

KEYWORDS: Assessment, Sanitation, Methods, Households, Utilization, El-Obeid, Eljallabiya.

1. INTRODUCTION

Sanitation refers to human excreta disposal. It should include environmental sanitation issues such as disposal of solid waste, disposal of animal excreta, liquid waste control and vector control.[1] In areas with poor sanitation, children are often infected at a very early age and become immune for life without clinical symptoms of disease.[2,3]

Sanitation and hygiene practices help maintain and promote health while preventing the spread of diseases, through proper hand washing with soap or other agents, food hygiene, overall personal hygiene including laundry, and environmental cleaning.[4] Contamination of water due to poor sanitation is largely responsible for transmission, but this does not fully explain the seasonality of recurrence, and factors other than poor sanitation must play a role.[2,3] In addition sanitation diminutions with the disruption of solid waste disposal systems, the contamination of food and water supplies and the propagation of vectors raise the risk of disease.[5]

Diarrhoeal diseases attributed to poor water supply, sanitation account for 1.73 million deaths each year, Other diseases are related to poor water, sanitation and hygiene such as trachoma, schistosomiasis, ascariasis, trichuriasis, hookworm disease, malaria and Japanese encephalitis and contribute to an additional burden of disease.[6] In general, poor areas in developing countries are not connected to functioning central sewerage systems.[7] Decreased standards of general housing sanitation and personal hygiene are among the most common effects of disaster upon environmental health conditions and services. Sanitation decreases with the disruption of solid waste disposal systems, the contamination of food and water supplies and the proliferation of vectors increase the risk of disease.[5]

MATERIAL AND METHODS

Study design

Community based descriptive cross-sectional study was done to an assessment of sanitation methods utilization among El-Jallabiya citizens, in El-Obeid Urban Area, North Kordofan State, Sudan.

Study Area

El-Jallabya is a big neighborhood in El-Obeid Urban Area, adjacent to the national road (El-Obeid- Al-Nuhud). It's bordered by three neighborhoods: North Al-Sahwa from the east, Al-Nuhud market from the west and South Al-Sahwa from the south. The total number of houses in this area is 802 houses. It is inhabited by a group of people, mostly from rural areas. It's considered a vulnerable area. It lack of basic environmental health services and primary health care services. There is also a shortage of water due to the absence of a public water network in the area. All residents rely on water transported by tankers and animal carts and stored in plastic containers (Gherba). Landfill and sewage disposal are very close to the area on the western side.

Sampling and Sample techniques

The sampling technique was employed is a cluster sampling technique; in this method, the households are divided into clusters or groups, and some of these are then chosen by systematic random sampling. The study area was divided into clusters and a simple random sampling technique used to select sample units. All units considering in the same cluster as a homogenous group, hence, determined the total of sample size (n = 121). A sample was taken proportionally from each block, as follow.

Block	Total No. of households	Calculation ($n_h = n_{prop} \frac{N_h}{N}$)	Sample size required from block
Block (1)	425	425 ÷ 802 × 121	64
Block (2)	169	169 ÷ 802 × 121	26
Block (3)	208	208 ÷ 802 × 121	31
Total	802		121

Where:

n_h = sub-sample from block (h)

N_h = Size of block

N = Size of population

Data Collection

Data collectors received a one-day intensive training in study design and purpose, questionnaire administration and collection. From the general population, the sample size was selected and taken proportionally from the study group. An Arabic questionnaire version (pre-coded and closed-ended) and and checked for consistency, it was used to collect data on basic information and utilization of sanitation methods from El-Jallabiya citizens. The final questionnaire included information about socio-demographic characteristics, including age, gender, occupation, monthly income, and educational level. The questionnaire comprised questions about the sanitation methods: presence, types, utilization, sharing, hazards, and their importance. Hand washing practice after defecation, availability of soap for handwashing, and waste disposal.

Data processing and analysis

* All data were entered, processed and analyzed using the Statistical Package for Social Sciences (SPSS), version (23.0). Chi-square (X^2-test) was used to verify a possible association between different variables. Values were considered to be statistically significant when the p-value obtained was less than (0.05) and the strength of correlation using Odd Ratio (OR) with 95% confidence intervals (CI). To determine the level of knowledge of citizens, the researchers developed criteria such as Likert's scale, where any question with more than two correct answers was classified as follows: Excellent:

answer four choices and above, good: answer three choices, Intermediate: answer two choices, poor: answer only one correct choice, and no knowledge: all their answer was wrong.

RESULTS

A total of (121) households were surveyed, participation rate was 100%. Among the total participants (16.5%) were males, whereas (83%) were females; (see Fig. **1**). Fig. **2** showed that the occupation status of the heads of households was farmers (10.2%), trades (6.3%), drivers (7.9%), officeholders (9.1%), and self-employed (65.6%). it indicated that monthly income was (500 - 1000) SDG with (72.4%), (1500 - 2000) SDG with (27%), and (2500 - 3000) SDG with (0.8%) as shown in (Fig. **3**). Fig. **4** distributes the respondents according to educational level; (30.2%) of them were uneducated, (40.9%) have a basic level of education, (21.5%) were secondary, (6.8%) are university graduates, and only (0.5%) were postgraduate. The level of knowledge towards hazards of latrines was good with (14%), poor with (61.1%), and no knowledge with (20.7%). The level of knowledge about the importance of latrines was excellent with (3.3%), intermediate with (14%), poor with (72.7%) and no knowledge with (9.1%). Knowledge level about sanitation related diseases was intermediate with (4.1%), poor with (61.1%), and no knowledge with (35.5%), as illustrated in Table **1**. Table **2** explained the presence of sanitation methods at the household and used it, (93.4%) had latrines at home. (72.7%) and (25.3%) had pit latrines and ventilated improved pit. (94.2%) had used the primitive latrines. (62.5%) who haven't had latrines defecated in the open. Regarding Table **3**, (26.4%) of citizens had washed their hands after defecation. Soap for hand washing was available in (23.1%). (15.7%) had disposed of waste by collecting it in sacks/bags, (33.9%) of them had disposed in a water channel or hole as resulting to (5.8%) and (13.2%), respectively. Participation in sanitation campaigns was (35.5%). Table **4** indicated that utilization of latrines [p= 0.193, OR 0.823; 95% CI (0.756, 0.896)] wasn't significantly associated with gender and hand washing practice after defecation [p= 0.000, OR 0.375; 95% CI (0.240, 0.587)] was significantly associated with gender. There was a highly statistically significant association between educational level and utilization of latrines (93.4%) and hand washing practice after defecation was (26.4%); (p= 0.000), (Check Table **5**). (65.2%) had been infected with WSRDs over the past 6 months, as indicated in Fig.**5**.

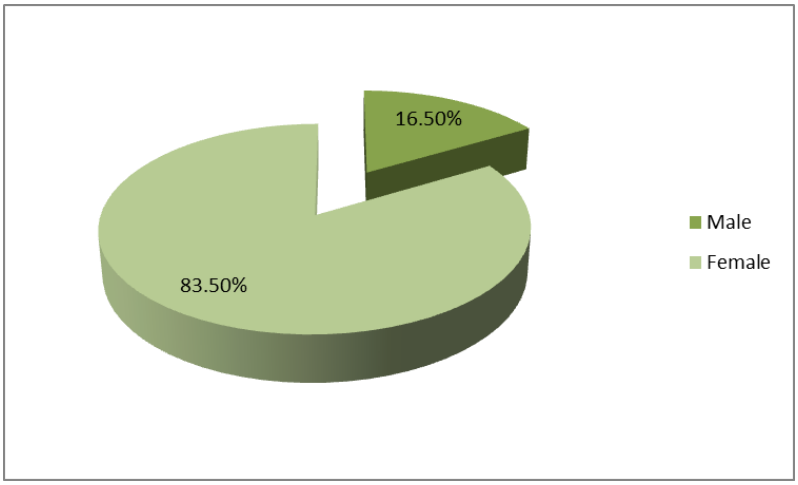

Fig 1: The distribution of respondents according to gender, in Eljallabiya, El-Obeid Urban Area; (n= 121).

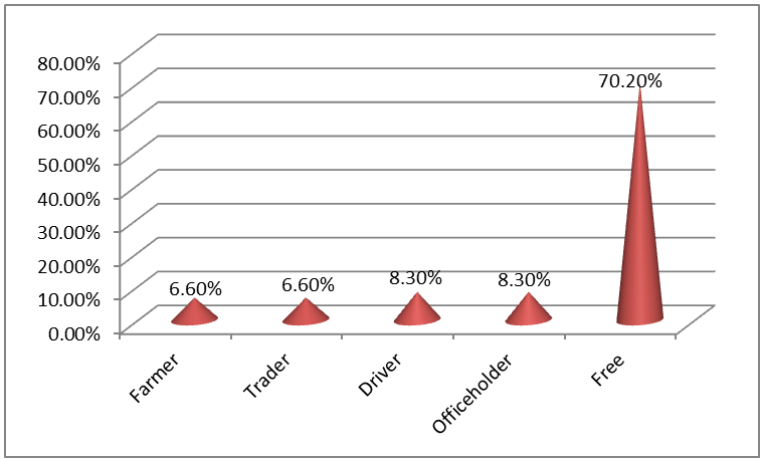

Fig 2: The distribution of respondents according to occupation, in Eljallabiya, El-Obeid Urban Area; (n= 121).

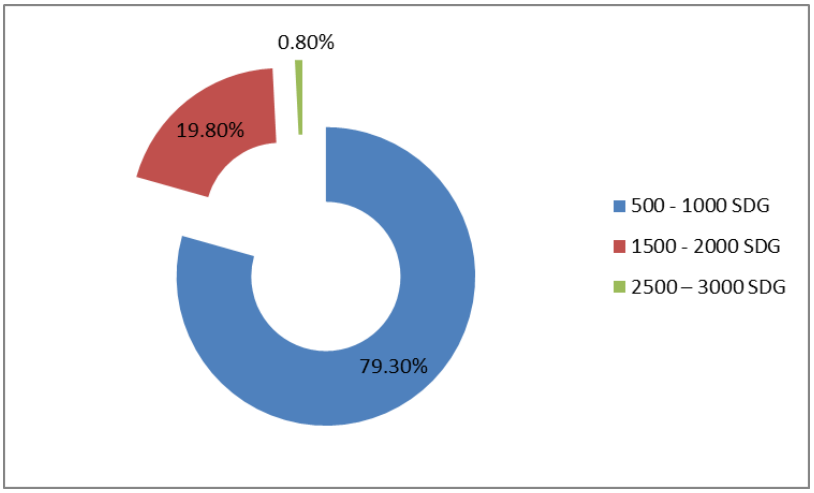

Fig 3: The distribution of respondents according to monthly income, in Eljallabiya, El-Obeid Urban Area; (n= 121).

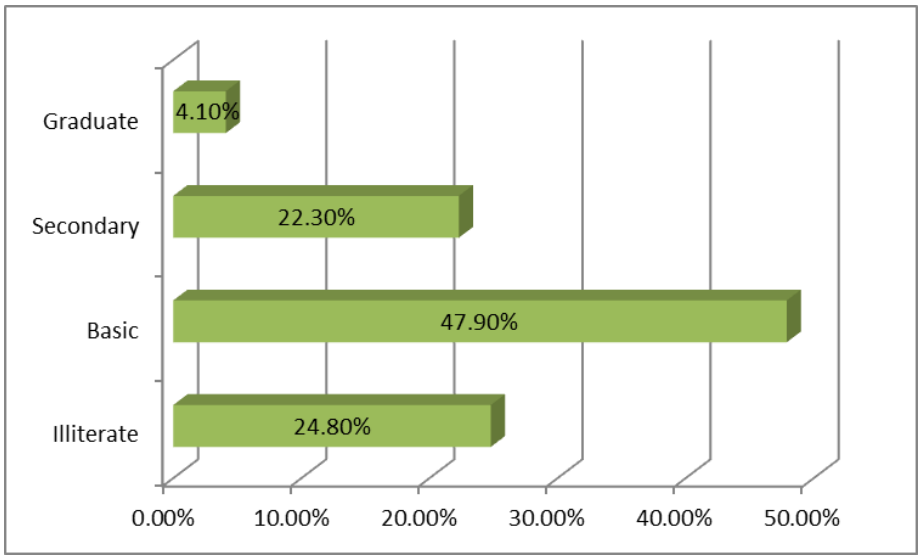

Fig 4: The distribution of respondents according to educational level, in Eljallabiya, El-Obeid Urban Area; (n= 121).

Table 1: Citizens's knowledge towards sanitation methods, El-Jallabiya, El-Obeid Urban Area; (n= 121)

Variable	Frequency	Percent (%)
Knowledge about hazards of latrines		
Excellent	4	3.3%
Good	17	14%
Poor	74	61.1%
No knowledge	26	20.7%
Knowledge About Importance Of Latrines		
Excellent	4	3.3%
Good	10	8.3%
Intermediate	17	14%
Poor	88	72.7%
No knowledge	2	1.7%
Knowledge of sanitation related diseases		
Excellent	2	1.7%
Good	1	0.8%
Intermediate	1	0.8%
Poor	74	61.2%
No knowledge	43	35.5%

Table 2: Availability and kinds of sanitation methods at household, El-Jallabiya, El-Obeid Urban Area; (n= 121)

Variable	Frequency	Percent (%)
Is there a latrine in household? (n= 121)		
Yes	113	93.4%
No	8	6.6%
What is type of latrine in household? (n= 121)		
Pit latrine	92	76%
VIP latrine*	25	20.7%
Septic tank	4	3.3%
Do you always use the latrine? (n= 121)		
Yes	113	93.4%
No	8	6.6%
Where are places uses to defecation when have no latrines at your home? (n= 121)		
Sharing with neighbors	3	37.5%
In open	5	62.5%

*(VIP) ventilated improved pit

Table 3: Practices of citizens towards sanitation and hygiene promotion in El-Jallabiya, El-Obeid Urban Area; (n= 121)

Variable	Frequency	Percent (%)
Do you wash your hand after defecation? (n= 121)		
Yes	32	26.4%
No	89	73.6%
In hand soap available soap? (n= 121)		
Yes	29	23.1%
No	92	75.9%
What are the household waste disposal methods? (n= 121)		
Collected it in bags	19	15.7%
Disposal in water channel and hole	41	33.1%
In battlefields	9	6.6%
Near from house	33	27.3%
Collected it in bags	19	15.7%
Participation in sanitation campaigns		
Yes	43	35.5%
No	78	64.5%

Table 4: Gender and participants' practices, El-Jallabiya; El-Obeid Urban Area, (n= 121)

	Gender		Total	P-value	Odd Ratio	95% Confidence interval	
	Male	Female				Lower	Upper
Do you always use the latrine? (n= 121)							
Yes	18.7	94.3	113	0.193	0.823	0.756	0.896
No	1.3	6.7	8				
Do you wash your hand after defecation? (n= 121)							
Yes	5.3	26.7	32.0	0.000	0.375	0.240	0.587
No	14.7	74.3	89.0				

Table 5: Education level and participants' practices, El-Jallabiya, El-Obeid Urban Area, (n= 121)

	Education level				Total	P-value
	Illiterate	Basic	Secondary	Graduate		
Do you always use the latrine? (n= 121)						
Yes	28	54.2	25.2	5.6	113/93.4%	0.000
No	2	3.8	1.8	0.4	8/6.6%	
Do you wash your hand after defecation? (n= 121)						
Yes	7.9	15.3	7.1	1.6	32/26.4%	0.000
No	22.1	42.7	19.9	4.4	89/73.6%	

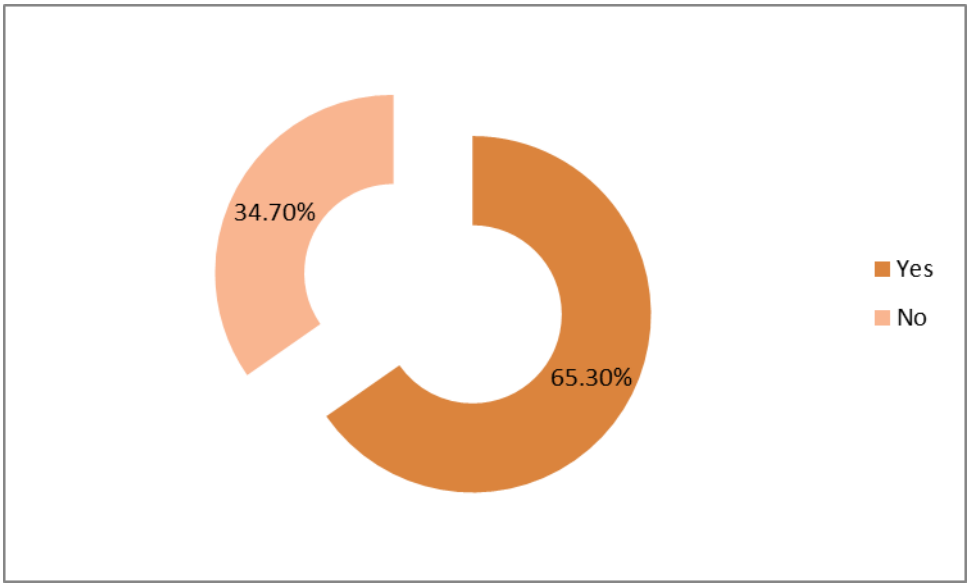

Fig 5: Distribution of citizens according to affected with WSRDs before 6 months ago in El-Jallabiya, El-Obeid Urban Area, (n= 121)

DISCUSSION

This study showed that about (93.4%) of citizens have latrines at home; this result is higher than similar studies conducted in different areas. In the Asia region, a previous study carried out in Southern India indicated that (30.9%) of participants had toilets.[8] However, a previous study conducted in Anse La Raye Village, Saint Lucia, Indies, showed that (29%) had no household toilets.[9] In India, it was shown that (73.6%) of households have own toilet facility.[10] Locally, a survey conducted among the Sudanese societies, close to (40%) do not have latrines in their houses, and almost half use primitive latrines, of them (85%) use outdoor latrines as an alternative to latrines.[11] Regionally, in Sokoto State, Nigeria, it was shown that (57.8%) of the households have toilet facilities.[4] In Kirkuk-Iraq, it was shown that (83%) of households reported having individual latrines.[12] Also, in South India (2016), only (11.3%) had a sanitary latrine in the household.[13]

The present study found that types of sanitation methods were primitive pit latrines (76%), ventilated improved pit (20.7%), and septic tank (3.3%). When comparing with a previous study conducted in many countries, In Anse La Raye Village, Saint Lucia, Indies, it showed that (0.6%) own a pit latrine, (1.9%) own an improved latrine, and (65.4%) own a flush toilet with a septic tank.[9] In Sokoto State, Nigeria, it showed that out of which (67%) had used a pit latrine with slab, bucket latrine (29%), and five households (2.2%) have a water closet.[4]

This study indicated that the utilization of latrines among those having latrines was (94.2%). The present result is higher than a similar study conducted in different countries; in South India, It showed that (76.5%) of the respondents were using latrines routinely.[13] Also, a similar study conducted in Zalingie showed that (49%) of the population use latrines.[14] In India, it showed that (83.3%) of individuals had used toilets.[10] In Southern India, only (67.9%) of households used toilets.[8] In Parla village, Kurnool district, Andhra Pradesh, only (48.4%) were fully utilizing toilets.[15]

Our study indicated that utilization of latrines [p= 0.193, OR 0.823; 95% CI (0.756, 0.896)] wasn't significantly associated with gender. A similar study conducted in Zalingie among populations indicated that Latrine use by gender is relatively balanced, with the male population at (50.51%) and the female at (49.50%).[14]

The present study illustrated that (37.5%) of citizens had used neighborhood latrines. This result is considered high when compared with studies conducted in different areas; in Anse La Raye Village, Saint Lucia, Indies, showed that only (26.9%) of individuals indicated that they share toilets with other households.[9] In Sokoto State, Nigeria, it was shown that (2%) use neighborhood toilets.[4]

In the current study, (62.5%) of citizens defecate in the open. Similar studies conducted in many areas showed the following results: In Parla village, Kurnool district, Andhra Pradesh, it showed that (51.6%) households were going to open field defecation even though a sanitary lavatory was present.[15] In Southern India, it was shown that (74.2%) of respondents defecate in fields, and there was no stigma associated with this traditional practice.[8] In Parla village, Kurnool district, Andhra Pradesh, it was shown that (75%) of households were practicing open field defecation practices.[15] In Sokoto State, Nigeria, it was shown that (94.6%) defecate in nearby bush and (4.8%) defecate in the polythene bag to be disposed of in an open field.[4]

This study indicated that the hand washing practice after defecation was (26.4%). Hand washing disturbs the

transmission of disease pathogenic and so can significantly reduce diarrhea and respiratory infections.[16] This result is lower than previous studies carried out in different areas; a similar study conducted in Zalingie showed that (88%) of the total population washes their hands.[14] A survey showed that more than (80%) of the population stated to wash their hands before and after eating, after going to the toilets, and before food preparation.[11] Hand washing with soap and water is ideal, but hand washing with a non-soap cleaning agent, such as ash or sand, is an improvement over not using any cleansing agent.[17]

The current study found that the availability of soap for hand washing was (23.1%). Similarly, A survey conducted by the Federal Ministry of Health, Sudan, revealed that only (55%) reported the use of soap during hand washing.[11] A study conducted in India showed that (32.6%) used soap with water for hand washing.[10] A study conducted in Zalingie showed that (66%) of the respondents use soap when washing hands.[14] Hand washing with soap, particularly after defecation and after handling a child's stool, can reduce diarrheal incidence by 42-47 % while continuing work.[10]

CONCLUSIONS

The majority of households have latrines. There was a poor knowledge regarding the importance of sanitation methods and their hazards, and sanitation-related diseases. Absence of a role for local and health authorities in waste disposal. Only a quarter of citizens wash their hands after defecation, majority of households haven't soap for hand washing. Therefore, there need for health education programs to be conduct among the population for increasing their awareness regard personal hygiene, such as hand washing after defecation.

ACKNOWLEDGEMENT

We extend our sincere thanks to the Ministry of Health and Social Development in North Kordofan State, as well as to the General Directorate of Health Affairs in Sheikan Locality, and we also thank the data collectors.

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