

Water Sanitation and Waterborne Disease Incidence among Households: A Cross-Sectional Study

Anu Joseph^{1*}, Emil Mathew², Bilvan Biju³, Delna Paul³

Abstract

The study was conducted to assess water sanitation practices and the incidence of waterborne diseases among households in a selected ward of Koodalloor Panchayath, Kottayam, Kerala. The objectives were to assess the sources of household water, evaluate water sanitation and safety practices, and identify the incidence of waterborne diseases among family members during the previous year. A community-based descriptive study design was adopted. A total of 138 households were selected using a convenience sampling technique. Data were collected using a self-designed structured questionnaire that assessed household water sources, sanitation practices, the distance between water sources and septic tanks, water treatment practices, and the occurrence of waterborne diseases. The findings showed that 137 (99.2%) households had their own source of water. Among these households, all 137 (100%) reported having a covered water source, while 94 (68.6%) practiced chlorination of their water source annually. Regarding the safety distance between the water source and septic tank, 7 (5.1%) households had a distance of less than 15 metres, indicating a potential risk of contamination. Only 2 (1.4%) households reported the occurrence of waterborne diseases among family members during the previous year. The findings indicate that most households had access to protected water sources and practiced water treatment. However, gaps in safe distance between water sources and septic tanks and continued occurrence of waterborne diseases highlight the need for regular monitoring, health education, proper sanitation practices, and community awareness regarding safe drinking water and prevention of waterborne diseases.

Keywords: Water sanitation, waterborne disease incidence, households, sanitation practices, chlorination

INTRODUCTION

Access to safe and clean water is an essential determinant of public health. However, contamination of water sources due to poor sanitation practices remains a major public health concern. Unsafe water and inadequate sanitation contribute significantly to the global disease burden. The World Health Organization estimates that millions of people worldwide suffer from preventable waterborne diseases every year, highlighting the urgent need to address water quality and sanitation at the community level [1]. Despite the availability of water, the safety and sanitation of water sources remain uncertain. Seasonal variations, open waste disposal, and lack of regular chlorination increase the risk of contamination. Therefore, assessing sanitation practices and waterborne disease patterns in communities is crucial for preventing waterborne diseases [2].

*Author for Correspondence

Anu Joseph
E-mail: Anu.Joseph/anupaulson07@gmail.com

¹Assistant Professor, Department of Community Health Nursing, Caritas College of Nursing, Kottayam, Kerala, India.

²Lecturer, Department of Community Health Nursing, Caritas College of Nursing, Kottayam, Kerala, India.

³Student, Department of Nursing, Caritas College of Nursing, Kottayam, Kerala, India.

Received Date: July 07, 2026

Accepted Date: July 24, 2026

Published Date: July 30, 2026

Citation: Anu Joseph, Emil Mathew, Bilvan Biju, Delna Paul. Water Sanitation and Waterborne Disease Incidence among Households: A Cross-Sectional Study. Journal of Nursing Science & Practice. 2026; 16(2): 26–30p.

A cross-sectional study conducted among 80 households in Kollam district, Kerala found that 93.4% of households were using boiled water for drinking. Only 40 % followed proper protection measures, including maintaining more than a 15-meter distance from septic tanks and proper lining. The study revealed that open wells in Kerala face significant bacterial contamination risks, especially where wells lie close to septic tanks, cattle sheds, and waste pits, which may contribute to diarrheal and other waterborne diseases among children in these households [3].

A cross-sectional study in an urban area of Trivandrum, Kerala, among 449 households showed that over 77% of wells had a septic tank within a 7.5 m radius and 73 % of wells had coliform contamination (groundwater was acidic: mean pH -5.4), and water was unfit for drinking. The study revealed the link between proximity to waste sources, poor sanitation infrastructure, and waterborne disease risk in the urban households [4].

A longitudinal study was conducted to assess water quality at the source and incidence of waterborne diseases among 300 rural households of South India. Water samples from household wells were collected across seasons and correlated with the incidence of waterborne diseases over 12 months. The study found that the incidence rate of waterborne diseases was 49 per 1000 persons per year. The study revealed that 60 % of the water sources had fecal coliform counts >10 MPN/100 mL and 30 % contained *E. coli*. The study reported that contamination was high during the rainy season [5].

The present study aimed to gather comprehensive information regarding the type and condition of water sources, maintenance practices such as chlorination, and to identify the risk of waterborne diseases in the community. The results can be used as a foundation for designing health education programs, improving water sanitation infrastructure, and strengthening preventive health measures to prevent waterborne diseases in the locality [6].

METHODOLOGY

A quantitative approach was used to study water sanitation and waterborne disease incidence among households. The design selected for the study was a survey research design. The study was conducted in the selected ward of Koodalloor Panchayath, Kottayam. The sample consisted of 138 households selected using convenience sampling. The inclusion criteria included households belonging to the Koodalloor Panchayath. Data were collected using a self-designed structured questionnaire. Content validity was ensured by providing the tool to experts in the field of Community Health Nursing. Both descriptive and inferential statistical methods were used to analyze the data.

RESULTS

Table 1 illustrates that almost all households (137, 99.2%) had their own sanitary well as a source of water, whereas only one household (0.8%) did not have access to a sanitary well. This indicates a high level of availability of sanitary well water in the study households.

Table 2 shows that among the 137 households having their own source of water, the majority (99.2%) had a covered water source, while only 0.8% had an uncovered source, indicating good household practices regarding protection of drinking water sources (Table 2).

Table 3 shows that annual chlorination of their water source was practiced by the majority of households (68.6%). In contrast, 16.0% chlorinated their water source once every 1–5 years, 1.5% after more than 5 years, and 13.9% reported no chlorination of their water source (Table 3).

Table 4 shows that the majority of households (94.9%) maintained a distance of more than 15 meters between the water source and the septic tank, while only 5.1% had a distance of less than 15 meters, indicating generally appropriate placement of water sources to minimize the risk of contamination (Table 4).

Table 5 reveals that the majority of households (98.6%) did not report any cases of waterborne diseases among family members during the last year, whereas only 1.4% of households reported such cases (Table 5).

Table 1. Frequency and percentage distribution of households according to own source of water (Sanitary well) (n = 138).

	Frequency	Percentage
Yes	137	99.2
No	1	0.8

Table 2. Frequency and percentage distribution of households according to the covered source of water (n = 137).

	Frequency	Percentage
Yes	136	99.2
No	1	0.8

Table 3. Frequency and percentage distribution of households according to chlorination of the source of water (n = 137).

	Frequency	Percentage
Every year	94	68.6
1–5 years	22	16
>5 years	2	1.5
No chlorination	19	13.9

Table 4. Frequency and percentage distribution of households according to distance between the source of water and septic tank (n = 137).

	Frequency	Percentage
<15 meters	7	5.1
>15 meters	130	94.9

Table 5. Frequency and percentage distribution of households according to reported cases of waterborne diseases among family members last year (n = 138).

	Frequency	Percentage
Yes	2	1.4
No	136	98.6

DISCUSSION

The present study was intended to assess the water sanitation and waterborne disease incidence among households. The assessment revealed that among the 137 households with an own source of water, only 99.2% of households had a covered source of water. The present study was supported by a cross-sectional study conducted among 80 households in Kollam district, Kerala found that only 40% of households

followed proper protection measures, including proper lining of wells and maintenance of more than 15-meter distance from septic tanks [3, 7].

The present study revealed that among the 137 households with their own source of water (5.1%) had less than a 15-meter distance between the source of water and the septic tank, and (1.4%) had an incidence of waterborne diseases among family members last year. This is supported by a cross-sectional study conducted in an urban area of Trivandrum, Kerala, among 449 households showed that over 77% of wells had a septic tank within a 7.5 m radius and 73% of wells had coliform contamination (groundwater was acidic: mean pH 5.4), and the water was unfit for drinking [4, 8, 9].

The study was conducted in the selected ward of Koodalloor Panchayath, which limits generalization. This study was limited to 138 households. Based on the findings of the present study, the following recommendations are made. A similar study can be conducted in various Panchayats on a large sample [10].

CONCLUSION

The study aimed to assess the water sanitation and waterborne disease incidence among households of selected wards of Koodalloor Panchayath, Kottayam. The study concluded that among 138 households surveyed, 137(99.2%) had their own source of water. Among the 137 households with their own source of water (99.2%) households had a covered source of water, and 68.6% were chlorinating the source of water every year. Among the 137 households with their own source of water (5.1%), <15 m distance between the source of water and septic tank, and (1.4%) had incidence of waterborne diseases among family members last year.

REFERENCES

1. World Health Organization. Drinking-Water. Geneva: World Health Organization; 2023.
2. Government of Kerala. Kerala State Planning Board. Economic Review 2025. Vol. 1. Thiruvananthapuram: Government of Kerala; 2025.
3. Binu J, Salam H, A JK, Fazil F, T HK, S G. A cross sectional study on household dependence on well water, source of contamination and well protection measures adopted by an urban and rural population in Kollam, Kerala. *Int J Community Med Public Health*. 2021;8:3042. doi:10.18203/2394-6040.ijcmph20212012.
4. Ananth M, Rajesh R, Amjith R, AL A, Valampampil MJ, Harikrishnan M, et al. Contamination of household open wells in an urban area of Trivandrum, Kerala State, India: a spatial analysis of health risk using geographic information system. *Environ Health Insights*. 2018;12:1178630218806892. doi:10.1177/1178630218806892. PMID:30369786; PMCID:PMC6201171.
5. Jayakrishnan T, Rao B, Cyriac ME, Harikumar PS, Cherumanalil JM. Water quality at the source and incidence of water borne diseases in rural households of South India. *Int J Community Med Public Health*. 2021;8:3958-64. doi:10.18203/2394-6040.ijcmph20213028.
6. Venkatesh U, Rahaman M, Ahmed A, Joshi HS, Dixit AM, Grover A, et al. Household-level WASH conditions and waterborne diseases among the Vantangiya Scheduled Tribe in India: a micro-scale spatial analysis. *Sci Rep*. 2026;16:21407. doi:10.1038/s41598-026-50775-w. PMID:42204183; PMCID:PMC13350806.
7. Saha A, Moray KV, Devadason D, Samuel B, Daniel SE, Lalthazuali PJV, et al. Water quality, sanitation, and hygiene among the tribal community residing in Jawadhi hills, Tamil Nadu: an observational study from Southern India. *J Family Med Prim Care*. 2020;9:5711-8. doi:10.4103/jfmpc.jfmpc_1519_20. PMID:33532419; PMCID:PMC7842438.
8. Hutton G, Chase C. The knowledge base for achieving the sustainable development goal targets on water supply, sanitation and hygiene. *Int J Environ Res Public Health*. 2016;13:536. doi:10.3390/ijerph13060536. PMID:27240389; PMCID:PMC4923993.

9. Ayele A, Adane M, Adane B, Berihun G, Gebrehiwot M, Woretaw L, et al. Living in a large family and low daily water consumption substantially expose for human scabies in rural Ethiopia: a matched analysis. *J Health Popul Nutr.* 2023;42:134. doi:10.1186/s41043-023-00471-6. PMID:38017554; PMCID:PMC10685524.
10. Swe PM, Fischer K. A scabies mite serpin interferes with complement-mediated neutrophil functions and promotes staphylococcal growth. *PLoS Negl Trop Dis.* 2014;8:e2928. doi:10.1371/journal.pntd.0002928. Erratum in: *PLoS Negl Trop Dis.* 2014;8:e3415. PMID:24945501; PMCID:PMC4063749.