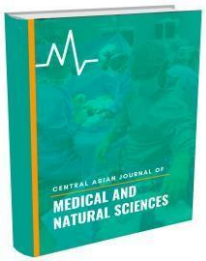

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*Article*

# Knowledge, Attitudes, and Practices Survey on Cholera Among the Residents of Iraq

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**Abstract:** Cholera is a serious waterborne disease that poses a recurring public health threat in Iraq, particularly due to challenges like poor sanitation, limited access to clean water, and displacement. Despite ongoing health efforts, underscoring a need to understand how communities perceive and respond to the disease. A Knowledge, Attitudes, and Practices survey helps identify gaps in public awareness and behaviors related to cholera prevention and control. To evaluate public and university students' awareness, perceptions, and behavioral responses regarding cholera in Iraq. A descriptive cross-sectional study was conducted from April to July 2025, using both online questionnaires and face-to-face interviews. Data were analyzed using SPSS version 24. Chi-square tests were performed to explore associations between demographic variables and Knowledge, attitude, and practice levels. Among the 413 valid respondents, 64.9% were aged between 20–40 years, and 66.1% were female. Knowledge regarding cholera was relatively high: 91.5% recognized water as a transmission route, and 66% identified bacteria as the causative agent. Positive attitudes were reported, with 98.5% stating they would seek hospital care if symptoms occurred. Hygienic practices were strong—97.1% used proper sanitation, 97.8% used soap during handwashing, and 94.9% stored water in clean containers. However, 23.5% reported using medication without a prescription, and 21.5% reported using alternative treatments. The study revealed good overall awareness and preventive behaviors toward cholera. Nonetheless, gaps in knowledge and risky behaviors, particularly among younger individuals, highlight the need for targeted health education campaigns focusing on youth and discouraging self-medication

**Keywords:** Cholera, Knowledge, Attitude and Practice, Public Health, Iraq

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## 1. Introduction

Cholera is a serious and highly contagious intestinal disease caused by the toxigenic strains of Vibrio cholerae, primarily serogroups O1 and O139. In its severe form, the illness begins suddenly with large volumes of watery diarrhea, which can quickly lead to extreme dehydration and potentially death if not treated promptly [1]. Vibrio cholerae is a gram-negative, curved, rod-shaped, motile bacterium. Although it does not invade body tissues, it produces a powerful toxin that triggers intense diarrhea. The bacteria are able to persist in water for up to two weeks and can survive for several days in moist, alkaline food at room temperature. They remain viable for even longer periods when food is stored in cold environments, such as refrigeration or freezing. However, the organism is sensitive to acidic and dry conditions, where it cannot survive for long [1]. In addition to diarrhea, patients may experience vomiting and abdominal cramps. The infection can affect individuals of all age groups [2]. In areas where medical infrastructure is limited, the diagnosis is often based on clinical symptoms due to the lack of laboratory resources. In

contrast, in more developed settings, culturing stool or rectal swabs remains the most reliable diagnostic method for confirming cholera [3]. When cholera is suspected, immediate medical care is essential, as fluid loss can occur rapidly. Rehydration therapy is the primary treatment. For infants, breastfeeding or formula feeding should be continued to ensure adequate hydration. Medical interventions may also involve antibiotics in specific cases and zinc supplements for young children [4]. Cholera is transmitted mainly through the consumption of contaminated water or food, particularly in places where sanitation and water treatment systems are inadequate. The bacteria are also found in slightly salty (brackish) and coastal waters. Consuming raw or undercooked seafood, such as shrimp and crab, can also be a source of infection. Direct person-to-person transmission is uncommon, and casual contact with an infected individual rarely leads to the spread of the disease [5]. Effective strategies for preventing and controlling cholera include strengthening disease monitoring systems, improving access to clean water and sanitation, enhancing hygiene practices, increasing public health awareness, ensuring access to quality healthcare services, and organizing oral cholera vaccination campaigns [6]. This study aims to address those gaps and provide data to guide future cholera education and prevention efforts in Iraq.

## 2. Materials and Methods

Study Design and Setting: This is a descriptive cross-sectional study conducted to assess the Knowledge, Attitude, and Practice (KAP) regarding cholera among the general public and university students. The study was carried out during the period from April 2025 to July 2025, and included both online and in-person

**Data Collection Methods**

Study Population and Eligibility Criteria: The study targeted university students and members of the general community from various backgrounds. Data were collected through two methods: an online questionnaire distributed via social media platforms (e.g., Facebook, WhatsApp, Telegram), and face-to-face interviews conducted at wasit university_ Al-zahraa teaching hospital, A total of 413 participants took part in the study. All individuals who willingly agreed to participate were included in the study, regardless of age, gender, or educational level. Participants were excluded if they:

- Refused to give consent,
- Submitted incomplete responses,
- Or provided answers with inconsistencies that could affect the accuracy of the data.

Sample Size and Sampling Method: A total of 413 participants were included in the study. The sampling method was non-probability convenience sampling, utilizing both online distribution and direct interviews for a broader reach.

Data Collection Tools and Procedure: Data were collected using a structured and validated questionnaire designed to evaluate KAP related to cholera. The questionnaire was divided into four sections:

1. Demographics (age, gender, education, occupation)
2. Knowledge about cholera (causes, symptoms, transmission, prevention)
3. Attitudes toward cholera (perceptions, seriousness, treatment beliefs)
4. Practices (hygiene behaviors, water safety, care-seeking). The questionnaire was distributed through:
    - Social media platforms (such as Facebook, WhatsApp, Telegram) using a Google Form.
    - Face-to-face interviews were conducted at Wasit University and Al-Zahraa Teaching Hospital to reach participants
    - Participation was voluntary and anonymous, and responses were collected over a period of eight weeks.

Data Analysis: The collected data were transferred to SPSS software (version 24) for statistical processing. To describe the data, descriptive statistics such as frequencies, percentages, and mean values were utilized. To assess relationships between demographic factors and KAP scores, inferential statistical methods, particularly the Chi-square test, were employed. A p-value below 0.05 was interpreted as indicating statistical significance.

Ethical considerations: Ethical approval was obtained from the Research Ethics Committee at Wasit University – College of Medicine on March 24, 2025. Informed consent was obtained digitally and verbally from all participants. Confidentiality and anonymity were strictly maintained throughout the research process.

## 3. Results

This study involved 413 participants. The majority of participants (64.9%) were aged between 20 and 40 years. Participants who were under 20 years made up 17.4%, 16.7% aged between 41 and 60 years, and only 1% were above 60 years. Regarding gender, 66.1% were female, and 33.9% were male. Educational levels were notably high: 69.5% of the participants had attained a university degree or higher, while 24.7% had completed secondary school, and only 5.8% had a primary level education. This suggests that the sample was well-educated, which may influence awareness and practices regarding cholera.

**Table 1.** Socio-Demographic Characteristics.

| Variable | Frequency | Percentage |
|---|---|---|
| **Age groups** | | |
| Less than 20 years | 72 | 17.4 |
| 20 to 40 years | 268 | 64.9 |
| 41 to 60 years | 69 | 16.7 |
| More than 60 years | 4 | 1.0 |
| **Gender** | | |
| Female | 273 | 66.1 |
| Male | 140 | 33.9 |
| **Educational level** | | |
| Primary school | 24 | 5.8 |
| Secondary school | 102 | 24.7 |
| University and above | 287 | 69.5 |

Figure 1 shows the knowledge about the causative agents of Cholera. The data show that the majority correctly identified bacteria as the causative agent, indicating a high level of basic health knowledge. A smaller percentage mistakenly believed that cholera is caused by parasites, fungi, or viruses, reflecting minor misconceptions.

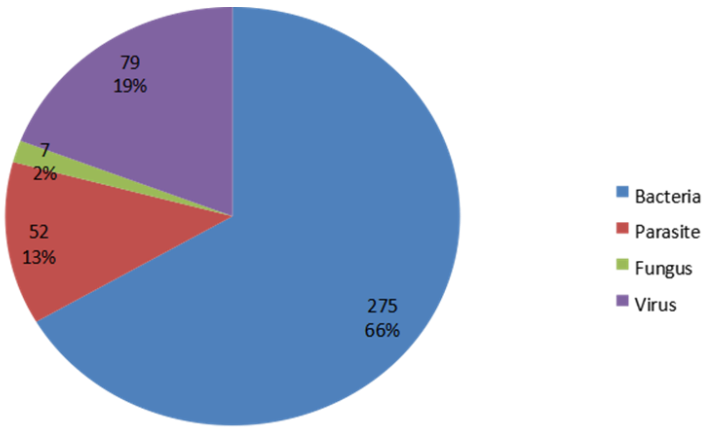


**Figure 1.** Knowledge About Cholera Causative Agents.

According to the participants' opinions about sources of cholera infection, Figure 2 shows that the most common sources of cholera were contaminated water (409 replies), followed by contaminated food (385). Additional pathways that were found included human-to- human transmission, wastewater, flies and mosquitoes, and inadequate hygiene. These findings demonstrate a general understanding of the direct and indirect routes of cholera transmission, with food and water contamination identified as the main causes.

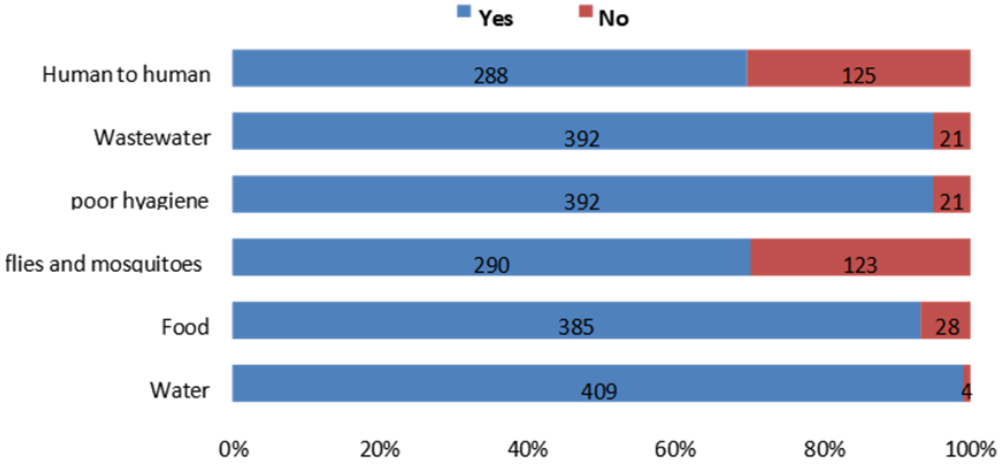


**Figure 2.** Knowledge About Cholera Transmission Sources.

Figure 3 shows the knowledge about symptoms of cholera. When asked about typical cholera symptoms, most participants (353) mentioned the disease's defining feature, severe watery diarrhea. Frequent loose stools (290), abdominal pain and dysentery (125), hematemesis (12), and bloody vomit (11) were other symptoms recorded. A few participants brought up hematemesis, which is not a common symptom of cholera and may indicate a misconception that could influence early detection and treatment-seeking behavior, even if the majority of responses were in line with the clinical presentation of the disease.

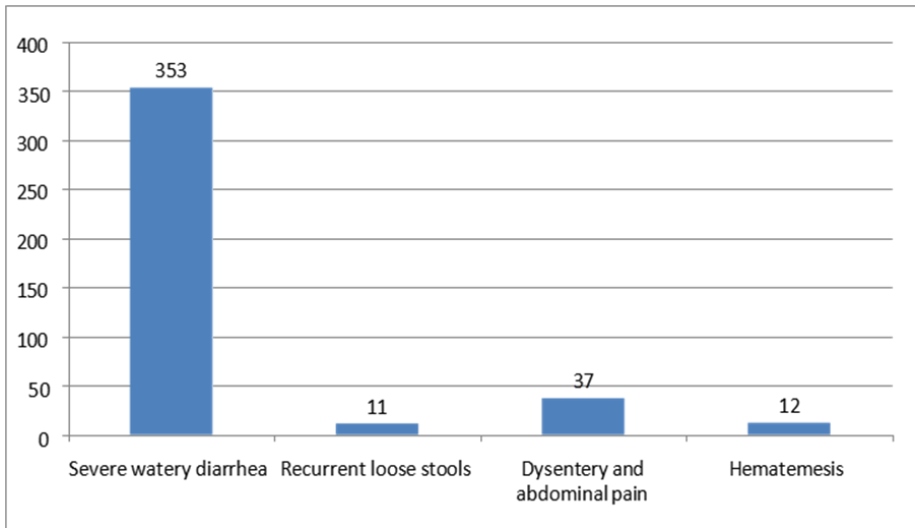


**Figure 3.** Recognition of Cholera Symptoms.

Table 2 shows the behavioral practices of participants about cholera prevention and treatment. The results reported strong adherence to public health recommendations: 98.5%

said they would visit a hospital when they suspected cholera or had severe symptoms, and 97.1% reported using toilets correctly along with proper hand hygiene. There was a good percentage of participants who used soap during hand-washing (97.8%). Additionally, 91.5% drank sterilized or boiled water, and 94.9% stored drinking water in clean containers. Waste disposal practices were also commendable, with 87.4% using recycling bins. However, 23.5% admitted to using medications without a doctor's prescription, and 21.5% used alternative treatments, which raises concerns about self-medication and reliance on non-medical practices.

**Table 2.** Practices of participants about cholera prevention and treatment.

| Variable | Frequency | Percentage |
|---|---|---|
| **Visit the hospital when you suspect** | | |
| Yes | 407 | 98.5 |
| No | 6 | 1.5 |
| **Using alternative ways to treatments** | | |
| Yes | 89 | 21.5 |
| No | 324 | 78.5 |
| **Using medicine without a doctor's prescription** | | |
| Yes | 97 | 23.5 |
| No | 316 | 76.5 |
| **Using the toilet correctly and practicing perfect hand washing** | | |
| Yes | 401 | 97.1 |
| No | 12 | 2.9 |
| **Using soap during hand washing** | | |
| Yes | 404 | 97.8 |
| No | 9 | 2.2 |
| **Drinking sterilized and boiled water** | | |
| Yes | 378 | 91.5 |
| No | 35 | 8.5 |
| **Put the waste inside the recycle bin** | | |
| Yes | 361 | 87.4 |
| No | 52 | 12.6 |
| **Put water in perfect bottles** | | |
| Yes | 392 | 94.9 |
| No | 21 | 5.1 |
| **Eat food from public restaurants** | | |
| Yes | 99 | 24.0 |
| No | 314 | 76.0 |

Table 3 reported the associations between demographic characteristics and participants' knowledge of participants about origin of cholera. Sex and educational level showed no significant associations ($P< 0.05$). Age was significantly associated with knowledge ($p = 0.045$). Participants under 20 years showed a higher percentage of incorrect answers compared to older age groups.

**Table 3.** Association between cause of infection and socio-demographic characteristics.

| Variables | Cause of infection | | P-value |
|---|---|---|---|
| | Bacterial | Non-bacterial | |
| **Gender** | | | |
| Female | 179 | 94 | **0.309** |
| | 65.1% | 68.1% | |

| | | | |
|---|---|---|---|
| Male | 96 | 44 | |
| | 34.9% | 31.9% | |
| **Educational level** | | | |
| Primary school | 19 | 5 | **0.199** |
| | 6.9% | 3.6% | |
| Secondary school | 72 | 30 | |
| | 26.2% | 21.7% | |
| University and above | 184 | 103 | |
| | 66.9% | 74.6% | |
| **Age groups** | | | |
| Less than 20 years | 58 | 14 | **0.045** |
| | 21.1% | 10.1% | |
| 20 to 40 years | 172 | 96 | |
| | 62.5% | 69.6% | |
| 41 to 60 years | 43 | 26 | |
| | 15.6% | 18.8% | |
| More than 60 years | 2 | 2 | |

## 4. Discussions

The current study aimed to assess the knowledge, attitudes, and practices (KAP) regarding cholera among the Iraqi population. Overall, participants demonstrated a good level of knowledge about cholera, including its causes, modes of transmission, symptoms, and preventive measures. Most respondents correctly identified bacteria as the causative agent of cholera and recognized contaminated water and food as the primary transmission routes. These findings align with previous research from Ethiopia, where 87.2% of participants also identified water as the most common transmission route for cholera [7].

In terms of attitudes and practices, the majority of participants showed a strong willingness to seek proper medical care, with 98.5% reporting they would visit a hospital if cholera were suspected. Furthermore, over 90% of respondents reported engaging in appropriate hygiene behaviors, such as regular handwashing with soap, boiling drinking water, and proper toilet use. These practices are crucial for reducing transmission during outbreaks and are consistent with the World Health Organization's WASH (Water, Sanitation, and Hygiene) guidelines for cholera control [8].

However, the study also identified some concerning practices. Approximately 25% of participants reported using medications without a prescription, and 21.5% reported relying on alternative treatments. Such behaviors may delay proper treatment and contribute to the growing problem of antimicrobial resistance—a global threat emphasized by both WHO and CDC [6], [9]. A similar trend was observed in a Nigerian study by Ilesanmi et al., where over 29% of participants preferred self-treatment over hospital visits during diarrheal episodes [10].

Additionally, the study explored associations between knowledge and socio-demographic characteristics. A statistically significant relationship was found between age and knowledge of cholera etiology ($p = 0.045$), with individuals under 20 years old showing lower levels of awareness. This highlights the need to strengthen health education among youth through schools and community programs. Interestingly, no significant association was found between education level and knowledge of cholera's bacterial cause, suggesting that public health messages may have successfully reached a wide range of the population. This observation is consistent with findings by Rahman et al [11].

Despite the valuable insights gained, this study has certain limitations. The cross-sectional design limits the ability to determine causal relationships between knowledge, attitudes, practices, and demographic factors. Additionally, the sampling method may

have introduced bias, limiting the generalizability of the results to the broader Iraqi population. Data collection relied on self-reported questionnaires, which can be subject to social desirability bias or inaccurate responses [12], [13].

Numerous studies in cholera-endemic regions have assessed the public's knowledge, attitudes, and practices (KAP) regarding the disease, A study conducted in Jazan, Saudi Arabia revealed low levels of knowledge, with only 43.8% of participants identifying bacteria as the causative agent, and just 52.5% recognizing contaminated water as a source of transmission, In addition hygienerelated practices were suboptimal, with less than half reporting regular handwashing or boiling drinking water [2]. Similarly, in Isiolo County, Kenya, although 99.3% of respondents were aware of cholera, only about half reported treating drinking water or maintaining proper sanitation practices [14]. In the Kalemie region of the Democratic Republic of Congo, 64% of participants demonstrated good knowledge, and 73.8% practiced proper water, sanitation, and hygiene (WASH), yet disparities existed based on age and education levels [15]. In contrast, the current study conducted in Iraq among 413 participants including both university students and members of the general community showed relatively higher levels of knowledge and more consistent hygienic practices, Over 90% of participants were aware of water and food contamination as transmission routes, and the majority reported proper hygiene behaviors, including the use of soap and water storage in clean containers. However, a significant portion (23.5%) still reported self-medicating without a prescription, and individuals under the age of 20 had lower knowledge levels compared to older groups ($p = 0.045$). These findings highlight a unique context within the Iraqi population, where health awareness appears higher than in comparable studies, yet gaps persist, particularly among younger individuals.

## 5. Conclusions

According to the study's results, the sample's Iraqi populace is well-informed about cholera and practices effective preventive measures. The majority of participants showed good cleanliness habits, a strong desire to seek health care, and knowledge of the causes and spread of the disease. However, the presence of unsafe habits, such as taking medication without prescriptions and the use of alternative medications, reveals potential areas for public health intervention. Additionally, the lack of awareness among young people emphasizes the necessity of focused cholera education initiatives for this demographic.

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