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Knowledge, Attitude, and Practice of Community towards Cholera in High-risk Districts of Kandahar Province Afghanistan

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ABSTRACT

Background: Afghanistan remains highly vulnerable to cholera outbreaks because of limited access to safe water, poor sanitation, and low community awareness. Kandahar Province experiences recurrent seasonal outbreaks. We aimed to assess the community knowledge, attitudes, and practices (KAP) regarding cholera in four high-risk districts.

Methods: A descriptive cross-sectional survey was conducted in 2022 in Dand, Daman, Spin Boldak, and Panjwai districts, Afghanistan using probability-based cluster sampling. A structured, pretested questionnaire was administered to 852 adults. Data were analyzed using Epi Info 7.2.3 and Stata 18. Descriptive statistics, chi-square tests, and logistic regression were performed, with $P<0.05$ considered statistically significant.

Results: Among 852 respondents, most were male (62.44%), married (87.79%), unemployed (77.46%), and illiterate (69.84%). Awareness of diarrheal diseases was high (88.33%), but misconceptions remained: 59.74% believed cholera is transmitted by insects and 56.57% by direct person to person contact. Most recognized contaminated water (79.81%) and food (76.52%) as transmission routes, but only 60.56% identified cholera as contagious. Although attitudes were generally positive, preventive practices were inadequate: only 34.97% boiled drinking water, 60.09% practiced open defecation, and 26.52% did not wash hands after toilet use. Only 30% achieved higher overall KAP scores. Female gender, higher education, and employment were significantly associated with better KAP.

Conclusion: Important gaps in cholera knowledge and preventive practices persist in high-risk districts of Kandahar. Despite generally positive attitudes, unsafe water use, poor sanitation, and misconceptions continue to hinder cholera control. Targeted health education and strengthened interventions are needed to improve community resilience and reduce cholera transmission.

Keywords: Cholera; Knowledge, attitudes, and practices; Water; Sanitation; Hygiene; Afghanistan

Introduction

Cholera is an infection caused by the gram-negative bacterium *Vibrio cholerae*, which targets the gastrointestinal tract and can be life-threatening without prompt treatment. The disease is characterized primarily by profuse watery diarrhea that can rapidly lead to severe dehydration (1). Cholera bacteria are commonly present in water sources or foods polluted by the feces of an infected person. Ensuring access to clean drinking water and proper sanitation is essential for preventing and controlling the spread of cholera and other waterborne illnesses (2).

According to the WHO, a total of 60 countries documented over 560,000 cholera cases and more than 6,000 deaths in 2024. This reflects a modest rise in the number of reported cases and a significant jump in mortality compared with 2023, when more than 535,000 cases and about 4,000 deaths were recorded (3). However, although according to Centers for Diseases Control and Prevention (CDC) many individuals infected with cholera never develop symptoms, the disease can still lead to severe, life-threatening watery diarrhea and vomiting in some cases. Globally, cholera affects an estimated 1.3 to 4 million people each year, and between 21,000 and 143,000 deaths are attributed to the infection annually (4). Therefore, cholera remains a significant global public health challenge, often considered an indicator of underdevelopment within affected countries.

Over recent years, numerous outbreaks have occurred across several nations, particularly in Asia and Africa, including India, Sudan, Pakistan, Bangladesh, and Afghanistan. Given that cholera outbreaks occur annually, primarily in low- and middle-income settings, strengthening community knowledge, attitudes, and practices related to cholera prevention and control are critically important (5). In 2024, the WHO Eastern Mediterranean Region (EMR) carried a disproportionate share of the global cholera burden, with eight countries reporting 597,026 cases and 2,403 deaths, representing almost 74% of worldwide cases. Countries such as Afghanistan, Pakistan, Iran, and Yemen continue to face recurrent outbreaks. Afghanistan contributed a major share of the regional caseload, while Yemen recorded over 245,000 cases and 861 deaths in 2024, reflecting the severe impact of prolonged conflict and failing water and sanitation systems (6,7).

Although epidemiological data help quantify the magnitude and severity of cholera outbreaks, they offer limited insight into how communities understand the disease, their attitudes toward prevention, and the everyday practices that may facilitate its spread. Evidence from various settings shows that knowledge, attitudes, and practices (KAP) related to cholera can differ widely between countries, underscoring the importance of context-specific assessments to guide effective control strategies. A KAP study conducted among healthcare professionals in District West, Karachi, found that while participants showed moderate knowledge and generally positive attitudes toward cholera, their preventive and reporting practices were inconsistent—indicating gaps that hinder effective outbreak control (7,8). In Malaysia in urban areas, only 29% accounted cholera as communicable disease while 91% and 92% of respondents agreed on transmission of cholera via contaminated water and foods respectively. Additionally, 84% of respondents accepted that using boiled water can prevent this infection (9). In contrary, a survey conducted on 428 participants from a community in Kenya, 73.2% of them thought cholera as communicable disease. Furthermore, only 48.8% of respondents had good practice of defecation (e.g., using closed-space defecation and using soap after). Having formal education, treating drinking water and positive attitude toward cholera had independent association with knowledge score of respondents (10). In Jazan city of Saudi Arabia, half of the participant thought that cholera is

contagious and fatal and can be prevented by considering good hygiene practices as well as taking vaccines if available. Additionally, 50% of respondents believed that practices of washing hands with soap after using restroom and using boiled water could help to prevent this infection. Therefore, public knowledge and awareness, positive attitude and practice would be crucial for lowering the cases of cholera and infection spread prevention (11).

Afghanistan is among the countries impacted by cholera, largely due to widespread limitations in access to safe drinking water and low public awareness of preventive practices for communicable diseases. These factors increase the country's vulnerability to cholera outbreaks. In 2022 south region provinces of Afghanistan especially Kandahar experienced heavy floods during summer which eventually led to drinking water sources contamination (12). In same year, the number of Acute Water Diarrhea (AWD) cases reached 13,864, contributing to 5% of annual country-wide cases making Kandahar among highly affected provinces while the surge kept growing for the upcoming years. Cases of AWD climbed to 38,886 during 2024, making the province one of the hot spots for this disease which consequently calls for multiple evidence to address the gaps and challenges in this province (13).

To date, no study has assessed the KAP of residents living in the high-risk districts of Kandahar, leaving a critical gap in the evidence needed to guide preparedness, prevention, and response strategies for future cholera outbreaks. The four districts included in this study (Dand, Daman, Spin-Boldak, and Panjwai) were classified as high-risk areas by the National Diseases Surveillance and Response (NDSR) system in Kandahar Province on the basis of historically elevated AWD case counts from provincial surveillance data, geographic vulnerability factors, and documented WASH infrastructure deficits. Spin-Boldak, as a major international border town, carries elevated risk from cross-border population movement. Daman and Dand experienced severe flooding during the summer of 2022, directly contaminating water sources and precipitating the outbreak that provides the epidemiological context for this study. Panjwai has consistently recorded low coverage of safe water and sanitation facilities in national WASH assessments. Despite this recognized burden, no prior community-level KAP assessment has been conducted in any of these four districts. This gap impedes the design of district-specific, culturally appropriate cholera prevention strategies. The current study tends to address this gap and elucidate results to illustrate community KAP toward cholera which is essential for implementing effective control measures and reducing transmission. The findings and recommendations from this study can contribute to decreasing cholera incidence by improving public awareness and strengthening preventive practices within the community.

We aimed to assess the KAP related to cholera among residents of high-risk districts in Kandahar province.

Methods and Materials

Study Design and Setting

A descriptive cross-sectional study (KAP survey) was conducted in November 2022 to evaluate the KAP related to cholera among residents of high-risk districts in Kandahar Province, Afghanistan. Kandahar, located in southern Afghanistan, comprises 17 districts, of which four, Dand, Panjwai, Daman, and Spin Boldak, have been classified as high-risk for cholera outbreaks by the National Diseases Surveillance and Response (NDSR) system. The study population included adult residents (≥18 years) living in these mentioned districts.

Sample Size

The sample size was calculated using Epi Info version 7.2.3, assuming a 95% confidence level and a 5% margin of error, resulting in a required sample of 852 participants. Since the sampling strategy for this study was probability cluster sampling and considering design effect of 2, the final sample size has been estimated as 854 individuals/households. Due to implementation of study in four districts, probability-proportional-to-size (PPS) strategy was employed considering overall population of 925,200 across four districts (Boldak: 376,200; Dand: 267,900; Daman: 103,500; and Panjwaye: 177,600). The adjusted sample size for each district is as follows:

1- Boldak: 347
2- Dand: 247
3- Panjwaye: 164
4- Daman: 96

Data Collection Instrument and Strategy

A probability-based cluster sampling approach was employed, and households were randomly selected from each district. Data were collected using a structured, pre-tested questionnaire administered through face-to-face interviews by trained data collectors. When necessary, participants were also allowed to self-administer the questionnaire. The 17-item questionnaire was designed to capture basic sociodemographic characteristics, knowledge, attitude, and preventive practices. A pilot test was conducted on 10% of overall sample size prior to data collection to refine the questionnaire, assess comprehension, and estimate the time required for completion. The internal consistency of questionnaire was assessed using Cronbach's Alpha with conventional threshold of >0.7 on piloted data which resulted in 0.832, projecting good internal consistency. Prior to study implementation, data collectors were trained on ethics of study, minimizing social desirability bias through neutral question delivery and appropriate methods of questions delivery to avoid prompting. Data collectors obtained informed consent from all participants before initiating interviews. Completed questionnaires were checked on-site for completeness, cleaned, and entered into predefined electronic data sheets. All physical forms were submitted to the NDSR office in Kandahar, where Afghanistan Field Epidemiology Training Program (AFETP) residents provided quality assurance oversight. Questionnaires with more than 5% of missing responses were excluded from the final analysis.

Operational Definitions

High Knowledge of Cholera: From 7 items within the questionnaire (diarrheal diseases awareness, water transmission, food transmission, hygiene, and contagiousness with score of 1 and transmission through direct contact and by insect with score 0) if participants answered correctly to 5 or more questions

Positive Attitude towards Cholera: From 5 items within the questionnaire (severity of cholera, preventable nature, travelling increase the risk, improper toilet, and visiting hospital upon suspicion for cholera, all score as 1 for correct answer) if participant scored 4 or higher

Good Practice towards Cholera: From five items in the questionnaire (medicine use, closed/flushed toilets, handwashing, and boiling water with score of 1 and public eating with score 0) if participant received 3 or higher

Composite or Overall High KAP Score: Is defined as participants who simultaneously met all three domain-specific thresholds: High Knowledge (≥5/7), Positive Attitude (≥4/5), and Good Practice (≥3/5).

Data Analysis

Data analysis was conducted using Epi Info version 7.2.3 and Stata 18. Descriptive statistics, including frequencies and percentages, were generated to summarize participant characteristics and KAP indicators. Difference of KAP components from the gender perspective was assessed using Chi-square test with alpha level set at 0.05.

A composite score was calculated based on the given operational definition to define an outcome variable and inferential statistic using Multivariable Logistic Regression with alpha level of 0.05 and Confidence Interval (CI:95%). Area Under the Curve (AUC), Hosmer-Lemeshow, and McFadden's pseudo-R^2 were used to describe the analytical model's discrimination, calibration and variance level. The model was adjusted for sex, age categories, marital status, educational level, occupation, and district.

Ethics of Study

Ethical approval was obtained from the Institutional Review Board (IRB), Afghanistan National Public Health Institute of the Ministry of Public Health, Afghanistan. Participation was voluntary and in adherence with Helsinki's declaration of ethical principles. Data collection teams were trained in maintaining justice, respect, anonymity, and beneficence of study participants and no personal identifiers were recorded. Data were eventually digitized and encrypted with passwords to ensure the data security and confidentiality. For literate participants, written informed consent was obtained prior to the interview. For illiterate participants, the consent procedure was adapted in accordance with ethical principles: the study information was read aloud in the participant's preferred local language (Pashto or Persian), consent was obtained verbally, and fingerprint of participant was received to formalize the informed consent form. Data collection team prioritized integrity and honesty in reading the details of consent forms and identical rights of withdrawal during any stage of the study was maintained among literate and illiterate participants.

Results

A total of 852 individuals were enrolled, representing the adult population of four high-risk districts of Kandahar. The largest age group consisted of respondents aged 20–30 years (34.86%), followed by those aged 30–40 years (28.52%), indicating that the sample was predominantly young to middle-aged adults (Table 1). The greater part of participants were male (62.44%) and married (87.79%), reflecting the typical demographic structure of households in the region.

Socioeconomic indicators revealed that a substantial proportion of respondents were unemployed (77.46%), and illiteracy was notably high (69.84%), with only 3.52% having attained a bachelor's degree. These characteristics highlight the socioeconomic vulnerabilities that may influence health-related knowledge and practices within the community. Participants were drawn from four high-risk districts identified by surveillance authorities, with the greatest representation from Spin-Boldak (Boldak) (40.61%), followed by Dand (29.23%), Panjwai (18.78%), and Daman (11.38%). This distribution reflects population density and the relative risk classifications used for sampling. For a detailed breakdown of the demographic and socioeconomic characteristics of respondents, Table 1 provides the full frequency distribution.

Table 1: Frequency distribution of sociodemographic factors of study participants (N=852)

Variables	***Number***	***Percentage***
Age categories(yr)		
<=20	66	7.75
>20 - 30	297	34.86
>30 - 40	243	28.52
>40 - 50	154	18.08
>50 - 60	60	7.04

>60	32	3.76
	Sex	
Male	532	62.44)
Female	320	37.56)
	Marital Status	
Married	748	87.79)
Single	98	11.50)
Other	6	0.70)
	Profession	
Employed	192	22.54
Unemployed	660	77.46
	Level of education	
Bachelor	30	3.52
High school graduate	119	13.97
Illiterate	595	69.84
Madrasa	108	12.68
	Districts	
Spin-Boldak	346	40.61
Daman	97	11.38
Dand	249	29.23
Panjwai	160	18.78

Knowledge Levels Regarding Cholera Transmission

Overall, the findings suggest a moderate level of awareness regarding cholera and its transmission among surveyed participants. Of the 852 respondents, 88.33% reported being familiar with diarrheal diseases, while 11.97% lacked such awareness (Table 2). In terms of awareness about the diarrheal diseases, there was a significant difference between males and females (P=0.008) with 15.9% of females lacking awareness compared to only 9.59% of males. A majority correctly identified key transmission pathways, with 79.81% recognizing contaminated water and 76.52% recognizing contaminated food as sources of cholera infection. Nevertheless, several misconceptions persisted: 59.74% believed that insects could transmit cholera, and 56.57% thought the disease could spread through direct person-to-person contact, despite limited evidence supporting these modes. There was a significant (P=0.027) difference in presence of these misconceptions among based on gender lens with 56.77% of males believing in these misconceptions compared to 64.69% of females. Additionally, while 73.23% acknowledged that poor hygiene contributes to cholera transmission, only 60.56% understood that cholera is a contagious disease, indicating gaps in foundational knowledge. Collectively, these findings demonstrate that although general awareness is relatively high, important misconceptions remain, underscoring the need for targeted health education and community-level risk communication. More details are presented in Table 2.

Table 2: Frequency distribution of knowledge of the participants (N=852)

Variables	*Male-N (%)*	*Female-N (%)*	*Total-N (%)*	*P-Value*[a]
Do you know diarrheal disease?				
Yes	481 (90.41)	269 (84.06)	750 (88.33)	0.008**
No	51 (9.59)	51 (15.94)	102 (11.97)	
Do you think cholera is a contagious disease?				
Yes	315 (59.21)	201 (62.81)	516 (60.56)	0.332
No	217 (40.79)	119 (37.19)	336 (39.43)	
Does cholera spread through contaminated water?				
Yes	429 (80.64)	251 (78.44)	680 (79.81)	0.492
No	103 (19.36)	69 (21.56)	172 (20.19)	
Does cholera spread through contaminated food?				
Yes	408 (76.69)	244 (76.25)	652 (76,52	0.949
No	124 (23.31)	76 (23.75)	200 (23.47)	
Does cholera spread by insects?				
Yes	302 (56.77)	207 (64.69)	509 (59.74)	0.027*
No	230 (43.23)	113 (35.31)	343 (41.26)	
Does cholera spread by non-observance of hygiene?				
Yes	396 (74.44)	228 (71.25)	624 (73.23)	0.349
No	136 (25.56)	92 (28.75)	228 (26.77)	
Does cholera spread by contact?				
Yes	288 (54.14)	194 (60.63)	482 (56.57)	0.075
No	244 (45.86)	126 (39.38)	370 (43.42)	

[a] Chi-square test performed for gender differences
*Significant at <0.05
**Significant at <0.01

Attitudes Toward Cholera and Its Prevention

The findings indicate generally positive attitudes toward cholera seriousness and prevention among study participants. Of the 852 respondents, 78.16% perceived cholera as a severe and potentially fatal disease, while 21.83% did not share this perception (Table 3). A significant difference in this attitude (p=0.019) was observed with 80% of males and 73% of females sharing this perception. A similar majority (72.30%) believed that cholera transmission can be prevented, whereas 27.46% felt it was not preventable. Awareness of key behavioral risks was also relatively strong, with 75.35% acknowledging that improper toilet use and open defecation contribute to cholera transmission, compared to 24.64% who did not recognize this link. Additionally, 59.27% of participants believed that traveling to a cholera-affected area increases the risk of infection. Importantly, most respondents (81.22%) indicated that they would seek hospital care if they suspected cholera, reflecting a generally proactive attitude toward seeking medical attention. Males were significantly higher scoring (p=0.001) in this attitude with 87% compared to females 70%. Collectively, these findings demonstrate favorable attitudes toward cholera severity, prevention, and care-seeking, although notable proportions of the population still hold misconceptions or less favorable views. More details are presented in Table 3.

Table 3: frequency distribution of attitudes of study participants (N=852)

Variables	***Male N (%)***	***Female N (%)***	***Total N (%)***	***P-Value[a]***
Do you think cholera disease is sever and have death?				
Yes	430 (80.83)	236 (73.75)	666 (78.16)	0.019*
No	102 (19.17)	84 (26.25)	186 (21.83)	
Do you think the spread of cholera is preventable?				
Yes	379 (71.24)	239 (74.69)	616 (72.30)	0.311
No	153 (28.76)	81 (25.31)	234 (27.46)	
Do you think that traveling to an area that has cholera can make you sick?				
Yes	311 (58.46)	194 (60.63)	505 (59.27)	0.581
No	221 (41.54)	126 (39.38)	357 (41.76)	
Do you think that improper use of toilet causes cholera?				
Yes	343 (64.47)	199 (62.19)	642 (75.35)	0.550
No	189 (35.53)	121 (37.81)	210 (24.64)	
Do you visit the hospital if you suspect cholera?				
Yes	466 (87.59)	226 (70.63)	692 (81.22)	0.001**
No	66 (12.41)	94 (29.38)	160 (18.77)	

[a] Chi-square test performed for gender differences
*Significant at <0.05
**Significant at <0.01

Cholera-Related Preventive Practices

Overall, the findings reveal considerable gaps in cholera-preventive practices among respondents. Of the 852 participants, only 34.97% reported using boiled water for drinking, while 65.23% did not, indicating limited adoption of safe water practices (Table 4). A significant difference in this practice was observed (*P*=0.001) among males compared to females with 52% of females using boiled water compared to only 24% in males. Hand hygiene was comparatively better, with 73.47% reporting that they routinely washed their hands after using the toilet; however, 26.52% still did not follow this essential preventive measure. With respect to sanitation facilities, 60.09% of respondents relied on open defecation, and only 26.64% used closed latrines, highlighting substantial sanitation challenges that elevate cholera transmission risk. Additionally, 64.67% stated that they would take medicine if they suspected cholera, whereas 35.32% would not, reflecting mixed health-seeking behaviors. Eating habits also varied, with 47.65% reporting that they ate in public places—an activity that may increase exposure to unsafe food sources. Significant difference (p=0.001) among males compared to females was observed in this practice with 52% of males adopting this practice compared to only 40% of females. Collectively, these findings demonstrate that although some hygiene practices are observed, major deficiencies remain in water treatment, sanitation, and risk-reducing behaviors, emphasizing the need for strengthened community-level cholera prevention strategies (Table 4).

Table 4: Frequency distribution of practice of study participants (N=852)

Variables	*Male N (%)*	*Female N (%)*	*Total N (%)*	*P-Value*[a]
Do you use medicine if you suspect cholera?				
Yes	343 (64.47)	208 (65.00)	551 (64.67)	0.935
No	189 (35.53)	112 (35.00)	301 (35.32)	
Which type of toilet do you use?				
Close	110 (20.68)	117 (36.56)	227 (26.64)	-
Open	346 (65.04)	166 (51.88)	512 (60.09)	
Toilet	76 (14.29)	37 (11.56)	113 (13.26)	
Do you wash your hands after toilet?				
Yes	379 (71.24)	247 (77.19)	626 (73.47)	0.068
No	153 (28.76)	73 (22.81)	226 (26.52)	
Do you use boiled water?				
Yes	130 (24.44)	168 (52.50)	298 (34.97)	0.001**
No	402 (75.56	152 (47.50)	554 (65.23)	
Do you eat in public places?				
Yes	277 (52.07)	129 (40.31)	406 (47.65)	0.001*
No	255 (47.93)	191 (59.69)	446 (52.34)	

[a] Chi-square test performed for gender differences
*Significant at <0.05
**Significant at <0.01

Overall, KAP Profile and Associated Factors

Of the 852 respondents, 262 (30.8%) demonstrated an adequate overall KAP profile meeting the threshold for high knowledge, positive attitude, and good practice simultaneously (Figure 1). The remaining 590 (69.2%) scored lower on at least one domain, despite many showing strengths in individual components, for example high knowledge alone was present in 69.0% of respondents. The mean total KAP score (sum of knowledge, attitude, and practice components, range 0–17) was 10.82 (Standard Deviation (SD) 2.84), with a median of 11.

In multivariable logistic regression, five factors were independently associated with adequate overall KAP after adjustment for age, marital status, education, occupation, gender, and district (Table 5).

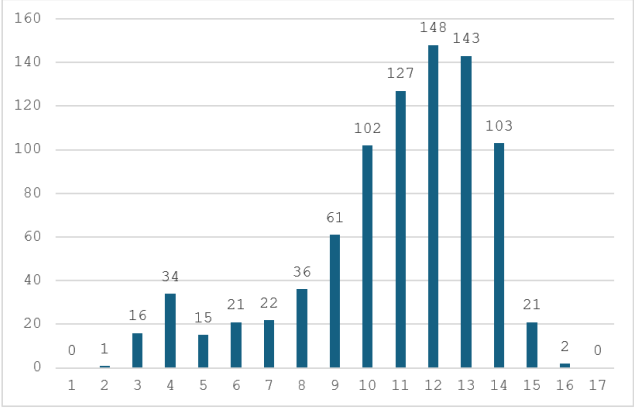

Figure 1: Total KAP score distribution among study participants (N=852)

Table 5: Factors associated with overall high KAP profile among study participants (N=852)

Variable	*Crude OR (95% CI)*	*Crude P-value*	*Adjusted OR (95% CI)*	*Adjusted P-value*
Gender (ref: Male)				
Female	1.69 (1.25–2.27)	0.001 **	3.13 (2.15–4.57)	<0.001 ***
Age group (ref: 21–30) (yr)				
≤20	0.61 (0.32–1.13)	0.117	0.59 (0.29–1.2)	0.148
31–40	0.92 (0.64–1.33)	0.656	0.96 (0.65–1.43)	0.844
41–50	0.96 (0.63–1.46)	0.856	1.04 (0.66–1.66)	0.853
51–60	1.03 (0.57–1.86)	0.919	1.14 (0.6–2.15)	0.691
>60	0.48 (0.19–1.19)	0.114	0.81 (0.3–2.19)	0.673
Marital Status (ref: Married)				
Not Married	0.9 (0.57–1.42)	0.653	1.39 (0.8–2.43)	0.241
Education (ref: Illiterate)				
Madrasa	1.55 (1.01–2.39)	0.047 *	1.26 (0.77–2.05)	0.353
High School	1.61 (1.06–2.43)	0.024 *	1.45 (0.84–2.49)	0.182
Bachelor	5.48 (2.51–11.97)	<0.001 ***	4.96 (2.06–11.94)	<0.001 ***
Occupation (ref: Unemployed)				
Employed	2.3 (1.65–3.2)	<0.001 ***	2.53 (1.58–4.03)	<0.001 ***
District (ref: Spin-Boldak)				
Daman	2.37 (1.48–3.79)	<0.001 ***	2.94 (1.77–4.85)	<0.001 ***
Dand	1.21 (0.84–1.75)	0.305	1.14 (0.77–1.7)	0.517
Panjwaye	1.79 (1.2–2.67)	0.005 **	1.84 (1.19–2.83)	0.006 **

ref: Reference Category
*Significant at <0.05
**Significant at <0.01
***Significant at <0.001

The multivariable model for adequate overall KAP showed acceptable discrimination (AUC = 0.698) and adequate calibration (Hosmer-Lemeshow $\chi^2 = 12.40$, $P = 0.134$), explaining 8.8% of the variance (McFadden's pseudo-$R^2 = 0.088$). Female respondents had over three times higher odds of achieving adequate overall KAP compared with males (aOR 3.13, 95% CI 2.15–4.57, $P<0.001$). This was the strongest predictor in the model and is notable given that gender was not a significant predictor of knowledge alone, suggesting that women more consistently translate cholera-related knowledge into positive attitudes and protective practices than men do.

Education showed a strong dose-response pattern. Respondents with a bachelor's degree had nearly five times higher odds of adequate overall KAP than illiterate respondents (aOR 4.96, 95% CI 2.06–11.94, $P<0.001$), while madrasa and high school education were not independently significant after adjustment. Employed respondents had over twice the odds of adequate overall KAP compared with the unemployed (aOR 2.53, 95% CI 1.58–4.03, $P<0.001$).

District-level differences were also significant. Compared with Spin-Boldak, respondents in Daman had nearly three times higher odds of adequate overall KAP (aOR 2.94, 95% CI 1.77–4.85, $P<0.001$), and those in Panjwai had nearly twice the odds (aOR 1.84, 95% CI 1.19–2.83, $P=0.006$). Dand did not differ significantly from Spin-Boldak. Age group was not and marital status was not significantly associated with the composite outcome in the adjusted model.

Discussion

This study provides an in-depth assessment of community KAP regarding cholera across four high-risk districts of Kandahar Province, Afghanistan. The findings highlight critical vulnerabilities related to water, sanitation, and hygiene (WASH), combined with significant gaps in cholera-related awareness and preventive behaviors.

Overall, the study revealed moderate knowledge levels among respondents, with most participants able to identify common transmission pathways such as contaminated water and food. However, misconceptions were widespread, including the belief that cholera is transmitted by insects or through direct person-to-person contact. These misconceptions mirror patterns reported in other low-resource settings. For example, a multi-country study across six MENA nations (13) found that although 85.4% of participants had heard of cholera, only 50.7% demonstrated adequate knowledge—emphasizing persistent gaps in understanding disease transmission. Similarly, a Kenyan KAP study reported misperceptions about water treatment and sanitation practices, highlighting socio-cultural and environmental contributors to poor cholera prevention behaviors (10, 14). Similar misconceptions have been reported in Yemen, where community knowledge of cholera transmission was suboptimal. Nearly half of the respondents incorrectly believed that cholera is transmitted by flies or insects, and 6.6% believed it spreads through direct person-to-person contact, highlighting persistent knowledge gaps despite recurrent outbreaks (15).

Attitudinal findings showed generally positive perceptions of cholera severity and preventability, with most respondents acknowledging that the disease can be fatal and prevented through appropriate hygienic behaviors. Comparable attitudes were observed in studies conducted in Saudi Arabia and Malaysia, where participants recognized cholera as a serious and preventable disease and showed favorable attitudes toward hygiene-related prevention. However, the presence of a sizeable minority who did not view cholera as severe or preventable signals the need for improved health communication strategies in Kandahar (16). Similar findings were reported in the Democratic Republic of Congo, where most participants perceived cholera as a serious disease and demonstrated positive attitudes toward prevention and control measures. The study found that 73.6% of respondents had positive attitudes toward cholera, including recognition of the importance of seeking treatment and engaging in prevention activities (17).

Preventive practices were suboptimal. Although handwashing was commonly reported, unsafe behaviors such as open defecation (60%) and the use of nonboiled water (65%) remain prevalent. These findings align with evidence from Kenya (9), where only 48.8% demonstrated safe defecation practices and just 51.3% consistently treated drinking water. Similarly, research from Zambia (17) found that even among educated populations, only 40% demonstrated consistent handwashing and preventive behavior, despite high levels of cholera awareness. These comparisons underscore that knowledge alone does not guarantee protective practices; structural barriers such as limited WASH infrastructure constrain behavior change (10,18).

Observing the knowledge to practice gap from the lens of COM-B framework (Capability-Opportunity-Motivation-Behavior), the authors believe that gap cannot be fully explained by the knowledge deficit alone. We observed that motivation (knowledge and attitude) was far stronger than the available opportunities to practice (latrines, fuel for boiling, access to safe water) and capability (literacy and economic situation). For instance, with 77% of study participants unemployed, procuring fuel or other means to boil the water could be viewed as significant economic burden. With only 26% of

closed latrine facilities reflects a collective action and public investment rather than individual knowledge failure.

In overall basis, our study showed that only 3 in every 10-participant scored high across KAP, reflecting an adequate KAP profile. Higher KAP profile was associated with female gender, educational and employment status along with district. Females, despite their lower standalone score in knowledge component, scored higher in KAP profile with odds of three compared to males. Higher education appeared to have odds of nearly five for improved KAP profile while the odds for employed individuals were 2.5. Daman district had the highest odd among other districts for higher composite KAP score compared to its counterpart. Our finding in regards of female gender, education, and employment is almost in similar resemblance to that of Mozambique (18).

Findings of our study reiterate that higher knowledge does not directly translate to practice in affected areas. Tailored interventions are required to address this behavioral gap meticulously. Based on the elucidated results and despite low knowledge score but higher overall KAP profile for cholera among females, while considering socio-cultural contexts, specific gender-segregated training programs using community-based approaches and mediated through female community health workers would help to leverage knowledge with attitude and practice levels. Moreover, targeted interventions to improve preventive practice among males would be beneficial to address this gender-based difference. Higher KAP scores among literate and employed individuals call for an unaddressed gap directed to illiterate and lower educational level. Strengthening an approach for all strategies by improving radio-based programs, advocacy through religious scholars, and head of villages (Maliks) would be helpful in addressing this issue. Meanwhile, gap of knowledge-to-practice translation could be addressed through investment in WASH facilities through conditional cash transfer or livelihood programs that enable households to afford fuel for water boiling, or subsidized latrine construction programs. These recommendations align with the WHO Global Task Force on Cholera Control's multi-sectoral approach, which emphasizes simultaneous behavioral change communication, WASH infrastructure investment, and surveillance strengthening as complementary pillars of cholera elimination.

This study is the first KAP assessment on cholera conducted in high-risk districts of Kandahar, filling a critical evidence gap in Afghanistan’s cholera prevention efforts. The use of probability-based cluster sampling increases representativeness, and the relatively large sample size enhances the validity of findings. The study also applied established KAP frameworks aligned with the WHO cholera prevention guidelines, improving comparability with international studies (19-20).

Despite its strengths, few limitations should be acknowledged. First, cross-sectional design limits its causal inference, as associations may not reflect temporal relationships. Second, self-reported behaviors such as handwashing and water treatment may be prone to social desirability bias, particularly in face-to-face interviews. Probably the answers would be overestimated by some leading questions. Third, the validation of self-reported behavioral data through direct observation or biomarker methods (such as household water quality testing) was not feasible given the field-response context, and resource constraints of the study setting. Consequently, reported practice rates for water boiling, handwashing, and latrine use likely represent upper-bound estimates of actual behavior. Fourth, women were underrepresented due to sociocultural constraints, potentially limiting generalizability for female populations. Finally, infrastructure-related WASH indicators were not directly measured, which could have provided additional context for practice-related findings.

Conclusion

This study provides critical evidence on the KAP related to cholera among residents of four high-risk districts in Kandahar Province, Afghanistan. Using a robust sampling strategy and maintaining high standards of data collection, the survey accurately captured community-level perceptions and behaviors relevant to cholera prevention and control. The findings reveal substantial gaps in access to safe drinking water, persistent sanitation challenges, and notable misconceptions surrounding cholera transmission. Although many participants demonstrated awareness of cholera and expressed positive attitudes toward prevention and care-seeking, preventive practices—particularly water treatment and safe sanitation—remained inadequate.

These results underscore the urgent need for strengthened public health initiatives, including improved WASH infrastructure, expanded health education efforts, and culturally tailored community engagement programs. Targeted interventions should prioritize vulnerable groups such as women and individuals with limited formal education, who were found to have disproportionately lower levels of awareness. Enhancing community knowledge and promoting sustainable hygiene behaviors will be essential to reducing cholera transmission and preventing future outbreaks. In high-risk settings such as Kandahar, an integrated approach combining behavioral change communication, infrastructure improvements, and ongoing surveillance is vital to building community resilience and protecting public health.

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Conflict of Interest

The authors of this study declare no conflict of interest.

Data Availability

The data that support the findings of this study are not publicly available due to participant privacy considerations and data governance policies of the Ministry of Public Health of Afghanistan. Anonymized data may be made available upon reasonable request to the corresponding author, in accordance with dissemination and data governance policy of ANPHI and Ministry of Public Health and subject to approval from the relevant institutional authority.

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