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Knowledge about cholera and its prevention among household heads in a highly urbanized city in Western Philippines: a cross-sectional study

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ABSTRACT

Introduction: Cholera remains a significant public health threat globally, but its impact can be significantly reduced with the right knowledge and correct preventive practices. Conducting a study to provide baseline data and identify knowledge gaps on cholera will benefit at-risk and vulnerable communities. This research aimed to determine the household heads' knowledge about cholera and its prevention in a barangay in the Western Philippines.

Methods: A cross-sectional survey using a questionnaire was conducted in an urban barangay in Iloilo City in Western Philippines among 252 randomly selected household heads in May 2023. Data were described, and t-Test for independent samples and one-way ANOVA were used to test for differences.

Results: The majority of household heads were generally knowledgeable about cholera and its prevention, but only 51.2% knew that oral rehydrating solution (ORS) could help manage symptoms of cholera. Furthermore, there was a significant difference in knowledge about cholera and its prevention based on sex (t = 2.92; p = 0.004).

Conclusions: Household heads understood well and were informed of cholera and its prevention, although there were still some misconceptions. Continuous health education and knowledge assessment are recommended to raise awareness and ensure correct and timely information dissemination regarding cholera.

Keywords: cholera, cross-sectional studies, family characteristics, health education, philippines

Introduction

Cholera is an acute diarrheal infection caused by the *Vibrio cholerae,* and about 10% of individuals with cholera will experience or encounter severe symptoms (Center for Disease Prevention and Control, 2020). At present, cholera is endemic in many nations, and researchers have reported that, on a yearly basis, there are approximately 1.3 to 4.0 million cases of cholera, and 21,000 to 143,000 fatalities are attributed to cholera worldwide (World Health Organization, 2022). In 2017, the global strategy to reduce cholera targeted reducing cholera deaths by 90% (World Health Organization, 2022).

Over the last decades to the present time, cholera continues to pose a worldwide risk to public health, serving as an indicator of both inequality and insufficient social development (World Health Organization, 2022). Cholera outbreaks typically occur in regions where food or water is contaminated due to poor sanitary practices (Alkhaledi, 2016). The primary strategy for preventing outbreaks involves enhancing public hygiene, ensuring clean water sources, upgrading sewage systems, and administering cholera vaccines (Ali, Mohamed and Tawhari, 2021; Centers for Disease Prevention and Control, 2020; Ratnayake et al., 2021)

The Philippines continues to witness communicable, infectious, or transmissible disease outbreaks across

regions (Philippine Genome Center, 2018). Cholera is an example of an illness condition that is causing multiple outbreaks in the country. The disease has become a significant issue in the Philippines since the start of widespread outbreaks in the 1820s, which claimed numerous lives of Filipinos (Acevedo, 2021). It is estimated that there are 24,295,524 people at risk for cholera, with a case fatality rate of 1.00 and an estimated number of annual deaths of 24 (Ali *et al.*, 2015). A 2019 report on waterborne diseases confirmed five cases of cholera in Western Visayas alone (Philippine Statistics Authority, 2021). In September 2022, the Iloilo City government announced a state of calamity after 282 cases of acute gastroenteritis (AGE) and eight confirmed cases of cholera in 77 *barangays* in Iloilo City were reported (Philippine Daily Inquirer, 2022).

Despite being a threat to the health of individuals, families, and communities, nearly all cholera incidents can largely be prevented with adequate and proper knowledge or awareness of its preventive practices (Ali, Mohamed and Tawhari, 2021). Disease knowledge is crucial in shaping preventive behavior for selected vector-borne diseases (Aerts *et al.*, 2020). Good health knowledge and a sound understanding of health information provide a conceptual and objective grasp of health-related topics, enhancing the probability of performing measures of health protection and prevention (Rincón Uribe *et al.*, 2021). Having high literacy about cholera would additionally aid communities in understanding diverse risk factors and prompt them to quickly respond to control the spread of infection outbreaks, such as cholera (Aerts *et al.*, 2020). Also, with proper knowledge, controlling cholera epidemics can prevent the exacerbation of the already overwhelmed healthcare systems in places lacking medical facilities, improving the capacity to deliver essential care to individuals afflicted by the disease (Lopez *et al.*, 2015).

Notwithstanding the Philippines being a cholera-endemic country, data about the disease remain limited (Lopez *et al.*, 2015). A review of the literature demonstrated that the majority of the studies on cholera knowledge and literacy levels were conducted abroad, such as in Bangladesh (Wahed *et al.*, 2013), Yemen (Dureab *et al.*, 2021), Nigeria (Anetor and Abraham, 2020), Kenya (Orimbo *et al.*, 2020), Tanzania (Nauja, Bugoye and Rongo, 2020), Ghana (Tutu, Gupta and Busingye, 2019), Lebanon (Akel *et al.*, 2023) and Saudi Arabia (Ali, Mohamed and Tawhari, 2021). There remain insufficient published studies examining the knowledge about cholera and its prevention among residents in highly urbanized cities in Western Philippines. The researchers only found one published research (Joseph *et al.*, 1965) that was conducted within Western Visayas in Bacolod City and Talisay, Negros Occidental.

As healthcare professionals, nurses play a significant part in the preventative healthcare of cholera through various activities aimed at controlling the spread of the disease and providing care to affected individuals, families, and communities. By primarily realizing how community awareness impacts public health, salient vital factors and their interrelationships are explored and crucial for proper assessment, planning, and evaluation (Fooladi, 2017). Consequently, adequate assessment of knowledge and preventive measures about cholera, encompassing its transmission routes, early diagnosis measures, and treatment of symptoms, is necessary for proper planning and evaluation (Ali, Mohamed and Tawhari, 2021). Performing a research investigation to provide current baseline data and identify knowledge gaps about cholera will undoubtedly benefit communities at risk of cholera in the Philippines.

Hence, this study assessed the knowledge about cholera and its prevention among household heads in a *barangay* in Iloilo City, Philippines. It also analyzed whether there were significant differences in household heads' knowledge based on selected socio-demographic characteristics.

Materials and Methods

Study Design

This study utilized quantitative cross-sectional research.

Samples, sampling

The study participants were household heads in one *barangay* in Iloilo City, Western Visayas, Philippines, where an outbreak of cholera was recorded. A *barangay* is a village or district and is the smallest administrative unit in the Philippines. A household head is an adult male or female person responsible for the organization and care of the household or who is regarded as such by the household members (Philippine Statistics Authority, 2021). Inclusion for the study entailed: a) household heads who are 18 years old and above; b) have been a registered *barangay* inhabitant or resident for a minimum of six months before the declaration of the cholera outbreak last August 31, 2022; c) have given their informed consent; and d) can understand either English or Hiligaynon. Based on the data provided by the *barangay,* household heads who are 18 years old and

above residing in the *barangay* the sample constitutes 550 individuals. Yamane's (1967) formula was utilized to determine the minimum sample size required, obtaining 232 of the sample needed. An additional 10% of the sample, giving a total of 255 questionnaires which were distributed to accommodate non-response in the study. The participants of the study were selected using the simple random sampling technique. Out of the 255 participants, 252 questionnaires were completed. Two participants refused to participate in the study, while one was no longer residing in the area at the time of the survey.

Instruments

The data collection was done through a two-section questionnaire. Part I consisted of the socio-demographic data, which included age, sex, marital status, highest educational level, monthly income level, and occupation. Part II consisted of 16 questions that were used to measure knowledge about cholera and its prevention. The items were based on the studies conducted by Wahed et al. (2013), Tutu, Gupta and Busingye (2019), Ali Mohamed and Tawhari (2021) and Dureab et al. (2021). The questions were adapted and revised to match the current context of the participants. There were 16 questions: questions one to seven pertained to cholera cause, signs and symptoms, and transmission, while questions eight to 16 were related to cholera prevention. The participants were asked to choose between three responses: "True," "False," and "Do not Know". "True" means the statement is correct, and "False" means the statement is incorrect. "Do not Know" means they have no idea whether the statement is correct or incorrect. One point was given to every correct answer and zero to every incorrect and do not know answers. The scoring system was based on Bloom's Cut-Off Categories: high if the score was between 80 and 100%, moderate if the score was between 60 and 79%, and low if the score was less than 60% (Feleke, Wale and Yirsaw, 2021). All items were translated into *Hiligaynon*, the dialect commonly used in Iloilo City. The instrument was submitted for content and face validation to a panel of three jurors: medical doctors and nurses. All authors approved the items in the instrument with an equivalent index of 1.00. The research instrument underwent pilot testing and was carried out on 30 selected household heads who were not included in the final survey. A reliability testing analysis using the Kuder-Richardson Formula was done, revealing a score of 0.881.

Data Collection and Ethical Considerations

The researchers secured administrative and ethical permission and approval from the WVSU Unified Research Ethics Review Committee (Protocol Number WVSU-URERC-2023.CONS_002). Upon the approval of the *Barangay* Captain, the researchers and the *Barangay* Health Workers went house to house to distribute the informed consent forms and questionnaires. After securing the participants' consent, the researchers gave instructions on how to fill out the questionnaire. Each participant was provided with a ballpoint pen. For most of the participants, however, the researchers read each question in the interview schedule and wrote the answers dictated by the participants. The participants were given 15-20 minutes to answer. For participants who answered the questionnaires themselves, these were retrieved immediately after responding. After that, the participants' responses were encoded, monitored, consolidated, and organized using an MS Excel spreadsheet.

Statistical Data Analysis

Statistical computations were calculated with the help of the IBM Statistical Package for the Social Sciences (SPSS) software version 26. Descriptive statistics were used along with inferential data analysis (Independent Samples t-Test and one-way ANOVA). The Independent Samples t-Test was used to test significant differences in knowledge according to sex, marital status, and family income level while one-way ANOVA was used to test significant differences in knowledge according to age, educational level, and occupation. Data were assumed normally distributed based on the sampling technique used (random) and a relatively large sample size. Moreover, the data points were close to the diagonal line in the Q-Q Plot matching a normal distributed data set. The significance level was set at 0.05 alpha.

Results

Table 1 reflects the sociodemographic profile of the household heads in the *barangay.* The mean age among the 252 household heads is 47.45 years old. The majority of the household heads were young (38.9%) to middle adults (39.3%), female (64.3%), married (69.4%), with high school (59.5%) as their highest educational attainment, and had a low income of PHP 10,957 or less (72.2%). The occupation of the household heads reveals

Table 1. Participants' Sociodemographic Profile and Differences in Knowledge (N=252)

Demographics	n	%	M	SD	Test statistics	p-value
Age (M= 47.45, SD= 14.89)					0.466	0.628
Young Adult (40 years old and below)	98	38.9	12.39	2.31		
Middle Adult (41 to 60 years old)	99	39.3	12.54	2.06		
Older Adult (61 years old and above)	55	21.8	12.75	2.25		
Sex					2.92*	0.004
Female	162	64.3	12.82	2.10		
Male	90	35.7	11.99	2.28		
Marital Status					1.27	0.207
Married	175	69.4	12.64	2.22		
Single	77	30.6	12.26	2.14		
Educational Level					1.532	0.218
Elementary	20	7.9	11.70	2.78		
Highschool	150	59.5	12.59	2.1		
College	82	32.5	12.61	2.22		
Income Level (M= PHP 10,486, SD= 13,351)					-1.302	0.194
Lower Income (PHP 10,957 or less)	182	72.2	12.41	2.28		
Higher Income (PHP 10,958 and above)	70	27.8	12.81	1.97		
Occupation					0.405	0.749
White Collar Occupation	13	5.2	12.39	2.22		
Blue Collar Occupation	89	35.3	12.34	2.40		
Others	81	32.1	12.60	2.05		
Unemployed	69	27.4	12.7	2.12		

*Note: M=Mean; *p<0.05*

that the majority (35.3%) had blue-collar occupations or jobs typically involving manual labor while few (5.2%) had white-collar occupations or jobs usually involving intellectual or analytical work and which may require formal education and specialized skills. Table 1 also shows that the t-Test revealed that, when classified according to sex, the results showed a significant difference (t = 2.92; p = 0.004) in knowledge about cholera and its prevention among household heads. On the other hand, the t-Test revealed no significant differences in knowledge about cholera and its prevention among household heads according to marital status (t = 1.27; p = 0.207) and income level (t = -1.302; p = 0.194). Table 1 also displays the ANOVA result revealing no significant differences in knowledge about cholera and its prevention among household heads according to age (F = .466; p = 0.628), educational level (F = 1.532; p = 0.218), and occupation (F = .405; p = 0.749).

Table 2 shows that most (58.3%) household heads in a highly urbanized city had a high level of knowledge, while some (31.7%) had a moderate level, and the least number (9.9%) had a low level of knowledge about cholera and its prevention. The mean score was 12.52 out of 16, with a standard deviation of 2.20.

Table 3 shows the percentage of knowledge items about cholera and its prevention that were answered correctly by the household heads. The top items the participants answered correctly were: "You should go to the nearest medical or health facility if cholera cannot be managed at home" (96.4%); "Cholera can be transmitted by drinking unsafe water" (95.6%); "Storing of cooking utensils in a dry and clean place can help prevent cholera" (95.6%); "Cholera vaccine can be utilized to avoid acquiring cholera" (93.3%); and "Cholera can spread by poor sanitation" (92.5%).

Table 2. Level of Knowledge about Cholera and its Prevention (N=252)

Level of Knowledge (M= 12.52, SD= 2.20)	n	%
High	147	58.3
Moderate	80	31.7
Low	25	9.9

On the other hand, less than 70% of the household heads were not able to correctly answer the following six items: "Boiling water for 1-3 minutes cannot help prevent acquiring cholera" (68.7%); "Cleaning and washing of fruits and vegetables after buying them from markets cannot prevent cholera" (64.7%); "Cholera cannot spread by flies" (64.3%); "The bacterium that causes cholera can be found in coastal water" (63.1%); "Washing your hands before and after eating cannot prevent cholera" (59.5%); and "A homemade solution composed of water, sugar, and salt or Oral Rehydrating Solution (ORS) is ineffective in managing cholera and its symptoms" (51.2%).

Discussions

This study was conducted among household head residents in a highly urban community in the Philippines. Given that household heads are the family members responsible for the organization and care of the household, the bulk population of household heads was in their adult years. This can be particularly helpful in spreading awareness about cholera and its prevention, as young and middle-aged adults have a more sophisticated understanding of the workings of the

Table 3. Percentage of Participants Who Answered the Knowledge Items Correctly (N=252)

Item	f	%
You should go to the nearest medical or health facility if cholera cannot be managed at home.	243	96.4
Cholera can be transmitted by drinking unsafe water.	241	95.6
Storing cooking utensils in a dry and clean place can help prevent Cholera.	241	95.6
Cholera vaccine can be utilized to avoid acquiring cholera.	235	93.3
Cholera can be spread by poor sanitation.	233	92.5
The practice of defecating in open spaces instead of in a toilet could help cholera spread.	218	86.5
Profuse watery stool or diarrhea is a symptom associated with cholera.	213	84.5
Proper disposal of human waste will prevent cholera.	204	81.0
Correct treatment of water with chlorine solution can help prevent cholera.	197	78.2
Unsafe drinking water will not cause cholera.	190	75.4
Boiling water for 1-3 minutes cannot help prevent acquiring cholera.	173	68.7
Cleaning and washing fruits and vegetables after buying them from markets cannot prevent cholera.	163	64.7
Cholera cannot spread by flies.	162	64.3
The bacterium that causes cholera can be found in coastal water.	159	63.1
Washing your hands before and after eating cannot prevent cholera.	150	59.5
A homemade solution composed of water, sugar, and salt or ORS (Oral Rehydrating Solution) is ineffective in managing cholera and its symptoms.	129	51.2

world around them (Lally and Valentine-French, 2019). Meanwhile, the majority of the household heads were dominated by women. Mothers are typically tasked with caring for the household, maintaining a clean and tidy household, and preparing nutritious and sanitary meals (Anetor and Abraham, 2020). Since women naturally fill this function, it is essential to have a sufficient number of them to assess their cholera knowledge and preventative actions. Also, health education can be delivered if they lack information regarding cholera— its cause, transmission, and preventative countermeasures (Anetor and Abraham, 2020). In addition, the majority of the household heads in the *barangay* had the highest educational attainment of high school due to the evident influence of poverty and the substantial demand for a hand-to-mouth way of living. According to Carlson and McChesney (2015), higher levels of education correlate with higher salaries. Consequently, the income disparity between individuals with varying educational levels has consistently expanded, favoring those with more educational achievement. In the absence of a college diploma as a prerequisite for a job, most chose to work in blue-collar jobs where manual labor is the primary source of investment. In blue-collar jobs, income amounts to approximately less than PHP 25,000, which, in reality, is not enough for a Filipino household to live comfortably (Ladrido, 2018).

Meanwhile, most household heads in this study had a moderate to high level of knowledge. During the survey with household heads and *barangay kagawad* on health, there were claims of prior informal information dissemination in the *barangay* regarding cholera education. Upon the declaration of the cholera outbreak last August 2022, the City Health Officer inspected the *barangays,* specifically the drinking water sources like deep wells and water refilling stations. Informal health teachings were provided, as claimed by the barangay officials and health workers, to the residents. However, there was no formal information dissemination among the residents. Based on an informal interview of the researchers with the household heads, some claimed they had known about cholera through reports from radio and television. The media is crucial in disseminating information about health issues (Anwar *et al.*, 2020). The accessibility of information through newspapers, television, radio, and the internet can significantly impact cholera knowledge. This may also have provided the household heads in the *barangay* with knowledge about cholera and its prevention. Notably, while there are also studies in other countries reporting low levels of knowledge about cholera infection and its prevention among household members and residents at high risk for cholera (Wahed *et al.*, 2013; Dureab *et al.*, 2021), the majority of our study samples showed a high level of knowledge. The result of the present investigation is similar to studies conducted by Orimbo et al. (2020) in Kenya and Nauja, Bugoye and Rongo. (2020) in Tanzania, which revealed a high level of knowledge about cholera infection and its prevention.

Analysis of each item in the questionnaire showed that household heads knew cholera's causes and related factors. They considered the cause of cholera not only as stemming from drinking unsafe water but also attributed it to various environmental factors, such as open defecation and inadequate food hygiene practices. Hence, they associate cholera with an illness that can be acquired from a dirty or contaminated environment. According to Orimbo et al. (2020), additional factors that make individuals more susceptible to cholera comprise inadequate hygiene practices, the practice of open defecation, consumption of untreated water, exposure to flies, consumption of unwashed fruits and vegetables, and living in unclean environments. Similar to the study of Wahed et al. (2013) in Bangladesh, 83% of their

respondents stated that drinking unsafe water was one of the main causes of cholera. They also stated that food safety (87%), maintaining good hygiene practices (85%), and using safe drinking water (74%) will prevent cholera. These findings are similar to those of Tutu, Gupta and Busingye (2019) in Ghana, where more than 50% of household heads agreed that the germs that cause cholera can be found in coastal waters. Surprisingly, many household heads in this study knew of the cholera vaccine. Perhaps the household heads became aware that vaccines are effective in preventing specific diseases, possibly due to vaccination programs in the *barangay*, such as the recent mass COVID-19 vaccination (Cleofas and Oducado, 2022).

Moreover, it is also evident in our study that a number of household heads remained unaware or were only moderately aware of cholera prevention, especially in managing the symptoms. Nearly half of the participants were unaware that an ORS could be used to manage the symptoms. Similar to the study by Nauja, Bugoye and Rongo (2020) in Tanzania, the majority of the household heads would send the cholera patient to the nearest treatment center rather than giving an ORS to a person who acquired cholera. In contrast to the study by Wahed et al. (2013), about 92% of the respondents were aware of ORS. The use of ORS may not have been introduced among household heads. They may also focus more on daily survival, financial challenges, and other urgent issues that take precedence over learning about diseases. Some residents may not have the time or money to commit to learning about certain diseases or health conditions when they are trying to meet their basic requirements. Prioritization of immediate concerns due to the hand-to-mouth way of living may also have influenced the acquisition of knowledge of some household heads.

In this study, female household heads had significantly higher levels of knowledge than male household heads. Based on the results of the study, sex was found to be associated with the household heads' knowledge about cholera and its prevention. Female household heads displayed higher knowledge about cholera and its prevention in comparison to male household heads. This could be attributed to the variations in traditional roles, responsibilities, and access to healthcare and health information between males and females. Women may be more engaged in caregiving roles or may attend healthcare-related events more, leading to increased exposure to cholera information. A study by Akel et al. (2023) on the general population's knowledge of cholera outbreaks in developing countries disclosed that higher knowledge about cholera was related to the female gender. Similarly, the study by Tutu, Gupta and Busingye (2019) revealed that females had a higher score on basic knowledge of cholera risk factors in Ghana. The finding of the present investigation is also congruent with those of Samuel Amoo et al. (2021) in Nigeria, Akabanda, Hlortsi and Owusu-Kwarteng (2017) in Ghana, and Baluka, Miller and Kaneene (2015) in Uganda, where more female food handlers or service workers participated in the study than males because females were more involved in food handling and primary health. Additionally, the study by Serrem et al. (2021) in Kenya showed that female food handlers had more knowledge of food safety and sanitation than males. In addition, the review paper of Tong, Raynor and Aslani (2014) noted that more women than men tend to search for health information. Overall, women exhibit more active health information-seeking behaviors to protect their health and the well-being of their families. This may be reflected in the higher number of female household head participants in the study, who scored generally higher than men in terms of knowledge about cholera, its prevention, and management.

Meanwhile, this study has important implications for public health practice and nurses working in the community setting. Despite the majority of the participants being knowledgeable of cholera and its preventive practices, there were still some household heads having low to moderate knowledge, underscoring the need for targeted and gender-responsive public health interventions aimed at bolstering cholera education and awareness at the community level. Public health workers and nurses may design and implement educational programs tailored to the specific needs of male household heads. These programs should acknowledge and address potential barriers to knowledge acquisition and health-seeking behaviors among males, such as traditional gender roles. Moreover, this study also highlights the need to educate household heads about a simple and easy-to-use ORS preparation in managing symptoms of cholera. By implementing these intervention recommendations, public health workers and nurses can empower household heads with the knowledge and resources necessary to prevent cholera transmission, protect their families, and contribute to the overall control of cholera outbreaks within their communities.

This study has limitations. The study was only focused on the knowledge of cholera and its prevention among household heads in one urban *barangay* in Iloilo, Philippines. The conclusions drawn from the survey do not extend to other residents not included in the

sample. Since the study is cross-sectional, the researchers recorded the information observed from the variables without manipulating them. A conclusion about the causality between variables cannot be drawn. Moreover, the study only focused on the following socio-demographic profiles of the household heads in terms of age, sex, marital status, educational level, family income level, occupation, and their association with knowledge of cholera and its prevention. Other factors influencing knowledge about cholera may be considered in future research. Understanding these factors can help public health policymakers design targeted interventions to improve knowledge of cholera in at-risk populations.

Conclusion

This study highlighted that the household heads understood well and were informed of cholera and its prevention. However, some misconceptions and disparities still exist concerning the disease's cause, transmission, and prevention. Furthermore, female heads of households exhibited a greater knowledge level than their male counterparts. The provision of continuous and consistent knowledge assessment, public health campaigns, and health education to the household heads may be undertaken to raise awareness further and ensure the correct and timely information regarding cholera, its prevention, and, more importantly, its appropriate and proper management. Designing targeted interventions to enhance awareness of cholera in at-risk populations, such as male heads of households, may warrant increased focus and consideration.

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Conflict of interest

Authors declare no conflict of interests.

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