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# The Relationship between Cholera Infection and Students' Knowledge at Nursing College in Baghdad City

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**Abstract:** ***Objectives: 1. To assess the students' knowledge about cholera infection at Nursing college in Baghdad City. 2. To identify differences in nursing students' knowledge about cholera infection between age groups, gender groups, marital status groups, class groups, residential area groups, information sources, and monthly income) at Nursing college in Baghdad City. Methodology: A descriptive study was conducted on a purposive sample of (100) students selected from the College of Nursing at the University of Baghdad. This study is carried out from October 15th, 2015 to December 15th, 2016, to assess the students' knowledge about cholera infection at Nursing College in Baghdad City. The sample of (100) students (males and females) were selected. A self-reported questionnaire was used for data collection. The validity of questionnaire was estimated through a panel of experts related to the field of study, and its reliability was determined through a pilot study which was carried out on (10) students who were selected purposively from the third stage and fourth stage at the College of Nursing – University of Baghdad. Data were analyzed through the application of descriptive and non-parametric statistical analyses. Results: The finding of the study indicated that (71.0%) of students are female. Their ages consist (74.0%) in ranging between (20-23) years old. As for the marital status, the majority of students are single (84.0%). Concerning their class, the majority of students are third stage (68.0%). Regarding the Residency, (83.0%) live in urban areas. Regarding information sources (45.0%) obtain from internet. Concerning the monthly income of students or students' families, (73.0%) described it as somewhat sufficient. Conclusion: The results showed that there was a moderate level of students' knowledge about cholera infection and prevention. Recommendations: The study recommends emphasis on continuous sessions concerning cholera infection control for student's in all College in Baghdad City. Increasing health awareness about cholera infection throughout multiple media facilities, such as radio, television, and magazines. Awareness programs concerning water treatment, water quality and importance of flushing toilets should be carried out in the rural areas to improve the status of public health.***

**Keyword:** Students' Knowledge, Cholera Infection, Prevention and Control

## 1. Introduction

Cholera is a diarrheic disease caused by vibrio cholera and is characterized by a sudden onset of profuse and painless watery stools. It is caused by an enterotoxin that affects the small intestine. The disease manifests through nausea and profuse vomiting in the early course of illness. **[1[**

Cholera is caused by the bacterium *Vibrio cholerae*, a rod-shaped and Gram-negative organism. *Vibrio cholerae*exists in various strains with multiple subgroups and serotypes. The infectious organism can be differentiated by serogroups based on its O antigen of its lipopolysaccharide component of the outer membrane. Serogroup O1 has been the main cause of epidemic cholera, although a newly-described outbreak of "O139 Bengal" in India and Bangladesh in 1992 caused concern of an 8th, concurrent pandemic. Serogroup O139 now coexists with O1 in Bangladesh and India, though it has failed to spread outside of that region in the epidemic proportions that were anticipated **[2].**

During epidemics, cholera organisms can remain hyper infectious for at least 5 hours after excretion from an infected patient. The persistence of this hyper infectious state, combined with crowded conditions and poor sanitation and hygiene, can lead to quick uptake by other immunogenically-naïve individuals **[3, 4, 5].** Because of the amount of cholera organisms shed by infected individuals and the length of the organism's hyper infectious period, cholera outbreaks can appear to simulate and be on the scale of person-to-person outbreaks. The organism may spend little time in the environment alone, especially when hyper infectious or in immunogenically-naïve communities **[6].**

It is difficult to accurately estimate the burden of cholera infection in a population primarily because cholera's presentation varies from asymptomatic to severe. Given this range of symptoms, identification of cholera in a community in overburdened and underdeveloped surveillance systems is difficult. Estimates indicate that from as low as 1% to as high as 33% of infections can be symptomatic, with the majority of clinical estimates ranging from 20–30%. Because the majority of cases are mild to moderate in severity, treatment advice is generally not sought and stool culture, a key identification tool in cholera outbreaks, may not be undertaken. Without using cultures to isolate the bacterium, mild to moderate cholera symptoms may easily be confused with those of other diarrheal diseases, making reliable surveillance estimates of cholera cases difficult to attain **[7].**

Lack of the security conditions impedes the implementation of an appropriate surveillance and control activities especially now in many Middle East countries including Iraq and Syria. There were a total of 190 549 cholera cases reported by the WHO from forty two countries during the year 2014, with CFR of 1.17%. There might be an under estimated reporting of the real number of cholera cases because of its negative reflect on travel, trade and food export from the affected countries. The lack of laboratory facilities for the diagnosis and absence of expert health teams dealing with the disease might result in over reporting

of acute diarrheal cases as cholera because of confusing case definitions **[8].**

The pathogenesis of *V. cholera* involves both the colonization of the intestine and the production of cholera toxin (CT) which acts locally to stimulate excessive electrolyte and fluid secretion, primarily from the crypt cells of the small intestine **[9].**

Symptoms of cholera are characterized by acute onset of profuse watery diarrhea (described as "rice-water" stools) and often vomiting. The incubation period is short that usually lasts from two hours to five days and therefore the number of cases can rise very quickly with explosive pattern of outbreaks **[10].**

In severe cases, continuous fluid loss may quickly lead to extreme dehydration and shock that could be fatal, and the mortality can reach up to 50% [**11**]. Among the people with symptoms, 80% have mild illness and around 20% develop acute watery diarrhea with severe dehydration. About two-third of the cholera patients do not develop any symptoms, the bacteria are 3 % in their faces for 7–14 days after infection and shed back into the environment that may potentially pass the infection to others **[12].** Prompt replacement of fluid lost is the mainstay of treatment of cholera. For mild or moderate dehydration, fluid replacement can be achieved by oral rehydration solutions. However, very severely dehydrated patients with stupor, coma, uncontrollable vomiting, or extreme fatigue that prevents drinking should be rehydrated intravenously **[10].**

Today's public is generally more aware of the environment and its effect on the health and comfort of human beings. In that context, hygiene may best be described as those practices that are conducive to providing a healthy environment. This description incorporates three areas of concern: safety, environmental comfort and stimuli, and infection control. Maintaining cleanliness not only provides comfort and positive stimuli, it also impacts on infection control **[12].**

Currently, 884 million people worldwide do not get drinking water from improved sources (for example, wells and piped water), representing about 16% of the population in the developing world **[13]**. Worldwide, 87% of people use improved drinking water sources, Safe water" describes a range of activities and interventions designed to promote access to clean, potable drinking water in low-resource settings, and often gets grouped with aspects of sanitation and hygiene to form the "WASH" (water, sanitation, and hygiene) sector, representing the inter-connectedness of these arenas **[14].**

## 2. Methodology

A descriptive study was conducted on a purposive "Non-probability" sample of (100) students (males and females) who were selected from the College of Nursing - University of Baghdad. The study was carried out from October 15$^{th}$, 2015 to December 15$^{th}$, 2016, to assess the students' knowledge about cholera infection at Nursing College in Baghdad City. A structured interview technique was used for data collection. The interview lasted between (20–25) minutes to answer the questions.

The validity of questionnaire was estimated through a panel of experts related to the field of study, and its reliability was determined through a pilot study was carried out on to and it was conducted on (10) students who were selected purposively from the third and fourth stage at Nursing College in Baghdad City by using test–retest technique. Pearson correlation coefficient (r) was = 0.86 for students' knowledge. A questionnaire format was used for data collection which consisted of two major parts; the first part is concerned with students' sociodemographic characteristics of age, gender, marital status, grade, residential area, sources of information and monthly income. The second part is concerned with students' knowledge domains towards cholera infection (22) items, prevention and control (16) items, health education (6) items, and environmental health (6) items; all of items which consisted of (50) items. These items of students' knowledge were rated on 3-point Likert scale; know, uncertain, and I do not know, and scored as 3, 2 and 1, respectively **[15].**

Data were analyzed by using descriptive statistics (frequency, percentage, and mean of scores) and inferential statistics (Pearson correlation coefficient), and non-parametric test (Kruskal-Wallis *H* test).

## 3. Results

**Table 1:** Descriptive Statistics of participants' demographic characteristics

| List | Demographic characteristics | Frequency | Percent |
|---|---|---|---|
| 1 | Age (year) | | |
| | 20-23 | 74 | 74.0 |
| | 24-27 | 26 | 26.0 |
| | Total | 100 | 100.0 |
| 2 | Gender | | |
| | Male | 29 | 29.0 |
| | Female | 71 | 71.0 |
| | Total | 100 | 100.0 |
| 3 | Marital status | | |
| | Single | 84 | 84.0 |
| | Married | 12 | 12.0 |
| | Divorced | 3 | 3.0 |
| | Widowed | 1 | 1.0 |
| | Total | 100 | 100.0 |
| 4 | Class | | |
| | Third | 68 | 68.0 |
| | Fourth | 32 | 32.0 |
| | Total | 100 | 100.0 |
| 5 | Residency | | |
| | Urban | 83 | 83.0 |
| | Rural | 17 | 17.0 |
| | Total | 100 | 100.0 |
| 6 | Information sources | | |
| | Internet | 45 | 45.0 |
| | TV | 17 | 17.0 |
| | Magazine | 2 | 2.0 |
| | Study sources | 36 | 36.0 |
| | Total | 100 | 100.0 |
| 7 | Monthly Income | | |

| | | | |
|---|---|---|---|
| | Sufficient | 24 | 24.0 |
| | Somewhat Sufficient | 73 | 73.0 |
| | Insufficient | 3 | 3.0 |
| | Total | 100 | 100.0 |

Table (1) shows that (71.0%) of students are female. Their ages consist (74.0%) in the study, ranging between (20-23) years old. As for the marital status, the majority of students are single (84.0%). Concerning their grade, the majority of students are third stage (68.0%). Regarding the residency, (83.0%) of students live in urban areas. With respect to information sources, (45.0%) obtain their information from internet. Concerning the monthly income, (73.0%) of students reported that they are of somewhat sufficient monthly income families.

**Table 2:** Description of Students' Overall Knowledge

| List | Overall Knowledge | Frequency | Percent |
|---|---|---|---|
| 1. | Fair | 27 | 27.0 |
| 2. | Good | 73 | 73.0 |

This table demonstrates that most of students have good overall knowledge (*n = 73*; 73.0%), and more than a quarter have a fair knowledge (*n = 27*, 73.0%).

**Table 3:** Assessment of Students' knowledge domains

| List | Students' Knowledge Domains (Items = 50) | I Know | Uncertain | I Don't Know | M.S | RS | Assess |
|---|---|---|---|---|---|---|---|
| 1 | Cholera infection domain | 782 | 961 | 457 | 2.14 | 71.33 | M |
| 2 | Prevention and control domain | 735 | 526 | 339 | 2.24 | 74.66 | M |
| 3 | Health education domain | 246 | 175 | 179 | 2.11 | 70.33 | M |
| 4 | Environmental health domain | 274 | 185 | 141 | 2.22 | 74.0 | M |

MS = Mean of Score, Low = Less than (1.66), Moderate = (1.66 – 2.33), High = More than (2.33).

In the above table indicates that the students' knowledge domains there is Moderate.

**Table 4:** Differences in Students' Knowledge between Age Groups

| Ranks | | | | | Mann-Whitney U | Asymp. Sig. |
|---|---|---|---|---|---|---|
| | Age | N | Mean Rank | Sum of Ranks | | |
| Overall Knowledge | 20-23 | 74 | 51.31 | 3797.00 | 902.000 | .637 |
| | 24-27 | 26 | 48.19 | 1253.00 | | |
| | Total | 100 | | | | |

Students of the age group of (20-23) years-old have a better knowledge than those of the age group of (24-27) years-old. However, there is no statistically significant differences in students' overall knowledge between age groups (Mann-Whitney U = 900.000, p-value = .637).

**Table 5:** Differences in Students' Knowledge between Gender Groups

| Ranks | | | | | Mann-Whitney U | Asymp. Sig. |
|---|---|---|---|---|---|---|
| | Gender | N | Mean Rank | Sum of Ranks | | |
| Overall Knowledge | Male | 29 | 46.07 | 1336.00 | 901.000 | .329 |
| | Female | 71 | 52.31 | 3714.00 | | |
| | Total | 100 | | | | |

Female students have better knowledge than male students. However, there is no statistically significant differences in students' overall knowledge between the gender groups (Mann-Whitney U = 901.000, p-value = .329).

**Table 6:** Differences in Students' Knowledge between Residence Groups

| Ranks | | | | | Mann-Whitney U | Asymp. Sig. |
|---|---|---|---|---|---|---|
| | Residence | N | Mean Rank | Sum of Ranks | | |
| Overall Knowledge | Urban | 83 | 50.15 | 1336.00 | 676.500 | .790 |
| | Rural | 17 | 52.21 | 3714.00 | | |
| | Total | 100 | | | | |

Students who live in rural areas have better knowledge than those who live in urban areas. However, there is no statistically significant differences in students' overall knowledge between the residence groups (Mann-Whitney U = 901.000, p-value = .329).

**Table 7:** Differences in Students' Knowledge between Class Groups

| Ranks | | | | | Mann-Whitney U | Asymp. Sig. |
|---|---|---|---|---|---|---|
| | Class | N | Mean Rank | Sum of Ranks | | |
| Overall Knowledge | Third | 33 | 72.82 | 1336.00 | 369.000 | .000 |
| | Fourth | 67 | 39.51 | 3714.00 | | |
| | Total | 100 | | | | |

Third class students have better knowledge than those in the fourth class. There is a statistically significant difference in students' overall knowledge between class groups (Mann-Whitney U = 369.000, p-value = .000).

**Table 8:** Differences in Students' Knowledge between Monthly Income Groups

| Ranks | | | | Chi-Square | df | Asymp. Sig. |
|---|---|---|---|---|---|---|
| | Monthly Income | N | Mean Rank | | | |
| Overall Knowledge | Sufficient | 24 | 41.04 | 2.553 | 1 | .110 |
| | Somewhat Sufficient | 73 | 51.62 | | | |
| | Total | 97 | | | | |

Students who reported that their monthly income as somewhat sufficient have better knowledge than those who described their monthly income as sufficient. Student of insufficient monthly income were excluded from this analysis because of their few number. However, there is no statistically significant differences in students' overall knowledge between the monthly income groups (Mann-Whitney U = 901.000, p-value = .329).

## 4. Discussion

**1. Discussion of demographic characteristics of study sample for students' knowledge.**

Throughout the course of the present study, and as it has been shown in table (1) that (71.0%) of students are female. Their ages constitute (74.0%) in the study, ranging between (20– 3) years old. As for the marital status, the majority of students are single (84.0%). Concerning their grade, the majority of students are fourth stage (68.0%). Regarding to the residential area that (83.0%) of students are Urban. Regarding information sources (45.0%) obtain from Internet. Concerning the Income that (73.0%) of students are Sufficient some extent. These results are supported by Shehab, A. and others (2016) [**16**,**20]**.

**2. Discussion assessment for Students' knowledge about cholera infection**

**Tables (2 and 3)** show the students' knowledge about cholera infection there is Moderate. These results are supported by Mohammad and others [**17-18].**

The educational programs significantly improved the knowledge of subjects about the preventable state of the disease where the expected proportions of responses before and after intervention were 51.5% and 99.5%, respectively. Moreover, only 33% of subjects knew that cholera infection can be transmitted, however, following the intervention, the expected percentage reached up to 99.5%. Most of the respondents (67%) ascertained that radio and TV had promoted their awareness [**24]**.

**3. Discussion of the Differences in Students' Knowledge between Age Groups, Gender Groups, Residence Groups, Class Groups, and Monthly Income Groups**

Students of the age group of (20-23) years-old have a better knowledge than those of the age group of (24-27) years-old. Further cross-tabulation displays that most students of the age group of (20-23) years-old are third class, who have better knowledge than fourth class. Concerning gender, female students have better knowledge than male students. Students who live in rural areas have better knowledge than those who live in urban areas. This could be attributed to that in Iraq, the risk and/or incidence of cholera in rural areas is greater compared to urban areas because of unsatisfactory water quality. As such, rural students may do their best to be more acquaintant of the aspects of cholera mode of infection, prevention and control.

Concerning students' class, third class students have better knowledge than those in the fourth class. There is a statistically significant difference in students' overall knowledge between class groups. This could be explained as that third-class students take more than one course in their curriculm that include materials that shed the light on cholera.

Students who reported that their monthly income as somewhat sufficient have better knowledge than those who described their monthly income as sufficient. Student of insufficient monthly income were excluded from this analysis because of their few number. However, there is no statistically significant differences in students' overall knowledge between the monthly income groups. This could be explained as that all students; regardless of their monthly income, never influnced by their monthly income in favor of acquiring knowledge about different aspects of cholera.

## 5. Conclusion

The results showed that there was a moderate level of students' knowledge about cholera infection and prevention. In addition to, being involved in materials that deals with cholera positively influenced students' knowledge about cholera.

## 6. Recommendations

The study recommends emphasis on continuous sessions concerning cholera infection for students in all colleges in Baghdad City. Increasing health awareness about cholera infection throughout multiple media channels, such as radio, television, and magazines. Awareness programs related to water treatment, water quality and importance of flushing toilets should be carried out in the rural areas to improve the status of the public health.

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