

Knowledge, Awareness, and Attitude Regarding Infection Prevention and Control among Medical Students in Al-Taif University

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ABSTRACT

Background: Infection prevention and control is required to prevent the transmission of communicable diseases in all health care settings. The risk of acquiring a healthcare associated infection is related to the mode of transmission of the infectious agent. As a result we wanted to assess the awareness level of infection control among medical students. **Objective:** In this research we aim to identify the extent of knowledge, awareness, and attitude regarding infection prevention and control among medical students in Taif University. **Methods:** The researchers used the descriptive method for its relevance to the current research. The research population included 250 medical students in Al Taif University. The researcher designed questionnaire as a data collection method to serve the purpose of this research, and the descriptive approach was used for its relevance to the current research. **Conclusion:** Most students were almost completely aware of the risk of infection transmission through the hospital, and about all the precautions needed to prevent and control the infection within the hospital. Also, the students were aware about the different kind of infectious disease.

Keywords: Knowledge, Awareness, Attitude, Infection Prevention and Control, Medical Students, Al-Taif University, KSA

INTRODUCTION

Health care-associated infections (HCAIs) are important public health problems. They are associated with significant increase in the risk of morbidity and mortality¹. The International Nosocomial Infection Control Consortium found that the rate of central line-associated blood stream infections in the intensive care units in Latin America, Asia, Africa, and Europe were 4.9 per 1,000 central line days¹⁻³. Almost, about 5%-10% of patients admitted to acute care hospitals acquire an infection during their stay⁴. As a result, the awareness of medical students regarding infection prevention and control the significant risk of acquiring infections during their hospitals rotations is essential. In this study we aimed to identify the extent of knowledge, awareness, and attitude regarding infection prevention and control among medical students in Taif University.

Study Population and Sample Size

Testing the hypotheses developed to answer the research question requires collection of data from individuals specific to the research undertaken. It may be possible in certain occasions to collect data from every possible individual; however, in many cases, this is impossible due to restrictions of time, money, and access⁵. Therefore, it is proposed that data should be collected from the people, events, or objects that can provide the right answers to the problem and from those who are considered representatives of the population⁵.

According to **Sekaran and Bougie *et al.***⁵, a population refers to “the entire group of people, events, or things that the research desires to investigate”. Medical students face a lot of things that might increase the risk of infection such as,

going to hospitals, and dealing with patients. As a result of these factors we have chosen to target the medical students in Al Taif University to assess their knowledge and attitude regarding infection prevention and control. A total of 250 out of 357 medical students participated in our study.

Profile of the Respondents of student:

The respondents of this study were asked to provide information regarding their Gender, Academic Years, and Age.

Table (1) represent the percentages, and number of Gender respondents to our study.

Gender	Frequency	Percentage
Male	32	12.80%
Female	218	87.20%

It is evident from **Table (1)** that there were significant difference in sex of the participants in which Female gender total participants were 87.2%, on the other hand only 12.8% of the total study sample were males. This might be because that males and females are studying in separated classes and college loopy which is the situation in all saudi arabia colleges. As a result, it was difficult to contact with them and include them in the study.

Table (2) presents the demographic profile of the age respondents with the frequencies, percentages, and a chart presenting the number of respondents of each group.

Category	Frequency	Percentage
18 – 20 years	171	68.40%
20-23 years	67	26.80%
23 – 25 years	12	4.80%

Table (2) shows that the age group "18-20 years" in the age variable has obtained the most frequent rate among all age groups, which obtained "171" samples out of "250" sample, ie, "68.4%" in. When the age group "20-23 years" came in second place, which received "67" samples of the "250" sample, or "26.8%", while the category "from 23 - 25 years," came in the last place in terms of redundancy where it obtained "12" samples out of the "250" sample, or "4.8%", which is the least frequent among all categories of the variable age.

Table (3) presents the demographic profile of the Academic Years respondents with the frequencies, percentages, and a chart presenting the number of respondents of each group.

Category	Frequency	Percentage
Third Years	123	49.2%
Forth Years	79	31.6%
Fifth Years	36	14.4%
Sixth Years	12	4.8%

Table (3) shows that the "third year" medical students were the most frequent percentage to participate in the study out of all classes of the academic years, which obtained "123" samples out of "250" sample, or "49.2%". The fourth year ranked second with "79" samples of "250" samples, or 31.6%. The fifth year ranked third with "36" samples out of "250" samples, or 14.4%. The least percentage of participants were "sixth year" medical students with a total of "12" samples out of "250" sample, or 4.8%.

Data Collection Methods

To save time and money we designed a questionnaire for the purpose of data collection; the answers obtained are not affected by the researcher and are considered convenient for respondents. Another important feature of questionnaires is their ability to be distributed to a large number of people simultaneously⁵⁻⁶. Since it was difficult to utilize other methods for data collection, the questionnaire was thus considered the most appropriate data collection method to serve the purpose of this study. The questionnaire was distributed by hand and Email to residential on 250 medical students in Al Taif University. A total of 10 questions were written and respondents were asked to indicate the degree of agreement of each statement

Statistical Analysis Unit

Once the primary data for this study have been collected from the sample of the population, it needs to be analysed to test the research hypotheses⁵⁻⁶. This section will discuss the methods used to analyze the data collected for the study and

thus test the hypotheses developed. The data collected through the questionnaire distributed to the sample will be analyzed using Statistical Package for Social Sciences (SPSS) version 19. The percentages and frequencies were used to describe the demographic profile of the respondents.

Validity and Reliability:

A crucial step in any research is to make sure that the instrument used to measure the study variables does in fact measure the intended concepts and does so accurately⁵⁻⁶. Therefore, in this section, the goodness of measures developed will be tested by determining the reliability and validity of the measures.

Validity

Validity tests how well the developed instrument measures the concepts it is supposed to measure, and whether it measures the right concepts⁵⁻⁶.

To ensure content's validity in this research, Knowledge, awareness, and attitude regarding infection prevention and control among medical students in Taif University were derived from literature reviews and from previous questionnaires with similar interest. Validity was conducted through distributing the questionnaire to three academic professors specialized in medical, and one statistician. They were asked to provide feedback to identify ambiguities and difficult questions and to make sure that the questionnaire was well designed and that the items measure the relevant factor without any redundant questions. Any unnecessary, difficult, or ambiguous questions were discarded to improve the validity of the questionnaire. As a result, questionnaires were modified and changed regarding the feedback in a way that reflects the main variable.

Reliability

Finding the internal consistency is the most appropriate method used for testing the reliability⁷. The internal consistency is determined through Cronbach's alpha coefficient. If Cronbach's alpha value is higher than 0.7, then the reliability of the framework is good⁸⁻⁹. Reliability assesses the goodness of a measure and indicates the stability and consistency with which the instrument developed measures the concept⁵⁻⁶. Furthermore, to ensure that the instrument used in this study will be as reliable as possible, the researcher conducted a pilot study for the new questionnaire. Reliability is established using a pilot study by collecting data from 10 persons not included in the sample. The data collected from the pilot study are then analysed using SPSS to determine Cronbach's alpha coefficient for each variable¹⁰. Data were collected and analysed and the results obtained

were acceptable since all the measures had Cronbach's alpha coefficients above 0.7 as shown in the table (4) below:

Table (4): Cronbach's alpha of study instrument based on pilot study)

Study Dimension	Number of questions	Cronbakh Alfa
Knowledge, awareness, and attitude regarding infection prevention and control among medical students in Taif University	10	83%

The results from the table above indicate that all values are greater than (0.60) which is within the acceptable limit. Therefore, the internal consistency reliability is considered reliable to achieve the research objectives.

Answer	Frequency	Percentage
URTI	123	0.492
Skin Infections	28	0.112
Needle Injury	91	0.364
I Don't Know	8	0.032

RESULTS

Q1: As a medical student do you know that you may acquire any infection during hospital rotation?

As we can see in **Table (5)**, the "Yes" category obtained "243" samples out of "250" in the question, "Did you know that you can get infected by taking you inside the hospital?" (93.6%). When the table showed that only "16" of the "250" sample samples, (6.4%) responded to the questionnaire, the sample showed that they were almost completely aware of the risk of transmission through the hospital.

Table 5:

Answer	Frequency	Percentage
Yes	234	93.6%
No	16	6.4%

Q2: Do you know that infectious disease may spread during your hospital rotations?

As we can see in **Table (6)**, the "Yes" category obtained "234" samples out of "250" in the question "Did you know that infection is transmitted by moving inside the hospital, or "93.6%". On the other hand, only "16" out of "250" samples, or (6.4%) didn't have idea about it, which means that the sample of the study is almost completely aware of the seriousness of the spread of infection among

hospital guests and staff by moving inside the hospital

Table 6:

Answer	Frequency	Percentage
Yes	234	0.936
No	16	0.064

Q3: In your opinion which of the following infections could spread during hospital rotations?

As we can see in **Table (7)**, the URTI group obtained "123" samples out of "250" samples in the question which states: "Which of the following diseases spread among the people during the movement inside the hospital, ie by 49.2%. The table "NEEDLE INJURY" came in second place with "91" sample, or "36.4%", while the category "SKIN INFECTIONS" came in third place with "28" samples ie "11.2%", finally, the "I DO NOT KNOW" came in the last place with" 8 "sample, or" 3.2%. After going through the answers of the samples of the study we conclude that there is different information about the diseases transmitted by infection as all the diseases mentioned have the potential to move the infection and so Wen "96.8%" percentage of the study sample answers are correct any individuals that they are aware and aware of the kinds of infectious disease.

Table 7:

Answer	Frequency	Percentage
URTI	123	%49.2
Skin Infections	28	%11.2
Injury Needle	91	%36.4
Don't Know I	8	%3.2

Q4: Do you know how can the infection spread to medical students?

As we can see in **Table (8)**, the "Through Air Droplets" category obtained "119" samples out of "250" in the question "Did you know how you can get infected while in hospital?" (47.6%). While the table showed that the category "Through patients contact" came in second place with "67" samples by "26.8%" while the category "Through needle-stick injury" came in third place with "52" samples, ie 20.8%. Finally, "I DO NOT KNOW" answer came in last place with "12" samples or (4.8%). Going through the responses of the study sample we conclude that there are different information about the methods of transmission of infectious diseases since all the methods mentioned are correct methods. A total of 95.2% of the medical students were aware about the various methods of infectious disease transmission in the hospitals.

Table 8:

Answers	Frequency	Percentage
air Through droplets	119	47.6
Through patients contact	67	26.8
needle- Through stick injury	52	20.8
don't know I	12	4.8

Q5: In your opinion, which of the following could be associated with an increased risk of infection during hospital rotations?

As we can see in **Table (9)**, the "Weaving your white coat outside the hospital setting" category obtained "119" samples out of "250" in the question, "What are the things that help in transmission? ", While the table showed that the category "I do not know" came in second place with "59" sample, or "23.6%". The category "Weaving artificial fingernails" came in third place with "44" participants or 17.6%. The "Wearing a necktie" category came in fourth place with "28" samples ie "11.2%". The "Wearing a necktie" category came in last place with "0" During the responses of the study sample; we conclude that there is a lack of knowledge and awareness of the things that might be associated with increased risk of infection.

Table 9:

Answers	Frequency	Percentage
Wearing jewelry	28	11.20%
Wearing your white coat outside the hospital setting	119	47.60%
Wearing artificial fingernails	44	17.60%
Wearing a necktie	0	0%
I don't know	59	23.60%

Q6: Do you know the standard isolation precautions for prevention and infection control?

As we can see in **Table (10)**, the "yes" category obtained "139" samples out of "250" samples or 55.6%. On the other hand, the table showed that only "111" of the "250" or 44.4 % samples responded to "No". We found that majority of the students were aware about the measures that prevent spread of the infection in the hospital.

Table 10:

Answer	Frequency	Percentage
Yes	139	55.60%
No	111	44.40%

Q7: From where did you get your information about the standard precautions of prevention and infection control?

As we can see, **Table (11)** shows that category "Educational meeting in hospital" received "67" samples out of "250" or 26.8% in the question, "Where do you get the information to reduce the spread of infection?. While the "Social media + internet" came in second place with "60" sample, or "24%". The category "Campaigns in university" came in third place with "55" sample, or "22.0%". The category "I do not care about it" came in fourth place with "40" samples, or "16%", while the category "Posters" came in the fifth place with "28" samples, or "11.2%", finally, TV "came in the last place with a " 0 "sample, a percentage of" 0% ". The sample of the study concludes that there is a lack of knowledge of the sample of the study by means of the dissemination of information about infection control as 16% do not care about these things, which means there lack of awareness about infection control.

Table 11:

Answer	Frequency	Percentage
Campaigns in university	55	0.22
TV	0	0
Educational meeting in hospital	67	0.268
Posters	28	0.112
Social media + internet	60	0.24
I don't care about it	40	0.16

Q8: Do you follow the standard precautions through your rotations?

As we can see, **Table (12)**, shows that "Yes" category has obtained "147" samples out of "250" samples OR 58.8% in the question, "Do you follow the standards of infection prevention during your hospital transfer?". On the other hand, the table showed that "103" samples out of "250" samples or 41.2% responded "no", which means that the greater proportion follows the necessary precautions of infection, while a large number also does not perform these procedures.

Table 12:

Answer	Frequency	Percentage
Yes	147	58.8%
No	103	41.2%

Q9: Do you know how to do effective hand hygiene?

As we can see in **Table (13)** below, the "Yes" category obtained "234" samples out of "250" or 93.6% in the question "Did you know how to wash

your hands correctly?. On the other hand, the table showed that " 16 "Only samples of the" 250 "samples or 6.4% answered with "No," which means that the study sample members have almost complete knowledge of the proper method of hand washing, which contributes to reducing the spread of infection.

Table 13:

Answer	Frequency	Percentage
Yes	234	93.6%
No	16	6.4%

Q10: Did you take any vaccine to protect yourself against hospital infections “hepatitis, influenza ... etc. “?

As we can see in **Table (14)**, the "No" category has obtained "147" samples out of "250" or 58.8% in the question "Have you taken any vaccine to protect yourself from infectious diseases such as hepatitis, flu or similar?, while the table showed that "103" samples out of "250" samples or 41.2% responded "yes". We conclude that a significant measures need to be done to increase the awareness about the importance of protection measures in preventing the transmission of hospitals acquired infections among the medical students, because as we can see in the results that a significant number didn't take any measures.

Table 14:

Answer	Frequency	Percentage
Yes	103	41.2
No	147	58.8

DISCUSSION

Medical students are daily exposed during their hospital rotations to a significant increase in the risk of getting health care associated infections. This can be prevented if the students were fully aware about the infection prevention control measures. As a result of this we wanted to assess the level of Knowledge, Awareness, and Attitude of Al-Taif university medical students regarding infection prevention and control.

By looking to the results of our study we found that the responses rate were (70%), which is a reasonable percentage in comparison to the other studies done to assess the same aim in different institutions as we can see in **Ibrahim and Elshafie et al.**¹ in which their responses rate were 76.04%.

We choose to approach the knowledge of the medical students regarding their knowledge about infection prevention and control by making a survey, which is the most feasible methods to evaluate their awareness.

Studies from Saudi Arabia that explored medical students' knowledge and awareness about infection

prevention and control is limited. To the best of our knowledge, there are only two almost related studies conducted at Qassim University, College of Medicine, Qassim, Saudi Arabia¹² and King Faisal University, College of Medicine, Dammam, Saudi Arabia¹³, in which they wanted to assess the knowledge of the medical students about the role of hand hygiene in infection prevention. Our current study tried to assess the general medical student’s awareness about the various measures that can help in infection control.

Our results were largely similar to other studies conducted elsewhere in Qatar¹, Saudi Arabia¹¹, Nepale¹⁴ and India¹.

In our study we found that most of the medical students (93.6%) are aware about the fact that infectious disease can spread inside the hospitals due to various reasons. This awareness might be a result of the educational classes they take it in the colleges, conferences, and posters. Also, we found that the respondents are aware about the various methods of pathogens transmission such as, air prone, water, food, and direct contact. The awareness about infectious disease transmission in the hospitals is important and needs the commitment of all individuals within the society because of the seriousness of this issue.

Standard isolation precautions guideline is the gold standard of infection prevention. The knowledge of the students regarding the percussions were low (55%). In **Ibrahim and Elshafie et al.**¹ it was also low (48.44%). Significant number of the medical students do not know anything about these precautions, so we advise that hospitals and medical colleges should make an obligatory attendant course for the medical students that explain everything about infection control. The student’s awareness about the proper method of hand hygiene were significantly high (93.6%). In **Hamadah et al.**¹² was 60%.

Our results showed that most of medical students (26.8%) get their knowledge about infection prevention and control during their attendance of the educational meetings in the hospitals.

There were many areas of concern, such as; TV did not help in any way (0%) in the infection control education. This is a serious problem in which most of the people in the society watch TV, so introducing of ideas that help in education of the society about the importance of infection control in the TV shows will help in escalation the awareness of the people about this dilemma.

Also, about (58.8%) of the medical students did not take any vaccine that can help in reducing the risk of getting hospital acquired infections. **Ghomraoui et al.**¹⁶ found that medical student’s awareness about the importance of vaccination

were (44.3%), which significantly low. Medical students should be educated regarding the importance of taking vaccinations against diseases which might be acquired during their hospital rotations.

CONCLUSION

- Most students were almost completely aware of the risk of infection transmission through the hospital and were aware of the seriousness of the spread of infection among hospital guests and staff by moving inside the hospital.
- The students were aware of the kinds of infectious disease and the ways of transmission of diseases within the hospital.
- The students recognized the precautions needed to prevent and control the infection within the hospital, while a large number were also unaware.
- It was found that students have almost complete knowledge of the proper method of hand washing, which contributes to reducing the spread of infection.

RECOMMENDATIONS

Based on the findings of the study, we conclude with several recommendations:

1. The need to raise awareness among students to do what is necessary to reduce the spread of communicable diseases.
2. Preparing training and guidance programs to learn how to deal with this phenomenon to reduce the risk of transmission among hospital guests and medical staff.
3. The need to intensify and disseminate guidance signs in all sections of the hospital and the need to comply with the instructions of all individuals within the hospital.

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