REVIEW ARTICLE





Knowledge, attitude, and risk perception toward HIV-, HBV-, and HCV-infected patients among dental students of October 6 University: descriptive cross-sectional study

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Abstract

Dentistry involves the use of many instruments that are sharp and deal with blood and saliva that may be contaminated with either HBV, HCV, or HIV. Professional exposure of healthcare workers (as dentists and dental students) to blood or other potentially infected biological material may cause transmission of infection to them.

Transmission of infection can occur through several routes; mucosal, cutaneous, or percutaneous.

Transmission of pathogens may result in an asymptomatic infection. This situation may last for weeks or months until symptoms appear. Some patients are, thus, not aware of their infectious status and may carry an asymptomatic infection when visiting a dental practice.

Aim of study The objective of the current study was to detect the level of knowledge among dental students regarding the human immunodeficiency virus, hepatitis B virus, and hepatitis C virus. The attitude and risk perception of the students about the treatment of patients with these viruses were also assessed. In our study, we determined also the relationship between knowledge, attitude, and risk perception.

Methodology Six hundred eighty responded students were included in this study. They were selected from all 5 years of study to form 2 equal groups (340 students in each group), group I (junior students): 1st, 2nd, and 3rd years and group II (senior students): 4th and 5th years. The questionnaires (distributed to the students) included five main parts: the sociodemographic part, the knowledge part, the attitude part, the risk perception part, and the self-evaluation part.

Results (1) The correct answer score was higher in group II than in group I (58.54% and 41.46% respectively). (2) The professional attitude score was higher in group II than in group I (60.81% and 39.19% respectively). (3) The positive risk perception was higher in group II than in group I (56.20% and 43.80% respectively).

Conclusion The level of knowledge plays an important role in forming attitudes and risk perceptions toward patients with HBV, HCV, and HIV. This is of concern in dentistry and other similar fields like otolaryngology.

Keywords HBV, HCV, HIV, Knowledge, Attitude, Risk perception

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Background

The emergence of blood-borne infections and the increasing demands for dealing with infected patients force dentists to have good knowledge about contagious diseases and how to prevent their transmission

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from patient to patient, patient to dentist, or dentist to patient [1].

Dentistry involves the use of many instruments that are sharp and deal with blood and other body fluids that may be contaminated with either human immunodeficiency virus (HIV), hepatitis B virus (HBV), or hepatitis C virus (HCV) [1].

The dental clinic creates an excellent environment for contagious microorganisms' transmission through highspeed equipment that creates an airborne mist of fluid, saliva, blood, and infectious driblets. This can be only overcome by infection control measures [2].

Dentists' discrimination against some patients with contagious diseases is ethically, and in some countries legally, unacceptable [3].

Several studies (about knowledge, attitude, and risk perception) were conducted in many parts of the world (including dentists and/or dental students) reflecting the importance of such a subject [4-7].

Most dentists through their clinical practice are involved in infection control programs and are expected to know how to perform professional exposure and achieve personal protection. As regards dental students (future dentists), the

the situation is different. Many questions about their knowledge, perception of risk, and attitude toward patients with infectious diseases, need correct answers. Several authors were interested in this subject [8–10].

The aim of the current study is to determine the degree of knowledge of dental students regarding HBV, HCV, and HIV. The attitude and the degree of perception of risk during the treatment of patients with infectious diseases should also be studied. We hope to determine the relationship between knowledge, attitude, and risk perception and to clarify the importance of providing health care to all individuals indiscriminately including dental treatment.

Subjects and methods

Our study was conducted at October 6 University, Faculty of Oral and Dental Medicine.

This study included students from all educational levels (all 5 years). As in the fourth year, students begin their clinical practice and become included in infection control programs, they were divided into two groups (Table 1):

Group I (junior students): 1st year, 2nd year, and 3rd year.

Group II (senior students): 4th year and 5th year.

Six hundred eighty responded students were included in this study (340 in each group). The students were 297

Group	Male	Female	Total
Group I (junior): 1st, 2nd, and 3rd year	146	194	340
Group II (senior): 4th and 5th year	151	189	340
Total	297 (43.68%)	383 (56.32%)	680

We arranged to take an equal number of responding students from each group. Lost students, for any reason, were substituted by other students of the same group

males and 383 females and their ages ranged from 18 to 24 years.

The questionnaires were distributed to all the students in their scheduled lectures, sufficient time was given to them to fill the questionnaires and the answered questionnaires were collected at their subsequent classes on the other days. Those who missed the first time would get the chance to answer the questionnaires the second time (in their subsequent lectures or practical sections).

The questionnaire is composed of five main parts:

- 1. Sociodemographic part: it contains information about the student (gender, year of the study, and parent's profession).
- 2. Knowledge part: it explores the student's knowledge regarding HBV, HCV, and HIV infection. The questions in this part have three possible answers: yes, no, or don't know. For every correct answer, a score of 1 was assigned. For every incorrect answer, a score of 0 was assigned. For each group, the total score of correct answers was calculated.
- 3. Attitude part: the student's attitude toward patients with infectious diseases is detected by a five-point Likert Scale. The scale detects the level of agreement with each statement (5=strongly agree and 1=strongly disagree). For every professional attitude, a score of 1 was assigned. For every non-professional attitude, a score of 0 was assigned. The total score (of professional attitude) for each group was obtained.
- 4. Risk perception part: it examines the student's risk perception. It is also assessed by the 5-point Likert Scale. For every positive risk perception, a score of 1 was assigned. For every negative perception, a score of 0 was assigned. The total score (of positive risk perception) for each group was obtained.
- 5. Self-evaluation part: it is a yes or no question. For each yes or no answer, a score of 1 was assigned. The total score for each answer (yes or no) was obtained.

N.B. For statistical analysis (and good interpretation of the results), strongly disagree and disagree were considered as disagreement. At the same time, strongly agree and agree were considered as agreement i.e. answers were assessed using a three-point Likert Scale (agree, neutral and disagree).

The questionnaire was based on previous studies with some modifications [11, 12]. Students who did not complete all the questionnaires were excluded from the study and were substituted by the same number of students from the same group. All the data were subjected to statistical analysis.

Recruitment of the students was achieved by the following:

- Inviting the students to complete the questionnaire in their classrooms.
- The help of some students for the distribution of the questionnaires to other students in their classrooms.
- Explaining to the students (with the help of the staff) the importance of testing their knowledge by sharing in this study.
- Adding knowledge to the students about HBV, HCV, and HIV to protect themselves (and the patients) and to improve their attitude and risk perception about the treatment of patients with such infections.
- Personal communication.

Like dentistry, otolaryngology involves the use of many sharp instruments and the dealing with blood or saliva that may be contaminated with either HIV, HBV, or HCV. Thus otolaryngologists can benefit from the recommendation of our study.

Results

Six hundred eighty students of the total students (in all years of study), responded to our study and completed the questionnaires.

Analysis of the results revealed the following:

- 1) Sociodemographic parameters: Table 2
- 2) Knowledge: Table 3 Fig. 1
- 3) Attitude: Table 4
- 4) Risk perception: Table 5
- 5) Self-evaluation: Table 6
- 6) Relationship among factors: Table 7 Table 8

Table 2 Number of responded students

	Male	Female	Total
1st year	46	69	115
2nd year	48	57	105
3rd year	52	68	120
4th year	83	97	180
5th year	68	92	160
Total	297	383	680

Year of study (1st, 2nd, 3rd, 4th, and 5th year with 115, 105, 120, 180, and 160 responded students respectively)

Та	ble	3	Correct	answers	(score))
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Group	Number of correct answers	Total
Group I (junior)	1st year: 1326 2nd year: 1312	4518 (41.46%)
Group II (senior)	3rd year: 1880 4th year: 3339	6379
Total	5th year: 3040	(58.54%) 10,897

P value < 0.05 (chi-square test)

Students of group I gave 41.46% of the number of correct answers. Students of group II gave 58.54% of the number of correct answers

Discussion

Dentistry involves the use of many instruments that are sharp and dealing with blood and other body fluids that may be contaminated with either HBV, HCV, or HIV [1].

Correct dealing of dentists with infected patients is mandatory to prevent the transmission of contagious diseases from patient to patient, patient to dentist, or dentist to patient. Most dentists through their clinical practice are involved in infection control programs and are expected to know how to perform professional exposure and achieve personal protection. As regards dental students (future dentists), the situation is different and many questions need to be answered:

- 1. What is the level of knowledge of the students about HBV, HCV, and HIV infections?
- 2. What is their attitude and risk perception about the treatment of patients with such infection?
- 3. Is there a relation between knowledge, attitude, and risk perception?
- 4. Is further education needed by the students regarding the treatment of patients with such infections?

In an attempt to answer these questions, this study was done.



Year of the study

Fig. 1 Personal knowledge (years). Personnel knowledge increased with the year of the study. N.B. personnel knowledge = no. of correct answers/ no. of students

Table 4 Professional attitudes (score)

Group	Number of professional attitudes
Group I (junior)	1444 (39.19%)
Group II (senior)	2241 (60.81%)
Total	3685

P value < 0.05 (chi-square test)

Students of group I showed 39.19% professional attitudes and students of group II showed 60.81% professional attitudes toward the patients

Table 5 Positive risk perception (score)

Group	Awareness of risks associated with treatment of patients	
Group I (junior students)	1373 (43.80%)	
Group II (senior students)	1762 (56.20%)	
Total	3135 (100%)	

P value < 0.05 (chi-square test)

Students of group I showed 43.80% positive risk perception and students of group II showed 56.20% positive risk perception with the treatment of the patients

One of the early studies on the knowledge, attitude, and risk perception of dental students toward patients with HBV, HCV, and/or HIV was conducted by [11]. This was followed by the series of [1, 7-10, 12-15].

Our study was conducted at the Faculty of Oral and Dental Medicine, on October 6 University, Egypt. The results were collected, analyzed, and compared to the results obtained from different areas.

In our study, the knowledge of the students about infection with HBV, HCV, and HIV was much less in the junior group than in the senior group. The percentage of correct answers was 41.46% and 58.54% for the junior and senior groups respectively. In fact, correct answers increased with each year of study (from first to fifth year), the lowest number was given by first-year students, while the highest number was given by fifth-year students (1326 and 3040 respectively). Similar results were obtained by [16].

In the faculty of dental medicine, university of Zagreb, Croatia, a survey was conducted among the students (in all the years of study). The results showed that the knowledge about HBV, HCV, and HIV increased through the years of study [12].

Table 6 Self-evaluation

Question	Yes	No
Do you need further theoretical and practical education on the dental treatment of patients with HIV, HBV, and HCV?	465 (68.38%)	215 (31.62%)
Do you feel competent to treat a patient with HIV, HBV, or HCV?	157 (23.09%)	523 (76.91%)

The great majority of the students (76.91%) felt less confident in their competence in treating the patients and 68.38% thought that they needed further theoretical and practical education

 Table 7
 Correlation
 between
 personal
 knowledge
 and
 professional attitude

Group	Personal knowledge	Professional attitude
Group I (junior)	13.2882	1444 (39.19%)
Group II (senior)	18.7617	2241 (60.81%)

P value < 0.05 (Spearman's rank correlation coefficient) (positive correlation)

 Table 8
 Correlation
 between personal knowledge and positive risk perception

Group	Personal knowledge	Positive risk perception	
Group I (junior)	13.2882	1373 (43.80%)	
Group II (senior)	18.7617	1762 (56.20%)	

P value < 0.05 (Spearman's rank correlation coefficient) (positive correlation)

Also, in agreement with our results, [8] showed that knowledge about HCV was influenced by the year of study.

The above result can be explained by (i) students got more knowledge with advances through years of education, (ii) most of the students attended an increasing number of courses concerned with infection control and/or dealing with such patients. In fact, students in the fourth year become included in clinical practice and attend infection control courses. They learn skills of professional exposure and how to protect themselves.

Progress of personal knowledge (through the years of study) was especially evident by comparing the answers of the students to certain questions in the question-naire e.g.:

"Can HIV be transmitted through social contact?" "Can HIV be transmitted by saliva?"

A small number of first-year students correctly answered these questions. On the other hand, a large number of fifth-year students correctly answered these questions. The answer to some questions the students discovered certain gaps in their knowledge e.g.: -

"Is a Hepatitis C vaccine available?" "Is the possibility of infection with Hepatitis C after a needle-stick about 50 to 75%?"

A large number of the students, even in the fifth year, incorrectly answered these questions.

In our study, the attitude of the students toward patients with HBV, HCV, and HIV was different in the different years of study. Senior students (group II) had more professional attitudes than junior students (group I). Professional attitudes were 60.81% and 39.19% for group II and group I respectively.

The study done by [8] showed that the attitude of dental students toward infected patients was influenced by the year of the study. The study done by [11] showed that the type of pathogen might also influence the attitude of the students toward infected patients. They were more willing to treat HBV and HCV-infected patients than to treat HIV-infected patients. This is due to the fear of HIV infection [4].

Disagreement with statements like: "I would prefer not to treat patients who are HIV positive" and "I would prefer not to treat patients with hepatitis" represented obvious professional attitudes towards these patients. Senior students were more willing to treat these patients. On the other hand, agreement with statements like: "Dentists have a professional obligation to treat patients who are HIV positive" and "I will let dentists treating HIV or hepatitis patients treat my teeth" represented also professional attitudes. Senior students supported this attitude more than junior students.

In our study, risk perception for HBV, HCV, and HIV infections was different during the 5-year course of study. Senior students (group II) showed more positive risk perception than junior students (group I). Positive risk perceptions were 56.20% and 43.80% for group II and group I respectively.

However, positive risk perception was satisfactory in both groups of students (senior and junior). In Karachi (Pakistan) one study showed that the magnitude of awareness of dental students towards HBV and HCV infections was also satisfactory [17]. Another study (also in Pakistan) revealed that dental students follow preventive guidelines for transmission of HBV during treatment procedures and they were more cautious during practice than medical students [18].

Most of the students in our study (88.38%) agree or strongly agree with the statement: "All patients should be considered potentially infectious". In other words, most of the students believe that there is a risk of HBV, HCV, and HIV infection in everyday patient treatment.

In the current study, gender did not affect the positive perception of the risk of infection during the treatment of patients with HBV, HCV, and HIV.

The majority of the students (76.91%) in the current study did not feel competent to treat patients with HBV, HCV, or HIV.

68.38% of the students in our study emphasized that they need further theoretical and practical education on the dental treatment of patients with HBV, HCV, and HIV. Thus, dental students (future dentists) would achieve much more protection against infectious diseases and at the same time would feel competent to treat patients with HBV, HCV, and HIV. The study of [12] showed that the great majority of students (97.4%) thought that theoretical education on the dental treatment of patients with HBV, HCV, and HIV should be obligatory in the curriculum.

Studying the relationship between professional attitude and knowledge showed a positive correlation. Many other studies confirmed this result [2, 14]. This result was confirmed more by other studies conducted on dentists and faculty members in dental institutions [19].

In contrast to the previous result, other studies concluded that in spite of good levels of knowledge, students and/or dentists may have negative attitudes (non-professional attitude) towards patients with these infections irrespective of the year of study or the level of knowledge [20]. Fear and concern of being infected made students and/or dentists refuse to treat these patients. This was applied more to dealing with patients with HIV [4].

In the current study, the detection of the relationship between knowledge and perception of the risk of infection revealed a positive correlation. The study of [21] was in agreement with our result. In contrast, a study conducted by [10], found a high seroprevalence of HBV and HCV despite the good knowledge of the students. This was explained by the poor practice of the students.

In our study, personal knowledge was positively correlated with these statements (in the attitude and risk perception questionnaire): "Dentists have a professional obligation to treat patients who are HIV positive", "All patients should be considered potentially infectious" and "Standard protective equipment (gloves, mask, glasses) provides sufficient safety against infection".

In our study, also, personal knowledge was negatively correlated with these statements (in the attitude and risk perception questionnaire): "I would prefer not to treat patients with hepatitis because of increased risk of infection", "I would prefer not to treat intravenous drug users", "If I found out that my long time patient had HIV or hepatitis, I would stop treating him" and "Dentists having HIV or hepatitis should cease their occupational activity".

After collecting the answered questionnaires, we took the chance and answered any questions from the participating students. We believe that in any scientific study, the participants should gain benefits and add to their knowledge.

Conclusion

Egyptian dental students' knowledge about HBV, HCV, and HIV infections increases with each year of study; the level of personal knowledge is higher in senior students (4th and 5th year) than the level of personal knowledge in junior students (1st, 2nd, and 3rd year).

Personal knowledge has an important role in forming perceptions of risk and attitudes toward patients with infectious diseases.

Egyptian dental students (future dentists) show willingness and a need for further theoretical and practical education on the dental treatment of patients with HBV, HCV, and HIV.

Future dentists would achieve much more protection against infectious diseases and at the same time would feel competent in treating patients with HBV, HCV, and HIV.

Recommendation

To avoid or minimize the occurrence of viral infection, dental students should be armed with the most effective weapon; knowledge. Educational programs should start early from the 1st year of dental study and continue all the time.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s43163-023-00540-x.

Additional file 1. Patient questionnaire

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Authors' contributions

NT contributed to the questionnaire assessment of the students, recording data obtained from the students, and tabulation of the results. GM gave the idea of the study and the main plane of the work. AH contributed to the formation of the study design, which was followed in the work. All authors shared in the formation of the items of the questionnaire and writing of the paper. All authors read and approved the final manuscript.

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Availability of data and materials

The datasets used or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The study was approved by the research ethics committee of the Faculty of Oral and Dental Medicine at Cairo University. Number of approval: 11 7 2015. Date of approval: 27\7\2015. An informed written consent was obtained from all students.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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