Knowledge and Attitude of Dental Students and Interns in Saudi Arabia (Riyadh Region) among Hepatitis C Virus Infection

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Authors’ contributions

This work was carried out in collaboration among all authors. Authors FSA, NA, ARA and KSA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors AIA and AOA managed the analyses of the study. Author AMA managed the literature searches. All authors read and approved the final manuscript.

ABSTRACT

Introduction: Hepatitis C virus (HCV) is considered one of the leading causes of chronic liver conditions in the world. The primary route of transmission of HCV can be by exposure of infected blood or sharing a contamination syringe during the injection of drugs. The purpose of this research is to evaluate and assess the knowledge and attitude of HCV infection among dental students and interns in Saudi Arabia population specially Riyadh region.

Materials and Methods: This is a cross-sectional-based survey, using a questionnaire which was divided into two parts, first covering sociodemographic information of the participant regarding gender, academic level of the participant and the University. Second part of the questionnaire was established based on the knowledge and attitude of the participant in regard to HCV.
Results: A total of 218 students participated in this study. The responses of participants differed in various academic levels with a statistically significant difference in only two questions; in question 10 when they were asked whether or not they knew that a vaccine for HCV exists (p = 0.02) and question 20, if they believed that dental staff would be afraid to treat a patient if they found out his/her positive HCV status (p = 0.02).

Conclusions: The present study showed that knowledge, among the dental students and interns in the Riyadh region was not adequate in regard to HCV, and their attitude toward HCV patients was inequitable.

Keywords: Hepatitis C virus; dental student; HCV vaccine; Riyadh region; Saudi Arabia.

1. INTRODUCTION

Hepatitis can be defined as an inflammation of the liver that can cause a variety of health problems and can eventually cause death. Hepatitis mainly have different five types that include type A, B, C, D and E that have a distinct mode of transmission; however, all can lead to liver diseases [1]. Hepatitis C virus (HCV) is considered one of the leading causes of chronic liver conditions in the world [2]. The prevalence of HCV based on antibodies HCV positive test globally is estimated at 1.6%, which ranges between 90 -145 million individuals [3]. People infected by HCV can later develop severe form of liver diseases such as cirrhosis and cancer [4].

The primary route of transmission of HCV is through exposure of infected blood or sharing a contaminated syringe during the administration of drugs [2]. Another way of HCV transmission is either through sexual transmission or maternal HCV transmission, but it is considered to be less common compared to other modes of transmission [5,6]. Dentists have one of the highest risks of HCV transmission among health care workers [7]. Several researches examined the knowledge and attitude toward the infection control protocols with the student, lab technician and dentist. The outcome of those investigations revealed that dentists have poor knowledge of infection control that increases the risk of infection depending on use of protective aids [7,8].

For instance, Okasha et al. (2015) published a study that aimed to document the prevalence and incidence of HCV between health care workers in Cairo, Egypt. This study revealed 7.3% per 1000 people per year incidence of HCV infection, which raised the risk of mortality and morbidity among dentists and health care workers in general [9]. A study was also conducted by Peeran et al. (2016) that aimed to understand and evaluate the knowledge and attitude toward HCV infection among undergraduate dental students and interns [10].

A recent study conducted by Rostamzadeh et al. (2018) to evaluate the basic infection control knowledge, attitudes and practices of dentists in the Iranian population revealed that there is an acceptable knowledge and attitude of dentists towards different infections such as HIV, HBV and HCV. However, some gap in infection control knowledge and applications are observed and increasing awareness of dental practitioners is recommended to have good infection control protocols to prevent any possible risk [11].

Accordingly, the purpose of this research is to evaluate and assess the knowledge and attitudes among dental students and interns regarding hepatitis C virus infection in Saudi Arabian population especially in Riyadh region. This study will provide an insight into the current knowledge and practices of dental students and interns with regards to HCV and help dental educators and policy rethink education and training policies and incorporate changes in HCV infection control training if needed, based on the results of this research.

2. MATERIALS AND METHODS

2.1 Study Design

The present study is a cross-sectional, survey based study. The survey was distributed through different social media platforms include, Twitter, Telegram, and WhatsApp among dental students and interns enrolled in the following eight dental colleges: Prince Sattam bin Abdulaziz University (PSAU), King Saud University (KSU), King Saud bin Abdulaziz University for Health Sciences (KSAU-HS), Riyadh Elm University (REU), Princess Nora bint Abdulrahman University (PNU), DAU University, Majmaah University, and Al-Farabi Colleges in Riyadh, Saudi Arabia.
2.2 Study Instrument

A self-designed, close ended questionnair was used for the survey. The questionnaire was written in the English language. It was converted to an electronic format using Google Forms. The integrity of the questionnaire was maintained by keeping the options and answering fields as they would appear in paper format. The validity of questionnare was measured first among dental students and interns in Prince Sattam Bin Abdulaziz University to ensure the feasibility of the study before distributing the questionna to the participants.

The questionnaire was divided into two parts; the first part assessed general information of the participant like demographic information, academic level of the participant and the University they belonged to. The second part of the questionnaire assessed the knowledge and attitude of the participants with regards to HCV and including items that asked about the route of transmission of HCV infection, HCV infection signs and symptom, the vaccination of HCV infection, patient thoughts toward HCV infection, and the treatment modalities of HCV patients.

2.3 Sampling and Sample Size

A stratified random sampling technique was used to obtain the study sample from among dental students and interns in the chosen dental schools. Sample size calculation was performed using the following formula:

$$n = \frac{Z^2_1 \times \alpha}{d^2} \times \left( \frac{p(1-p)}{\text{CI}} \right)$$

Where,

- $n$ is the sample size,
- $Z_1\alpha/2^2$ is the standard normal variate (at 5% Type 1 error and 95% CI [p<0.05] it is 1.96),
- $p$ is the expected proportion in population based on previous studies and,
- $d$ is the absolute error or precision.

According to this formula, with a present knowledge level of 75% based on previous studies and a precision of 5%, a minimum sample of 198 participants were needed to produce statistically accurate results.

2.4 Statistical Analysis

Data was collected, tabulated and analyzed using SPSS software (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp.). Frequency distribution of demographic variables like gender, university and academic level of participants was calculated using descriptive statistics. Comparisons were made between knowledge-based variables and academic level, University and gender using Pearson’s Chi-Square tests. Variables with non-binary responses were reported individually for better visualization.

3. RESULTS

A total of 218 students participated in this study. Table 1 represents the distribution of respondents with respect to demographic variables. Majority of the respondents were males (56.8%), from Prince Sattam bin Abdulaziz University (PSAU; 29.3%) and studying in 2nd year (38.9%). Similarly, only 1.3% of respondents studied in 1st year and were the least with respect to academic level.

Table 2 depicts frequency distribution of responses of participants and chi-squared p values with respect to academic level of study. The responses of participants differed in various academic levels with a statistically significant difference in only two questions; in question 10 when they were asked whether or not they knew that a vaccine for HCV exists ($p = 0.02$) and question 20, if they believed that dental staff would be afraid to treat a patient if they found out his/her positive HCV status ($p = 0.02$). Participant responses to the rest of the questions did not differ significantly.

Fig. 1 depicts the distribution of “yes” responses among males and females. It was observed that in all questions, a greater number of females responded with a yes than males except in question 25 (males =47%, females = 41%). Similarly, Fig. 2 depicts the frequency distribution of responses of male and female participants. When responses of participants were compared on the basis of gender, it was found that there was no statistically significant difference between responses of males and females (Table 3).
### Table 1. Distribution of the sample according to gender, university and academic level (N= Number of participants, % = Percentage)

| Demographic variable | N     | %    |
|----------------------|-------|------|
| Gender               | N     |      |
| Males                | 124   | 56.8 |
| Females              | 94    | 43.1 |
| University           |       |      |
| PSAU                 | 64    | 29.3 |
| PNU                  | 36    | 16.5 |
| Majmaah University   | 8     | 3.6  |
| KSU                  | 41    | 18.8 |
| KSU-HS               | 16    | 7.3  |
| DAU University       | 6     | 2.7  |
| REU                  | 29    | 13.3 |
| Al Farabi Colleges   | 18    | 8.2  |
| Academic level       |       |      |
| 1st year             | 3     | 1.3  |
| 2nd year             | 85    | 38.9 |
| 3rd year             | 44    | 20.1 |
| 4th year             | 52    | 23.8 |
| 5th year             | 34    | 15.5 |

Analyses were also done to compare knowledge of participants based on the university they studied in. Frequency distribution of responses are depicted in Table 4. There were differences that were statistically significant in eight of the total binary response questions in the questionnaire. These differences were found in Q.10 (p = 0), Q.13 (p=0.03), Q.14 (p=0.017), Q.15 (p=0.04), Q. 21 (p=0.007), Q.22 (p=0.01), Q.24 (p=0.001) and Q.25 (p=0.03). Distribution of participants who responded with “yes” to every question are presented in Fig. 3.

Responses to questions 2 and 3 were non-binary and are presented in Table 5, Fig. 4, and Fig. 5. When asked about the preferred method of seeking more knowledge about HCV (Q.2), majority of the males (47.5%) chose books while majority of the females (40.4%) chose visual media. This difference in responses was statistically significant (p=0.03). Similarly, majority of 2nd year students (38.8%) and 4th year students (44.2%) also chose books as their preferred source of additional HCV knowledge but the difference between academic level was not statistically significant (p=0.13). On the contrary, responses were significantly different among students of different universities (p=0.018). Additionally, when asked about the major route of transmission of Hepatitis C (Q.3), majority of the all the respondents with respect to gender, academic level and university responded chose blood (Table 5) but there were no significant differences in the responses between any variable (gender, academic level or university).

![Percentage of participants answered "YES" to the questions based on Gender](image)

**Fig. 1.** Shows the % of males and females that responded “yes” to every question.
Table 2. Display the distribution and comparison of the students’ knowledge of HCV based on academic level composed of 26 questions. ($\chi^2$ and $P$ = Statistical values)

| Question                                                                 | Response | 2nd year students ($n = 85$) | 3rd year students ($n = 44$) | 4th year students ($n = 52$) | 5th year students ($n = 34$) | Total students ($n = 215$) | $\chi^2$ | $P$ |
|-------------------------------------------------------------------------|----------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|---------------------------|---------|-----|
| 1. Do you consider yourself having adequate knowledge about HCV infection? | Yes      | 47 (55.29)                    | 28 (63.64)                    | 35 (67.31)                    | 24 (70.59)                    | 134 (62.33)              | 3.36    | 0.3393 |
|                                                                         | No       | 38 (44.71)                    | 16 (36.36)                    | 17 (32.69)                    | 10 (29.41)                    | 81 (37.67)                |         |     |
| 4. Can dentists get hepatitis C from their patient if he/she does not use a proper barrier technique? | Yes      | 77 (90.59)                    | 41 (93.18)                    | 47 (90.38)                    | 33 (97.06)                    | 198 (92.09)              | 1.70    | 0.6379 |
|                                                                         | No       | 8 (9.41)                      | 3 (6.82)                      | 5 (9.62)                      | 1 (2.94)                      | 17 (7.91)                |         |     |
| 5. Can a dentist transmit hepatitis C to their patients if he/she doesn’t use proper barrier techniques? | Yes      | 77 (90.59)                    | 37 (84.09)                    | 43 (82.69)                    | 29 (85.29)                    | 186 (86.51)              | 2.13    | 0.5469 |
|                                                                         | No       | 8 (9.41)                      | 7 (15.91)                     | 9 (17.31)                     | 5 (14.71)                     | 29 (13.49)               |         |     |
| 6. Hepatitis C can cause chronic hepatitis? | Yes      | 70 (82.35)                    | 37 (84.09)                    | 42 (80.77)                    | 30 (85.29)                    | 178 (83.26)              | 0.91    | 0.8237 |
|                                                                         | No       | 15 (17.65)                    | 7 (15.91)                     | 10 (19.23)                    | 4 (11.76)                     | 36 (16.74)               |         |     |
| 7. Hepatitis C can lead to cirrhosis? | Yes      | 64 (75.29)                    | 33 (75.00)                    | 44 (84.62)                    | 30 (88.24)                    | 171 (79.53)              | 3.90    | 0.2724 |
|                                                                         | No       | 21 (24.71)                    | 11 (25.00)                    | 8 (15.38)                     | 4 (11.76)                     | 44 (20.47)               |         |     |
| 8. HCV is associated with an increased risk of liver cancer? | Yes      | 57 (67.06)                    | 33 (75.00)                    | 40 (76.92)                    | 25 (73.53)                    | 155 (72.09)              | 1.89    | 0.5948 |
|                                                                         | No       | 28 (32.94)                    | 11 (25.00)                    | 12 (23.08)                    | 9 (26.47)                     | 60 (27.91)               |         |     |
| 9. Dose HCV lead to jaundice? | Yes      | 58 (68.24)                    | 34 (77.27)                    | 36 (69.23)                    | 28 (82.35)                    | 156 (72.56)              | 3.22    | 0.3595 |
|                                                                         | No       | 27 (31.76)                    | 10 (22.73)                    | 16 (30.77)                    | 6 (17.65)                     | 59 (27.44)               |         |     |
| 10. Is there a vaccine against HCV exists? | Yes      | 52 (61.18)                    | 32 (72.73)                    | 23 (44.23)                    | 17 (50.00)                    | 124 (57.67)              | 9.18    | 0.1229 |
|                                                                         | No       | 33 (38.82)                    | 12 (27.27)                    | 29 (55.77)                    | 17 (50.00)                    | 91 (42.33)               |         |     |
| 11. Can a dentist treat hepatitis C positive patients in a normal dental setting? | Yes      | 45 (52.94)                    | 18 (40.91)                    | 27 (51.92)                    | 18 (52.94)                    | 108 (50.23)              | 1.939   | 0.0270 |
|                                                                         | No       | 40 (47.06)                    | 26 (59.09)                    | 25 (48.08)                    | 16 (47.06)                    | 107 (49.77)              |         |     |
| 12. Do you consider that your current curriculum will make you fit to manage patient with HCV? | Yes      | 55 (64.71)                    | 23 (52.27)                    | 23 (44.23)                    | 19 (55.88)                    | 120 (55.81)              | 5.778   | 0.1229 |
|                                                                         | No       | 30 (35.29)                    | 21 (47.73)                    | 29 (55.77)                    | 15 (44.12)                    | 95 (44.19)               |         |     |
| Question                                                                 | Response | 2nd year students (n = 85) | 3rd year students (n = 44) | 4th year students (n = 52) | 5th year students (n = 34) | Total students (n = 215) | $X^2$ | P     |
|-------------------------------------------------------------------------|----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|-------|-------|
| 13. Do you feel confident that with the standard precaution taken, there will be no transmission of HCV? | Yes      | 60                        | 29                        | 35                        | 22                        | 146                       | 67.91 | 0.5294 |
|                                                                         | No       | 25                        | 15                        | 17                        | 12                        | 69                        | 32.09 | 0.9124 |
| 14. Would you treat a patient who is at high risk of hepatitis C, such as injecting drug user? | Yes      | 46                        | 28                        | 22                        | 17                        | 113                       | 52.56 | 4.529  |
|                                                                         | No       | 39                        | 16                        | 30                        | 17                        | 102                       | 47.44 | 0.2097 |
| 15. Would you be stressed while treating a known HCV-positive patient or the risk groups? | Yes      | 67                        | 37                        | 47                        | 26                        | 177                       | 82.33 | 3.933  |
|                                                                         | No       | 18                        | 7                         | 5                         | 8                         | 38                        | 17.67 | 0.2688 |
| 16. Are you ethically/morally responsible to treat hepatitis C-positive patients? | Yes      | 72                        | 35                        | 43                        | 26                        | 176                       | 81.86 | 1.312  |
|                                                                         | No       | 13                        | 9                         | 9                         | 8                         | 39                        | 18.14 | 0.7264 |
| 17. Do you think that the patient should inform you correctly about his/her HCV positive status? | Yes      | 74                        | 37                        | 47                        | 30                        | 188                       | 87.44 | 0.8909 |
|                                                                         | No       | 11                        | 7                         | 5                         | 4                         | 27                        | 12.56 | 0.8276 |
| 18. Is it necessary that hepatitis C-positive dentists should inform their patients about his status? | Yes      | 64                        | 33                        | 38                        | 22                        | 157                       | 73.02 | 1.504  |
|                                                                         | No       | 21                        | 11                        | 14                        | 12                        | 58                        | 26.98 | 0.6814 |
| 19. Do you think that treating HCV-positive patients will increase personal risk for the disease? | Yes      | 59                        | 27                        | 41                        | 20                        | 147                       | 68.37 | 5.113  |
|                                                                         | No       | 26                        | 17                        | 11                        | 14                        | 68                        | 31.63 | 0.1637 |
| 20. Do you think that dental staff will be afraid if they know about the HCV positive status of the patient? | Yes      | 76                        | 32                        | 47                        | 31                        | 186                       | 86.51 | 9.08   |
|                                                                         | No       | 9                         | 12                        | 5                         | 3                         | 29                        | 13.49 | 0.0282 |
| 21. Do you think regular HCV testing for dentists and dental health care workers is necessary to protect the patient? | Yes      | 79                        | 41                        | 47                        | 31                        | 198                       | 92.09 | 0.4033 |
|                                                                         | No       | 6                         | 3                         | 5                         | 3                         | 17                        | 7.91  | 0.9396 |
| Question                                                                 | Response | 2nd year students (n = 85) | 3rd year students (n = 44) | 4th year students (n = 52) | 5th year students (n = 34) | Total students (n = 215) | $\chi^2$ | $P$   |
|-------------------------------------------------------------------------|----------|----------------------------|----------------------------|----------------------------|----------------------------|--------------------------|---------|-------|
| 22. Should regular hepatitis C testing of the patient be made mandatory before any surgical procedure is carried out? | Yes      | 67                         | 78.82                      | 25                         | 56.82                      | 38                       | 73.08   | 26    | 76.47 | 156   | 72.56 | $\chi^2 = 7.419$ | $P = 0.0597$ |
|                                                                         | No       | 18                         | 21.18                      | 19                         | 43.18                      | 14                       | 26.92   | 8     | 23.53 | 59    | 27.44 |                      |         |
| 23. Do you think that dentists have the right to reject treating hepatitis C-positive patients? | Yes      | 52                         | 61.18                      | 21                         | 47.73                      | 35                       | 67.31   | 20    | 58.82 | 128   | 59.53 | $\chi^2 = 3.953$ | $P = 0.2666$ |
|                                                                         | No       | 33                         | 38.82                      | 23                         | 52.27                      | 17                       | 32.69   | 14    | 41.18 | 87    | 40.47 |                      |         |
| 24. Do you think that government should construct/manage separate hospitals/clinics for HCV-positive individuals? | Yes      | 56                         | 65.88                      | 31                         | 70.45                      | 36                       | 69.23   | 23    | 67.65 | 146   | 67.91 | $\chi^2 = 0.3338$ | $P = 0.9536$ |
|                                                                         | No       | 29                         | 34.12                      | 13                         | 29.55                      | 16                       | 30.77   | 11    | 32.35 | 69    | 32.09 |                      |         |
| 25. In case of an emergency, would you be ready to perform mouth to mouth resuscitation (CPR) in HCV positive patient? | Yes      | 41                         | 48.24                      | 21                         | 47.73                      | 17                       | 32.69   | 15    | 44.12 | 94    | 43.72 | $\chi^2 = 3.564$ | $P = 0.3126$ |
|                                                                         | No       | 44                         | 51.76                      | 23                         | 52.27                      | 35                       | 67.31   | 19    | 55.88 | 121   | 56.28 |                      |         |
| 26. Do you think that you have to uphold the confidentiality of a patient with hepatitis C-positive status? | Yes      | 62                         | 72.94                      | 30                         | 68.18                      | 35                       | 67.31   | 25    | 73.53 | 152   | 70.70 | $\chi^2 = 0.761$ | $P = 0.8588$ |
|                                                                         | No       | 23                         | 27.06                      | 14                         | 31.82                      | 17                       | 32.69   | 9     | 26.47 | 63    | 29.30 |                      |         |
Fig. 2. Frequency distribution of participant responses on the basis of gender

Fig. 3. Shows the % of participants that responded “yes” to every question based on university
Table 3. Distribution and comparison of the students' knowledge of HCV based on gender.  
($X^2$ and $P$ = Statistical values)

| Questions | Gender | YES | NO | $X^2$ | P value |
|-----------|--------|-----|----|-------|---------|
| Q1        | Male   | 74  | 50 | 0.617 | 0.432   |
|           | Female | 61  | 33 |       |         |
| Q4        | Male   | 116 | 8  | 1.237 | 0.266   |
|           | Female | 84  | 10 |       |         |
| Q5        | Male   | 103 | 21 | 1.169 | 0.28    |
|           | Female | 83  | 11 |       |         |
| Q6        | Male   | 100 | 24 | 1.684 | 0.194   |
|           | Female | 82  | 12 |       |         |
| Q7        | Male   | 94  | 30 | 2.214 | 0.137   |
|           | Female | 79  | 15 |       |         |
| Q8        | Male   | 90  | 34 | 0.002 | 0.969   |
|           | Female | 68  | 26 |       |         |
| Q9        | Male   | 85  | 39 | 2.225 | 0.136   |
|           | Female | 73  | 21 |       |         |
| Q10       | Male   | 77  | 47 | 2.179 | 0.14    |
|           | Female | 49  | 45 |       |         |
| Q11       | Male   | 61  | 63 | 0.184 | 0.668   |
|           | Female | 49  | 45 |       |         |
| Q12       | Male   | 64  | 60 | 2.208 | 0.137   |
|           | Female | 58  | 36 |       |         |
| Q13       | Male   | 80  | 44 | 1.113 | 0.291   |
|           | Female | 67  | 27 |       |         |
| Q14       | Male   | 65  | 59 | 0.072 | 0.788   |
|           | Female | 51  | 43 |       |         |
| Q15       | Male   | 99  | 25 | 1.489 | 0.222   |
|           | Female | 81  | 13 |       |         |
| Q16       | Male   | 97  | 27 | 2.252 | 0.133   |
|           | Female | 81  | 13 |       |         |
| Q17       | Male   | 106 | 18 | 0.718 | 0.397   |
|           | Female | 84  | 10 |       |         |
| Q18       | Male   | 86  | 38 | 1.405 | 0.236   |
|           | Female | 72  | 22 |       |         |
| Q19       | Male   | 78  | 46 | 3.28  | 0.07    |
|           | Female | 70  | 24 |       |         |
| Q20       | Male   | 106 | 18 | 0.367 | 0.545   |
|           | Female | 83  | 11 |       |         |
| Q21       | Male   | 112 | 12 | 1.413 | 0.235   |
|           | Female | 89  | 5  |       |         |
| Q22       | Male   | 83  | 41 | 3.687 | 0.055   |
|           | Female | 74  | 20 |       |         |
| Q23       | Male   | 77  | 47 | 0.482 | 0.487   |
|           | Female | 54  | 40 |       |         |
| Q24       | Male   | 83  | 41 | 0.12  | 0.729   |
|           | Female | 65  | 29 |       |         |
| Q25       | Male   | 58  | 66 | 0.605 | 0.437   |
|           | Female | 39  | 55 |       |         |
| Q26       | Male   | 83  | 41 | 2.428 | 0.119   |
|           | Female | 72  | 22 |       |         |
Table 4. Distribution and comparison of the students’ knowledge of HCV based on university. (X² and P= Statistical values)

| University | Q1 YES | Q1 NO | Q2 YES | Q2 NO | Q3 YES | Q3 NO | Q4 YES | Q4 NO | Q5 YES | Q5 NO | Q6 YES | Q6 NO | Q7 YES | Q7 NO | Q8 YES | Q8 NO | Q9 YES | Q9 NO | Q10 YES | Q10 NO |
|------------|-------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
| PSU        | 34    | 30    | 57     | 7     | 51     | 13    | 52     | 12    | 45     | 19    | 42     | 22    | 43     | 21    | 46     | 18    |
| PNU        | 25    | 11    | 30     | 6     | 33     | 3     | 28     | 8     | 29     | 7     | 26     | 10    | 24     | 12    | 24     | 12    |
| Majmaah    | 8     | 0     | 8      | 0     | 5      | 3     | 7      | 1     | 7      | 1     | 6      | 2     | 7      | 1     | 7      | 1     |
| KSU        | 25    | 16    | 39     | 2     | 37     | 4     | 37     | 4     | 32     | 9     | 33     | 8     | 34     | 7     | 24     | 17    |
| KSAU-HS    | 11    | 5     | 15     | 1     | 14     | 2     | 14     | 2     | 15     | 1     | 13     | 3     | 12     | 4     | 5      | 11    |
| DAU        | 3     | 3     | 6      | 0     | 6      | 0     | 6      | 0     | 5      | 1     | 3      | 1     | 3      | 4     | 2      | 1     |
| REU        | 16    | 13    | 27     | 2     | 27     | 2     | 25     | 4     | 26     | 3     | 25     | 4     | 24     | 5     | 9      | 20    |
| Alfalabi Colleges | 13 | 5 | 18 | 0 | 13 | 5 | 13 | 5 | 14 | 4 | 10 | 8 | 10 | 8 |
| Alfalabi Colleges | 13 | 5 | 18 | 0 | 13 | 5 | 13 | 5 | 14 | 4 | 10 | 8 | 10 | 8 |
| | | | | | | | | | | | | | | | | |
| PSU        | 9.948 | 7.622 | 11.861 | 5.721 | 7.58 | 10.313 | 8.93 | 26.601 |
| P value    | 0.192 | 0.367 | 0.105 | 0.573 | 0.371 | 0.172 | 0.258 | 0 |

Table 5. Shows distribution and comparison of the students’ knowledge of HCV in non-binary response-based questions. (X² and P = Statistical values)

| Demographic variables | Meetings | Books | Journals | Visual media | χ² | P value |
|-----------------------|----------|-------|----------|--------------|----|---------|
| Gender                |          |       |          |              |    |         |
| Male                  | 26       | 59    | 8        | 31           | 8.945 | 0.03 |
| Female                | 19       | 28    | 9        | 38           |     |         |
| University            |          |       |          |              |    |         |
| PSU                   | 13       | 30    | 4        | 17           | 36.74 | 0.018 |
| PNU                   | 8        | 11    | 3        | 14           |     |         |
| Majmaah               | 6        | 1     | 1        | 0            |     |         |
| KSU                   | 7        | 13    | 3        | 18           |     |         |
| KSAU-HS               | 2        | 3     | 3        | 8            |     |         |
| DAU                   | 1        | 3     | 0        | 2            |     |         |
| REU                   | 6        | 14    | 1        | 8            |     |         |
| Alfalabi Colleges     | 2        | 12    | 2        | 2            |     |         |
Which of the following do you prefer to improve your knowledge about HCV?

| Demographic variables | Meetings | Books | Journals | Visual media | χ² | P value |
|-----------------------|----------|-------|----------|--------------|----|--------|
| Academic Level        |          |       |          |              |    |        |
| 1st Year              | 1        | 1     | 1        | 0            | 17.54 | 0.13   |
| 2nd Year              | 18       | 33    | 4        | 30           |      |        |
| 3rd Year              | 12       | 13    | 1        | 18           |      |        |
| 4th Year              | 9        | 23    | 8        | 12           |      |        |
| 5th Year              | 5        | 17    | 3        | 9            |      |        |

Which of the following is the major route of transmission of Hepatitis C?

| Demographic variables | Blood | Fecooral | Sexual | χ² | P value |
|-----------------------|-------|----------|--------|----|--------|
| Gender                |       |          |        |    |        |
| Male                  | 96    | 19       | 9      | 0.365 | 0.833  |
| Female                | 74    | 12       | 8      |      |        |
| University            |       |          |        |    |        |
| PSAU                  | 49    | 10       | 5      | 18.77 | 0.174  |
| PNU                   | 24    | 10       | 2      |      |        |
| Majmaah               | 7     | 1        | 0      |      |        |
| KSU                   | 34    | 3        | 4      |      |        |
| KSAU-HS               | 14    | 2        | 0      |      |        |
| DAU                   | 4     | 0        | 2      |      |        |
| REU                   | 22    | 5        | 2      |      |        |
| Alfarabi              | 16    | 0        | 2      |      |        |
| Academic Level        |       |          |        |    |        |
| 1st Year              | 2     | 0        | 1      | 9.21  | 0.324  |
| 2nd Year              | 68    | 9        | 8      |      |        |
| 3rd Year              | 35    | 8        | 1      |      |        |
| 4th Year              | 37    | 11       | 4      |      |        |
| 5th Year              | 28    | 3        | 3      |      |        |

4. DISCUSSION

Very few studies in literature discuss the knowledge and attitude of dental student and intern towards HCV infection especially in Saudi Arabia.

Therefore, the main aim of this research was to understand the level of understanding regards the HCV infection, which in turn improves the awareness regards the implication of the infection control guidelines among dental students and interns.

A total of 218 respondents from both genders participated in this study from different academic levels and institutions in Saudi Arabia. There was no significant difference in knowledge between males and females, and between different academic levels. However, a similar study found that female practitioners have more negative attitudes towards infection compared to their male counterparts [12].

To the best of the authors’ knowledge, this is the first study that investigates the knowledge and attitude of dental students and interns in Saudi Arabia. Other studies from different countries have the same aims but differ in the aspect of their samples.

Regarding knowledge of HCV infection, our findings show that most of the students in our sample lack basic knowledge of HCV infection that could help them to manage the patients diagnosed with HCV. A study published by Mtengezo et al. (2016) in Malawi that aimed to understand the knowledge and attitude of HIV, HBV and HCV virus infection among health care workers, showed that the majority of participants had less knowledge with regards to HCV infection [13]. The authors of this study recommend an educational program to improve this shortage in their knowledge. In our study we aim to understand the early knowledge of the students to overcome the weakness in early stage. Another study by Peeran et al. (2016) similar to our study investigated the knowledge and attitude of dental students from Libya. The result of that study indicates a gap in knowledge of HCV infection among the students [10]. These results show to be similar to findings in this study. The knowledge of participants is found to be equal between different academic levels and this lack of knowledge can elevate the stress level of students and interns when they plan to treat HCV patients. Furthermore, the rejection of treatment of HCV patients is not a positive attitude for the patients and can reflect a negative action that harms the patients. The students and interns should always follow...
universal infection control guidelines to treat any patients.

As for the attitude towards HCV infection, our results show that there is no clear answer from the participants with regards to the best approach to manage these kinds of patients. These results were also present in different studies that investigate the attitude toward HCV patients [10,14,15].

Fig. 4. Frequency distribution of responses to question 2

Fig. 5. Frequency distribution of responses to question 3
5. CONCLUSION

The present study demonstrated that the knowledge of HCV among dental students and interns in Riyadh region was not adequate, and their attitude toward HCV patients was not favorable. However, this research paper clearly shows that the student knowledge and attitude for HCV patient can be improved if further improvements are made in education and training to allow students and interns to handle HCV patients without discriminating against these types of patients.

6. LIMITATIONS

This study primary evaluates the knowledge and attitude of HCV infection among the students and interns in Riyadh region, Saudi Arabia. Response bias is intrinsic to all survey-based research and limits the application of results of such studies to the broader population and this is also a limitation in this study. Furthermore, a non-validated instrument was used in this study which hampers reproducibility of results on other similar samples. We recommend future researchers to develop standardized, validated instruments to assess self-reported measures of knowledge and attitudes.

CONSENT

As per international standard or university standard, Participants’ written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

Ethical approval for the study was obtained from the Ethical Committee of Prince Sattam bin Abdulaziz University.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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