

Training Gaps and Risk Factors Analysis Contributing to Hepatitis Infections among Early-Age Dental Professionals in India

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Abstract

Context: Dental professionals are at increased risk of acquiring viral hepatitis (VH) infections as they are predisposed to occupational exposure to infectious fluids while performing various dental processes. The risk can be minimized by creating awareness about preventive measures. Thus training of early-age dental professionals on management of viral hepatitis is needed.

Aims: The study aims at assessing the effectiveness of one day training on viral hepatitis among dental professionals.

Settings and Design: Study setting was Project PRAKASH, Institute of Liver and Biliary Sciences, New Delhi and Design was Pre-post design.

Methods and Material: A one-day training program titled 'Viral Hepatitis in Dentistry' was conducted among early-age dental professionals. The participants were provided with one-day training on VH with each session ranging from 45–60 minutes. An online link for Pre-post knowledge assessment consisting ten questions was shared with all registered participants before and after training. One mark was allotted for each correct response.

Statistical analysis used: The data was analysed using IBM-SPSS version-21. Independent samples t-test was used to assess the mean knowledge score across various demographic factors and the paired t-test was used to assess the improvement in knowledge post training. The statistical significance was considered at 0.05.

Results: A total of 253 dental professionals with mean age of 24.9±5.6 were trained across six states of India. The pre-test score and post score were 4.7±2.1 and 7.2±1.8 respectively with maximum score being 10. The mean improvement in knowledge score was found to be statistically significant.

Conclusions: Overall, study observed significant improvement of knowledge among dental professionals and this training on VH can help in increasing the knowledge about necessary preventive measures to prevent VH among dental professionals.

Key-words: Occupational hazard; Dental professionals; Viral hepatitis; Capacity-building.

Key Messages: Viral hepatitis is a severe complication and the knowledge level of early-age dental professionals on prevention and management of viral hepatitis was poor to moderate. Also, dental professional are more prone to occupational hazards and percutaneous injuries due to their close contact with patient's blood and other body fluids like saliva and splatter. Thus, there is an urgent need to initiate trainings of dental professionals on prevention and management of viral hepatitis.

Introduction

Viral Hepatitis is a recognized public health problem worldwide with 1.4 million annual deaths. Across the globe, approximately 240 million cases of hepatitis B and 130-150 million cases of hepatitis C.¹ India accounts for 15.3% of the global burden with to approximately 40 million cases of hepatitis B and 6-12 million cases of hepatitis C.²

Healthcare workers (HCWs) are highly prone to blood-borne infections from patients due to close contact while treatment. A study on HCWs stated a prevalence of hepatitis B as 14.4% and hepatitis C as 1.4% with major contribution from dentists, nursing personnel and laboratory technicians.³ Studies on dental professionals stated the considerable risk of contracting and spreading viral hepatitis infections owing to direct as well as indirect contact with blood, body fluids, saliva, splatter of droplets and aerosols of infected patients.⁴ Another study inferred that dental professionals acquire the disease primarily due to the frequent use and disposal of blood stained instruments. Percutaneous injury of the fingers with contaminated patient's blood or saliva is also a major source of infection among dental fraternity.⁵ Thus, predisposing the dental surgeons, dental students, and auxiliary staffs at increased risk of viral hepatitis, mainly attributable to the frequent use of small, sharp instruments contaminated with blood or other fluids.⁶

Despite increased occupational risk, the mean knowledge about viral hepatitis infection in dental HCWs ranges between poor to moderate, varying across the different cohorts of dental professionals.⁷ A study reemphasized that the good knowledge about viral hepatitis among dental professionals was only restricted to 21% of the participants.⁸ A study among dental students, interns and practitioners indicated that students or early age dental professionals had lesser knowledge towards hepatitis and were subjected to several misconceptions regarding spread of hepatitis infection.⁹ Another study reemphasized that in absence of practical experiences, early-age residents under training were predisposed to occupational injuries from small and sharp dental instruments, further increasing the risk for viral hepatitis infection.¹⁰

In addition to this, merely 20% of the participants were completely vaccinated against hepatitis B virus whereas remaining were partially vaccinated or not vaccinated.¹¹

Several studies on early-age dental professionals stated limited knowledge on transmission and

severity of hepatitis infection, thus predisposing them to frequent needle stick injuries and increased exposure in absence of adequate use of infection-prevention measures. Also, a study stated that having more qualitative knowledge about hepatitis and its transmission, reflected higher vaccination among dental professionals.¹² Thus, educating and training the early-age dental professionals about mode of transmission, infection mechanism of pathogenic organisms, methods of prevention, control and appropriate actions in response to contamination and injuries by small and sharp instruments, can help in drastically reducing the burden of viral hepatitis.^{13,14} Based on this, one day training program on viral hepatitis in dentistry has been developed under the project PRAKASH. The present study aims at assessing the effect of one-day training program on viral hepatitis in dentistry among early-age dental professionals.

Materials and Methods

A one-day training program titled 'Viral Hepatitis in Dentistry' was conducted to train and impart the training about viral hepatitis among early-age dental professionals under the Project PRAKASH, Institute of Liver and Biliary Sciences (ILBS), a super specialty autonomous institute under Delhi National Capital Territory involved in treatment and management of various liver diseases.

The scientific agenda and speakers were finalized and the study material was prepared in consultation with the faculties of the dental colleges and hepatologist at ILBS. The speakers were requested to provide few questions from their respective topics which were used as pre-post questions. Following finalization of the training agenda, six Continuing Dental Education (CDE) points from Delhi Dental Council (DDC) was availed. The brochure of the training was circulated with the principals and faculties associated with dental colleges. The training provided provision of registration of the participants through online as well as offline modes.

Before the commencement of the training, a pre-assessment of knowledge was done after taking the informed consent from the participants via sharing of an online link on survey monkey platform. The pre-assessment questionnaire consisted of demographic details along with 10 multiple-choice questions related to knowledge of viral hepatitis in dental practices. Each question was of one-mark, making the total score to be 10. There were five questions each from two domains. Question numbers 3-7 were from general knowledge about

hepatitis and rest were from dental manifestations of viral hepatitis.

Following assessment of knowledge, the training on scientific sessions related to viral hepatitis in dentistry was imparted by the subject-experts through face to face medium. The training program continued for entire day covering six important scientific topics covered across nine sessions of 45 minutes to one hour each. The scientific sessions associated with training program were divided into six major topics (i) Role of oral health in general health, (ii) Liver diseases and its oral manifestation, (iii) Periodontal diseases and Hepatic disorders, (iv) Overview and epidemiology of viral hepatitis in dentistry, (v) Occupational safety among early age dental professionals including Needle Stick Injury (NSI), Post Exposure Prophylaxis (PEP), Sterilization & infection control and (vi) case based discussions. Following the end of the sessions, queries of the participants were addressed in detail by the session-experts.

At the end of the scientific sessions link of the post assessment questionnaire was shared with all the participants via email and text messages on their registered email-id and mobile number. The online post-test questionnaire consisted of the same questions as pre-test. The pre and post survey questions were divided into two domains: General Hepatitis and Dental Manifestation of viral Hepatitis. General Hepatitis domain included Q3, Q4, Q5, Q6 and Q7, whereas Dental Manifestation of viral Hepatitis included Q1, Q2, Q8, Q9 and Q10.

The data on pre-post knowledge assessment was extracted in MS-Excel from SurveyMonkey platform and was analysed using SPSS Version 21. The continuous data was summarized as mean and standard deviation whereas categorical data was summarized as frequencies with percentages. For the purpose of analysis, the age was categorized into two categories as less than 25 years and 25 years and above. Independent t-test and one-way ANOVA was used to assess the mean knowledge score across various demographic variables. The paired t-test was used to assess the mean difference in pre and post knowledge assessment amongst the participants. The level of significance was taken as <0.05.

Ethical approval: The present activity was undertaken as a part of outreach activity; however, ethical clearance was obtained with No. F.37/(1)/9/ILBS/DOA/2020/20217/78 dated 01-03-2021 from the institutional ethics committee.

Results

A total of 253 early-age dental professionals with mean age of 24.94 ± 5.62 years were included in the pre-post assessment. Out of the total 253 participants, 183 (72.3%) were female. Approximately 98% of the participants were from private sector. The participants consisted of 36.1% of Bachelors of Dental Surgery (BDS) students, 39.4% of BDS and Masters of Dental Surgery (MDS) students and remaining 24.5% were MDS and above. Further, the study included participants from almost every department of dentistry and majorly from General Dentistry (30.9%), Periodontics (10%) and Oral and Maxillofacial Surgery (7.6%) as seen in (Table 1).

Table 1: Baseline Characteristics of Early-age Dental professionals (N=253).

Baseline Characteristics	n (%)
Mean Age \pm SD	24.94 \pm 5.62
Gender	
Male	70 (27.7)
Female	183 (72.3)
State	
Delhi	5 (2)
Haryana	32 (12.6)
Punjab	4 (1.6)
Madhya Pradesh	4 (1.6)
Uttar Pradesh	208 (82.2)
Type of Facility	
Government	6 (2.4)
Private	247 (97.6)
Qualification (N=249)	
BDS Student	90 (36.1)
BDS and MDS Student	98 (39.4)
MDS and above	61 (24.5)
Department (N=249)	
General Dentistry	77 (30.9)
Public Health Dentistry	9 (3.6)
Conservative and Endodontics	7 (2.8)
Orthodontics	14 (5.6)
Periodontics	25 (10.0)
Prosthodontics	10 (4.0)
Oral and Maxillofacial Surgery	19 (7.6)
Pediatric Dentistry	13 (5.2)
Oral Medicine and Radiology	5 (2.0)
Oral Pathology and Microbiology	14 (5.6)
Not Applicable (NA)	56 (22.5)

SD: Standard deviation; BDS: Bachelor of Dental Surgery; MDS: Masters of Dental.

Mean knowledge score from pre-assessment was found to be 4.77 ± 2.09 , out of total of 10. The mean post-assessment knowledge score was found to be 7.20 ± 1.89 . The difference in pre and post assessment of knowledge was found to be significant ($p < 0.001$) which can be seen in (Table 2). The correct responses in pre-assessment questionnaire was found to be in range 25.3% to 64.0% with 47.7% individuals responded correctly. The correct responses in the post-assessment increased to 71.9% with range being 42.3% to 90.1% as seen in (Supplementary 1). Overall, 79.8% participants reflected increase in knowledge score, following the training.

Table 2: Total and Domain wise Pre and post knowledge assessment.

Domain name	Mean Pre Test Score \pm SD	Mean Post Test Score \pm SD	p-value
General Knowledge	2.54 ± 1.34	3.88 ± 1.23	<0.001
Oral manifestations of viral hepatitis	2.20 ± 1.15	3.35 ± 1.05	<0.001
Overall Knowledge Score	4.77 ± 2.09	7.20 ± 1.89	<0.001

SD: Standard deviation

The association of pre-test with demographic factors suggested the mean knowledge score among individuals less than 25 years of age was 4.61 ± 2.02 whereas the mean knowledge score was 5.08 ± 2.17 among individuals 25 and above. The mean knowledge score among females was 4.85 ± 2.03 and males was found to be 4.56 ± 2.21 . However, both these associations were not found to be significant ($p = 0.091$, $p = 0.315$) indicating the knowledge related to viral hepatitis in dental practices to be same across various age categories and gender.

Furthermore, there was no difference found in pre-assessment knowledge score of the participants categorized based on educational qualification ($p = 0.668$). Similar to pre-assessment, post assessment knowledge score was not varying statistically across age and gender. However, the significant statistical difference was observed in post-assessment knowledge score across various educational qualifications ($p = 0.012$). The mean post-assessment score was found to be lowest in BDS and MDS students with mean score 6.99 ± 1.89 whereas as highest in MDS and above group with means score 7.82 ± 1.70 as seen in (Table 3).

Table 3: Association of Pre and post knowledge assessment with demographic characteristics.

Characteristics	Mean Pre Test Score \pm SD	p-value	Mean Post Test Score \pm SD	p-value
Age				
< 25 years	4.61 ± 2.02	0.091	7.07 ± 1.90	0.117
\geq 25 years	5.08 ± 2.17		7.46 ± 1.81	
Gender				
Female	4.85 ± 2.03	0.315	7.16 ± 1.91	0.594
Male	4.56 ± 2.21		7.30 ± 1.80	
Qualification				
BDS Student	4.68 ± 2.10		7.02 ± 1.93	
BDS and MDS students	4.76 ± 2.10	0.668	6.99 ± 1.89	0.012
MDS and above	4.98 ± 2.07		7.82 ± 1.70	

SD: Standard deviation; BDS: Bachelor of Dental Surgery; MDS: Masters of Dental Surgery

Discussion

Health care workers including the dental professionals are at increased risk of hepatitis B and C due to occupational risk. Among the dental professionals, early-age dental professionals are more predisposed to percutaneous injuries through needle stick injuries and injuries from small and sharp instruments which is mainly attributable to limited knowledge about viral hepatitis and preventive measures among them. Considering this, one day training program on viral hepatitis in dentistry was implemented under the project PRAKASH. The present study aimed at assessing the effect of one-day training program on knowledge about viral hepatitis in dentistry among early-age dental professionals.

The results of the study disclosed low knowledge score of 4.77 ± 2.09 in pre-assessment among early-age professionals. The results of the present study was in line with the previous studies, indicating poor to moderate knowledge being common among dental fraternity.¹⁶ A study on dental professionals supported the findings of the present study, that merely 19.2% of dental professionals who were practicing had sufficient knowledge about prevention of hepatitis B.¹⁷ A previous study indicated that dental students who were about to start their practice, had relatively less knowledge regarding the usage of PPEs and precautions to be taken while treating hepatitis patients.¹⁸ Low knowledge among dental students or early-age

dental professionals could be attributable to the fact that they are less exposed to usage of PPE and have limited practical knowledge as compared with experienced dental professionals.¹⁰

The present study indicated no difference in pre-assessment knowledge with respect to gender. These findings were supported by a study from Iran where knowledge in males and females was found to be similar.¹⁴ The current study highlighted similar knowledge among various age groups, which was consistent with the previous study.¹⁹

The post assessment knowledge scores was found to be 7.20 ± 1.89 in the present study. There was a significant difference in pre and post knowledge assessment, which could be attributable to one-day training on viral hepatitis in dentistry. The training program increased the knowledge about viral hepatitis in 79.8% of the participants. Similar findings have been reported from a previous study that stated the role of education and training in preventing transmission of hepatitis where approximately 78% of the participants had increment in their knowledge levels following a training on viral hepatitis.²⁰ Thus, the need of educating early age dental professionals regarding transmission and safety measures of viral hepatitis was sought. Previous studies have also emphasized that importance of training about infection prevention and control about blood-borne infections including viral hepatitis in interns as well as dental professionals, prior to entering the clinical practice.²¹

The limitation of the study was, the use of non-validated knowledge assessment tool for the data collection which could mainly attributable to time constraint. There could have been selection bias as the participation in the training was voluntary and there is a possibility that only enthusiastic and knowledge seeker participants volunteered for the study. Despite these limitations, this was one of the pioneer studies from Indian setting assessing the effect of one-day training program on viral hepatitis in dentistry. Furthermore such trainings on early-age dental professionals is recommended to prevent the spread of viral hepatitis.

Conclusion

The study concluded one-day training programs resulted in significant increase of knowledge related to viral hepatitis among dental professionals, which will eventually help in improving necessary preventive measures while treating patients. This will ultimately help in decreasing the incidence of

percutaneous injuries and promoting Hepatitis B vaccination. Furthermore, such trainings on dental professionals should be encouraged to prevent the transmission of viral hepatitis.

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