

Knowledge and Awareness of Needle Stick Injury among Dental Students

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Abstract

Background: Needle Stick Injury (NSI) and Sharp Injuries are major hazards in transmission of infectious blood borne diseases among Health Care Workers and Medical students who are at a risk of injuries because of daily procedures in performing clinical activities in hospitals. To reduce the risk of increased growth rate of NSIs, there should be an essential need to improve and update knowledge of NSIs and its management by lectures and seminars.

Aim: To assess the knowledge and awareness regarding sharp injuries amongst dental students.

Materials and Methods: This cross-sectional survey study was conducted among 103 voluntarily participating dental students who were receiving their undergraduate clinical training in a private Dental College. Data was recorded on a structured questionnaire to elicit knowledge and awareness towards Needle Stick Injuries. Statistical analysis was done by SPSS Software-23.

Results: 76.7% Dental students experienced NSI. 57.28% students aren't aware of the Universal Precaution Guidelines. Adequate number of students had good knowledge and awareness regarding Needle Stick Injury. In practice, a maximum number of students washed hands, used gloves, and recapped needles after use. Pearson chi square test was done and p value obtained for comparing the knowledge between male and female on the awareness of Universal Precaution Guidelines is 0.882(>0.5).

Conclusion: Dental students require training and teaching regarding management of Needle Stick Injury and should be encouraged to report it to the concerned authority.

Key words: Needle Stick Injury • Dental Students • Universal Precaution Guidelines • Health Care Workers • Innovative Technique • Novel Method

Introduction

Needlestick injury is the penetration of skin by a hypodermic needle or other sharp object that has been in contact with blood. These are an important and common occupational injury among Health care workers (34.8% i.e., 200/575). These are the major transmission pathways for entering infectious blood borne diseases [1]. Health Care Workers and Medical professionals and students are least concerned for their own health, however, they are at an increased risk for acquiring more than 20 different pathogens due to occupational exposure to blood and body [2].

According to WHO in the year of 2000, the annual estimated properties of HCW exposed to Blood Borne Pathogens globally were 2.6% for HCV, 5.9% for HBV and 0.5% for HIV transmissions [3].

More than 90% of these unintentional injuries occur in developing countries but most of these NSIs remain unreported [4]. NSI results in psychological impacts as tension and distraction during their work. Even though both medical and dental students and practitioners are exposed to NSI by their profession, due to the performing procedures under closed, small environments, the probability of occurring an NSI among Dental students is gradually more than that of other medical field students.

Dental students who work in various Dental departments such as oral surgery, endodontics, orthodontics, prosthodontics are generally at a higher risk of occurring of this occupational hazard due to the lack of experience and skill in performing Dental procedures during clinical training periods [5]. In dental practice, various sharp instruments and syringes are used that pose them at an

increased risk of sustaining NSIs. Most of the NSIs can be prevented by using safety devices and by applying 'Universal Precautions' as safety measures [6]. Due to the lack of experience and skill in performing dental procedures during clinical training periods, major dangerous NSIs occur.

The World Health Organisation defines safe injection treatment as "A safe injection is the one that doesn't result in any waste that is dangerous to the community". Irrational and unsafe injection practices are rife in developing countries [7]. Poor compliance to universal precautions is a risk factor for sharp injuries and it doubles the risk of getting an injury [8]. Many studies highlighted the relationship occurring between injuries among HCWs and workplace variables [9]. A recent study demonstrated that extended weekly work hours weren't associated with greater risk of occupational injury or illness [10]. In other researches, participants are low in number.

Despite the risk of NSIs, several studies have demonstrated and shown to the world that the knowledge on NSIs of undergraduate dental students are inadequate regarding their prevention methodologies and management of those problems. According to the WHO, the knowledge and awareness about needle stick injury is very important among medical students especially for dental students and HCWs to avoid transmission of blood borne diseases. Our team has extensive knowledge and research experience that has translate into high quality publications [11-30].

The main aim of this study was to investigate, to determine and to assess the knowledge and awareness among dental students of NSIs. Through this, we can spread knowledge, awareness, reduce psychological impacts such as tension, fear and distraction.

Materials and Methods

A cross sectional study was conducted in a private Dental college among 103 dental students studying first, second, third and final year. All participants had voluntarily participated in the study and were fully informed about the design and purpose of the study. A questionnaire was prepared with 13 questions to assess their awareness about Needle Stick Injury, Blood-Borne diseases and possible precautions which were distributed among dental students to elicit the level of knowledge, awareness towards sharp injuries.

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The questionnaire was validated and later distributed to the participants. An online-based questionnaire was also developed using Google forms and was circulated. The participation of the subjects was kept voluntary and nobody was not obligated to fill the form. Questions were answered with "yes" or "no" or by marking the correct responses. All data were collected and tabulated in terms of number and percentage. The data were analyzed in Statistical Package for the Social Sciences (SPSS 23). The statistical tests were applied including proportions and chi-square tests for significance.

Results

A total of 103 Dental Students participated in this study. Out of these students, 78 are male and rest 25 are females and majority of the participants are of the age group of less than 20. 70.87% of students were aware of the Needle Stick Injury (Figure 1) 26.47% of the participants said NSIs occur from contaminated instruments and 25.49% by Injections, 21.57% as Recapping of needles, 11.76% as by Suturing and 14.56% as by All of the above (Figure

2). 76.7% of the participants experienced NSIs during their career (Figure 3). 58.25% were aware of the post exposure guides and 41.75% were not aware about the same (Figure 4). 50.49% don't have any training for hand hygiene and others (49.51%) had proper training for hand hygiene (Figure 5). 53.4% knew the transmission risks of NSIs and 46.6% didn't know about it. 52.43% of them support that Needle Stick injury should be reported after its occurrence to the authorities and 47.57% of them don't support this idea. Out of all, only 42.72% were aware of the Universal Precaution Guidelines. Only 42.72% were aware of those Universal Precaution Guidelines of NSI and 57.28% were aware of those precautions. Only 52.43% of the students support the idea of reporting the occurrence of a Needle stick injury because others are afraid of their career loss. Males were more aware about the risk of transmission of diseases when compared to females. This difference is statistically not significant (Pearson chi square test; p value of 0.882 (>0.05)- Not significant (Figure 6). Males were more aware about the universal precaution guidelines than females. This difference is statistically not significant (Pearson chi square test, p value=0.123(>0.05)- Not significant.

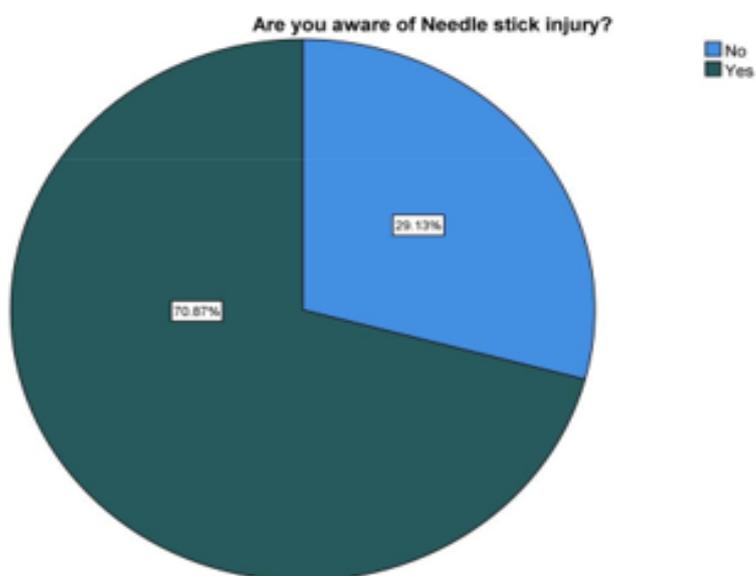


Figure 1. Represents the response on the awareness of Needle Stick Injury.70.87% of them are aware of the Needle Stick injury and 29.13% of them weren't aware of the Needle Stick injury. Blue indicates people aren't aware and Green indicates people with awareness.

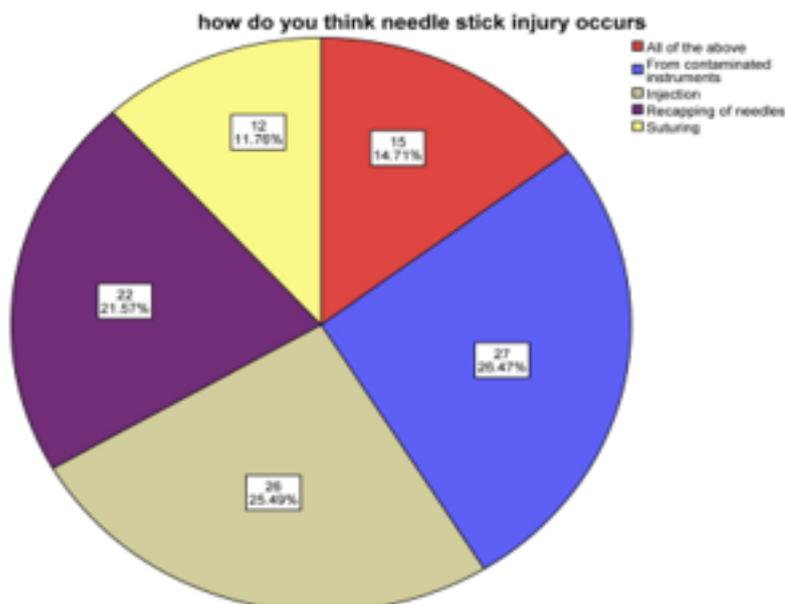


Figure 2. Shows the percentage of participants on occurrence of Needle Stick Injury. 26.47% of the participants said NSIs occur from contaminated instruments and 25.49% by Injections, 21.57% as Recapping of needles, 11.76% as by Suturing and 14.56% as by All of the above. Purple denotes from contaminated instruments, Yellow as Suturing, Violet as Recapping of needles, Sandal as Injection and Saffron as All of the above.

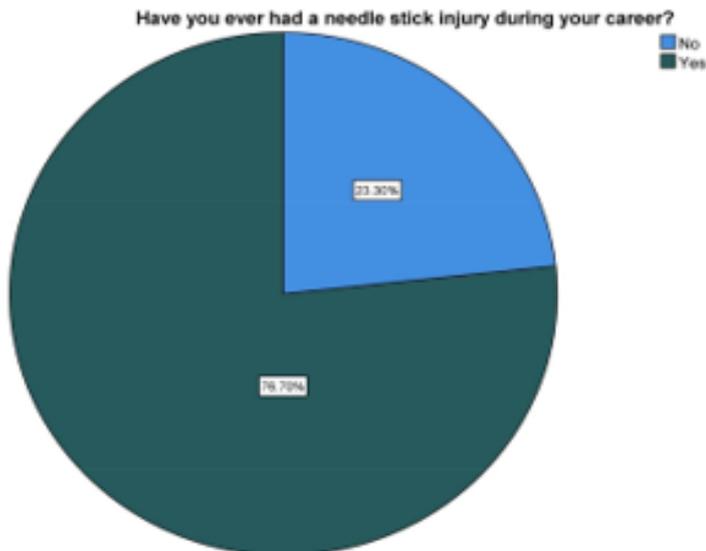


Figure 3. Pie chart shows the response on occurrence of NSI in their career. 76.7% experienced NSI and 23.3% did not have NSI in their career. Blue indicates No and green indicates Yes.

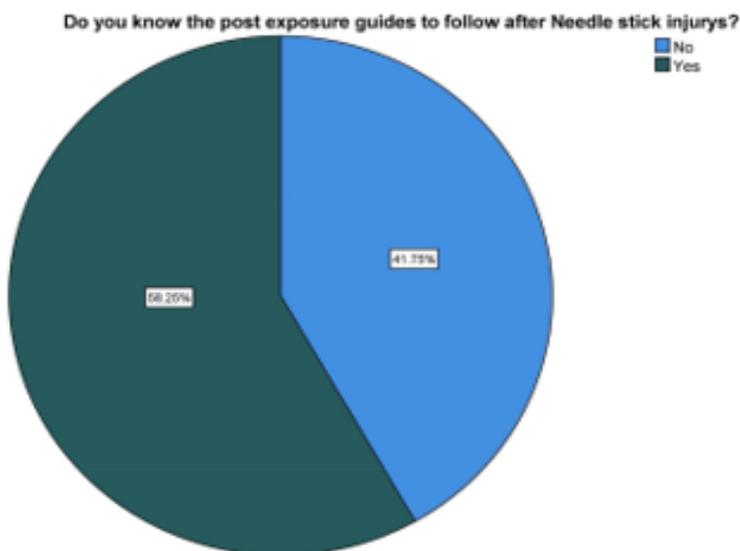


Figure 4. Pie chart shows the response on their knowledge of the post exposure guides to follow after a NSI. 58.25% were aware of the post exposure guides and 41.75% were not aware about the same. Blue indicates no and green indicates yes.

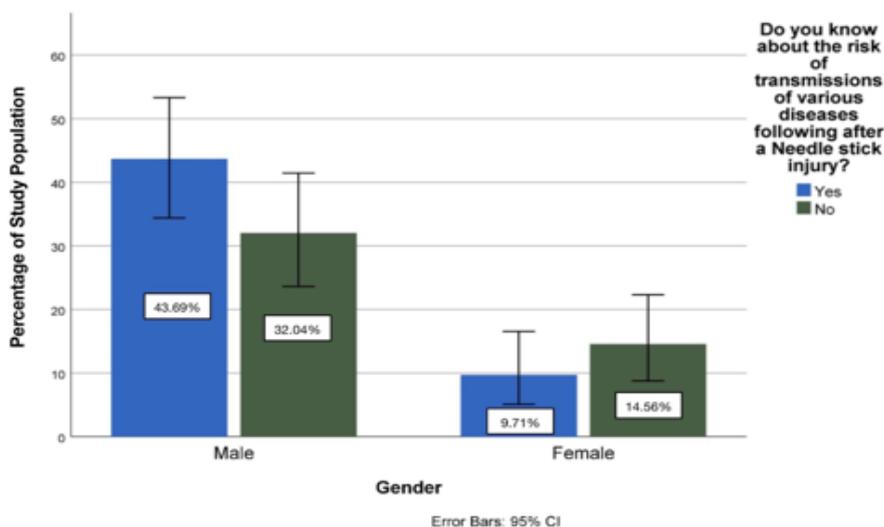


Figure 5. Bar graph showing the association between genders and the knowledge about risk of transmission of various diseases after Needle Stick Injury. X axis represents gender and Y axis represents percentage of responses. Blue denotes No, green denotes Yes. Males were more aware about the risk of transmission of diseases when compared to females. This difference is statistically not significant (Pearson chi square test; p value of 0.882 (>0.05)- Not significant).

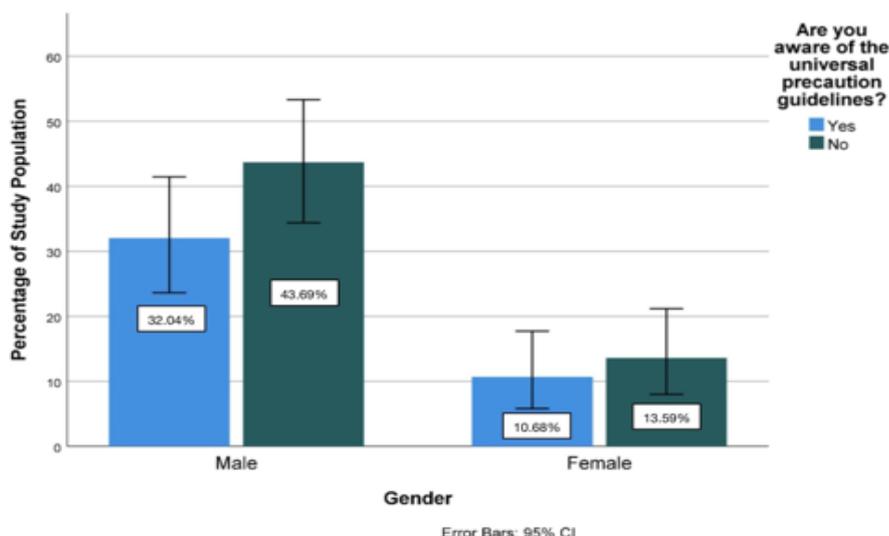


Figure 6. Bar graph showing the association between genders and the knowledge about Universal Precaution Guidelines. X axis represents gender and Y axis represents percentage of responses. Blue denotes No, Dark green denotes Yes. Males were more aware about the universal precaution guidelines than females. This difference is statistically not significant (Pearson chi square test, p value= 0.123(>0.05)- Not significant).

Discussion

70.87% of students were aware of the Needle Stick Injury. NSI often come under percutaneous injury. Percutaneous injuries are unintentional injuries which break the integrity of the skin and often occupational related injury. A NSI is the penetration of skin by a needle or other sharp objects, which was in contact with blood, tissue, or other body fluids before exposure. Medicinal field professionals are most negligent, as far as their own health. They are exposed to a major risk of various infections and blood borne diseases, and also become victims of lifestyle diseases due to their stressful schedules and high degree of professional responsibility. One of the most serious threats faced by Dental students during their clinical training is the possibility of exposure to blood-borne pathogens, especially Hepatitis B, Hepatitis C and Human Immunodeficiency Virus HIV. Such injuries are an occupational hazard in the medical community.

In the present study, 26.47% of the participants said NSIs occur from contaminated instruments and 25.49% by Injections, 21.57% as Recapping of needles, 11.76% as by Suturing and 14.56% as by All of the above. The needle stick injuries can cause the transmission of infectious diseases. Compared to other members of the community, dentists are at great risk of needle stick injury because of their frequent contact with the saliva and the blood. Out of all the participants, 53.4% knew the risk of transmission of various diseases by these injuries. These findings were similar to that of some researchers [31]. Whereas, some others also in their study reported that only 22% students have the knowledge of NSIs and 58.6% knew their possible disease transmitting risks [32].

The result findings also showed that sharp injuries may lead to significant stress and anxiety for the affected injured person whereas, Scientists commented that only 47% students led to stress and anxiety after NSIs [33]. The findings provided the results that 52.43% of them support the idea that after the occurrence of a NSI, it should be reported to the authority. But some researchers' results say that 99% of the respondents believed that those injuries should be reported [34]. Other researchers in their study found that most of the students were aware that NSI would have psychological effects and diseases transmitted after a NSI can be prevented by vaccinations. Limitation of this study was a low sample. This study is just a pilot questionnaire study and also some of the participants responded with an unclear mind due to their lack of knowledge on the topic NSIs. Further research should be done involving the other medical professionals.

Conclusion

This study revealed that knowledge of dental students about risks associated with Needle Stick Injuries and the use of preventive measures

were inadequate. A standard protocol regarding training as well as adapting preventive measures should be formulated in all dental institutions. Every Dental care centre and college should have an infection control committee for providing training and to look after injured individuals.

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Conflict of Interest

All the authors declare that there was no conflict of interest in the present study

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References

- Clarke SP, Sloane DM, Aiken LH. "Needlestick injuries to nurses, in context." LDI Issue Brief 8 (2002): 1-4.
- Aiken LH, Sloane DM, Klocinski JL. "Hospital nurses' occupational exposure to blood: prospective, retrospective, and institutional reports." Am J Public Health 87 (1997): 103-107.
- Pendsey S. Diabetic foot: a clinical atlas. CRC Press, 2013.
- Mutangadura GB. "World health report 2002: reducing risks, promoting healthy life: world health organization, Geneva, 2002, 250 pages, US \$13.50, ISBN 9-2415-6207-2." Agricultural Economics 30 (2004): 170-172.
- Jaber MA. "A survey of needle sticks and other sharp injuries among dental undergraduate students." Int J Infect Control 7 (2011).
- Acharya AS, Khandekar J, Sharma A. "Awareness and practices regarding needle stick injuries among nurses in a tertiary care hospital of Delhi." Indian J Community Health 26 (2014): 390-395.
- Rajasekaran M, Sivagnanam G, Thirumalaikolundusubramanian P, and Namasivayam K, et al. "Injection practices in southern part of India." Public Health 117, no. 3 (2003): 208-213.

8. Jacob A, Newson-Smith M, Murphy E, and Steiner M, et al. "Sharps injuries among health care workers in the United Arab Emirates." *Occup Med* 60 (2010): 395-397.
9. Hoppia K, Dennerlein JT, Hashimoto D, and Orechia T, et al. "Occupational injuries for consecutive and cumulative shifts among hospital registered nurses and patient care associates: a case-control study." *Workplace Health Saf* 60 (2012): 437-444.
10. Weaver MD, Patterson PD, Fabio A, and Moore CG, et al. "The association between weekly work hours, crew familiarity, and occupational injury and illness in emergency medical services workers." *Am J Ind Med* 58 (2015): 1270-1277.
11. Santhakumar P, Prathap L. "Awareness on Preventive Measures taken by Health Care Professionals Attending COVID-19 Patients among Dental Students." *Eur J Dent* 14 (2020): S105-S109.
12. Mathew MG, Samuel SR, Soni AJ, and Roopa KB. "Evaluation of adhesion of *Streptococcus mutans*, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary molars: Randomized controlled trial." *Clin Oral Investig* 24 (2020): 3275-3280.
13. Sridharan G, Ramani P, Patankar S, and Vijayaraghavan R. "Evaluation of salivary metabolomics in oral leukoplakia and oral squamous cell carcinoma." *J Oral Pathol Med* 48 (2019): 299-306.
14. Hannah R, Ramani P, Ramanathan A, and Gheena S, et al. "CYP2 C9 polymorphism among patients with oral squamous cell carcinoma and its role in altering the metabolism of benzo [a] pyrene." *Oral Surg Oral Med Oral Pathol Oral Radiol* 130 (2020): 306-312.
15. Antony JV, Ramani P, Ramasubramanian A, and Sukumaran G. "Particle size penetration rate and effects of smoke and smokeless tobacco products—An invitro analysis." *Heliyon* 7 (2021): e06455.
16. Sarode SC, Gondivkar S, Sarode GS, and Gadbail A. "Hybrid oral potentially malignant disorder: A neglected fact in oral submucous fibrosis." *Oral Oncol* (2021): 105390.
17. Ramani P, Tilakaratne WM, Sukumaran G, and Ramasubramanian A, et al. "Critical appraisal of different triggering pathways for the pathobiology of pemphigus vulgaris-A review." *Oral Dis* (2021).
18. Chandrasekar R, Chandrasekhar S, Sundari KS, and Ravi P. "Development and validation of a formula for objective assessment of cervical vertebral bone age." *Progress Orthod* 21 (2020): 1-8.
19. Subramanyam D, Gurunathan D, Gaayathri R, and Priya VV. "Comparative evaluation of salivary malondialdehyde levels as a marker of lipid peroxidation in early childhood caries." *Eur J Dent* 12 (2018): 067-070.
20. Jeevanandan G, Eapen T. "Volumetric analysis of hand, reciprocating and rotary instrumentation techniques in primary molars using spiral computed tomography: An in vitro comparative study." *Eur J Dent* 12 (2018): 021-026.
21. Ponnulakshmi R, Shyamaladevi B, Vijayalakshmi P, and Selvaraj J. "In silico and in vivo analysis to identify the antidiabetic activity of beta sitosterol in adipose tissue of high fat diet and sucrose induced type-2 diabetic experimental rats." *Toxicol Mech Methods* 29 (2019): 276-290.
22. Sundaram R, Nandhakumar E, Haseena Banu H. Hesperidin. "Hesperidin, a citrus flavonoid ameliorates hyperglycemia by regulating key enzymes of carbohydrate metabolism in streptozotocin-induced diabetic rats." *Toxicol Mech Methods* 29 (2019): 644-653.
23. Alsawalha M, Rao CV, Al-Subaie AM, and Haque SM, et al. "Novel mathematical modelling of Saudi Arabian natural diatomite clay." *Mater Res Express* 6 (2019): 105531.
24. Yu J, Li M, Zhan D, and Shi C, et al. "Inhibitory effects of triterpenoid betulin on inflammatory mediators inducible nitric oxide synthase, cyclooxygenase-2, tumor necrosis factor-alpha, interleukin-6, and proliferating cell nuclear antigen in 1, 2-dimethylhydrazine-induced rat colon carcinogenesis." *Pharmacogn Mag* 16 (2020): 836.
25. Shree KH, Ramani P, Sherlin H, and Sukumaran G, et al. "Saliva as a diagnostic tool in oral squamous cell carcinoma—a systematic review with meta analysis." *Pathol Oncol Res* 25 (2019): 447-453.
26. Zafar A, Sherlin HJ, Jayaraj G, and Ramani P, et al. "Diagnostic utility of touch imprint cytology for intraoperative assessment of surgical margins and sentinel lymph nodes in oral squamous cell carcinoma patients using four different cytological stains." *Diagn Cytopathol* 48 (2020): 101-110.
27. Karunakaran M, Murali P, Palaniappan V, and Sivapathasundharam B. "Expression and distribution pattern of podoplanin in oral submucous fibrosis with varying degrees of dysplasia—an immunohistochemical study." *J Histotechnol* 42 (2019): 80-86.
28. Sarode SC, Gondivkar S, Gadbail A, and Sarode GS, et al. "Oral submucous fibrosis and heterogeneity in outcome measures: a critical viewpoint." *Future Oncol* 17 (2021): 2123-2126.
29. Preeth DR, Saravanan S, Shairam M, and Selvakumar N, et al. "Bioactive Zinc (II) complex incorporated PCL/gelatin electrospun nanofiber enhanced bone tissue regeneration." *Eur J Pharm Sci* 160 (2021): 105768.
30. Saini R. "Knowledge and awareness of needlestick injury among students of Rural Dental College, Maharashtra, India." *Ann Niger Med* 5 (2011): 12.
31. Gupta M, Kumar S, Kumath M, and GV Jain. "Forensic Medicine and Autopsy: Knowledge and Awareness among 2nd Year Medical Students." *Indian J Forensic Med Pathol* 12 (2019): 285-291.
32. Singh I, Sharma M, Sharma I, and Sharma P, et al. "Knowledge, attitude and practices regarding smoking amongst young females." (2020): 1458.
33. Mungure EK, Gakonyo JM, Mamdani Z, and Butts F. "Awareness and experience in needle stick injuries among dental students at the University of Nairobi, Dental Hospital." *East Afr Med J* 87 (2010): 211-214.
34. Osman T. "Epidemiology of sharp instruments injuries at a dental school in Sudan." *Int J Infect Control* 10 (2014).

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