Emerging Hot Topics - Original Article

Assessment of knowledge of oral pathologists and postgraduate students on safe laboratory practices during the COVID-19 pandemic

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Abstract

Background: Oral pathologists are involved in laboratory diagnosis and receive specimens of biopsy, oral cytologic smears and samples for hematology, biochemistry and microbiology and thus are at a risk for laboratory-acquired infections, which may occur inadvertently and can be considered as an occupational hazard.

Aim and Objectives: This study was conducted during the coronavirus disease (COVID-19) pandemic to assess the knowledge of oral pathologists and oral pathology postgraduate students regarding the safe laboratory practices, procedures and guidelines.

Materials and Methods: The study was a cross-sectional online questionnaire-based study. Questions were framed to evaluate the knowledge on specimen/sample collection, its handling, disposal and protective measures for laboratory personnel. The study population comprised oral pathologists and oral pathology postgraduate students of various dental colleges in India. A Google Doc format was used to create an effective computerized questionnaire system, and the link was forwarded to around 500 participants. The survey was fielded online between August 29, 2020, and September 5, 2020. Three hundred and twelve responses were received, which were downloaded as spreadsheets for subsequent data analysis.

Results: Mean value of right answers for the oral pathologists was 8.11 ± 2.02 and for postgraduate students was 7.38 ± 1.75. When the knowledge score between the two groups was compared, a statistically significant difference was found.

Conclusion: This article compares and highlights the knowledge lacunae among the oral pathologists and oral pathologists postgraduate students in relation to guidelines to be followed for safety in the laboratory. Adhering to these biosafety regulations reduces occupational health hazards and enhances a safe working environment in the laboratory.

Keywords: COVID-19, laboratory guidelines, oral pathologist, postgraduates, questionnaire study

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INTRODUCTION

The coronavirus outbreak began in December 2019 in Wuhan, China's Hubei province and since then has spread across more than 200 countries worldwide, drastically changing the global health scenario.[1] This zoonotic infectious disease, causing respiratory infections, initially called novel coronavirus-infected pneumonia by the World Health Organization (WHO), was officially renamed coronavirus disease (COVID-19) in February 2020.[2] The WHO declared the outbreak a pandemic on March 11, 2020.[3]

The virus, belonging to coronavirus family was originally called 2019 novel coronavirus, which was later termed severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) by the International Committee on Taxonomy of Viruses, since the strain showed marked similarity to the one that caused the SARS outbreak.[4] The disease has spread rapidly all across the globe, with the virus being transmitted from one person to another through respiratory droplets, indirect or direct contacts or through feco-oral route.[5] The incubation period of the disease ranges between 2 and 14 days, with an average of 5 days.[6,7] COVID-19 presents with a vast clinical spectrum ranging from no symptoms at all to fatal pneumonia.[4] The majority of the immunocompetent individuals exhibit either no symptoms or mild symptoms such as shortness of breath, throat pain, fever, dry cough and fatigue.[8] However, fatal complications such as pneumonia and acute respiratory distress syndrome can also occur, especially in older and immunocompromised individuals.[2] The case burden in India is remarkably high with 7,053,806 total confirmed cases and 108,334 confirmed deaths as on October 11, 2020.[9]

The coronaviruses are a large family of single-stranded RNA viruses, with glycoprotein spikes on the envelope projecting from the virion surface, giving it a crown-like appearance when viewed under the electron microscope.[10,11] These viruses easily cross-species barrier and can result in a wide variety of diseases with respiratory, enteric, hepatic and neurological manifestations in varied species. In humans, till date, seven coronaviruses have been identified, which have resulted in a wide spectrum of illness ranging from the common cold and upper respiratory infections in immunocompetent individuals to epidemics such as SARS, Middle-East respiratory syndrome (MERS) with a significant mortality rate.[12,13]

Taking into account the nature of the viruses transmissibility, health-care workers and laboratory personnel are at a high risk of acquiring the infection. Disquieting figures have been released by several international authorities regarding COVID-19 infections among health-care workers. In China, health-care personnel accounted for 3.8% of all COVID-19 patients, while the percentage had spiked to 63% during the initial outbreak.[14] According to The Italian National Institute of Health, 10.7% of the health-care workers acquired the infection.[15] If the newspapers are to be believed, in India, around 87,000 health staff members were infected and 573 dead by the end of August.[16] This necessitates call for guidance on adequate biosafety procedures to protect health-care staff including laboratory personnel.

To safeguard the health-care workers in the laboratories, several organizations such as Centres for Disease Control and Prevention (CDC), WHO, Indian Council of Medical Research (ICMR), Ministry of Health and Family Welfare (MHFW), International Federation of Clinical Chemistry and Laboratory Medicine (IFCC), Indian Association of Pathologists and Microbiologists have issued guidelines on biosafety measures.[15,17-21] Oral pathologists are involved in laboratory diagnosis and receive specimens of biopsy, oral cytological smears and samples for hematology, biochemistry and microbiology and thus are at a risk for laboratory-acquired infections. It may occur inadvertently and can be considered as an occupational hazard. This study was conducted during the COVID-19 pandemic to assess the knowledge of oral pathologists and oral pathology postgraduate students regarding the safe laboratory practices, procedures and guidelines.

MATERIALS AND METHODS

Based on the biosafety laboratory guidelines issued by the CDC, WHO, MHFW, ICMR and IFCC, a set of 14 questions were prepared to assess the knowledge of oral pathologists and oral pathology postgraduate students. The questions focused on laboratory safety practices, procedures and guidelines. Questions were framed to evaluate the knowledge on specimen/sample collection, its handling, disposal and protective measures for laboratory personnel. Pretesting of the questionnaire was done on ten randomly selected oral pathology postgraduate students and faculty. The questionnaire was brought to fruition after the indeterminate and inapt questions were revised based on the pretest results.

Study design

The study was a cross-sectional online questionnaire-based study. The study population comprised oral pathologists and oral pathology postgraduate students of various dental colleges in India. Completion of the survey was taken as a form of consent to participate. Due to the current pandemic scenario and the risk of data loss and fidelity, electronic version of questionnaire was used in this

study, which has shown consistent test–retest reliability of data.[22] A Google Doc format was used to create an effective computerized questionnaire system, and the link was forwarded to the participants. The questionnaire was formatted in such a way that every participant could log in through their mail id and give their response only once. No personal identifying data were collected. The questionnaire data along with responses received could be downloaded as spreadsheets for subsequent data analysis.

Data collection

The link of the Google Doc Questionnaire format was forwarded to around 500 participants, and the survey was fielded online between August 29, 2020, and September 5, 2020. After September 5, 2020; 23:59 IST, responses were not accepted.

Statistical analysis

Information from the returned questionnaire was coded and entered into Statistical Package for the Social Sciences (SPSS) version 25 software (SPSS Inc., Chicago III, USA). Unpaired *t*-test was used to compare the knowledge score between the two groups, i.e., oral pathologists and postgraduate students. ANOVA test was done with *post hoc* least significant difference to compare knowledge score among oral pathologists and different postgraduate year of study and determine where the significant difference lies. A value of <0.05 was considered significant.

RESULTS

A total of 312 responses comprising 164 (52.6%) oral pathologists and 148 (47.4%) oral pathology postgraduate students were received. Among the 148 postgraduate students, 43 were in 1st year, 56 in 2nd year and 49 in the final year of their study [Figure 1].

Table 1 represents the respondent's answers. According to the WHO guidelines, all the specimens received in the laboratory should be considered potentially infectious.[23] 84.8% of the oral pathologists and 89.9% of the postgraduate students agreed with the edict. On the other hand, 7.3% of the pathologists did not agree and 7.9% were not sure about it, while 2% of the postgraduates students were in denial of the statement and 8.1% were in a dilemma.

In a laboratory, personnel can acquire infections through parenteral inoculation with syringe needles or other contaminated sharps, spills and splashes onto skin and mucous membrane, exposure through touching of mouth or eyes with fingers or contaminated objects or inhalation of infectious aerosol. Nearly 93.9% of the oral pathologists and 98% of the students assented with this precept. To prevent the spread of infections, it is advisable for the laboratory staff to wear personal protective equipment (PPE) based on the risk assessment of the procedure, and the majority of our participants (83.5% pathologists and 89.9% students) concurred with it.[21]

Using data obtained from coronaviruses such as SARS and MERS, it has been recommended by experts that if appropriate guidelines are followed, formalin fixation and paraffin embedding should inactivate the coronavirus.[24] Nearly 73.8% of the oral pathologists agreed with this, while 26.2% were in denial. On the other hand, postgraduate students had contrary notions with 60.1% of them disagreeing with the above statement, while 39.9% of them were in agreement. When questioned regarding the duration of formalin fixation of the histopathological specimens, the majority of the participants (73.2% oral pathologists and 60.1% postgraduate students) were in favor of fixing the specimens for a duration of 24 h.

The participants were quizzed regarding which step of tissue processing according to them had the highest chances of eliminating the coronavirus. Around 71.3% of the oral pathologists voted in favor of fixation and dehydration, while 14% replied in favor of dehydration, impregnation and 11% for fixation and clearing. However, the student's responses showed a different trend with 50% in favor of fixation and dehydration, 20.9% for fixation and clearing, 17.6% for dehydration and clearing and 11.5% for dehydration and impregnation. The trend obtained from students responses showed their lack of expertise in this field, as fixation and dehydration are the two steps most capable of eliminating the viral load due to the chemicals used (i.e., formalin and alcohol) and prolonged time duration of treatment. The participants were also asked regarding their opinion if fixing cytology specimens in >70% concentration would kill the coronavirus, for which 47% of the pathologists replied with a yes, 43.3% with a maybe and 9.8% with a no. Instead, the majority 42.6% of the postgraduate students answered with a maybe, 37.2% with a yes and 20.3% with a no.

According to the findings of Duan *et al*. on exposure times and temperatures on several coronaviruses, it has been suggested that it is admissible to consider formalin-fixed paraffin-embedded (FFPE) tissue blocks to have low risk of corona infectivity.[24,25] Nearly 46.3% of the oral pathologists concurred with this, while 28% of them believed there was no risk associated. However, majority of the student population (48%) believed the FFPE tissue blocks to have moderate risk of infectivity, while 35.1% of

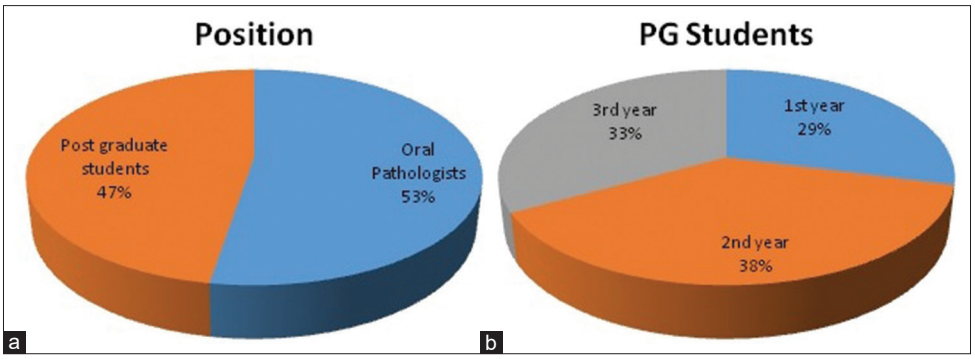

Figure 1: (a) Distribution of the respondents according to their positions (oral pathologists/oral pathology postgraduate students). (b) Distribution of postgraduate students according to their year of study

them believed these blocks to have low infectivity.

Any aerosol-generating procedure is considered hazardous as the risk exposure to coronavirus is considerably high. Procedures such as centrifugation, heat fixation during Gram staining or acid-fast bacteria (AFB) staining are likely to generate aerosols and are thus precarious.[21] Around 50% of the oral pathologists and students concurred with this statement. Twenty-five percent of the oral pathologists believed none of the abovementioned procedures produced aerosols, while 11% of them were in favor of only AFB staining, 9.8% for centrifugation alone and 4.3% for Gram staining in solidarity. On the other hand, 20.3% of the postgraduate students were in favor of centrifugation, 11.5% for AFB staining, while 18.2% of them believed neither of the procedures had aerosol producing properties.

According to the CDC guidelines, any procedure with the potential to generate aerosols or droplets should be performed in a certified Class II biological safety cabinet (BSC).[17] The knowledge of both the groups regarding this norm and about biosafety cabinets was inept. Around 41.5% of the pathologists answered in favor of Class III cabinets, 32.3% for Class I, while only 26.2% answered correctly in favor of Class II cabinets. On the other hand, 43.2% of the students voted in favor of Class I cabinets, 30.4% for Class III and 26.4% for Class II. Similarly, when asked where air or heat drying of smears should be performed, majority of the oral pathologists, i.e., 43.9% replied Class I cabinet while 44.6% of the students answered Class II cabinet.

Duan *et al.* on the basis of his findings established that irradiation of culture media with ultraviolet (UV) light for 60 min on several coronaviruses resulted in undetectable levels of virus infectivity.[25] The study participants when inquired about this topic showed insufficient level of expertise. Around 22.6% of the oral pathologists and 25.7% of the postgraduate students gave the right response.

Once the specimens are processed, it is advisable to decontaminate the work surfaces, equipment and other inanimate surfaces with appropriate disinfectants. According to Kampf *et al.*, coronaviruses such as SARS, MERS persisting on surfaces can be efficiently inactivated by surface disinfection using 60%–70% alcohol, 0.5% hydrogen peroxide or 0.1% sodium hypochlorite.[26] Around 48.2% of the oral pathologists and 48% of the students agreed with this, while the others gave a mixed response in favor of individual disinfectants.

Special waste management guidelines have to be followed for disposal of COVID-19 laboratory waste. The infectious materials should be disposed in yellow and red labeled leak proof, puncture-free bags by workers donning adequate protective gear.[27] Most of our respondents (79.3% pathologists and 69.6% students) gave the right response.

The mean value of right answers for the oral pathologists was 8.11 ± 2.02, and for postgraduate students was 7.38 ± 1.75 [Table 2 and Figure 2]. When the knowledge score between the two groups (i.e., oral pathologists and oral pathology postgraduate students) was compared, a statistically significant difference was found ($P = 0.0001$). However, intragroup comparison between the postgraduate students in different years of their curriculum was not statistically significant [Table 3 and Figure 3]. A statistically significant difference was found on comparing the knowledge of oral pathologists with 1st and 3rd year students [Table 4 and Figure 4].

DISCUSSION

Safety in the laboratories is mandated for smooth and proper functioning of the laboratory procedures. In the current COVID scenario, factors such as rapid transmissibility of infection and need for regular changes in the information and parameters regarding the novel virus, necessitates setting up guidelines for routine

Table 1: Representing the respondents answers

	Frequency (%)
All specimens collected for lab investigations should be regarded as potentially infectious	
Oral pathologists	
Yes	139 (84.8)
No	12 (7.3)
May be	13 (7.9)
Postgraduate students	
Yes	133 (89.9)
No	3 (2.0)
May be	12 (8.1)
Which according to you are routes of laboratory acquired infections?	
Oral pathologists	
Exposure through touching of mouth or eyes with fingers or contaminated objects	3 (1.8)
Inhalation of infectious aerosol	7 (4.3)
All of the above	154 (93.9)
Postgraduate students	
Inhalation of infectious aerosol	3 (2.0)
All of the above	145 (98.0)
Do you think formalin fixation and paraffin embedding can deactivate the virus?	
Oral pathologists	
Yes	121 (73.8)
No	43 (26.2)
Postgraduate students	
Yes	59 (39.9)
No	89 (60.1)
What is the level of corona virus infectivity risk associated with formalin-fixed paraffin-embedded tissue block?	
Oral pathologists	
Low	76 (46.3)
Moderate	32 (19.5)
High	10 (6.1)
No risk	46 (28.0)
Postgraduate students	
Low	52 (35.1)
Moderate	71 (48.0)
High	19 (12.8)
No risk	6 (4.1)
How long would you suggest formalin fixation for virus deactivation?	
Oral pathologists (h)	
8	6 (3.7)
12	10 (6.1)
24	120 (73.2)
36	28 (17.1)
Postgraduate students (h)	
8	9 (6.1)
12	28 (18.9)
24	89 (60.1)
36	22 (14.9)
According to you which steps in routine tissue processing would eliminate the corona virus on highest scale?	
Oral pathologists	
Fixation and dehydration	117 (71.3)
Fixation and clearing	18 (11.0)
Dehydration and clearing	6 (3.7)
Dehydration and impregnation	23 (14.0)
Postgraduate students	
Fixation and dehydration	74 (50.0)
Fixation and clearing	31 (20.9)
Dehydration and clearing	26 (17.6)
Dehydration and impregnation	17 (11.5)
Which of the following procedures are associated with risk of exposure to corona virus?	
Oral pathologists	
Centrifugation	16 (9.8)
Performing gram stain	7 (4.3)
Performing AFB smear	18 (11.0)
None of the above	41 (25.0)
All of the above	82 (50.0)
Postgraduate students	

Contd...

Table 1: Contd...

	Frequency (%)
Centrifugation	30 (20.3)
Performing AFB smear	17 (11.5)
None of the above	27 (18.2)
All of the above	74 (50.0)
Any step which might produce aerosols should be done in	
Oral pathologists	
Class I biosafety cabinet	53 (32.3)
Class II biosafety cabinet	43 (26.2)
Class III biosafety cabinet	68 (41.5)
Postgraduate students	
Class I biosafety cabinet	64 (43.2)
Class II biosafety cabinet	39 (26.4)
Class III biosafety cabinet	45 (30.4)
Air drying or heat drying of smears should be done in	
Oral pathologists	
Class I cabinet	72 (43.9)
Class II cabinet	55 (33.5)
Class III cabinet	37 (22.6)
Postgraduate students	
Class I cabinet	54 (36.5)
Class II cabinet	66 (44.6)
Class III cabinet	28 (18.9)
Do you think fixing cytology specimens in above 70% alcohol would kill the corona virus?	
Oral pathologists	
Yes	77 (47.0)
No	16 (9.8)
May be	71 (43.3)
Postgraduate students	
Yes	55 (37.2)
No	30 (20.3)
May be	63 (42.6)
Which of the following would result in undetected levels of viral infectivity in culture medias?	
Oral pathologists	
Irradiation with UV for 30 min	49 (29.9)
Irradiation with UV for 60 min	37 (22.6)
Irradiation with UV for 45 min	38 (23.2)
Irradiation with UV for 10 min	40 (24.4)
Postgraduate students	
Irradiation with UV for 30 min	42 (28.4)
Irradiation with UV for 60 min	38 (25.7)
Irradiation with UV for 45 min	25 (16.9)
Irradiation with UV for 10 min	43 (29.1)
Which disinfectants can be used effectively on inanimate objects?	
Oral pathologists	
60%-70% alcohol	27 (16.5)
0.5% hydrogen peroxide	7 (4.3)
0.1% sodium hypochlorite	51 (31.1)
Any of the above	79 (48.2)
Postgraduate students	
60%-70% alcohol	31 (20.9)
0.5% hydrogen peroxide	12 (8.1)
0.1% sodium hypochlorite	34 (23.0)
Any of the above	71 (48.0)
Infectious materials should be disposed in which of the following?	
Oral pathologists	
Yellow and red bag labelled covers	130 (79.3)
Green and blue bag labeled covers	7 (4.3)
Yellow and green bag labeled covers	9 (5.5)
Red and blue bag labeled covers	18 (11.0)
Postgraduate students	
Yellow and red bag labeled covers	103 (69.6)
Green and blue bag labeled covers	3 (2.0)
Yellow and green bag labeled covers	27 (18.2)
Red and blue bag labeled covers	15 (10.1)
Is wearing of PPE for laboratory staff advisable?	

Contd...

Table 1: Contd...

	Frequency (%)
Oral pathologists	
Yes	137 (83.5)
No	27 (16.5)
Postgraduate students	
Yes	133 (89.9)
No	15 (10.1)

PPE: Personal protective equipment, AFB: Acid-fast bacilli, UV: Ultraviolet

Table 2: Comparison of knowledge score between the oral pathologists and oral pathology postgraduate students

Position	*n*	Mean±SD	*t*	*P*
Oral pathologists	164	8.1098±2.02443	3.392	0.001*
Postgraduate students	148	7.3851±1.74778		

*Statistically significant. SD: Standard deviation

Table 3: Comparison of knowledge score among the postgraduate students

Position Postgraduate students	*n*	Mean±SD	*F*	*P*
1st year	43	7.3023±1.58166	0.900	0.409
2nd year	56	7.6250±1.72218		
3rd year	49	7.1837±1.91130		
Total	148	7.3851±1.74778		

SD: Standard deviation

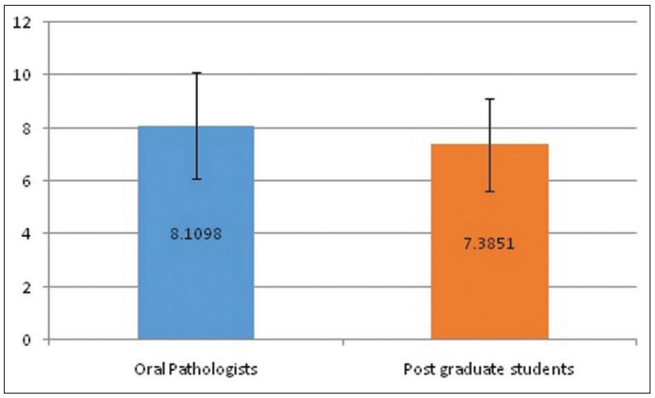

Figure 2: Graphical representation of comparison of knowledge score between the oral pathologists and oral pathology postgraduate students

laboratory practices. Safeguarding the health-care workers in the laboratories and preventing personnel to personnel transmission should be of the top priority. To implement these safety measures, guidelines have been issued, and it is a requisite for the people involved in this line of work to be well acquainted with these guidelines. Thus, this study was conducted to assess the knowledge of oral pathologists and oral pathology postgraduate students regarding safe laboratory practices, procedures and guidelines since they receive and handle specimens and samples from various clinical departments on a daily basis and are thus at a high risk of acquiring laboratory-based infections. To the best of our knowledge, this is the first study of its kind.

The study showed a mean score of 8.11 ± 2.02 for the pathologists and 7.38 ± 1.75 for the postgraduate students. When the knowledge score between the two groups was compared, a statistically significant difference was found, with the oral pathologists having an upper hand. This finding highlights the need to train the postgraduate students accordingly. The responses obtained from study participants showed a paucity of knowledge in terms of the level of coronavirus infectivity associated with FFPE specimens, aerosol-generating procedures, use of biosafety cabinets, disinfection of culture media and inanimate objects. A high unsure response of maybe was received when the participants were asked if fixing cytology specimens in above 70% alcohol would kill the virus.

During routine histopathology processing, specimens pass through formalin, alcohol, xylene for varied time interval followed by paraffin infiltration at a temperature of 60°–65° for 2 h or more. These processes are considered to inactivate many viruses including Ebola.[28] Darnell *et al.* showed that incubation in formalin at room temperature significantly decreased the virus infectivity in 24 h.[29] Duan *et al.* reported that several coronaviruses were rendered inactive after subjecting to high temperature for allocated time period.[25] Based on these findings, it is safe to consider that FFPE tissue blocks have a low risk of coronavirus infectivity. Moreover, this can be supported by the fact that Xu *et al.* presented the autopsy findings of a COVID-19 patient, wherein the photomicrographs showed that the specimens were formalin-fixed, paraffin-embedded and stained with hematoxylin and eosin, which advocates for the safe use of FFPE specimens.[30]

Biosafety cabinets are closed contained cabinets which prevent exposure of the laboratory personnel, aerosol contamination, pathogenic organism escape and cross-contamination.[31] Based on the risk of laboratory work being done, these are of three types: Class I suitable for low-to-moderate risk laboratory work; Class II for low to high risk while Class III maintains the maximum safety level against high-risk infectious agents. It has been recommended that any aerosol-generating procedure such as centrifugation of samples in open tubes, loading and unloading of sealed centrifuge cups, vigorous shaking or mixing, flaming of

Table 4: Comparison of knowledge score between the oral pathologists and postgraduate students (year wise)

Comparison	LSD				
	Mean difference	SE	Significant	95% CI	
				Lower bound	Upper bound
Oral pathologist versus 1st year	0.80743	0.32548	0.014*	0.1670	1.4479
Oral pathologist versus 2nd year	0.48476	0.29403	0.100	−0.0938	1.0633
Oral pathologist versus 3rd year	0.92608	0.30929	0.003*	0.3175	1.5347
1st year versus 2nd year	−0.32267	0.38520	0.403	−1.0806	0.4353
1st year versus 3rd year	0.11865	0.39697	0.765	-0.6625	0.8998
2nd year versus 3rd year	0.44133	0.37162	0.236	−0.2899	1.1726

*Statistically significant. LSD: Least significant difference, SE: Standard error, CI: Confidence interval

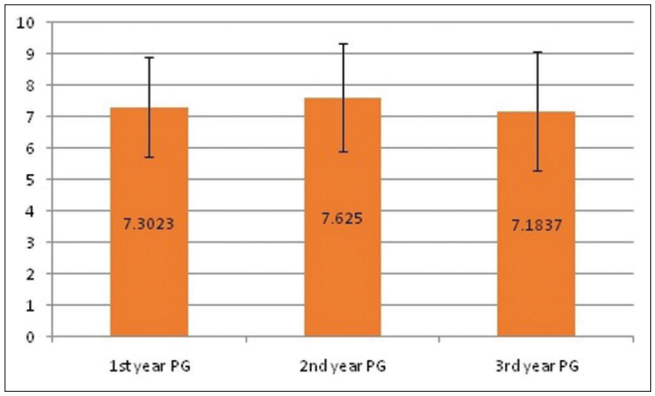

Figure 3: Graphical representation of comparison of knowledge score among the postgraduate students

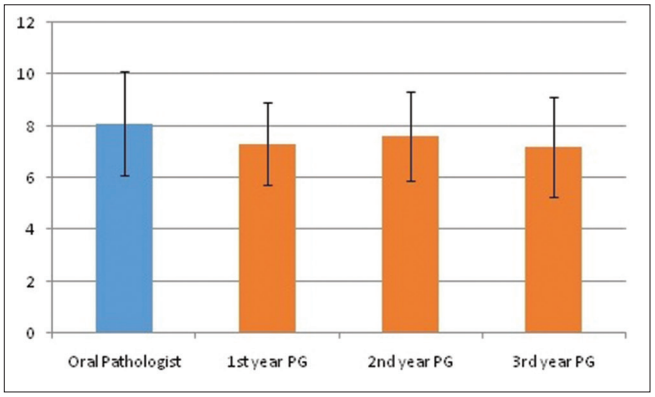

Figure 4: Graphical representation of comparison of knowledge score between the oral pathologists and postgraduate students (year wise)

loops, needles or glass slides, opening of containers with infectious material whose internal pressure may be different from the ambient pressure, like a vacutainer, accidental spilling or splashing must be done inside a Class II BSC.[17,21] Procedures such as performing frozen sections and grossing partially fixed specimens should be avoided, but it has to be done should be done inside these cabinets to contain aerosol spread. Class II BSC work on the underlying principle of bidirectional airflow: downflow and inflow, which get mixed outside the working zone and then filtered by a combination of supply and exhaust HEPA (high-efficiency particulate air) filters to remove the airborne contaminants.[32]

According to the Interim Laboratory Biosafety Guidelines from the CDC, once the specimens are processed, work surface and equipments must be decontaminated using appropriate disinfectants.[17] Kampf *et al.* in their study on coronaviruses such as SARS and MERS showed that these viruses could persist on inanimate surfaces for up to 9 days but can be efficiently killed by disinfection using 62%–71% ethanol, 0.5% hydrogen peroxide or 0.1% sodium hypochlorite within a minutes interval. However, other agents such as 0.02% chlorhexidine gluconate and benzalkolium chloride proved to be less efficacious.[26] These disinfectants would prove to be potent for COVID-19 virus too since, the viral genome shows 70%–80% similarity with SARS-CoV.[33]

Culture media play a crucial role in isolation, identification and sensitivity testing of different pathogenic microorganisms, and sterilizing these media before use is essential for quality maintenance.[34] Several methods such as autoclaving, microwaving and use of UV radiation are used in general practice for sterilization of culture media.[35] Duan *et al.* reported that irradiation with UV light for 60 min on several coronaviruses in culture media resulted in undetectable levels of viral infectivity, and hence this method can be safely employed during this pandemic.[25]

Appropriate use of PPE is important for laboratory professionals for their safeguarding and should be based on risk assessment. PPE should comprise laboratory coat, surgical masks, face shields, surgical cap and gloves, but for aerosol-generating procedures, a fluid impervious gown or coveralls, double gloves, proper masks, head cover, shoe covers, goggles and face shield should also be incorporated.[21]

CONCLUSION

This article compares and highlights the knowledge lacunae among the oral pathologists and oral pathologists postgraduate students in relation to guidelines to be followed for safety in the laboratory. Adhering to these biosafety

regulations would reduce occupational health hazards and enhance a safe working environment in the laboratory.

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Conflicts of interest

There are no conflicts of interest.

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