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Importance of the universal precautions among health care personnel and its impact against Covid-19 spread - A survey

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ABSTRACT

Universal precautions are a vital standard set of rules applied to be followed by patients and doctors while carrying out any clinical procedure, but especially in patients with blood-borne diseases or infections. It is carried out to prevent the spread of infection from one person to another. Universal precautions are of great significance to medical personnel, where they expose themselves to numerous infectious diseases. The research aimed to assess and improve knowledge about universal precautions among health care personnel to reduce the rate of harmful exposure and infections among them. A questionnaire comprising 20 questions was created and circulated among 100 health care workers through the online platform "Google forms". The results were collected and analysed. Statistical analysis was performed using SPSS. It was evident that many people were not aware of the seriousness of universal precautions. Fortunately, many medical personals followed and were aware of universal precaution to an extent. Universal precaution should be followed religiously and judiciously to prevent the spread of deadly diseases.

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INTRODUCTION

Coronavirus is the club shape virus which has spikes on its surface. coronavirus infects both mammals and birds. It causes respiratory tract infection (Woo, 2007). The virus was first discovered in Chinese horseshoe bats. This virus is a single strand, a non-segmented virus which poses positive RNA (Lai and Cavanagh, 1997). Various awareness studies were carried out in dental students like virus replicates in the epithelium of the upper and lower respiratory tract, they survive from a few hours to a few days in the air (Cavanagh, 1986). This study is the first one to be done on universal precautions in dental students. It takes 5 to 14 days for the symptoms to appear for the virus after the person gets affected, symptoms of the virus are the common cold, SARS and cough (Hossain, 2020). Many oral diseases which are commonly seen like periodontal diseases, oral cancer and so on require the treatment with the use of universal precautions (Shree, 2019).

Universal precaution involves a single standard. It is applied to all the patients who do not disclose
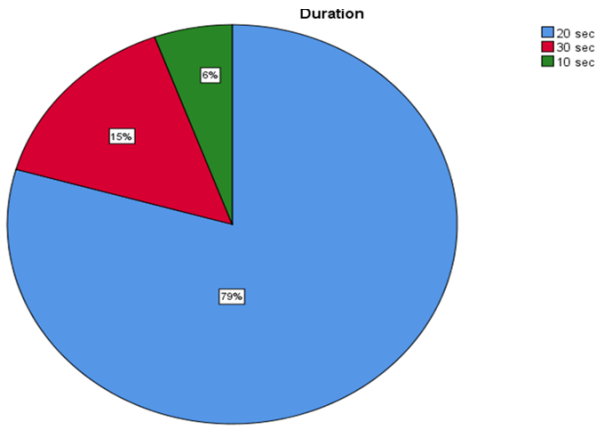
Figure 1: The pie chart depicts the distribution of awareness on the duration for hand wash
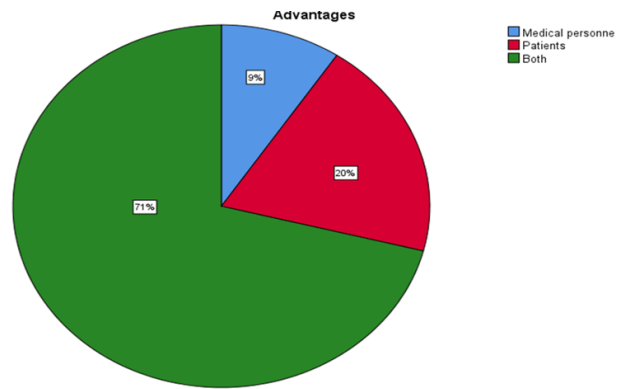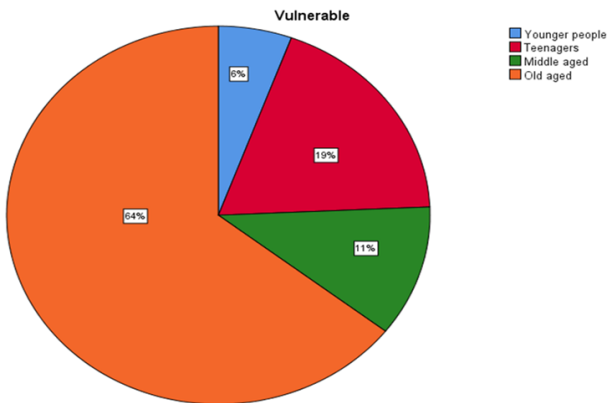

Figure 2: The pie chart depicts the distribution of awareness about the vulnerability of coronavirus among different age groups

Figure 3: The pie chart depicts the distribution of responsibility for the mode of transmission of the virus

Figure 4: The pie chart depicts the distribution of response regarding the usefulness of universal precautions among doctors and patients
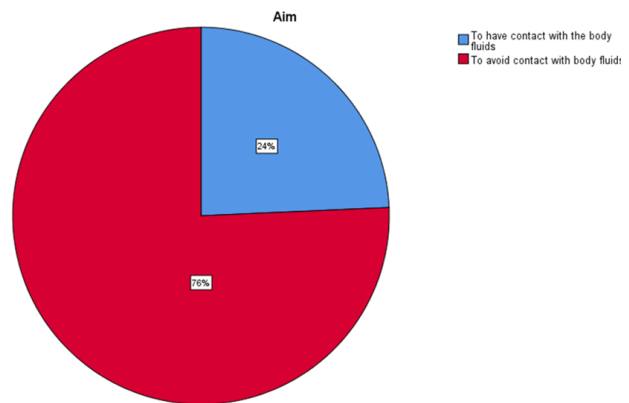

Figure 5: The pie chart depicts the distribution of awareness of the aim of universal precautions

Figure 6: The pie chart depicts the duration of awareness about various steps of universal precautions
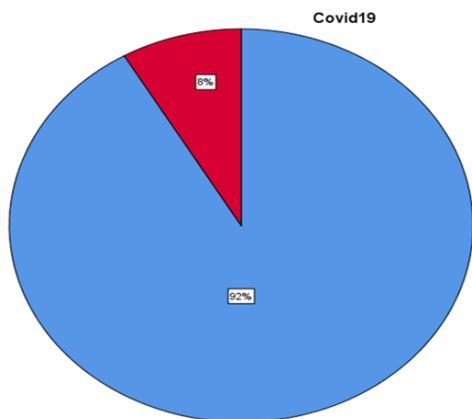
Figure 7: This pie chart depicts the distribution of awareness of Covid 19 among respondents
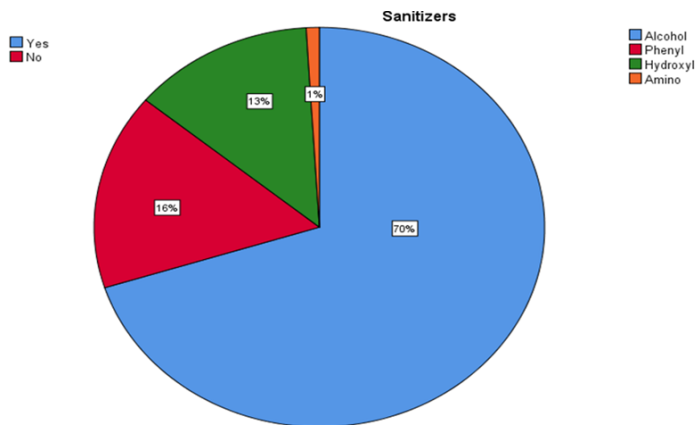
Figure 10: The bar graph depicts the awareness of composition of sanitisers for coronavirus

Figure 8: This pie chart depicts the distribution of awareness of the hazards of coronavirus among the participants
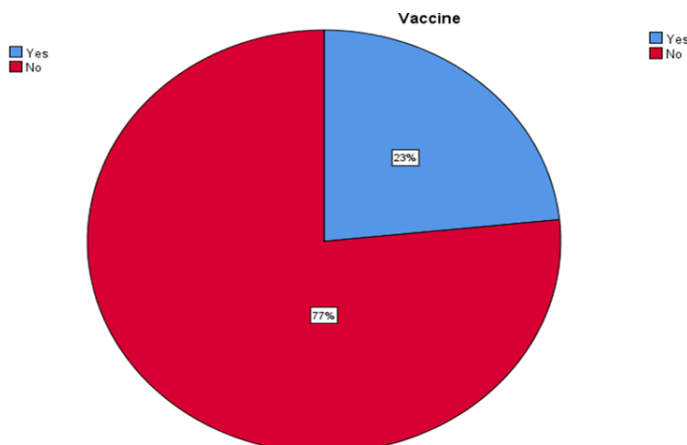
Figure 11: The pie chart depicts the distribution of awareness of vaccines for coronavirus
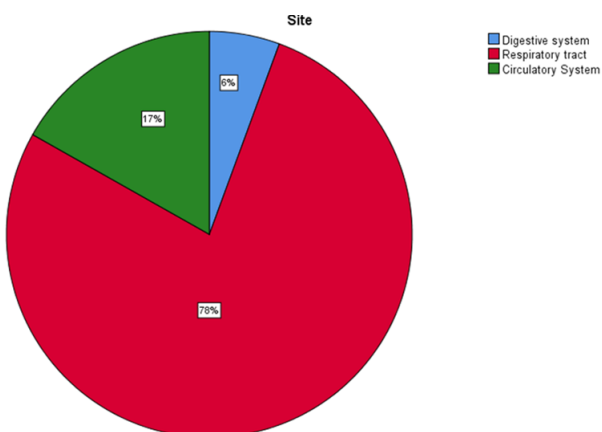
Figure 9: The bar graph depicts the knowledge on site of coronavirus attack
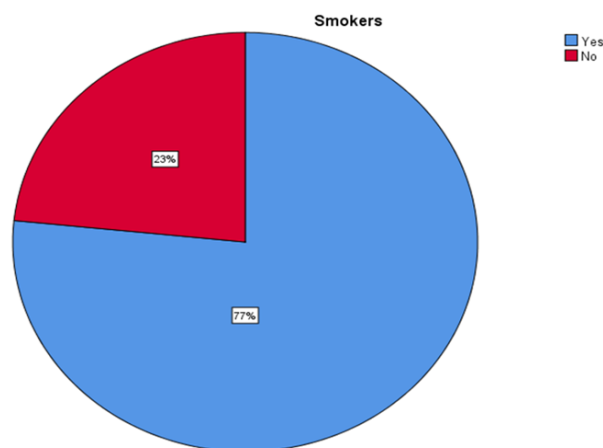
Figure 12: The pie chart represents the distribution of response on the vulnerability ofsmokers to coronavirus
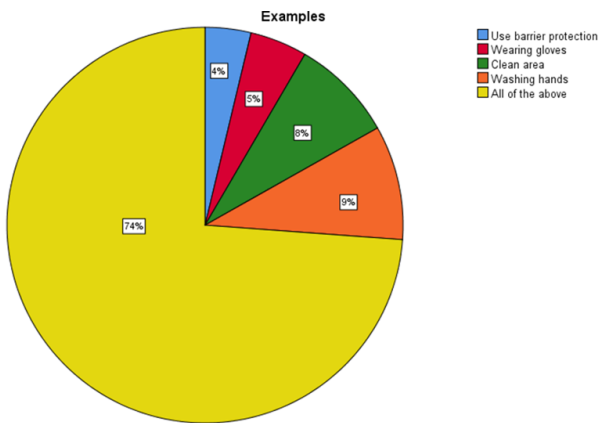
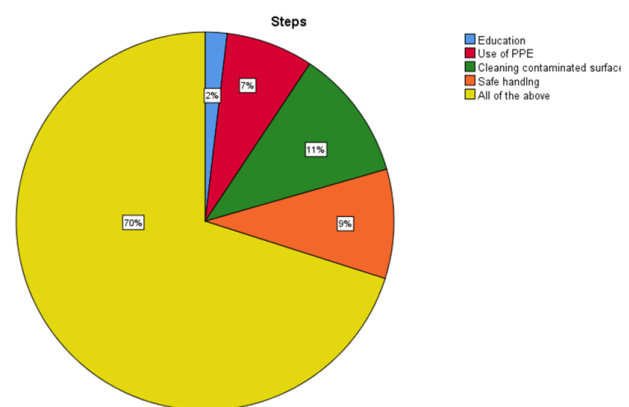**Figure 13: The pie chart depicts the distribution of awareness about the procedure of universal precautions**
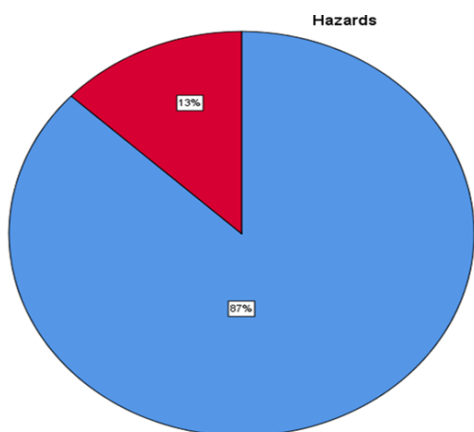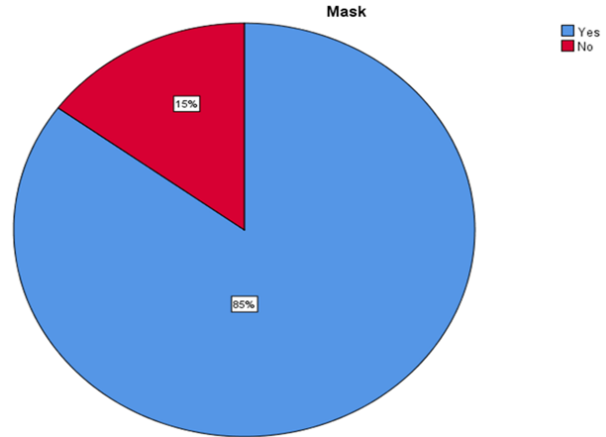

Figure 16: The graph depicts the response for using a mask as a universal precaution
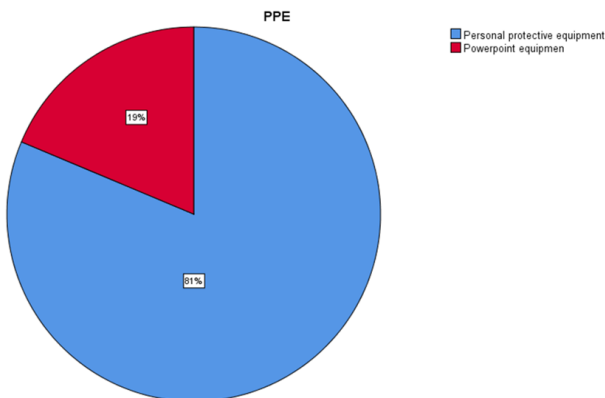
Figure 14: The pie chart depicts the distribution of awareness on the abbreviation of PPE
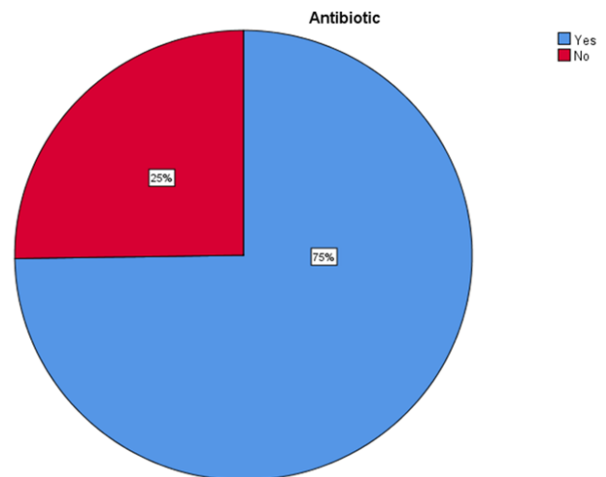
Figure 17: The pie chart depicts the distribution of response regarding the relation of antibiotics and Covid 19
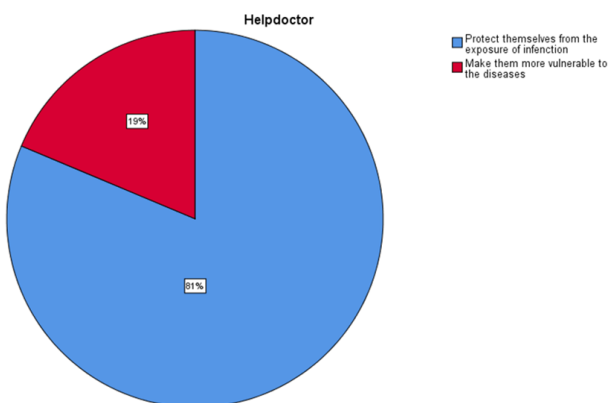
Figure 15: The pie chart represents the distribution of response regarding the advantages of universal precautions among medical personnel
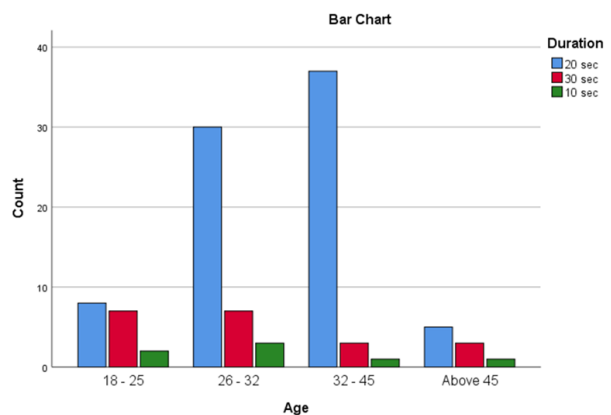
Figure 18: Association between knowledge of the duration of hand wash and age
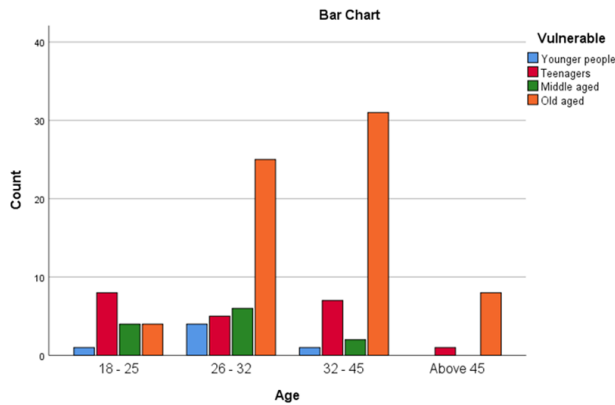
Figure 19: Association between the age of respondents and awareness on vulnerability to coronavirus among different age groups
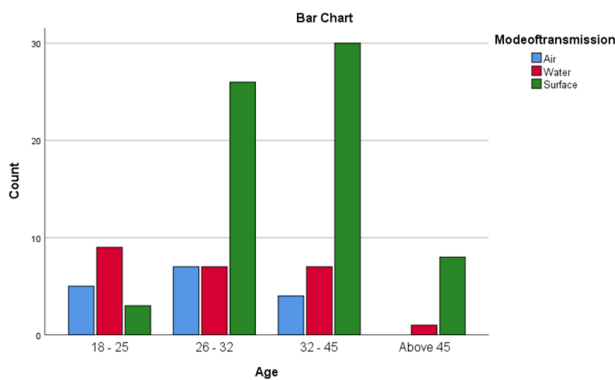
Figure 20: Association between knowledge on the mode of transmission of virus and age
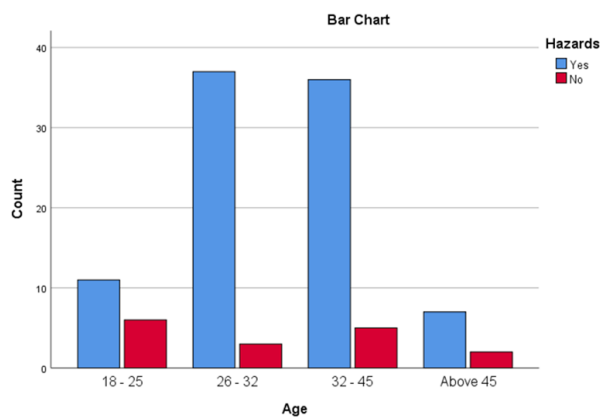
Figure 21: Association between awareness on the hazards of covid 19 and age
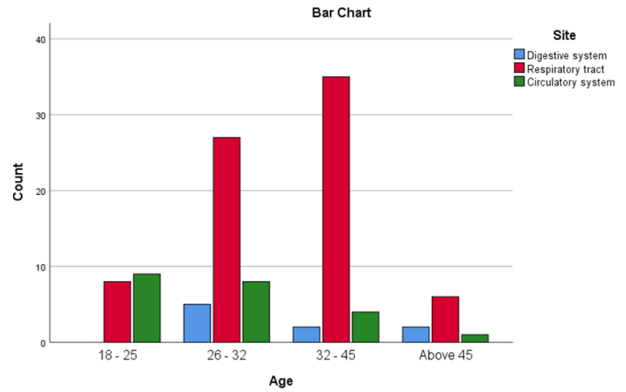
Figure 22: Association between the awareness on site of attack of coronavirus and age
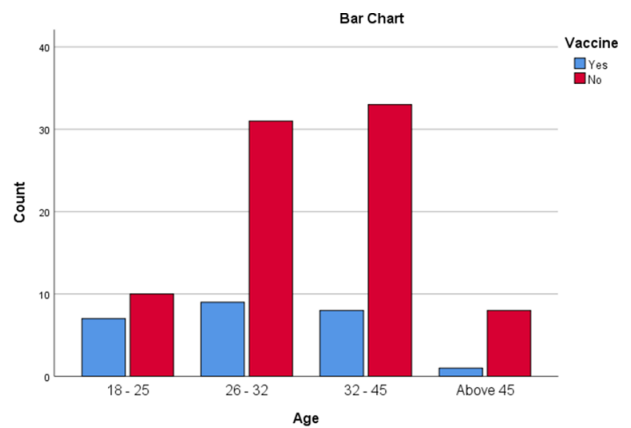
Figure 23: Association between the knowledge of vaccines for coronavirus and age
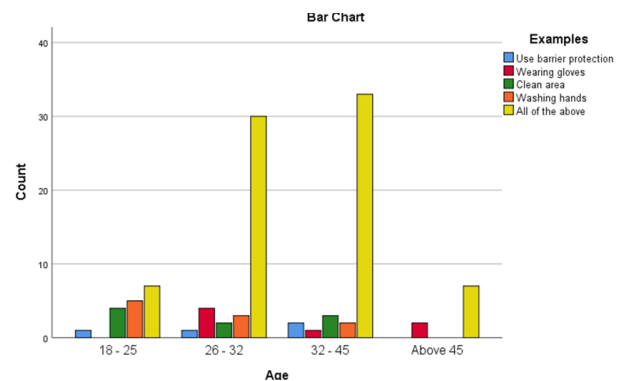
Figure 24: Association between the knowledge of examples of universal precautions and age among medical personnel

their infectious state and are infected by viral infections unknowingly. Various studies are done on universal precautions which have an implication in the diagnosis of Covid 19 like universal precautions include education, hand washing, use of protective barriers, cleaning of the contaminated surface, safe handling and disposal of contaminated materials (Sadoh, 2006). Universal precautions mean avoiding contact with patient's body fluids

using, wearing non-porous material such as medical gloves, goggles and face shields (Gourlay *et al.*, 2005).

Following the universal precautions would help the doctors and nurses to protect themselves from the exposure of infectious disease (Pollock, 2011). Owing to the multifold increase in exposure infection and death among medical personnel, handling patients with Covid 19, this research in the current scenario is of utmost importance to reduce the exposures among medical fraternity by increasing the awareness about universal precautions. The study aimed to assess and improve knowledge about universal precautions among health care personnel to reduce the rate of harmful exposure and infections among them.

MATERIALS AND METHODS

An online-based survey was created and distributed among 100 healthcare personnel who gave consent for participation. The study contained 20 questions. The questions are mainly focused on universal precautions for Covid 19 and its advantages. The questionnaire was conducted on Google forms with multiple-choice questions. The results were collected and analysed, and the data were entered in Excel and was converted to SPSS software. Correlation analysis was done by chi-square test using SPSS software, followed by data interpretation and analysis. The data were presented as percentages and descriptive statistics.

RESULTS AND DISCUSSION

The response of the survey was collected and tabulated in the form of a bar graph [Figures 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 and 17] When inquired about the awareness of the universal precaution, 98% of participants responded. When asked about the knowledge of universal precaution, 94% of the participants responded positively. The majority of the response was seen from age 26 to 32 years. 91.6% of the population were aware of coronavirus, while 86.9% were aware of the hazards of coronavirus. 98% of the people found the survey useful. It was evident from the study that many people are unaware of the steps and advantages of universal precautions.

In the current study, for the recommended duration to wash our hands, 79% were aware that 20 sec washing our hands helps us to destroy the fat globules of the virus and stops the infections while 15% believed 30 seconds and 6% believed 10 seconds [Figure 1]. 6% believed young people were more vulnerable to the virus, while 19% believed that teenagers were more susceptible to the virus. In comparison, 11% believed middle-aged, and 64% were aware that virus infections are common among older people and old aged are more vulnerable to the virus [Figure 2].

15% of the people believed that the primary mode of transmission of the virus is through the air, while other 21% believed that water but only 64% of the people were aware that the virus spreads mainly through surfaces [Figure 3]. 9% of the people believed that universal precautions are useful only for medical personnel. In comparison, 20% believed the universal precautions are helpful only for patients, only 71% of the people were aware that both medical staff as well as patients, both would be benefited from universal precautions [Figure 4].

24% of the people believed that the main aim of the universal precaution is to have contact with body fluids. In comparison, 76% believed that avoiding contact with body fluids is the main aim of universal precautions [Figure 5]. For steps in universal precaution, 2% believe education, 7% believe the use of PPE, 11% assumed cleaning contaminated surfaces. In comparison, 9% considered safe handling, but only 70% were aware that all education, use of PPE, cleaning contaminated surfaces, and safe handling comes under universal precaution [Figure 6]. For awareness of Covid 19 among respondents, 92% of the people were aware of Covid 19, while 8% were unaware of Covid 19 [Figure 7]. For awareness of the hazards of coronavirus among the participants. 87% of the people were aware of the dangers of coronavirus, while 13% were not aware [Figure 8]. 6% of the people believed the coronavirus attacks the digestive system. 17% of the people thought that the virus attacks the circulatory system, while 78% believed the respiratory tract [Figure 9]. For the awareness of the composition of sanitisers for coronavirus. 70% of the people think that alcohol sanitiser is used to prevent coronavirus, 16% believe phenol, 13% of the people believe hydroxyl and 1% - amino compounds [Figure 10]. 77% of the people believe that vaccines have been developed for coronavirus, while 23% of the people were aware that vaccines had not been prepared for coronavirus [Figure 11]. For the knowledge of the vulnerability of smokers to coronavirus, 77% felt that smokers were vulnerable to coronavirus, while 23% thought they were not [Figure 12]. 4% of the people believe that protection barrier comes under universal precaution while other 5% believe gloves, 9% believe cleaning contaminated surfaces, 9% believe washing hands and 74% believes all of the above [Figure 13]. 82% of the people believe that personal

protective equipment is the abbreviation of PPE, while 17% believed PowerPoint engine [Figure 14]. For the knowledge on advantages of universal precautions among medical personnel. 81% of the people believed that universal precautions protect us from infections, while 19% thought that universal precautions make us more vulnerable to the infections [Figure 15]. 85% of the people were aware that masks come under universal precaution, while 15% of the people felt it was not [Figure 16]. 75% of the people believed that antibiotics worked against coronavirus, while 25% opposed it [Figure 17].

Association between age and the following parameters was analysed using chi-square test, which is represented in the graphs [Figures 18, 19, 20, 21, 22, 23 and 24], p <0.05 was considered to be statistically significant.

Figure 1 shows that, 79% of the people believe 20 seconds (blue) is the ideal time for washing our hands while 15% of the people believe 30 seconds (red) and 6% believe 10 seconds (green).

Figure 2 shows that, 6% of people believe that young people are more vulnerable to the coronavirus (blue). 19% of people believe that teenagers (red) are more prone to the virus. In comparison, 11% believe middle-aged (green), and 64% of the people believe old aged (orange).

Figure 3 shows that, 15% of the people believe that air (blue) is the mode of transmission of the virus, while 21% believe water (red) and 64% believe surfaces (green).

Figure 4 shows that, 9% of people believe that universal precautions are useful to doctors (blue). In comparison, 20% of the people believe patients (red)while 71% of the people think it is helpful for both medical personnel and the patients (green).

Figure 5 shows that, 24% of the people believe that universal precaution helps to have contact with body fluids (blue) while 76% of the people believe universal precautions is to avoid contact with body fluids (red).

Figure 6 shows that, 2% of the people believe education (blue) is the primary step in universal precaution, 8% of the people believe in PPE(red), 11% of the people believe in cleaning the contaminated surfaces (green). In comparison, 9% of the people believe in safe handling (orange) and 70% of the all (yellow).

Figure 7 shows that, 92% of the people were aware of Covid 19 (blue) while 8% were unaware of Covid 19 (red).

Figure 8 shows that, 87% of the people were aware of hazards (blue) of coronavirus, while 13% were not aware (red).

Figure 9 shows that, 6% of the people believed the coronavirus attacks the digestive system. 17% of the people believed that the virus attacks the circulatory system, while 78% believed the respiratory tract.

Figure 10 shows that, 70% of the people believe that the alcohol sanitiser (blue) is used to prevent coronavirus, 16% believe phenol (red), 13% of the people believe hydroxyl (green) and 1% - amino compounds (orange).

Figure 11 shows that, 77% of the people believe that vaccines have been developed for coronavirus (blue) while 23% of the people were aware that vaccines had not been developed for coronavirus (red).

Figure 12 shows that, 77% felt that smokers were vulnerable to coronavirus (blue), while 23% thought they were not (red).

Figure 13 shows that, 4% of the people believe that the protection barrier comes under universal precaution (blue). In comparison, other 5% believe gloves (red), 9% believe cleaning contaminated surfaces (green), 9% believe washing hands (orange) and 74% believes all of the above (yellow).

Figure 14 shows that, 82% of the people believe that personal protective equipment (blue) is the abbreviation of PPE while 17% believed PowerPoint engine (red).

Figure 15 shows that, 81% of the people believed that universal precautions protect us from infections (blue), while 19% believed that universal precautions make us more vulnerable to infections (red).

Figure 16 shows that, 85% of the people were aware that masks come under universal precaution, while 15% of the people felt it was not.

Figure 17 shows that, 75% of the people believed that antibiotics worked against coronavirus (blue), while 25% opposed it (red).

Figure 18 shows that, The X-axis represents the age in years, and Y-axis represents the number of responses for the understanding of the duration of handwash among the medical personnel. Pearson chi-square test shows p-value is 0.028, hence there is a significant association between age and knowledge of the duration of handwashing (p-value < 0.05) which is statistically significant.

Figure 19 shows that, The X-axis represents the age and Y-axis represents the number of responses for the awareness of vulnerability to coronavirus and age among different age groups. Pearson chi-square test shows p-value is 0.009, hence there is a significant association between age and awareness

of vulnerability to coronavirus among different age groups (p-value < 0.05) which is statistically significant.

Figure 20 shows that, The X-axis represents age and Y-axis represents the number of responses for the knowledge on the method of transmission of coronavirus and age. Pearson chi-square test shows p-value is 0.002, hence there is a significant association between age and knowledge on the mode of transmission of the virus (p-value < 0.05, statistically significant).

Figure 21 shows that, The X-axis represents age and Y-axis represents the number of responses for the awareness of the dangers of Covid 19 and age among medical personnel. Pearson chi-square test shows p-value is 0.048, hence there is a significant association between age and awareness on hazards of covid 19 (p-value < 0.05, statistically significant).

Figure 22 shows that, The X-axis represents the age and Y-axis represents the number of responses for the awareness on site of attack of coronavirus. Pearson chi-square test shows p-value is 0.004, hence there is a significant association between age and awareness on site of attack of coronavirus (p-value < 0.05) which is statistically significant.

Figure 23 shows that, The X-axis represents age, and Y-axis represents the number of responses for the understanding of vaccines for coronavirus and age. Pearson chi-square test shows p-value is 0.248, hence there is not a significant association between age and knowledge of vaccines for coronavirus (p-value > 0.05) which is statistically insignificant.

Figure 24 shows that, The X-axis represents the age and Y-axis represents the number of responses for the knowledge of examples of universal precautions. Pearson chi-square test shows p-value is 0.015, hence there is a significant association between age and knowledge of examples of universal precautions (p-value < 0.05) which is statistically significant.

Coronavirus disease (covid-19) is an acute respiratory distress syndrome. It transmits at very high rates, and each one of us must understand the seriousness of the disease and take precautions against it (Pollock, 2011; Tolksdorf, 2020). The virus mainly attacks the respiratory tract and leads to syndrome-like fever, chills and cough (Peiris, 2003). Vaccine for coronavirus is not developed yet, but it is believed that hydroxychloroquine decreases the action of the virus (Sethna *et al.*, 1989). Universal precaution is mainly used to avoid contact with body fluids. Universal precautions are mainly used in process use procedures involving body fluids like blood and contaminated fluids (Sethna *et al.*, 1989; Chan, 2002).

Minimum duration to wash our hands is 20 seconds. Washing hands for 20 seconds breaks the fat particles of the virus, 20 seconds is compared to the singing of happy birthday Song twice (Türsen *et al.*, 2020). Universal precautions help doctors to protect themselves from the exposure of infectious disease. Universal precautions include barrier protection, wearing gloves, cleaning areas contaminated and washing hands (Li, 2013). Washing hands with alcohol-based sanitisers help us to stay away from the virus. It is recommended to hand rub with a sanitiser, which contains 60% ethanol or 70% isopropanol as active ingredients (Hilburn *et al.*, 2003).

Four main universal precautions are gloves, facial protection, gown and environmental cleaning. Three types of transmission-based precaution universal precautions are contact precaution, droplet precaution and airborne precaution (Ibeziako and Ibekwe, 2007).

Health care workers must take precautions towards patients with diseases like Coronavirus disease, hepatitis B&C or HIV to control the rate of infection (Hon, 2008).

Various awareness studies were performed in dental students (Palati *et al.*, 2020; Uma, 2020; Ahad and Gheena, 2016; Hannah, 2018; Prasanna and Gheena, 2016; Sukumaran and Padavala, 2018; Manohar and Abilasha, 2019; Palati *et al.*, 2019) but none of the studies has focused on the importance of universal precautions. The previous studies on awareness PPE, safe handling, education, protective barriers (Krishnan, 2018; Sheriff and Santhanam, 2018) have led us to work on the importance of universal precaution while handling patients with blood-borne diseases. Many tooth-related studies which are used for identification and other disorders (Gunasekaran and R, 2016; Sukumaran and Padavala, 2018; Harrita and Santhanam, 2019; Abitha and Santhanam, 2019; Sarbeen and Gheena, 2016) have performed in dental students. Still, studies on knowledge about the importance of universal precaution have not been updated. Hence present study has been carried out to fill the gap and improve the current perception of universal precautions. The health care workers and medicinal fraternity should have empathy in situations of pandemic and medical crisis and should advise patients on following universal precautions with utmost accuracy and care (Prasanna and Gheena, 2016).

CONCLUSION

From the study, it was concluded that the knowledge about universal precautions lacked among health care personnel, and most of the participants are unaware of the benefits and importance of it. Even medical staff have less knowledge of universal precautions, the ways to use it, which can prevent the spread of infections. Owing to the multi fold increase in exposure to infections among them medical personnel handling patients with Covid 19, this research in the current scenario is of utmost importance to reduce the exposures among medical fraternity by increasing awareness about the use of universal precautions.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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