

Impact of Adherence to SOPs on COVID-19 Screening Elements in Dental Outdoor Patients of University Dental Hospital, Lahore

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Abstract

Objectives: The study was conducted to assess the association between practicing COVID-19 Standard Operating Procedures (SOPs) with age, gender, educational status, and prevalence of signs & symptoms in patients visiting the outpatient department of University Dental Hospital (UDH). **Materials and Methods:** A descriptive cross-sectional quantitative study with non-probability convenient sampling was conducted using a self-administered questionnaire to determine the association between COVID-19 SOPs with signs & symptoms evaluated during the screening of the selected representative population. SPSS version 25 was used for statistical analysis. **Results:** In public places, Group D (50-69 years) and female gender group displayed the highest percentage of conformity with combination-2 (FM+HS) of SOPs. Same was true for individuals with post graduate education. However, in work places Group A (20-29 years) exhibited maximum abundance with combination-2, a trend that was visible amongst females and post graduate students in a work/institutional setting. Similarly, in hospital settings Group A and female gender group observed combination-2 of SOPs to the greatest extent. The same trend was observed amongst higher than bachelor level education holders. The uneducated and middle-level educational group chose a single SOP of FM, while the rest of the educational groups utilized a mix of FM, HS, and SD. Males showed greater compliance with FM only. **Conclusion:** It was divulged that the population following single COVID-19 SOP was at a greater risk to experience COVID-19 symptoms in comparison to those who followed combination-1(HS+FM) and combination-2(HS+FM+SD) of SOPs.

Keywords: Face masking (FM), Hand sanitization (HS), Social distancing (SD), COVID-19 screening, SOPs.

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INTRODUCTION

Dated back to 31st December 2019, WHO was informed about the cases of pneumonia of unknown cause in Wuhan City, China. A novel coronavirus was identified as the cause of unknown pneumonia by Chinese authorities on 7th January 2020 and was temporarily named “2019-nCoV”. Coronaviruses (CoV) are a larger family of viruses that cause illnesses ranging from the common cold to more severe diseases. Novel coronavirus (nCoV) is a new strain that has not

been previously identified in humans. This new virus was subsequently given the name of “COVID-19” [1].

Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. Most people who fell sick with COVID-19 experienced mild to moderate symptoms and recovered without special treatment while others became seriously ill and required urgent medical attention. The documented mode of transmission indicated from an infected person

by sneezing, coughing, speaking, singing, or breathing. Contact tracing of individuals who were infected revealed inhalation of viral particles through breathing within two meter distance of infected person mostly in crowded settings [2].

Since the beginning of the pandemic, many Standard Operating Procedures (SOPs) have been devised and are being advocated by local and international authorities to reduce the spread of the virus including frequent hand washing, hand sanitization, use of face masks and social distancing. Several studies have shown that adopting the measures of primary prevention and avoiding airborne droplet transmission by practicing SOPs significantly decreases the community's spread of COVID-19. According to Silva *et al.*, social distancing is an important and necessary measure to arrest the spread of SARS-CoV-2 [3]. *Tabatabaeizadeh et al.*, in a meta-analysis, suggested that there is a relationship between face mask use and reduction in COVID-19 [4]. *Cheng et al.*, demonstrated that community-wide wearing of face masks might have contributed to the control of COVID-19 by minimizing the amount of emission of infected saliva and respiratory droplets from individuals with subclinical or mild COVID-19 symptoms [5]. On the basis of clinical findings, *Esposito S et al.*, were of the opinion that the universal use of face masks seems necessary when people have to go out in their everyday lives [6].

Apart from Covid-19 data multiple reports from different studies across the globe have inferred that the hand hygiene compliance rate has been estimated to be around 40% (*Erasmus et al., 2010*) while in critical care units it is up to 46.25% (*Bezerra et al., 2020*). Although this is a simple and lifesaving task, regrettably, it has not always been undertaken (*Doronina et al., 2017*). In the current pandemic situation, hand washing has been the main focus of attention therefore, we must ensure that it must be continued to lower viral transmission among the masses [7]. Maintaining high personal hygiene by the following handwashing and being vigilant of clinical signs is widely recommended to minimize the disease burden [8]. In order to prevent virus transmission, the Centre for Disease Control and Prevention (CDC) recommends frequent hand washing with soap and water [9]. However, primary parameters in practice for preventing the spread of the virus in the community are hand hygiene, social distancing and quarantine [10].

Hundreds of patients with different dental complaints visit the outpatient department (OPD) of University Dental Hospital (UDH) daily. These people are demographically distributed in various age groups, gender and varying educational qualifications. It has been commonly found that in the OPD, visitors have a diverse pattern of observance of displayed SOPs of COVID-19. It has also been discerned that some

visitors show the presence of one or more symptoms of COVID-19 including cough, fever, shortness of breath etc. Despite the clear display of SOPs at several places in the OPD and a clear endorsement at the entrance, it has been observed that some of the patients display gross negligence in regard to following them.

The rationale of this study was to understand the association between the observance of COVID-19 SOPs and the demographic characteristics of the patients visiting the dental OPD of UDH. The present study also demonstrated the coalition among the observance of SOPs by the visitors at public places, workplaces in the community and the prevalence of COVID-19-related symptoms at the time of visit to dental OPD of UDH. The findings will help to put system in place for recommended practice of Covid-19 SOPs at OPD of UDH. The aforementioned will also lead to decrease in the spread of Covid-19 at UDH that will ultimately create a safe work place for the visitors as well as for the dental faculty and staff.

MATERIALS AND METHODS

Non-probability convenient sampling technique was used to collect the data. Considering the overall population of 10,000 and confidence limits set at 5%, according to Open Epi v3 our sample size was 370 at a confidence level of 95%.

A descriptive quantitative cross-sectional study was conducted among the patients visiting the outpatient department of UDH Lahore. The inclusion criteria of the study participants was age ranging between 20 years to 69 years. Both genders and all levels of educational qualifications irrespective of prior compliance with SOPs of Covid-19 were selected. The corresponding age of the study population was further divided into 4 Groups; Group A ranging between “20-29” years, Group B “30-39” years, Group C “40-49” years and Group D “50-69” years of age. The participants with age range less than 20 years or more than 69 years visiting UDH were not included in the study.

The participants were assessed on the basis of a single as well as combination of SOP which include hand washing (HW), hand sanitization (HS), face masking (FM), Social Distancing (SD) and avoidance of touching nose and mouth (TCH N/M). Combinations of SOPs were labeled as combination-1 comprising of face mask and hand sanitization (FM+HS), and combination-2 includes FM+HS and social distancing (SD).

Data was collected following approval from institutional ethical review board (ERB). The duration of the study was 6 months starting from March 2021 to September 2021.

Data was collected from each participant in two steps. First step comprised of acquiring the responses from patients through a self-administered questionnaire consisting of two sections. First section consisted of demographic detail while second section contained four closed ended questions regarding adoption of Covid-19 SOPs at public place, work place or institute and hospital or clinical settings. In second step of data collection each patient was screened for Covid-19 screening elements through a performa containing 15 parameters.

The study was conducted to determine the association between adherence to SOPs and the presence of symptoms of COVID-19. Moreover, the relationship between coherence to SOPs and the demographic characteristics of the patients including age, gender and education status was also determined.

Informed consent was taken from each patient and the participants were seated in a comfortable, noise-free environment and provided with the questionnaire.

Data was analyzed by using SPSS version 25. The Chi-square test was applied to determine the association between the evaluated variables while the standard assumption of the aforementioned test was violated since we used the likelihood ratio to determine the associations. P-value of ≤ 0.05 was considered as statistically significant.

RESULTS

A total of 370 respondents participated in this study. The majority of participants belonged to group A (n=182, 49.1%) followed by group B (n=84, 22.7%) (Figure 1). Gender distribution of the of the study participants revealed that 52.2% of the participants were females and 47.8% were males.

It was noted that the majority of the population had a bachelor-level qualification (n=113, 30.5%) while the second largest group had a post-graduate level qualification (n=77, 20.8%) (Figure 2).

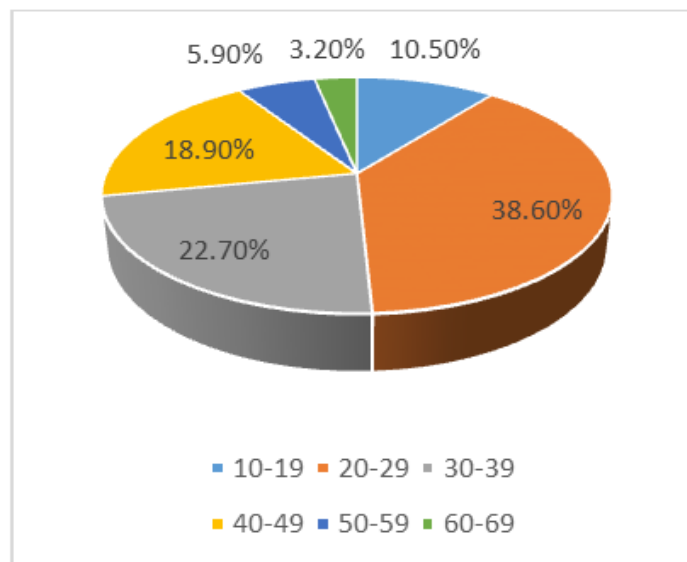


Figure 1: Percentage distribution of respondents among age

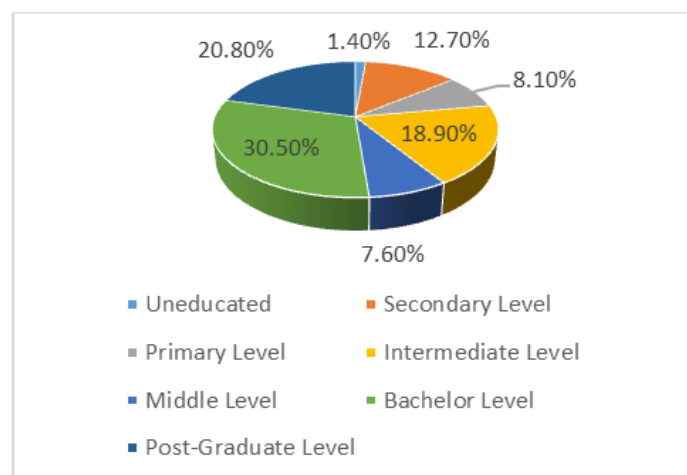


Figure 2: Percentage distribution of respondent according to the level of education**Observance of individual & combinations of SOPs at different places****1-Public Place**

With reference to the age of the study participant, it has been noticed that group D practiced the combination-2 of SOPs with the highest percentage in public places (n=19, 55.8%) and group C (n=32, 45.7%) was the least performer. The single SOP that was adopted the most by all age groups was face masking whereas group B followed the aforementioned parameter with the highest percentage of 33.3%(n=28). Adaptation of combination-2 of SOPs in a public place by all age groups was quite significant with a p-value of 0.026 which is shown in Table 1.

According to the gender distribution, females demonstrated the combination-2 of SOPs with the highest frequency in a public place (n=108, 56%) against the males (n=79, 44.6%) while the single SOP of face masking was best observed by the males. (n=50, 28.2%).

In terms of educational levels, above bachelor were amongst those who practiced the combination-2 of SOPs with maximum abeyance (n=48, 62.3%) followed by inter, bachelor, primary, secondary and middle level education holders respectively. Single SOP of face masking was practiced at maximum by middle educational level (n=15, 53.5%). Regardless of age, gender and educational levels of the participants, face masking was the most prioritized single SOP among all.

Table 1: Association of age, gender and education with adoption of COVID-19 SOPs at Public, Work/Institutional and Hospital/Clinical setups

	Age	Gender	Education
COVID-19 SOPs are you adopting while going to public place?	0.026*	0.133	0.00*
COVID-19 SOPs are you adopting at your workplace/study institute?	0.272	0.558	0.00*
COVID-19 SOPs are you adopting while going to hospital/clinics?	0.087	0.836	0.001*

Significant p-value $\leq 0.05^*$, where $>20\%$ cells have an expected count of less than 5, likelihood ratio was considered instead of Pearson Chi square value.

2-Work/Institutional Place

At the institutional level, group A was at first place amongst all age groups in observing the combination-2 of SOPs with a percentage of 52.7% (n=96) and group D was at the lowest place with a percentage of 41.1% (n=14). Face masking has been the first priority of single SOP where group B participants performed with exceeded 33.3% (n=28) of study attendants.

Female participants were amongst those who observed combination-2 of SOPs at the highest score in institutions with a percentage of 53% (n=10). On the other hand, males took first place in observance of the single SOP of face masking which was 26.6% (n=47).

In terms of educational levels, postgraduates with bachelors educational level were being at first place in the following combination-2 of SOPs (n=46, 59.7%). The single SOP of wearing a face mask was best practiced by the patients with middle-level education with a percentage of 57.1% (n=16).

3-Hospital/Clinical Setup

At the hospital and clinical setup group A practiced the combination-2 of SOPs with the highest percentage of 61.5% (n=112) and least percentage of 44.1% (n=15) observed by group D. Group C of the

study population performed best in practicing of single SOP of face masking comprising of 30% (n=21).

Gender results in terms of combination-2 of SOPs adaption demonstrated that females performed well with the majority of 55.4% (n=107). The best-practiced single SOP was face masking which males practiced with the majority comprising 26.5% (n=47) of the study population.

Educational level demonstrated that postgraduates practiced the combination-2 of SOPs with a higher percentage of 67.5% (n=52). Astonishingly single SOP i.e. face masking was best practiced (n=14, 40%) by the primary level qualified participants.

An interesting finding regarding educational status was found showing statistically significant results in terms of adoption of combination-2 of SOPs at all places with a p-value of p-0.00 at public place p-0.00 at workplace and p-0.001 at a hospital or clinical setups.

Observance of avoiding touching nose and mouth at different places

The screening element of avoiding touching the nose and mouth revealed a statistically significant association with age scoring a p-value of 0.013 as shown in Table 2.

Table 2: Distribution of respondents according to age,gender and education status and statistical association with COVID-19 symptoms

Symptoms	Age groups (Years)				p-value	Gender (n)		p-value	Educational Status (n)						p-value
	Group A(n)	Group B(n)	Group C(n)	Group D(n)		Male	Female		Primary	Middle	Secondary	Inter	Bach	>Bach	
Cold	11	2	4	3	0.441	9	11	0.794	2	1	1	7	7	2	0.368
Fever	12	3	5	1	0.593	11	10	0.668	1	0	2	6	8	4	0.361
Cough	22	7	6	5	0.628	19	21	0.964	4	3	1	10	14	8	0.432
SOB	10	4	1	0	0.143	7	8	0.926	1	2	2	3	5	2	0.941
Myalgia	15	3	6	2	0.466	9	17	0.162	3	4	3	3	8	5	0.717
Headache	37	12	13	4	0.498	28	38	0.331	6	3	9	11	24	13	0.822
Sore throat	13	6	5	0	0.458	13	11	0.521	2	2	2	6	6	6	0.921
Runny Nose	12	2	1	3	0.121	10	8	0.502	1	2	2	6	2	5	0.322
Taste Disorder	10	5	2	0	0.222	11	6	0.154	1	1	3	5	5	2	0.794
Olfactory Disorder	7	4	1	0	0.272	7	5	0.459	1	1	1	2	6	1	0.737
Vomit	7	2	1	0	0.359	6	4	0.646	1	1	2	4	2	0	0.226
Diarrhea	8	3	4	0	0.339	9	6	0.336	1	2	3	3	5	1	0.647
Exhaustion	16	4	6	5	0.355	8	23	0.010*	3	2	3	7	8	8	0.946
Contact with Suspected COVID+	5	4	0	0	0.082	3	6	0.378	1	0	0	3	2	3	0.373
Gathering attendance	22	9	6	1	0.412	22	16	0.190	3	3	2	7	15	8	0.628
Avoid Touching Nose & Mouth	113	48	37	11	0.013*	91	118	0.059	17	12	26	41	63	50	0.367

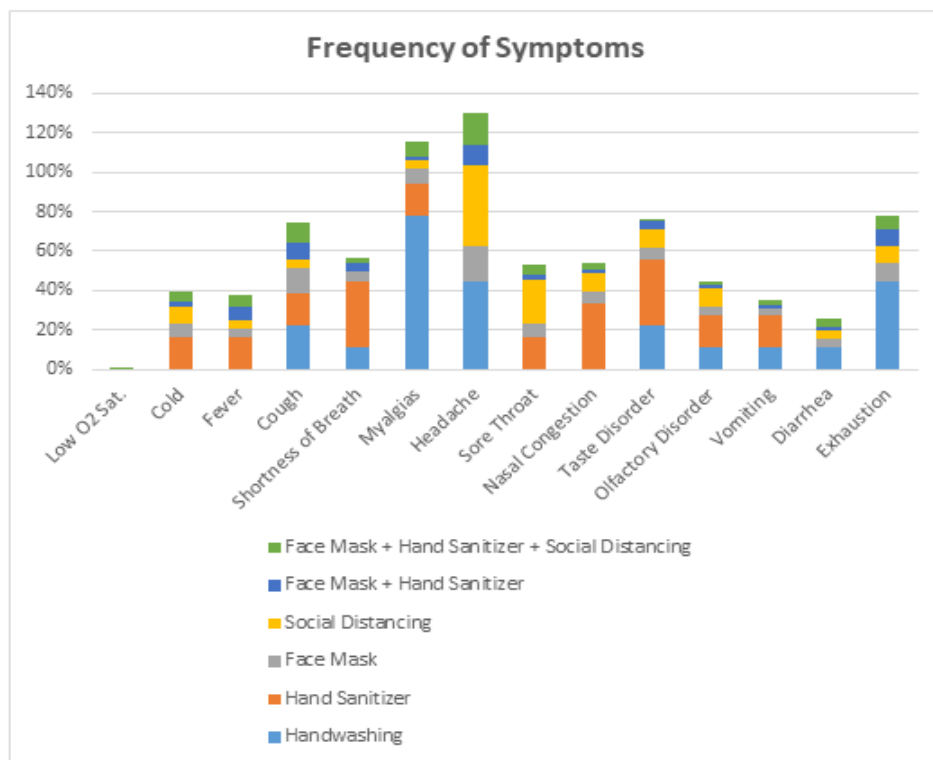


Figure 2: Frequency of COVID-19 symptoms in study participant who followed SOPs. Myalgia was most frequently seen in the respondents who followed handwashing. Cold-like symptoms, taste disorder and olfactory disorder were observed in respondents who followed hand sanitization. Headache was present among those who were following combination-1 of SOPs. Minimal symptoms were noticed in the population who were keenly observing combination-2 of SOPs

Distribution of COVID-19 symptoms in the respondents concerning observed SOPs

It has been observed that none of the symptoms turned out to be statistically significant in terms of age, gender and educational status of the patients apart from exhaustion which was statistically significant in terms of gender with a p-value of 0.010 shown in Table 2.

It has been observed that those study participants who were following the combination-1 of SOPs had an increased frequency of myalgia as compared to those who were following combination-2 of SOPs whereas headache had been the most observed symptom as in Figure 2.

Since it has been evident from Figure 2 that low oxygen saturation was the least reported symptom among the study participants. The possible reason of aforementioned observation could be the gravity of the symptoms is dealt as an emergency situation and requires an urgent hospitalization thus does not allow patient to attend any outpatient department.

DISCUSSION

The COVID-19 pandemic tremendously affected global health and the economy. It has become a great challenge for the whole world. Several institutions in every single sector crumbled due to the aftershocks brought forth by the pandemic. Governments and health organizations all over the world worked hard to implement effective measures, SOPs and policies to control COVID-19 cases in their respective regions. Accelerated viral transmission necessitates the implementation of effective measures and strategies for early diagnosis, prevention and treatment guidelines to cope with virus spread [11].

The purpose of the present study was to observe the difference in preference for COVID-19 SOPs among people belonging to different age groups, gender and educational status at different places that include public places, work/institutional places and hospital/clinical setups. There is good reason to believe that a bias will exist for compliance with a certain set of SOPs in a specific age group and gender class due to behavioral differences.

In the current study, it was observed that young people were among those who significantly practiced COVID-19 SOPs at clinics/hospitals (n=112, 61.5%), followed by 53.2% (n=97) at public place and 52.7% (n=96) work/institutional place. *Harriet et al* showed that younger individuals displayed greater compliance with COVID-19 SOPs which could be due to the realization of how non-compliant individuals were becoming the source of spread of infection, a fact highlighted by the use of social media [12].

Common perception regarding the Covid-19 infection emphasized the fact that it threatens mainly the older population especially those with co-morbidities. This could lead to a false safety message for younger people it has been reported 1% of hospitalization due to COVID-19 in China was among those following in age range of 20–29 years, and 3% from the age group of 30–39 years old [13, 14]. According to the United State National Health Survey, approximately one-third of young people are medically vulnerable to severe COVID-19 illness in the U.S [15]. This provides conclusive evidence that the young population is also at risk of experiencing severe symptoms from COVID-19.

In the current study, it was noticed that the overall adherence to the COVID-19 preventive measures was independent of the age group. However, adherence to single particular type of SOP of hand washing was age-dependent and the older subjects showed more adherence to it. *Barcenilla M et al.*, found that less knowledge was observed in the 18-29 years age group regarding hand hygiene (HH) which indicated that knowledge about HH increased after the progressing age due to re-enforcement of education [16]. This could explain increased compliance with hand hygiene amongst older individuals.

In terms of gender association with adoption of COVID-19 SOPs, it was revealed that the male proportion of the population showed more adherence to face masks at all places as compared to females. A possible explanation of female subservience was mentioned by a study published by *Anczyk S et al.*, which highlighted that women's skin was more sensitive and prone to skin-related problems therefore, wearing a face mask exacerbated acne more frequently in females as compared to males [17]. Due to the preferable aforementioned dermatological problems that could cause an aesthetic impairment, women may show less compliance with wearing face masks [18-20].

With regard to the educational levels of the population, it was found that low education level was associated with non-compliance [21, 22]. The majority of studies have demonstrated that a low level of education is directly associated with non-adoption of SOPs with educated status as less than a high school education increased the odds of non-adherence by 41% [23, 24]. In the current study, similar findings were observed that the higher the education level the more was the compliance with COVID-19 SOPs.

CONCLUSION

The study suggested that population following just single COVID-19 SOP of preventive protocol was at greater risk to experience COVID-19-related symptoms. While those who followed combination-1(HS+FM) of SOPs were less likely to develop symptoms than those who only followed a single SOP.

Additionally, the person who followed combination-2(HS+FM+SD) of SOPs had a lower chance of developing COVID-related symptoms.

The findings of this study indicate that observance of COVID-19 SOPs have impact of non-development of COVID-19 symptoms in patients visiting the UDH outpatient department. The adoption of COVID-19 SOPs and patients' educational status clearly correlate at all place however, there was no discernible connection between the SOPs' adoption and patients' gender. Patients with greater levels of education closely followed COVID-19 SOPs.

Strengths and Limitations:

The study provides helpful information pertaining to the importance of adherence to the COVID-19 SOPs in a bid to decrease the spread of infection in different settings of the community. Since the data had been collected from different age groups and educational status of the participants, it can allow organizations to develop an awareness program tailored to the specific population which displayed deficient compliance. However, the sample size of this study was limited and regional coverage of administrative constraints. Therefore, it was not possible to employ snowballing recruitment strategy to enhance the horizon of the study.

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Conflict of Interest: We have no conflict of interest to declare.

Authors Contributions:

AH conceived the study and contributed in manuscript writing. WA designed the study, supervised the project, constructed title and wrote abstract. RA gathered data, compiled it and presented the results through figures and tables. UJ reviewed and proofread the manuscript. ST performed data analysis. PB was responsible for interpretation of data. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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