Experience and Perceptions of Medical and Dental Interns on the Effects of the COVID-19 Pandemic on their Internship Program - A Questionnaire Based Study in Makkah Region of Saudi Arabia

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Authors’ contributions

This work was carried out in collaboration among all authors. Authors KS and OW conceptualized the study, formulated the study design with regard to this work and were also the principal investigators and primary authors of the manuscript. They also analyzed the collected data and coordinated with the statistician for the analysis of the data. Authors ATMM, ZNA, MHZ and MMK gathered the data, helped in analysis of these data and necessary inputs were given towards the designing of manuscript. All authors discussed the methodology and results and contributed to the final manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: COVID-19 is a highly infectious disease caused by an RNA virus belonging to a large family of coronaviruses. WHO declared COVID-19 as a public health emergency and classified it as a pandemic. The COVID-19 pandemic affected the medical education globally.

Aim of the Study: The aim of the study is to evaluate the impact of COVID-19 on the internship program.

Materials and Methods: A cross-sectional study was conducted among the medical and dental students of various universities in Makkah region of Saudi Arabia. A questionnaire consisting of 15
close ended, pre-tested questions was developed to determine the experiences and perceptions of medical and dental interns due to COVID-19. The data were tabulated and analyzed using SPSS version 21. Chi-square test was used to assess the experiences and perceptions among the Medical and Dental interns. P-value of less than 0.05 was considered statistically significant.

**Results:** The study included 453 participants, out of which 253 were dental interns and 200 were medical interns. 231 (51%) of male interns participated in this study and 222 (49%) female interns participated. 140 (55.6%) and 138 (69.3%) of the participants of the dental and medical interns respectively felt COVID-19 affected options to select specialties of their interest for post-graduation, whereas, 112 (44.4%) and 61 (30.7%) of the dental and medical interns felt other way.

**Conclusion:** Majority of the participants reported that COVID-19 did not affect them psychologically. In addition, most of the medical and dental interns felt covid -19 affected opinions to select specialties of their interest for post-graduation.

**Keywords:** COVID-19; interns; healthcare workers; higher education; pandemic.

1. INTRODUCTION

After graduation, medical and dental students pursue their careers with general practice or Postgraduate studies based on the available options. Generally they begin working at academic institutions or dental clinics. It is the opportunity for them to exhibit their skills and techniques and additionally acquire knowledge on recent advances in medicine or dentistry [1].

Career counselling is very important aspect for the medical and dental interns in pursuing their dreams. The interns gets benefited from the rotation policy and exposed to broader range of specialties, which indeed helps them to have broader career options. All medical and dental associations should help the institute to arrange career counselling and prepare medical and dental interns to face the challenges after graduation [2,3].

The novel corona virus COVID-19 has created major changes in everyday practice and activities worldwide. All of us are facing challenges in coping with this situation. All the education system has affected very badly especially higher education [4,5].

Medical and dental healthcare workers are at a higher risk of contracting this infectious disease constantly and oral health care settings may act as a means of disease transfer [6]. Additionally, study by Volgenant and de Soet J reported that the patients visiting dental clinic for routine check-up or other emergency treatments serve as a reservoir for the microorganisms that cause various infectious diseases, including COVID-19 [7].

The Public Health Administrators throughout the world [8,9] and specifically the Ministry of Health (MOH) in Saudi Arabia are actively working toward the control of spread of the COVID-19 by disseminating timely educational videos, educational brochures, and social media updates for health care practitioners and also for general population. Frequent hand sanitizing, following cough etiquettes, and using personal protective equipment’s (masks, gloves, eye shields etc.) have been encouraged. In addition, travel history of the patients has been added to the health charting, and contact information of a nearby tertiary hospital equipped with diagnostic tests and quarantine facilities for suspected cases are made available [10].

Due to the current pandemic situation, graduation is delayed for some of the medical and dental interns globally, which in turn influenced the medical care job market, job demand, manpower and financial issues and it is a major serious concern for most of the countries. Internship committee should plan in advance regarding alternative plan that enable medical and dental interns to obtain adequate experience, technique and skills [5,11,12].

Higher education in most of the affected countries such as China, continued with online activities and some countries like United States of America having online and on-site activities with all the precautionary measures such as wearing masks and physical distancing. [4,13]. All trainees did not have the necessary resources, such as technical requirements, which raise other issues of inequity of opportunities and a lack of organizational awareness of the long-term benefits of internships [14]. The healthcare sectors throughout the world initiated certain activities during COVID-19, such as E-Health,
pharmaceutical and medical supplies, and virtual healthcare and Teledentistry [15].

Although, many studies are conducted globally regarding the impact of COVID-19 on medical and dental education and internship program. Most of the researchers focused on nationwide study. Suzanne R conducted study for medical students in Philadelphia [16], Mansoor A et al., conducted study regarding impact of COVID-19 on pharmacy education in Saudi Arabia [17], Leonardo AF et al., conducted study to assess the Perception of medical interns about the internship during the COVID-19 pandemic in Peru [18] and Mir FAQ et al., conducted study to assess awareness among dental interns regarding COVID-19 in Saudi Arabia [19]. To our knowledge, limited studies have been performed in Makkah region of Saudi Arabia. That is why this study was proposed to evaluate the experience and perception of medical and dental interns in Makkah region of Saudi Arabia during COVID-19.

2. MATERIALS AND METHODS

A survey-based study was conducted among the medical and dental interns of Makkah region (Jeddah and Makkah) of Saudi Arabia. This study was conducted for 3 months from first of November 2020 till the end of January 2021. The non-probability convenience sampling technique was used for calculating the appropriate sample size. In this current study, we kept a 95% level of confidence and precision error of 5% and the sample size was selected based on the formula by Charan J and Biswas [20], (Z1-α/2P (1-P) d2 where Z1-α/2 = standard normal variate (at 5% type 1 error (P<0.05), it is 1.96 and at 1% type 1 error (p<0.01) P= expected proportion (400 participants including medical and dental interns) in population based on previous studies [21,22,23,24] for pilot studies and d= absolute error or precision. Sample size for our study was 453.

2.1 Inclusion and Exclusion Criteria’s

All the medical and dental interns (present and just passed the previous year) who were willing to participate in this study were included and those who were not willing to participate in this study were excluded.

A literature review was performed by the authors to validate the present cross-sectional study. Based on that, an open ended questionnaire was formulated in English and Arabic languages consisting of 15 questions. The questions were sourced from the previous studies [21,22,23]. Pilot study was conducted on 15 medical interns and 15 dental interns respectively in Makkah region. Based on the information received from the pilot study, authors reviewed the content of each question to make sure that study reflected appropriate phrasing and understanding and validation. The Cronbach’s alpha value has ranged from 0.75-0.78.

The closed ended questionnaire of 15 questions were constructed by the authors. First part of the questionnaire had 2 questions pertaining to demographic details (gender and age) of the participants and second part had 15 questions related to experiences and perceptions of medical and dental interns respectively. Questionnaires were sent to 600 medical and dental interns in Makkah region of Saudi Arabia. A covering letter was attached stating the instructions, rationale and purpose of the survey. All medical and dental interns were contacted and assured of confidentiality. The participants were allowed to select more than one answer, if they desired. All the participants filled the questionnaires online and submitted it. Approximately 10 days’ time was given for participants to fill the questionnaire. Reminder message was sent periodically to improve response rate. Altogether 453 medical and dental interns participated in this study and the response rate was 75.5%. Likert scale was used to measure the perceptions of medical and dental interns. Only completely filled questionnaires were considered for final data analysis.

Link for google form:
https://docs.google.com/forms/d/e/1FAIpQLScdQarQ8HWKe0q1uRw1Uwk7leE80NkKu2vK0j8bH1QvUziXdQ/viewform?usp=sf_link

2.2 Statistical Analysis

The data were tabulated and analyzed using the Statistical Package for the Social Sciences (SPSS) version 21 (SPSS Inc., Chicago, IL). Chi-square test was used to assess the experiences and perceptions among the medical and dental interns in Makkah region of Saudi Arabia on the effects of the COVID-19 pandemic on their internship program. P-value of less than 0.05 was considered statistically significant, and a p-value of less than 0.001 was considered strongly significant.
3. RESULTS

The study included 453 participants, out of which 253 were dental interns and 200 were medical interns. 231 (51%) of male interns participated in this study and 222 (49%) female interns participated. (Table 1). Age of the participants ranged from 25 to 28 years, out of which 112 (24.7) of them belongs to 25 years, 206 (45.5%) of them belongs to 26 years, 124 (27.4%) of them belongs to 27 years and 11 (2.4%) of them belongs to 28 years group (Table 2). Minimum age of the participants was 23 and maximum age of the participants was 26 years and mean age of the dental intern was 24.12 and medical interns was 24.02 (Table 3).

Based on the responses of the participants, 170 (67.2) and 119 (59.5%) of the dental and medical interns respectively felt distance education was sufficient for their pre-graduation information needs whereas 83 (32.8%) and 81 (40.5%) of the dental and medical interns felt other way. 167 (66.0%) and 128 (64.0%) of the participants of the dental and medical interns respectively reported that, did lot of activities during distance education, whereas 86 (34.0%) and 72 (36.0%) of the dental and medical interns reported other way.

So also, 197 (77.9%) and 145 (72.5%) of the participants of the dental and medical interns respectively felt they have enough awareness and experience to work during COVID-19, whereas, 53 (20.9%) and 55 (27.5%) of the dental and medical interns felt other way and 3 (1.2%) of the dental interns did not answer this question. 172 (68.0%) and 130 (65.0%) of the participants of the dental and medical interns respectively reported specific support was given by the mentors due to virus crisis, whereas, 81 (32%) and 70 (35.0%) of the dental and medical interns reported other way.

In addition, 183 (72.3%) and 145 (72.5%) of the participants of the dental and medical interns respectively felt they have enough awareness and experience to prevent the transmission of COVID-19 in the hospital, whereas, 69 (27.3%) and 55 (27.5%) of the dental and medical interns felt other way. 140 (55.6%) and 138 (69.3%) of the participants of the dental and medical interns respectively felt COVID-19 affected options to select specialties of their interest for post-graduation, whereas, 112 (44.4%) and 61 (30.7%) of the dental and medical interns felt other way. 192 (75.9%) and 141 (70.5%) of the participants of the dental and medical interns respectively reported that they could carry out clinical procedures on the patients during COVID-19 pandemic and 61 (24.1%) and 59 (29.5%) of the dental and medical interns reported other way.

Moreover, 130 (51.4%) and 114 (57.3%) of the participants of the dental and medical interns respectively reported that their attitude and communication with patients was same as before covid-19 and 123 (48.6%) and 85 (42.7%) of the dental and medical interns reported other way. 188 (74.3%) and 142 (71.0%) of the participants of the dental and medical interns respectively reported that the quarantine during the pandemic gave you more time to learn new things and develop a new skill and 65 (25.7%) and 58 (29.0%) of the dental and medical interns reported other way. 165 (65.2%) and 113 (56.5%) of the participants of the dental and medical interns respectively reported that the experiences related to covid-19 affected you psychologically and 86 (34.0%) and 87 (43.5%) of the dental and medical interns reported other way. 2 (0.8%) of the participants did not answer this question.

Additionally, 207 (81.8%) and 143 (72.2%) of the participants of the dental and medical interns respectively recommended infection control standards to be followed in this crisis and 46 (18.2%) and 55 (27.8%) of the dental and medical interns reported other way. 193 (76.3%) and 140 (70.4%) of the participants of the dental and medical interns respectively reported that the crisis affect your internship training and achievement of clinical skills and 60 (23.7%) and 59 (29.6%) of the dental and medical interns reported other way. 186 (73.5%) and 139 (69.5%) of the participants of the Dental and Medical interns respectively reported that COVID 19 made it difficult for you to study for your SLE examination and 67 (26.5%) and 61 (30.5%) of the dental and medical interns reported other way.

As well, 157 (62.3%) and 106 (53.0%) of the participants of the dental and medical interns respectively reported that the current crisis affecting your public health education level and 95 (37.7%) and 94 (47.0%) of the dental and medical interns reported other way. 119 (47.0%) and 82 (41.0%) of the participants of the dental and medical interns respectively preferred online
| Gender | Groups | Total |
|--------|--------|-------|
|        | Dental | Medical |       |
| Males  | Count  | 127    | 104   | 231   |
|        | %      | 50.2%  | 52.0% | 51.0% |
| Females| Count  | 126    | 96    | 222   |
|        | %      | 49.8%  | 48.0% | 49.0% |
| Total  | Count  | 253    | 200   | 453   |
|        | %      | 100.0% | 100.0%| 100.0%|

Chi-square value- 0.14
p value-0.703

| Age | Groups | Total |
|-----|--------|-------|
|     | Dental | Medical |       |
| 25  | Count  | 59     | 53    | 112   |
|     | %      | 23.3%  | 26.5% | 24.7% |
| 26  | Count  | 115    | 91    | 206   |
|     | %      | 45.5%  | 45.5% | 45.5% |
| 27  | Count  | 69     | 55    | 124   |
|     | %      | 27.3%  | 27.5% | 27.4% |
| 28  | Count  | 10     | 1     | 11    |
|     | %      | 4.0%   | .5%   | 2.4%  |
| Total| Count  | 253    | 200   | 453   |
|     | %      | 100.0% | 100.0%| 100.0%|

Chi-square value- 5.94
p value-0.11

| Groups | N    | Minimum | Maximum | Mean | Std. Deviation | p value |
|--------|------|---------|---------|------|----------------|---------|
| Dental | 253  | 23      | 26      | 24.12| .808           | 0.18    |
| Medical| 200  | 23      | 26      | 24.02| .750           |         |

To our knowledge, this study is the first to evaluate the experiences and perceptions of medical and dental interns during COVID-19. COVID-19 has affected many sectors globally, such as economy, healthcare and education [25]. Since most of the institutes had suspended all teaching activities, it was the medical and dental interns who were affected the most and their participation and responses were highly valuable as they are the future of medicine as well as dentistry. Our objective in the present study was therefore to try and ascertain how far affected internship program for medical and dental interns in Jeddah region of Saudi Arabia.

The participants of this study consisted of medical and dental interns of various Universities in Jeddah region of Saudi Arabia and investigated their experiences and perceptions during COVID-19. This study included 453 participants, out of which 253 were dental interns and 200 were medical interns. 51% of male interns participated in this study and 49% female interns participated. Age of the participants ranged from 25-28 years and mean age of the dental intern was 24.12 and medical interns was 24.02.
Table 4. Distribution of the responses

| Questions                                                                 | Responses | Groups |          | Total | Chi-square value | p value |
|---------------------------------------------------------------------------|-----------|--------|----------|-------|------------------|---------|
|                                                                           |           | Dental | Medical  |       |                  |         |
| 1. Was distance education sufficient for your pre-graduation information   | Yes       | Count  | 170      | 119   | 289              | 2.86    | 0.09|
| needs?                                                                    |           | %      | 67.2%    | 59.5% | 63.8%            |         |
|                                                                           | No        | Count  | 83       | 81    | 164              |         |
|                                                                           |           | %      | 32.8%    | 40.5% | 36.2%            |         |
| 2. Did you do lot of activities during distance education?                 | Yes       | Count  | 167      | 128   | 295              | 0.19    | 0.65|
|                                                                           |           | %      | 66.0%    | 64.0% | 65.1%            |         |
|                                                                           | No        | Count  | 86       | 72    | 158              |         |
|                                                                           |           | %      | 34.0%    | 36.0% | 34.9%            |         |
| 3. Do you think you have enough awareness and experience to work during    | Yes       | Count  | 197      | 145   | 342              | 0.19    | 0.65|
| covid 19?                                                                 |           | %      | 77.9%    | 72.5% | 75.5%            |         |
|                                                                           | No        | Count  | 53       | 55    | 108              |         |
|                                                                           |           | %      | 20.9%    | 27.5% | 23.8%            |         |
|                                                                           | Unanswered| Count   | 3        | 0     | 3               |         |
|                                                                           |           | %      | 1.2%     | 0.0%  | .7%              |         |
| 4. Was there a specific support given to interns suffering from stress    | Yes       | Count  | 172      | 130   | 302              | 0.44    | 0.5 |
| due to the virus crisis where you do your internship?                     |           | %      | 68.0%    | 65.0% | 66.7%            |         |
|                                                                           | No        | Count  | 81       | 70    | 151              |         |
|                                                                           |           | %      | 32.0%    | 35.0% | 33.3%            |         |
| 5. Do you think you have enough awareness and experience to prevent covid   | Yes       | Count  | 183      | 145   | 328              | 0.79    | 0.67|
| 19 pandemic will affect your options to select specialties of your         |           | %      | 72.3%    | 72.5% | 72.4%            |         |
| interest for post-graduation?                                             | No        | Count  | 69       | 55    | 124              |         |
|                                                                           |           | %      | 27.3%    | 27.5% | 27.4%            |         |
|                                                                           | Unanswered| Count   | 1        | 0     | 1               |         |
|                                                                           |           | %      | .4%      | 0.0%  | .2%              |         |
| 6. Do you think covid-19 pandemic will affect your options to select        | Yes       | Count  | 140      | 138   | 278              | 8.94    | 0.003*|
| specialties of your interest for post-graduation?                         |           | %      | 55.6%    | 69.3% | 61.6%            |         |
|                                                                           | No        | Count  | 112      | 61    | 173              |         |
|                                                                           |           | %      | 44.4%    | 30.7% | 38.4%            |         |
| 7. Do you think you can carry out clinical                                 | Yes       | Count  | 192      | 141   | 333              | 1.66    | 0.19|
|                                                                          |           | %      | 71.9%    | 52.6% | 63.8%            |         |
| Questions                                                                 | Responses | Groups          | Total     | Chi-square value | p value |
|--------------------------------------------------------------------------|-----------|-----------------|-----------|------------------|---------|
| procedures on the patient during covid-19 pandemic?                      | No        | Dental          | Medical   | Total            |         |
|                                                                          | %         | 75.9%           | 70.5%     | 73.5%            |         |
|                                                                          | Count     | 61              | 59        | 120              |         |
|                                                                          | %         | 24.1%           | 29.5%     | 26.5%            |         |
| 8- Do you think your attitude and communication with patients will be same as before covid-19? | Yes       | Count           | 130       | 114              | 244     | 1.56   | 0.21   |
|                                                                          | %         | 51.4%           | 57.3%     | 54.0%            |         |
|                                                                          | No        | Count           | 123       | 85               | 208     |         |         |
|                                                                          | %         | 48.6%           | 42.7%     | 46.0%            |         |
| 9- Do you think the quarantine during the pandemic gave you more time to learn new things and develop a new skill? | Yes       | Count           | 188       | 142              | 330     | 0.61   | 0.43   |
|                                                                          | %         | 74.3%           | 71.0%     | 72.8%            |         |
|                                                                          | No        | Count           | 65        | 58               | 123     |         |         |
|                                                                          | %         | 25.7%           | 29.0%     | 27.2%            |         |
| 10-Do you think the experiences related to covid-19 affected you psychologically? | Yes       | Count           | 165       | 113              | 278     | 5.6    | 0.06   |
|                                                                          | %         | 65.2%           | 56.5%     | 61.4%            |         |
|                                                                          | No        | Count           | 86        | 87               | 173     |         |         |
|                                                                          | %         | 34.0%           | 43.5%     | 38.2%            |         |
| Unanswered                                                               | Count     | 2               | 0         | 2                |         |        |        |
|                                                                          | %         | .8%             | 0.0%      | .4%              |         |
| 11-Did you know the recommended infection control standards to be followed in this crisis? | Yes       | Count           | 207       | 143              | 350     | 5.88   | 0.015* |
|                                                                          | %         | 81.8%           | 72.2%     | 77.6%            |         |
|                                                                          | No        | Count           | 46        | 55               | 101     |         |         |
|                                                                          | %         | 18.2%           | 27.8%     | 22.4%            |         |
| 12. Did the crisis affect your internship training and achievement of clinical skills? | Yes       | Count           | 193       | 140              | 333     | 2.02   | 0.15   |
|                                                                          | %         | 76.3%           | 70.4%     | 73.7%            |         |
|                                                                          | No        | Count           | 60        | 59               | 119     |         |         |
|                                                                          | %         | 23.7%           | 29.6%     | 26.3%            |         |
| 13. Did COVID 19 made it difficult for you to study for your SLE examination? | Yes       | Count           | 186       | 139              | 325     | 0.88   | 0.34   |
|                                                                          | %         | 73.5%           | 69.5%     | 71.7%            |         |
|                                                                          | No        | Count           | 67        | 61               | 128     |         |         |
|                                                                          | %         | 26.5%           | 30.5%     | 28.3%            |         |
| 14. Do you think the current crisis affecting                             | Yes       | Count           | 157       | 106              | 263     | 3.96   | 0.046* |
| Questions                                      | Responses | Groups | Total | Chi-square value | p value |
|------------------------------------------------|-----------|--------|-------|------------------|---------|
| your public health education level?            | No        | 62.3%  | 53.0% | 58.2%            |         |
|                                               | %         | Count  |       |                  |         |
|                                               |           | 95     | 94    | 189              |         |
|                                               |           | 37.7%  | 47.0% | 41.8%            |         |
| 15 Do you prefer online learning experience    | Yes       |        |       | 1.64             | 0.19    |
| over hands on experience?                     | %         | Count  |       |                  |         |
|                                               |           | 47.0%  | 41.0% | 44.4%            |         |
|                                               | No        |        |       |                  |         |
|                                               | %         | Count  |       |                  |         |
|                                               |           | 53.0%  | 59.0% | 55.6%            |         |
| *significant                                  |           |        |       |                  |         |
susceptible to the risk of infection diseases [33]. Experienced students are likely to be more stringent in following control procedures. Thus, the knowledge about microorganisms is critical in preventing contamination of various body fluids. Dentists, dental students, and auxiliary staff are at more risk of spreading infection [31]. The key to preventing contamination is the strict adherence to infection control procedures. When removing blood or other body fluids, proper personal protective equipment (PPE) is essential. Medical masks, and face shields are required. When removing contaminated PPE such as gowns, gloves, medical masks, and face shield in high-risk settings, it is necessary to follow strict safety regulations to prevent further contamination and spread of infection [31]. Dentists, dental students, and auxiliary staff are at a higher risk of encountering pathogens transmitted through blood or other body fluids than the normal population [32]. The key to reducing and preventing contamination of various microorganisms is strict adherence to infection control procedures. Thus, the knowledge about and attitudes towards infectious diseases of students who have started patient treatment procedures in the clinic are very important. Less experienced students are likely to be more susceptible to the risk of infection diseases [33].

In addition, most of the participants reported that pandemic affected options to select specialties of their interest for post-graduation and reported that recommended infection control standards to be followed in this crisis and the current crisis affecting your public health education level. All these results were statistically significant. Amal AA, in her study reported that, investigated the factors influencing career choices and specialty preferences for 5th, 6th year dental students and interns and the findings of these studies have helped education providers to tailor specialty programs to the preference of graduates [34]. Gupyi Y et al., reported in their study that, a minority of healthcare professionals and medical students regretted their career choices during the COVID-19 outbreak. Enhance personal psychological resilience and professional value would helpful to reduce career choice regret among healthcare professionals and students during pandemic [35]. Abdul S et al., in their study reported that, the dental residents were found to be dissatisfied with their career compared with medical graduates. Better job perspectives and better placements need to be created. Endorsement of effective policies is required [36]. Hanadi S L et al., reported in their study that, a considerable percentage of dental students their college are anxious and changed their hygienic and social habits due to COVID-19. This anxiety reflects worries about the dental profession in one-third of participants that necessitate counselling services and psychological support [37].

Additionally, most of them reported that the experiences related to covid-19 affected them psychologically. All these results are statistically not significant. Abdul Majeed and Moath S A, reported in their study that, during the early days of the pandemic, nearly one-fourth of students experienced moderate to severe symptoms of PTSD. Their findings could help guide schools and universities in implementing a clear, effective strategy for students to navigate the coming academic year and expand the efforts made on academic and psychological counseling, especially for the vulnerable populations [38]. Sanjeev K and Abdul Mohsen A, reported in their study that, the outbreak of COVID-19 pandemic has affected the mental health of dental interns. The presence of depression, anxiety, and stress among dental interns highlights the need for special intervention and support programs to promote mental health and well-being among dental interns [39]. Zaki H et al., reported in their study that, the presence of elevated levels of

24.02 respectively. Bassel T et al. and Khalifa S A et al. reported in their studies that, 177 dentists participated out of 627 and response rate was 28.2% and 287 dental practitioners out of 1000 and response rate was 28.7% respectively [26,27]. Whereas Zaki H et al. in their study reported that mean age of participants was 21.76 and 54.7% of the participants were females [28].

With regards to distance education, our survey observed that most of the participants felt sufficient for their pre-graduation information needs and they have enough awareness and experiences to work during COVID-19. Mahmoud A, in his study concluded that, with advances in technologies and social media, distance learning is a new and rapidly growing approach for undergraduate, postgraduate, and health care providers. It may represent an optimal solution to maintain learning processes in exceptional and emergency situations such as COVID-19 pandemic. Technical and infrastructural resources reported as a major challenge for implementing distance learning, so understanding technological, financial, institutional, educators, and student barriers are essential for the successful implementation of distance learning in medical education [29]. Mohammed S A et al., reported in their study that, the survey of this study showed results that more than 90% of the dental students have good knowledge about COVID-19 pandemic and dentistry. The dental students are well aware of the protocol to be followed during the dental practices [30].

For prevention and control of infectious disease in healthcare settings, healthcare workers should place a high value on safely putting on, removing and disposing PPE. When removing contaminated PPE such as gowns, gloves, medical masks, and face shield in high-risk settings, it is necessary to follow strict safety regulations to prevent further contamination and spread of infection [31]. Dentists, dental students, and auxiliary staff are at more risk of encountering pathogens transmitted through blood or other body fluids than the normal population [32]. The key to reducing and preventing contamination of various microorganisms is strict adherence to infection control procedures. Thus, the knowledge about and attitudes towards infectious diseases of students who have started patient treatment procedures in the clinic are very important. Less experienced students are likely to be more susceptible to the risk of infection diseases [33].
depression, anxiety and stress among dental students highlights the need for psychological empowerment strategies involving institutional counseling services [28].

5. LIMITATIONS OF THE STUDY

There are a few limitations of the study. The present study was an online survey, so there was a possibility of reporting bias. This study is pertaining to the Makkah region of Saudi Arabia and it is advised to include wider regions for the survey to get a broader perspective.

6. CONCLUSION

Within the limitations of the study, it was concluded that, most of the participants of our study reported that, distance education was sufficient for pre-graduation information needs and majority of the participants felt covid -19 affected opinions to select specialties of their interest for post-graduation. This study provide a platform to aid and facilitate the development of internship programs in the near future in the event of continued covid crisis.

CONSENT

As per international standard or university standard, Participants’ written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

This research project was approved by the ethics committee of the Ibn Sina National College for Medical studies, Jeddah with ethical approval number H-11-19102020.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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