

|   |
|---|
| <b>Access this article online</b>   |
| Quick Response Code:  |
|  |
| Website:<br><a href="http://www.jehp.net">www.jehp.net</a>                        |
| DOI:<br>10.4103/jehp.jehp_939_20  |

# Oral health practitioners' knowledge, attitude, and awareness about coronavirus: A systematic review and meta-analysis

Abdosaleh Jafari, Mohammadtaghi Mohammadpour<sup>1</sup>, Arash Ghanbarzadegan<sup>2</sup>, Giampiero Rossi-Fedele<sup>3</sup>, Peivand Bastani

Health Human Resources Research Center, School of Management and Medical Informatics, Shiraz University of Medical Sciences, Shiraz, Iran, <sup>1</sup>Department of Health Care Management and Health Economics, Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran, <sup>2</sup>Australian Research Centre for Population Oral Health, Adelaide Dental School, University of Adelaide, Adelaide 5000 SA, Australia, <sup>3</sup>Department of Endodontics, Faculty of Health and Medical Sciences, Adelaide Dental School, University of Adelaide, Adelaide, South Australia, Australia

## Address for correspondence:

Prof. Peivand Bastani, Health Human Resources Research Center, School of Health Management and Medical Informatics, Shiraz University of Medical Sciences, Shiraz, Iran.  
E-mail: [bastanip@sums.ac.ir](mailto:bastanip@sums.ac.ir)

Received: 09-08-2020  
Accepted: 21-08-2020  
Published: 28-01-2021

## Abstract:

**BACKGROUND:** Oral health practitioners are at the frontline of infection, particularly with respiratory viruses such as the novel coronavirus. Knowledge, awareness, and attitude of these workers are considered important in preventing and controlling the outbreak. This study aims to review the literature to provide a better understanding of the status of dentists and other oral health practitioners' knowledge, attitude, and awareness about COVID-19.

**METHODS:** A systematic review was conducted through Web of Science, PubMed, Scopus, and ProQuest up to May 6, 2020. All the knowledge, attitude, and practice studies on oral health workers about respiratory contagious outbreak the same as severe acute respiratory syndrome, Middle East respiratory syndrome, and COVID-19 were included in the meta-analysis.

**RESULTS:** A total of eleven studies were included in the meta-analysis. 85.5% of the dentists and oral health practitioners had a high level of awareness about virus transmission modes (95% confidence interval [CI]: 78.6%–92.4%;  $P < 0.001$ ). 80.7% of the oral health practitioners gave right answers to the questions related to virus transmission modes (95% CI: 69.9%–91.4%;  $P < 0.001$ ), and 79.9% of the dentists had a positive attitude about virus transmission modes (95% CI: 66.4%–93.4%;  $P < 0.001$ ).

**CONCLUSION:** This meta-analysis shows that the level of dentists and oral health practitioners' knowledge, awareness, and attitude was relatively high about the respiratory contagious diseases as well as COVID-19. The present results can shed further light for policymakers to support the best evidence medical education for all health-care workers the same as oral health practitioners. Preventing the dissemination of misinformation along with preparing comprehensive guidelines can be considered by the oral health policymakers, particularly in the more infected regions.

## Keywords:

COVID-19, dentist, health promotion, knowledge, attitude, and practice study, meta-analysis, oral health practitioner, respiratory contagious outbreaks

## Introduction

The novel coronavirus (severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2]) that makes COVID-19 originating from China in 2019 is now spread worldwide, and the World Health Organization has announced it as a global pandemic on March 11, 2020.<sup>[1]</sup> Health-care

practitioners are considered as the frontline of the disease as they are vulnerable to the infection from many airborne or contact ways. Among these workers, risk of infection may be higher among practitioners who work in close physical distances to the patients the same as ophthalmologists and dentists.<sup>[2]</sup> Dentists and other oral health practitioners, such as dental technicians and

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: [WKHLRPMedknow\\_reprints@wolterskluwer.com](mailto:WKHLRPMedknow_reprints@wolterskluwer.com)

**How to cite this article:** Jafari A, Mohammadpour M, Ghanbarzadegan A, Rossi-Fedele G, Bastani P. Oral health practitioners' knowledge, attitude, and awareness about coronavirus: A systematic review and meta-analysis. *J Edu Health Promot* 2021;10:39.

dental hygienists as the allied oral health practitioners, are more vulnerable because of their direct contact with the respiratory aerosols of patients infected with new coronavirus.<sup>[3]</sup> In this regard, Felice *et al.* have claimed that health-care workers can be considered as a vehicle for transmission of the disease to patients, work colleagues, or family members<sup>[4]</sup> and dentists are not exceptions in such a condition.

Assessment of the knowledge and awareness of these workers about the ways of transmission and control of the disease is, therefore, crucial. In this regard, many efforts have been devoted to provide clear and convenient guidelines for managing dental patients and put dentists and other oral health practitioners safe at lower risk.<sup>[5]</sup> At the same time, evidence shows that not only the accurate and available knowledge of health-care workers can play an important role in managing the outbreaks, but also the misinformation flow during epidemic or pandemic outbreak can complicate the condition for health-care workers and health policymakers.<sup>[6]</sup>

In addition to the importance of oral health workers' knowledge and information about the nature of COVID-19 outbreak, their attitude and practice should be understood. Ahmed *et al.* stated that about 87% of their studied participants from 30 different countries have reported fear or attitude of getting infected with new coronavirus from either their patients or other coworkers.<sup>[7]</sup> Similarly, Khader *et al.* have confirmed that most of the dentists in their study believed that awareness about the nature of the virus spread may lead to the particular attitudes and practices, such as requesting the dental patients to sit far from each other, using masks in the waiting rooms, and handwashing before sitting in the dental chair.<sup>[8]</sup>

Based on the above, the present study reviewed systematic publications examining the oral health practitioners' knowledge, awareness, and attitude (knowledge, attitude, and practice [KAP] studies) about respiratory contagious diseases such as SARS, Middle East respiratory syndrome (MERS), and COVID-19. To the best of our knowledge, no previous study has systematically reviewed the papers examining the oral health practitioners' knowledge, awareness, and attitude (KAP studies) about respiratory contagious diseases. The results of this review can help decision-makers in developing guidelines for the coronavirus management in dentistry.

## Methods

This was a systematic review and meta-analysis study that was conducted in 2020. The time period for searching the databases was up to May 6, 2020, without the initial date limitation.

## Literature search

Cross-sectional observational studies investigating the KAP of respiratory contagious diseases the same as SARS, MERS, and COVID-19 were included.

Four databases of Web of Science, PubMed, Scopus, and ProQuest were searched systematically according to the keywords indicated in the search strategy up to May 6, 2020 [Table 1]. Google Scholar was searched at the final step according to the full-text articles.

The PICO criteria were defined as follows:

- Population: All the articles that studied knowledge, attitude, and awareness of oral health workers about respiratory contagious outbreaks in English language
- Intervention: Not restricted
- Comparisons: Not restricted
- Outcomes: The mean level of the oral health-care workers' knowledge, attitude, and awareness about respiratory contagious outbreaks.

## Inclusion and exclusion criteria

The retrieved articles were reviewed by their titles, and after removal of the duplicates (42 articles), the abstracts were assessed. Finally, ten articles in English language and one in Chinese were included. English full texts were read in full, whereas the necessary data were extracted from the abstract for the study in Chinese. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis flowchart [Figure 1] shows the process of retrieving and including the articles. Endnote X7.1, by Thomson Reuters, was used for managing the above process.

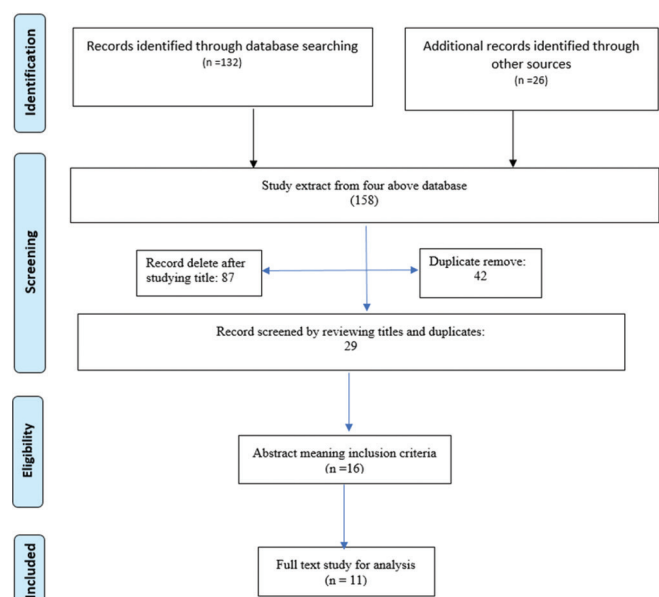


Figure 1: Preferred Reporting Items for Systematic Reviews and Meta-Analysis flowchart of the systematic review

**Table 1: The systematic search strategy**

| Databases | Key words  |
|-----------|--|
| PubMed    | ((((("Knowledge"[Mesh] OR "Health Knowledge, Attitudes, Practice"[Mesh]) OR ("Attitude"[Mesh] OR "Attitude of Health Personnel"[Mesh] OR "Attitude to Health"[Mesh] )) OR "Awareness"[Mesh]) OR "Behavior"[Mesh])) AND ((((((("Dentists"[Mesh] OR "Dentists, Women"[Mesh]) OR "Specialties, Dental"[Mesh]) OR "Dental Technicians"[Mesh]) OR "Dental Care"[Mesh]) OR "Dental Hygienists"[Mesh]) OR "Dental Prosthesis"[Mesh]) OR "Oral Health"[Mesh])) AND (((("COVID-19" [Supplementary Concept]) OR "SARS Virus"[Mesh]) OR "Influenza, Human"[Mesh]) OR ("Coronavirus Infections"[Mesh] OR "Middle East Respiratory Syndrome Coronavirus"[Mesh] ))   |
| SCOPUS    | TITLE-ABS-KEY(Attitudes) OR TITLE-ABS-KEY(Opinion) OR TITLE-ABS-KEY("Health Attitude") OR TITLE-ABS-KEY("Health Attitudes") OR TITLE-ABS-KEY(Knowledge) OR TITLE-ABS-KEY(Practice) OR TITLE-ABS-KEY("Staff Attitudes") OR TITLE-ABS-KEY(Awareness) OR TITLE-ABS-KEY("Situation awareness") AND TITLE-ABS-KEY(Dentist) OR TITLE-ABS-KEY(Prosthodontist) OR TITLE-ABS-KEY("Pediatric Dentists") OR TITLE-ABS-KEY(Periodontists) OR TITLE-ABS-KEY(Periodontist) OR TITLE-ABS-KEY("Restorative Dentists") OR TITLE-ABS-KEY("Dental Specialties") OR TITLE-ABS-KEY("Dental Technician") OR TITLE-ABS-KEY("Dental Hygienist") OR TITLE-ABS-KEY("dental care") AND TITLE-ABS-KEY("COVID-19 pandemic") or TITLE-ABS-KEY(COVID19) OR TITLE-ABS-KEY("SARS-CoV-2 infection") OR TITLE-ABS-KEY("2019-nCoV infection") OR TITLE-ABS-KEY(SARS-CoV) or TITLE-ABS-KEY("SARS Coronavirus") OR TITLE-ABS-KEY("SARS Related Coronavirus") OR TITLE-ABS-KEY("SARS-Associated Coronavirus") OR TITLE-ABS-KEY("Coronavirus Infection") OR TITLE-ABS-KEY("Middle East Respiratory Syndrome") OR TITLE-ABS-KEY(MERS) OR TITLE-ABS-KEY(MERS-CoV) OR TITLE-ABS-KEY("Human Influenzas") OR TITLE-ABS-KEY(Influenza) |
| WOS       | #1<br>TS=("COVID-19pandemic")ORTS=(COVID-19)ORTS=("SARS-CoV-2infection")ORTS=("2019-nCoVinfection")ORTS=(SARS-CoV) ORTS=("SARSCoronavirus")ORTS=("CoronavirusInfection")ORTS=(Coronavirus)ORTS=(MERS)ORTS=("MiddleEastRespiratory Syndrome") OR TS=(MERS-CoV) OR TS=("Human Influenzas") OR TS=(Influenza)<br>#2<br>TS=(Dentist)ORTS=(Dentists)ORTS=(Prosthodontist)ORTS=("PediatricDentists")ORTS=(Periodontists)ORTS=(Periodontist)OR TS=("Dental Specialties") OR TS=("Dental Technician") OR TS=("Dental Hygienist") OR TS=("dental care") OR TS=("oral health")<br>#3<br>TS=(Attitudes) OR TS=(Opinion) OR TS=("Health Attitudes") OR TS=(Knowledge) OR TS=(Practice) OR TS=("Staff Attitudes") OR TS=(Awareness) OR TS=(Behavior)<br>#1 AND #2 AND #3  |
| PROQUEST  | Set#: S26<br>Searched for:ab(dentist)ORab(prosthodontist)ORab("oralhealth")ORab("DentalHygienist")ORab(Periodontists)ORab(Periodontist) OR ab("Restorative Dentists") OR ab("Dental Specialties") OR ab("Dental Technician") OR ab("dental care")<br>Set#: S27<br>Searched for:ab(COVID-19)ORab("SARS-CoV-2infection")ORab("2019-nCoVinfection")ORab(SARS-CoV)ORab("SARSCoronavirus") OR ab("Coronavirus Infections") OR ab("Middle East Respiratory Syndrome") OR ab(mers) OR ab(MERS-CoV) OR ab(Influenza)<br>Set#: S29<br>Searched for: ab(Attitudes) OR ab(opinion) OR ab("attitude health") OR ab("staff attitudes") OR ab(Awareness) OR ab("Situation Awareness") OR ab(Knowledge) OR ab(Behavior)<br>Searched for: S29 AND S27 AND S26  |

### Data extraction

Data extraction form was used to tabulate the relevant data extracted from the articles. This form included: the author, the year of publication, study design, study place, sample size, outcome, and the questionnaires that were used in the original included articles.

### Statistical analysis

The included studies were combined according to their sample size, mean, and standard deviation. The heterogeneity of the studies was examined by applying Cochrane’s Q-test and  $I^2$  statistics. Random-effects model was used to combine those studies with heterogeneity (Cochrane’s  $Q P < 0.10$  and  $I^2 > 50\%$ ).<sup>[9]</sup> The variable of practice was excluded from the meta-analysis because only 2 studies were indicating this variable that had the inclusion criteria to the meta-analysis. Data were analyzed by applying a Comprehensive meta-analysis (version 2).

### Results

The results of the systematic review are presented in Table 2. As Table 2 shows, 11 studies were finally included. Among these articles, all had a cross-sectional design and most of them (72.7%) were published after 2015. Three of the manuscripts have focused on COVID-19, four articles are related to the flu, and the others have concentrated on MERS. Those manuscripts related to COVID-19 had the greatest sample size and the multinational approach. In contrast, the other studies were conducted nationally with smaller sample sizes.

The results of the meta-analysis were presented separately for knowledge, awareness, and attitude. Figure 2 shows the awareness of dentists about the modes of virus transmission the same as sneezing, coughing, shaking hands, and contacting infected surfaces. According to Figure 2, 85.5% of the dentists

**Table 2: Characteristics of studies on oral health practitioners' knowledge, attitude, and awareness about coronavirus**

| Author (reference number)                  | Year | Study design    | Study location                          | Disease        | Sample size | Focus group                 | outcome                             |
|--|------|-----------------|---|----------------|-------------|-----------------------------|-------------------------------------|
| Ahmed <i>et al.</i> <sup>[7]</sup>         | 2020 | Cross-sectional | 30 different countries across the world | COVID-19       | 650         | Dentists                    | Fear and practice                   |
| Khader <i>et al.</i> <sup>[8]</sup>        | 2020 | Cross-sectional | Jordan                                  | COVID-19       | 368         | Dentists                    | Awareness, perception, and attitude |
| Kamate <i>et al.</i> <sup>[10]</sup>       | 2020 | Cross-sectional | Multinational                           | COVID-19       | 860         | Dental practitioners        | Knowledge, attitudes, and practice  |
| Singh <i>et al.</i> <sup>[11]</sup>        | 2019 | Cross-sectional | India                                   | H1N1 Influenza | 255         | Dental health professionals | Knowledge and awareness             |
| Althomairy <i>et al.</i> <sup>[12]</sup>   | 2017 | Cross-sectional | Saudi Arabia                            | MERS-CoV       | 202         | Dental health professionals | Knowledge and attitude              |
| Nerli <i>et al.</i> <sup>[13]</sup>        | 2017 | Cross-sectional | India                                   | swine flu      | 133         | Dental surgeons             | Knowledge and attitude              |
| Gaffaret <i>et al.</i> <sup>[14]</sup>     | 2016 | Cross-sectional | Saudi Arabia                            | MERS-CoV       | 423         | Dentists                    | Knowledge and practice              |
| Kharmat <i>et al.</i> <sup>[15]</sup>      | 2015 | Cross-sectional | Saudi Arabia                            | MERS-CoV       | 200         | Dental students             | Knowledge                           |
| Abdul Baseer <i>et al.</i> <sup>[16]</sup> | 2013 | Cross-sectional | Saudi Arabia                            | MERS           | 406         | Dental health professionals | Knowledge, attitude, and practice   |
| Hyang-Nim <i>et al.</i> <sup>[17]</sup>    | 2010 | Cross-sectional | China                                   | H1N1 Influenza | 279         | Dental hygiene students     | Awareness, attitude                 |
| Kaipa <i>et al.</i> <sup>[18]</sup>        | 2009 | Cross-sectional | India                                   | Influenza      | 220         | Dental practitioners        | Knowledge and attitude              |

with confidence interval [CI] = 95% had a high level of awareness about virus transmission modes (95% CI: 78.6%–92.4%;  $P < 0.001$ ).

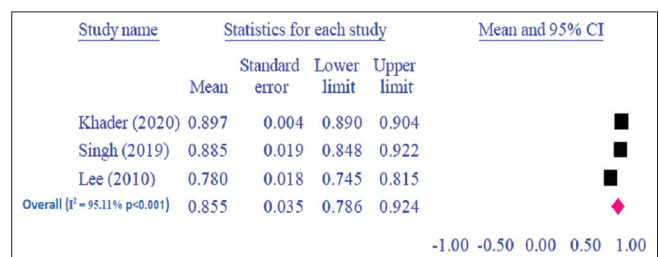
Figure 3 indicates the dentists' knowledge about virus transmission modes. As Figure 2 presents, 80.7% of the dentists with CI = 95% gave the correct answers to the questions related to virus transmission modes (95% CI: 69.9%–91.4%;  $P < 0.001$ ).

Figure 4 represents the attitude of the dentists about the protective guidelines against the virus, like continuous handwashing, social distancing, and mask wearing. According to Figure 4, 79.9% of the dentists had a positive attitude about virus transmission modes (95% CI: 66.4%–93.4%;  $P < 0.001$ ).

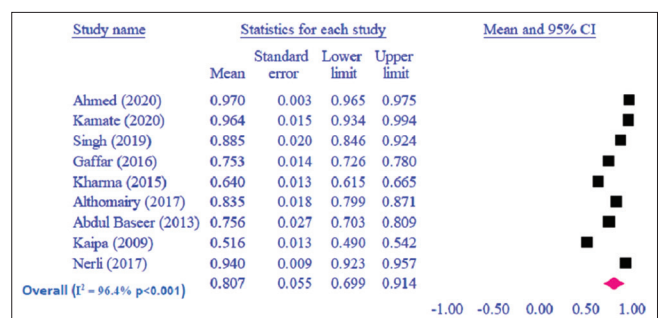
### Discussion

The present study was aimed to report the level of knowledge, awareness, and attitude of the oral health practitioners, including dentists, about the nature of respiratory contagious infections such as COVID-19 outbreak, its transmission modes, and the effective ways of preventing and controlling the disease.

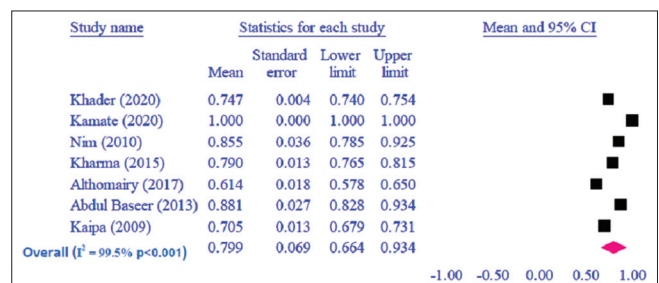
The results of the meta-analysis have shown that 85.5% of the dentists and other oral health practitioners had a high level of awareness about virus transmission modes (95% CI: 78.6%–92.4%;  $P < 0.001$ ). 80.7% of the dentists gave correct answers to the questions related to virus transmission modes (95% CI: 69.9%–91.4%;  $P < 0.001$ ), and 79.9% of the dentists had a positive attitude about virus transmission modes (95% CI: 66.4%–93.4%;



**Figure 2:** Dentists' awareness about virus transmission modes



**Figure 3:** Oral health practitioners' knowledge about virus transmission modes



**Figure 4:** Oral health practitioners' attitude about the protective guidelines

$P < 0.001$ ). The significance of these findings becomes more obvious when we notice that sufficient precautions against the new coronavirus involve using personal protective equipment the same as gloves, gowns, face masks, and face shields can broadly decrease the rate of virus transmission and infection among health-care workers<sup>[10]</sup> as well as dentists. Considering these precautions is greatly related to the level of knowledge and awareness of the dentists. Furthermore, health-care workers can play an effective role as powerful agents for change in preventing and constraining the disease, particularly in the consequent future outbreaks.<sup>[19]</sup> It is obvious that increased knowledge can lead to better understanding and appropriate practice in this regard.

At the same time, although evidence of a meta-analysis has shown that oral hygiene is considered as one of the main health concerns in many of the developing countries,<sup>[20]</sup> another study from India indicates that there were some significant gaps in the knowledge of the dentists about the flu as well as respiratory infective diseases;<sup>[18]</sup> elsewhere, in Iran, Rostamzadeh *et al.* claimed that there was a gap in the dentists' knowledge about some infectious diseases the same as HBV, HCV, and HIV/AIDS.<sup>[21]</sup> These pieces of evidence clearly suggest that the knowledge of oral and dental health workers must be regularly updated and expanded in many low-income developing and underdeveloped countries. This necessity becomes even more relevant with COVID-19, considering that several aspects of the related current knowledge are doubtful, vague, or superficial. At the same time, in such pandemic situations, dissemination of misinformation consisting of false information, inadequate information, opportunistic misinformation (intentional or unintentional), and even sometimes the expired information can be potentially hazardous and cause a threat to the public health.<sup>[22]</sup> Thus, despite the acceptable level of knowledge and awareness in this meta-analysis, policymakers need to pay enough attention to the ways for maintaining up to date the dentists' knowledge and keep them aware as well as informed about the best available evidence in the relevant topic. Furthermore, as the results of the present study demonstrate a satisfactory level of attitude, it is inevitable to suggest that the health-care attitude can positively affect the behaviors or dentists and oral health operators, and these practices in an outbreak condition like COVID-19 can greatly end to prevent, control, and overcome this disease or, in contrast, lead to worsening the situation. Thus, it is important for policymakers to pay enough attention to the attitude of dentists and oral health practitioners together with their knowledge, information, and awareness.

## Conclusion

This meta-analysis has shown that the level of dentists' knowledge, awareness, and attitude was relatively

high about respiratory contagious diseases, including COVID-19. The present results can shed light for policymakers to support the best evidence medical education for all health-care workers the same as oral health practitioners. Preventing the dissemination of misinformation along with preparing comprehensive guidelines can be considered by the oral health policymakers, particularly in the regions that present with higher numbers of infections.

## Strengths of the study

This study is the first meta-analysis to execute the KAP of oral health workers as well as dentists about respiratory contagious outbreaks the same as SARS, MERS, and COVID-19. This study can present a combination of the results of the available KAP studies in this area and help the health-care policymakers to use this produced knowledge in preventing and controlling the disease as well as reinforcing and improving the health-care workers the same as those who act in the oral and dental scope.

## Limitations of the study

This study has some limitations: First of all, most of the included KAP studies had not reported all 3 variables of knowledge, attitude and practice/skill. In another word, the third variable (practice/skill) of the dentists were not reported in all of the included studies. This led to the elimination of this important part of the KAP study. Another limitation was the limited number of published materials in this area, particularly in developing and underdeveloped contexts that can restrict the generalizability of the meta-analysis results.

## Acknowledgments

The authors would like to thank Vice-Chancellor for Research Affairs, Shiraz University of Medical Sciences, for the technical support of the study.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## References

1. Riley T, Sully E, Ahmed Z, Biddlecom A. Estimates of the potential impact of the COVID-19 pandemic on sexual and reproductive health in low- and middle-income countries. *Int Perspect Sex Reprod Health* 2020;46:73-6.
2. Chersich MF, Gray G, Fairlie L, Eichbaum Q, Mayhew S, Allwood B, *et al.* COVID-19 in Africa: Care and protection for frontline healthcare workers. *Global Health* 2020;16:46.
3. Meng L, Hua F, Bian Z. Coronavirus disease 2019 (COVID-19): Emerging and future challenges for dental and oral medicine. *J Dent Res* 2020;99:481-7.

4. Felice C, Di Tanna GL, Zanus G, Grossi U. Impact of COVID-19 outbreak on healthcare workers in Italy: Results from a national e-survey. *J Community Health* 2020;45:675-83.
5. Peng X, Xu X, Li Y, Cheng L, Zhou X, Ren B. Transmission routes of 2019-nCoV and controls in dental practice. *Int J Oral Sci* 2020;12:9.
6. Gesser-Edelsburg A, Diamant A, Hijazi R, Mesch GS. Correcting misinformation by health organizations during measles outbreaks: A controlled experiment. *PLoS One* 2018;13:e0209505.
7. Ahmed AM, Jouhar R, Ahmed N, Adnan S, Aftab M, Sohail Zafar M, *et al.* Fear and practice modifications among dentists to combat novel coronavirus disease (COVID-19) outbreak. *Int J Environ Res Public Health* 2020;17:2821.
8. Khader Y, Al Nsour M, Al-Batayneh OB, Saadeh R, Bashier H, Alfaqih M, *et al.* Dentists' awareness, perception, and attitude regarding COVID-19 and infection control: Cross-sectional study among Jordanian dentists. *JMIR Public Health Surveill* 2020;6:e18798.
9. Haidich AB. Meta-analysis in medical research. *Hippokratia* 2010;14:29-37.
10. Ghinai I, McPherson TD, Hunter JC, Kirking HL, Christiansen D, Joshi K, *et al.* First known person-to-person transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in the USA. *Lancet* 2020;395:1137-44.
11. Singh I, Munjal S, Kumar M, Jha M, Gambhir RS, Talukdar B. H1N1 Influenza: Assessment of knowledge and awareness of private dental health professionals of a Tricity. *J Family Med Prim Care* 2019;8:2229-33.
12. Althomairy SA, Baseer MA, Assery M, Alsaffan AD. Knowledge and attitude of dental health professionals about middle east respiratory syndrome in Saudi Arabia. *J Int Soc Prev Community Dent* 2018;8:137-44.
13. Nerli S, Hugar SM, Gokhale NS, Kohli D, Uppin C, Badkar CM. Knowledge and attitude regarding swine flu among dental house surgeons in Belagavi city: A cross-sectional study. *BLDE Univ J Health Sci* 2017;2:50-4.
14. Gaffar BO, El Tantawi M, Al-Ansari AA, AlAgl AS, Farooqi FA, Almas KM. Knowledge and practices of dentists regarding MERS-CoV. A cross-sectional survey in Saudi Arabia. *Saudi Med J* 2019;40:714-20.
15. Kharma MY, Alalwani MS, Amer MF, Tarakji B, Aws G. Assessment of the awareness level of dental students toward middle east respiratory syndrome-coronavirus. *J Int Soc Prev Community Dent* 2015;5:163-9.
16. Baseer MA, Ansari SH, AlShamrani SS, Alakras AR, Mahrous R, Alenazi AM. Awareness of droplet and airborne isolation precautions among dental health professionals during the outbreak of corona virus infection in Riyadh city, Saudi Arabia. *J Clin Exp Dent* 2016;8:e379-e387.
17. Hyang-Nim L, Hyung-Sun S. Dental hygiene students' knowledge, attitude in an influenza A (H1N1). *Journal of Korean Society of Dental Hygiene* 2011;11:301-11.
18. Kaipa S, Epari V, Gupta S. Knowledge and attitude towards swine influenza (2009) among dental practitioners in Nellore district of Andhra Pradesh, India *J Educ Ethics Dent* 2011;1:52-8.
19. Parry J. China coronavirus: Hong Kong health staff strike to demand border closure as city records first death. *BMJ* 2020;368:m454.
20. Rad M, Shahravan A, Haghdoost AA. A systematic review of questionnaires used on oral health knowledge, attitude, and practice in 12-year-olds. *J Oral Health Oral Epidemiol* 2016;5:1-12.
21. Rostamzadeh M, Afkhamzadeh A, Afrooz S, Mohamadi K, Rasouli MA. Dentists' knowledge, attitudes and practices regarding Hepatitis B and C and HIV/AIDS in Sanandaj, Iran. *BMC Oral Health* 2018;18:220.
22. Sbaifi L, Zhao Ch. Modeling the online health information seeking process: Information channel selection among university students. *J Assoc Inf Sci Tech.* 2020;71(2):196-207.