ORIGINAL ARTICLE

Misinformation about COVID-19 and Dentistry on the Internet

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ABSTRACT

Background and Objective: The COVID-19 pandemic to-date has no treatment or vaccine and protection from the viral illness is only possible by acting upon valid and reliable information. The dentists are considered to be the most vulnerable profession due to proximity with the patient, and this also puts dental patients at risk. Internet is one of the primary sources of information, therefore this study aimed to evaluate the accuracy of the online available information using validated instruments.

Methods: The following terms were searched on google.com "Coronavirus and dentistry", "COVID-19 and dentistry" and "SARS COV 2 and dentistry". The first fifty results for each search term were evaluated. Eighteen of the websites did not meet inclusion criteria so 132 websites were critically analyzed by Health on the Net Foundation Code of Conduct (HON code) and the Journal of the American Medical Association (JAMA) benchmark. Also, the websites were categorized according to content type.

Results: A total of 6 (4.54%) websites had the HON code seal, and the JAMA benchmark showed that 14 (10.6%) did not fulfill any of the requirements. Another 69 (52.3%) links had fulfilled all the requirements but 65 (94.2%) of these websites were either links to research journals or guidelines published by dental associations, universities or government organizations, and usually not accessed by the general public.

Conclusion: The information available to the dentists is satisfactorily accurate and reliable, but the non-health personnel need to be aware of the quality of information they read. The dentists should provide information to the patients about accessing reliable online sources for information and the expected changes in dental practice. The government should regulate health information on the internet to curb apprehension associated with dental treatment and viral pandemic.

KEYWORDS: Coronavirus, COVID-19, Severe acute respiratory syndrome, Dentistry, Pandemic.

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INTRODUCTION

The Coronavirus has affected more than 4 million

people worldwide and it was declared as a pandemic by the World Health Organization (WHO) on March 11, 2020.[1,2] Pandemics of respiratory disease follow a certain pattern as outlined by "Pandemics Interval Framework". The acceleration phase which affects most of the susceptible population is followed by a deceleration phase characterized by easing of non-pharmaceutical interventions in the community (e.g. school closures) and preparation of the second wave which can possibly have a higher severity than the initial wave.[3]

As the world moves from the acceleration to the succeeding phases it is of utmost importance that the information available to the public and the healthcare workers is accurate and reliable, as the infodemic can be as dangerous as the pandemic itself.[4] One of the primary sources of information these days is the internet with a worldwide access of two billion people.[4] In a study it was reported that 70% of websites providing health information were not of optimum quality, and finding valid and reliable information online was identified as a significant problem.[6] During the acceleration phase of the novel COVID-19 dental treatments are deferred except for the emergencies. It is important that dentists have access to accurate and reliable information regarding practicing dentistry during the acceleration and the subsequent phases. I addition, the patients should be aware of the dental emergencies in which they must visit the dentist and what to expect when they visit dental office under new circumstances.

The reliability of online information can be evaluated by several assessment tools such as HON code, DISCERN questionnaire and JAMA benchmark. Health on the Net Foundation (HON code) is a nonprofit and nongovernment organization accredited to the United Nations that provides certification to the websites for providing credible and reliable information. The code is approved by Economic and Security Council and WHO. The websites in compliance with HON code are provided with a seal which is easily identifiable and valid for one year, and during that period random audits are also done to ensure that the requirements are met.[7] The HON code of conduct comprises of eight principles (Table-1). JAMA benchmark was published by Sielberg et al,[8] to guide the consumers of online information about its accuracy and reliability. There are four elements to which the information provider on the internet must comply with (Table-1). Each requirement if met is given a score of 1, and thus each website is scored out of 4.

This study aims to evaluate the accuracy and reliability of information available on internet regarding dental practices during COVID-19 pandemic using HON code seal and JAMA benchmark. The information gathered from this study will identify the reliable online sources and determine the need for establishing better quality online sources which benefit patients and dentists across the globe.

METHODS

The ethical approval for the study was not needed, since information available online to the public was accessed without involving any sensitive information. It was a cross-sectional study for which data was collected using the search words, "Coronavirus and dentistry", "COVID-19 and dentistry" and "SARS-COV 2 and dentistry" on May 12, 2020 using Google search engine (google.com).

Search Strategy

The search was done using an updated version of Google Chrome Version 81.0.4044.138. Before the search, all existing cookies were deleted from the browser and English language was set as the search language in Google settings. One search was performed for each of the search words, and the first fifty websites were included. If a website was repeated for the different search words, it was included for all of them. The evaluation was done in a single sitting to ensure uniformity of results. The information obtained from a website both directly and indirectly (by clicking on the subheading, link, or leading pages) was included in the study. Information published by medical organizations, hospitals, universities, dental associations, government, research journals and blogs were included. The links which advertised CPD courses, newspaper articles mentioning statements of government officials and public announcements, links for submission in research journals, websites

solely advertising commercial products, or those mentioning links to other websites without providing other information were considered out of scope for the current study, and thus not included in the data analysis.

Table 1: HONcode[7] and JAMA benchmark[8] criteria.

HON Code Principles	JAMA Benchmark Criteria
Authoritative Indicates the qualifications of the authors	**Authorship:** Authors and contributors, their affiliations, and relevant credentials
Privacy: Respects the privacy and confidentiality of site users	**Attribution:** Clear references and sources for all content
Complementarity: Information should support, not replace, the doctor-patient relationship	**Disclosure:** Ownership of the website, the sponsorship, the advertising, the underwriting, the commercial funding or support sources, and any potential conflicts of interest
Attribution: Cites the source(s) and dates of published medical information	**Currency:** Dates of initial posting and updating of the content
Justifiability: Site must back up claims relating to benefits and performance	
Transparency: Accessible presentation, accurate email contact	
Financial Disclosure: Identifies funding sources	
Advertising Policy: Clearly distinguishes advertising from editorial content	

Quality Assessment Tools

Among the available tools, HON code and JAMA benchmark were used in this study (Table-1). The HON code software was downloaded and for each URL the badge seal was searched. For JAMA benchmark, a table was inserted in MS word where the score for each characteristic and the total score for each website was entered. Also the websites reviewed were categorized based on affiliation (government source, non-government organization, medical/dental association and news), content type (guidelines for dental health professionals, information for patients, medical and dental facts) and exclusivity (whether the whole website was dedicated to Coronavirus and dentistry or only a section of it).

Statistics

Quantitative analysis of the data was done. Comparison of score between the first 20 websites and the rest was done using Mann Whitney U test. 20 randomly selected websites were scored again after 48 hours to determine intra-rater reliability (95% confidence interval, $p < 0.05$ was considered significant). All the data analysis was done using SPSS software version 26.0.

Results

For the search term "Coronavirus and Dentistry" about 1,150,000,000 results appeared in 0.66 seconds. Out of the first fifty results, three were considered out of scope (6%). For the search term "COVID-19 and Dentistry" about 150,000,000 results appeared in 0.62 seconds, out of the fifty results seven did not meet the inclusion criteria (14%), and 983,000,000 results appeared for "SARS-COV 2 and dentistry" in 0.85 seconds of which nine did not meet the inclusion criteria (18%). All the websites were partially exclusive i.e. a portion or subheading was dedicated to the topic. There was no website dedicated wholly to Coronavirus and dentistry. The categorization of content is shown in Fig:1. The descriptive statistics and results of HON code seal and JAMA benchmark are shown in table II. The distribution of JAMA benchmark score according to content type is shown in fig 2. Mann Whitney U test scores of comparison between first 20 websites and the rest showed that the difference was not significant for the search term "Coronavirus and dentistry" ($P = 0.32$) and "COVID-19 and Dentistry" ($P = 0.055$) whereas the difference was significant for the term "SARS COV 2 and Dentistry" ($P = 0.047$), where $P < 0.05$ was considered significant. On re-evaluation of 20 randomly selected websites intra-rater reliability was good having value 0.725.

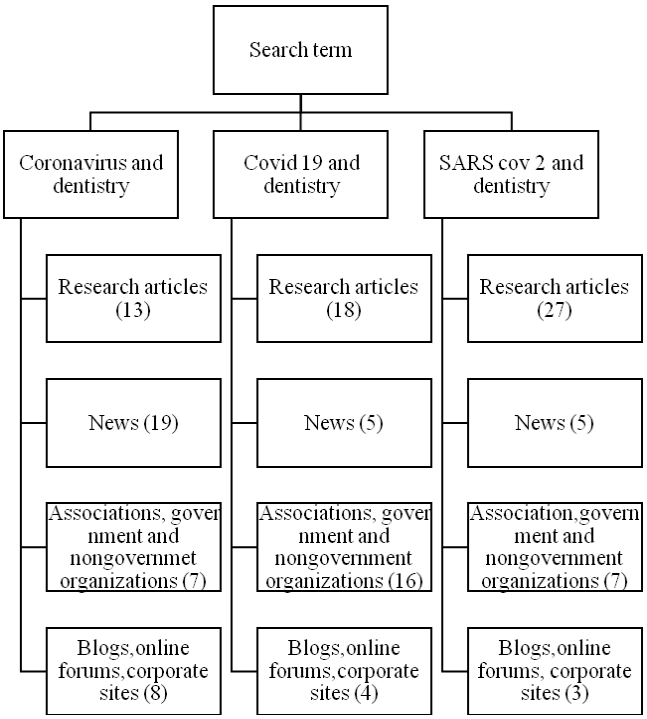

Fig.1: Categorization of Content Type.

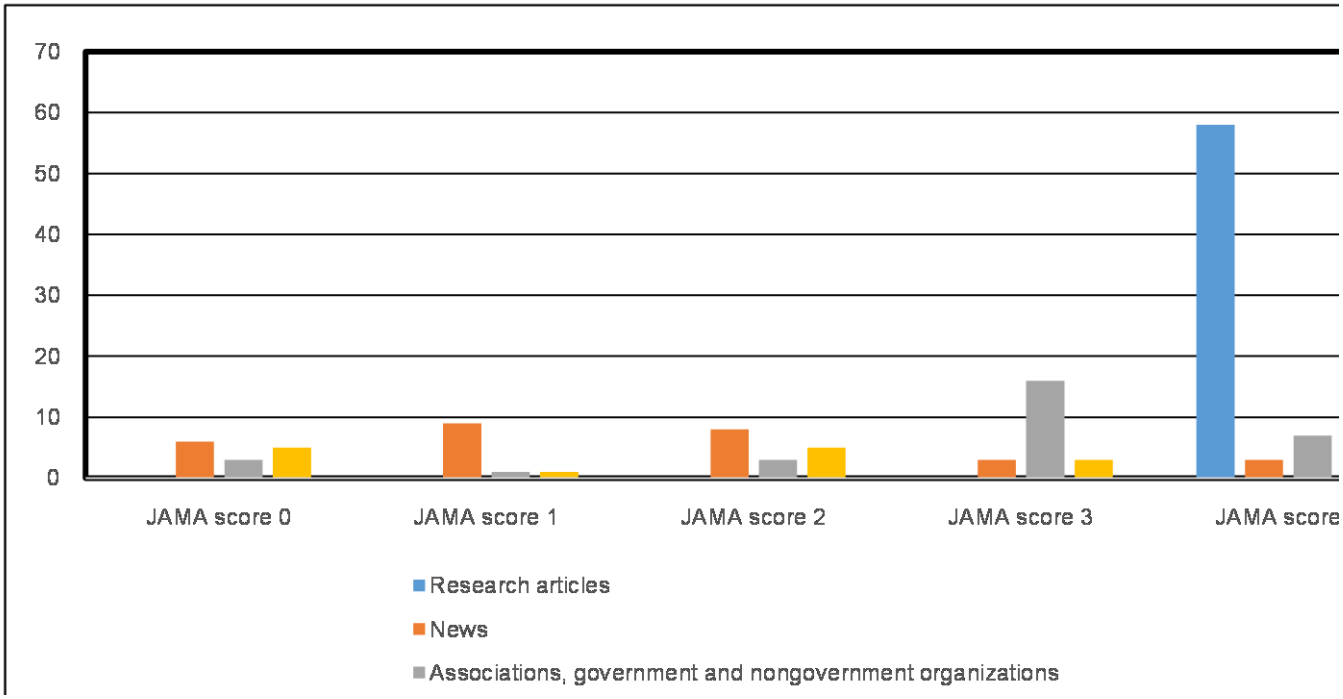

Fig.2: Distribution of JAMA benchmark score according to content type.

Table-2: HONcode[7] seal and JAMA[8] benchmark score.

HON Code Seal	Coronavirus and Dentistry (n = 47)	COVID-19 and Dentistry (n= 43)	SARS-COV 2 and Dentistry (n = 42)
Present	2 (4.3%)	3 (7%)	1 (2.4%)
Absent	45 (95.7%)	40 (93%)	41(97.6%)
JAMA benchmark score			

0	10 (21.3%)	2 (4.3%)	2 (4.3%)
1	5 (10.6%)	5 (10.6%)	1 (2.1%)
2	10 (21.3%)	4 (8.5%)	2 (4.3%)
3	6 (12.8%)	12 (25.5%)	4 (8.5%)
4	16 (34.0%)	20 (42.6%)	33 (70.2%)
Median score ± standard deviation	2.00 ± 1.55	3.00 ± 1.21	4.00 ± 1.04

DISCUSSION

The New York Times in an article identified dentistry as the profession most affected with the novel Coronavirus,[9] and this susceptibility puts the dental patients at risk as well. Owing to the apprehension, all dental services except for emergencies were suspended during the acceleration phase of the pandemic. And as the life starts returning to normal, the dental services also have started to resume. In these circumstances, it is important that dentists follow protocols which protect them as well as their patients, and the patients are aware of the treatments which can be deferred, and of the changes in protocols at the dental offices. Since internet is a major source of information, this study aimed to evaluate the quality of information available online regarding COVID-19 and dentistry, as previous studies have found that the health information available online is not always reliable.[6]

In a study by Cuan-Baltazar et al,[5] for the search term "Wuhan Coronavirus", it was found that only 1.8% websites had HON code seal and only 10.0% websites fulfilled the four quality criteria of JAMA benchmark score. This study was conducted when the terms COVID-19 and SARS COV 2 were not introduced, and the information available was preliminary. In contrast, this study included all the three terms used to refer to the virus, "Coronavirus", "COVID-19" and "SARS COV 2" to eliminate the limitation of data being restricted to a single term. "Wuhan" was not considered in the search terms because the virus has been declared a global pandemic and the ethical limitation of associating it with a particular region. The first fifty websites were included because it was seen in a study.[5] that most of the users do not go beyond the first two pages of citations that they find (20 – 40 links).

In the results of this study it was seen that only 4.54% websites had the HON code seal, which confirms the presence of following eight characteristics: authority, complementarity, privacy, attribution, justifiability, transparency, financial disclosure and advertising policy. In contrast to the previous studies[9], the JAMA benchmark score was 4 for 69 (52.3%) websites which shows that the quality of information is satisfactory. But this should be concluded with caution because 65 (94.2%) websites with score 4 were either research articles or documents published by associations, government or non-government organizations and universities or colleges. These sources are comparatively less accessed by the public as compared to news, blogs and online forms. The quality of information provided by news sources and blogs was not optimum. Six news sources (20.7%) and five blogs/ online forums (33.3%) did not fulfill any of the JAMA criteria. And only three news sources (10.3%) and one blog/online forum (6.7%) fulfilled all the criteria. This is in accordance with the previous studies which found the online information to be misleading, incomplete and inappropriate.[5,10]

According to the results of this study the median values of JAMA score are different for each search term, and this difference can be attributed to the content type. The median value of JAMA score is 4.00 ± 1.04 for the term "SARS COV 2 and dentistry" for which the searched content had links to 27 research articles as compared to the terms "Coronavirus and dentistry" and "COVID-19 and Dentistry" which had 13 and 18 research articles respectively, and a median JAMA score of 2.00 ± 1.55 and 3.00 ± 1.21 respectively. Thus, the content which appears on the web search affects the quality of information to which the healthcare workers and patients are exposed.

The results from this study imply that while searching for information about their dental treatments individuals will come across poor quality information, which may affect their decision making.[5] And during this search, they will come across news sources and blogs which offer inaccurate information and may create apprehension about dental treatment post COVID-

19. The dental healthcare providers should inform their patients about reliable information sources and advise them to critically evaluate any information they obtain from the web, even if it appears to be from a reliable source. The patients should preferably look for the HON code seal which is easier to identify and makes the source trustworthy. Also, it was seen in this study that most of the universities and organizations, although scored 4 on JAMA benchmark, did not have the HON code seal. Such certification would make it easier for the patients to differentiate them from less credible sources, so this certification should be sought for by healthcare organizations and associations. The dentists must assume a role in the society with the following recommended actions: 1) Participate in programs to share valid information 2) Educate patients about dental health conditions 3) Produce media content and promote open access websites of organizations and dental associations so that patients refer to them for information. The government and health organizations should control the quality and flow of online health information, subsidize visibility of information from reliable sources on the search engines, and subsidize universities and organizations which provide reliable and accurate health information to the public.

CONCLUSION

Internet can educate the patients about their dental health conditions, but there is inaccurate and unreliable information available online which can adversely affect the decision making of patients. This makes the role of dentists important in educating patients with valid information through various mediums such as videos and blogs and also educates them about identifying information sources which can be relied upon.

LIMITATIONS OF STUDY

Limitations of this study are that the social media sites were not included in this study which also offers a platform for sharing information and opinion making. Also, geographical location from which the internet was accessed (Rawalpindi, Pakistan) may have affected the results, and the websites are being constantly being updated or removed so the results may vary if the search is conducted again.

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CONFLICT OF INTEREST

None to declare.

FINANCIAL DISCLOSURE

None to disclose.

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Author's Contribution

ZHR: Conception and acquisition of data, critical revision for important intellectual content.

MS: Drafting the article.