Review Article

DOI: 10.7860/JCDR/2016/20387.8536

Dentistry Section

Knowledge and Awareness Regarding Swine-Influenza A (H1N1) Virus Infection among Dental Professionals in India - A Systematic Review

RAMANDEEP SINGH GAMBHIR[1], PRABH ROOHAN PANNU[2], TARUN NANDA[3], GAGANDEEP ARORA[4], AMANPREET KAUR[5]

ABSTRACT

Introduction: Swine flu or Influenza A (H1N1) flu is the most recent of the pandemic disease that has affected the world's population. We, as health care providers should feel responsible for reducing the transmission of influenza.

Aim: To conduct a systematic review of observational studies and to assess dental professionals' knowledge and awareness regarding swine flu.

Materials and Methods: Relevant cross-sectional observational studies were included in the systematic review to assess the level of knowledge and awareness regarding swine flu among dental professionals. Three studies out of 28 were finally included in the present review after conducting both electronic and manual search of scientific databases like Pubmed, Medline, and EMBASE. No limitation in terms of publication date and language was considered. Potential biases were reported and appropriate data were extracted by the concerned investigators. Descriptive statistics, student t-test were used for analysis.

Results: Majority of the subjects (92.6%) had heard about swine flu, and 64.3% of them knew about the H1N1 virus in one of the study reports. More than 80% of subjects were aware regarding the availability of swine flu vaccine in one study reports as compared to another study in which only 31.5% had awareness. Majority of the subjects were of the opinion that frequent hand washing and use of sanitizer are one of the effective methods to prevent swine flu in all the three studies.

Conclusion: The results of the present review showed that some knowledge gaps existed among dental professionals regarding swine flu. Therefore, there is an urgent need for training and continuous education programs regarding infectious diseases.

Keywords: Dentists, Immunization, Preventive measures, Transmission

INTRODUCTION

Swine Flu or the Influenza A (H1N1) flu, an acute respiratory disease of the pigs, is caused by one of the numerous swine influenza A strains and is highly contagious [1]. The transmission of the virus is from person-to-person and is similar to the manner in which seasonal influenza spreads [2]. The typical incubation period found for influenza is 1 to 4 days, with an average of 2 to 3 days. The symptoms of this form of virus includes sore throat, chills severe headache, coughing, weakness and general discomfort like those of influenza. However, some individuals with swine flu have shown serious respiratory illness, including pneumonia or respiratory failure leading to death [2]. Persons suffering from chronic medical conditions like heart disease, diabetes etc., and pregnant women are at higher risk for complications from swine flu [3].

On June 11, 2009, the World Health Organization (WHO) raised its pandemic alert level to the highest one indicating that a pandemic of H1N1 flu was underway [4]. Occurrence of swine flu has been reported form every part of the globe like mid-western United States, Canada, Mexico, South America, Kenya, China, Taiwan, Japan, and several parts of Eastern Asia including India [5]. Rajasthan and Gujarat are the worst affected regions in India. In the year 2014, 937 cases of swine flu were reported in India and out of which the death toll was 218 [6]. According to latest reports, swine flu has already claimed more than 90 lives in states of Punjab, Gujarat and Rajasthan since January 2016 [7].

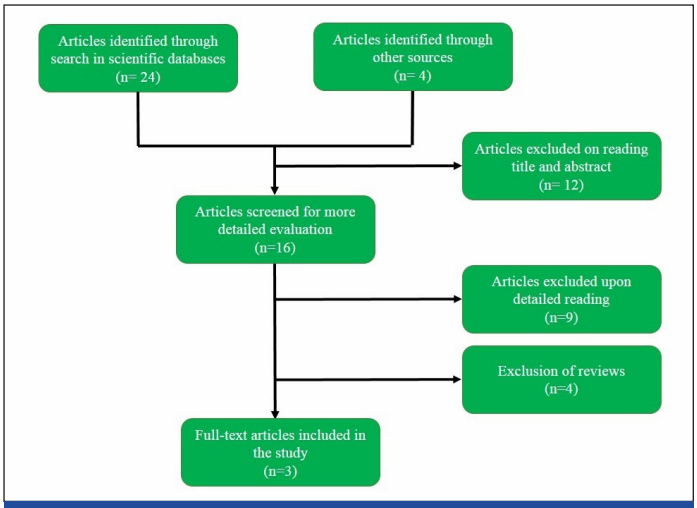
The main aim of the health care workers should be to prevent or limit the transmission of H1NI virus to other health care workers as well to patients. Dental professionals are exposed to numerous micro-organisms present in the dental operatory which are transmitted via blood, respiratory and oral secretions. According to Centre for Disease Control and Prevention, the virus can infect a person for up to 2 to 8 hours after being left on items like wooden tables, doorknobs and desks which are also a part of the dental operatory [8]. Therefore, dental professionals are exposed to a greater extent via aerosol spread of this deadly virus. Hence, they should have sound knowledge regarding the mode of symptoms, mode of transmission and preventive measures so that there would be no infection spreading through the dental operatory. Therefore the present study was conducted to assess the knowledge and awareness of dental professionals towards swine flu in India.

MATERIALS AND METHODS

Eligibility Criteria: The present systematic review included the studies conducted on oral health and knowledge of dental professionals towards swine flu. Study selection was based on following inclusion criteria: 1) studies on dental professionals; 2) studies conducted on Indian population; 3) studies in which the outcome measures are knowledge and awareness; 4) studies that were cross-sectional and observational in nature. There were no limitations regarding publication dates and language used in the studies, in the search strategy. Studies that were excluded from the present review were: 1) studies conducted elsewhere but not in India; 2) review articles on swine flu; 3) studies focussing only on medical professionals; 4) unpublished material and abstracts.

Identification of appropriate studies: Search strategy utilized in the present systematic review is depicted in [Table/Fig-1].

The present review was conducted according to the mentioned protocol and guidelines [9]. Relevant literature search was



[Table/Fig-1]: Flow diagram of various studies included in the review.

carried out through search of scientific databases like MEDLINE, EMBASE, Pubmed Databases using MESH terms- 'preventive measures', 'dentists' and 'transmission'etc., irrespective of the date of publication. Manual search was also conducted from Institutional and PGIMER library. Online search engines like 'Google Scholar' were also assessed using various keywords - knowledge, awareness, swine flu, H1N1, dental professionals, India, etc. Various combinations of key words were made using 'and', 'or' as Boolean operators. We identified 28 papers with these methods. Where possible, all terms were included as full text, with truncation used where possible to capture variation in the terminology. Finally three articles were selected for inclusion in the review.

Selection of studies: All the examiners were trained in the department by experts to select and retrieve the data for conducting the review and calibrated (kappa=0.8). Duplicate studies were removed by two authors (RSH & PP) from the list of studies that was obtained after conducting manual and electronic search. Thereafter, abstracts and titles of the studies were screened to select those studies that fulfilled the inclusion criteria. Inter-examiner reliability was good. Review articles on swine flu were not included but their references were screened in order to make sure that no study should be left behind. Screening of the selected studies was done using STROBE checklist [10].

Control of bias assessment: A thorough literature search was conducted to find a suitable tool that assessed the quality of observational studies. Issues that were addressed regarding the risk of bias and quality assessment were as follows: (1) completeness of reporting information regarding swine flu, (2) incomplete outcome reporting, (3) reporting a single outcome measure (assessing only knowledge or awareness), (4) design of the study, and (5) any conflict of interest present in the study. After addressing all the criteria in the above mentioned issues, the overall plausible risk of bias in the studies was estimated as moderate to low.

Quality assessment and extraction of data: Mandatory guidelines (PRISMA) were followed in order to do the quality assessment of the studies [11]. The qualifying criteria was satisfactorily met by all the studies. A pre-determined data collection form was used by two other authors (TN & GA) independently to extract the following information: 1) study title; 2) year of publication of the study; 3) geographical area in which the study originated; 4) number of study subjects; 5) design of the study; and 6) knowledge and awareness level regarding swine flu. The fifth author (AK) sorted out any kind of disagreement regarding article screening and extraction. For obtaining missing or unclear data, corresponding authors of selected studies were contacted through emails. One author was contacted by us for the above purpose.

RESULTS

Description of selected studies: The original search identified 28 studies and only three studies were potentially eligible for the present systematic review after performing necessary exclusions [12-14]. The study population in two studies included dental students also, whereas in one study it comprised entirely of practicing dentists. A summary of various study characteristics is mentioned in [Table/Fig-2]. All the three studies were conducted in different geographical regions of the country (Andhra Pradesh, Haryana and Rajasthan). All included studies were cross-sectional studies and utilized a self-structured, close ended questionnaire for congregation of the data on knowledge and awareness concerning swine flu.

Authors	Year of publication	Sample Size	Study population	Study area	Outcome measure	Results
Palwankar et al., [12]	2015	349	Dental students, interns and staff	Haryana	Knowledge, awareness, perception and behavioural changes	96% of undergraduates, 96% of interns and 100% of staff had adequate knowledge
Singh et al., [13]	2012	448	Dental students	Rajasthan	Knowledge, attitude, behavioural response and use of preventive measures	92.6% had heard about swine flu, whereas only 64.3% of them knew about the H1N1 virus.
Kaipa et al., [14]	2011	220	Dentists	Andhra Pradesh	Knowledge and attitude	The mean scores of knowledge and attitude were 37.92 (±5.63) and 11.34 (±2.51) from the maximum scores of 52 and 20 respectively

[Table/Fig-2]: Summary of studies reviewed for knowledge regarding swine flu among dental professionals.

Gender and educational qualification of subjects: Gender and educational qualification of subjects was mentioned in two of the three studies [13,14]. It can be noted that three-fourths of the subjects were males and 45.6% of subjects were postgraduates (MDS) in the study reports of Kaipa et al., [14] [Table/Fig-3]. Female subjects and students who belonged to clinical categories had significantly higher knowledge scores as compared to their male counter parts in the study reports of Singh et al., (p=0.001) [13]. On the contrary, Kaipa et al., [14] in their study reported that males had significantly higher knowledge as compared to females.

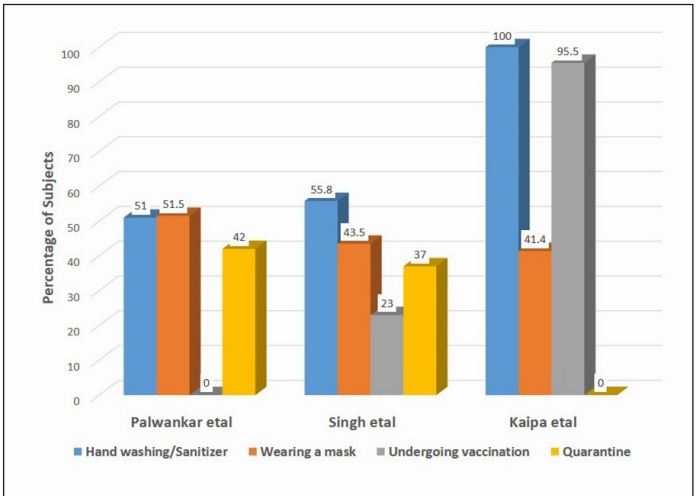
Knowledge and awareness regarding the H1N1 virus and its transmission: Majority of the subjects (92.6%) had heard about swine flu, and 64.3% of them knew about the H1N1 virus in the study reports of Singh et al., [13]. Study findings of Palwankar et al., revealed that more than 50% of subjects were aware about H1N1 virus [12]. Study reports of Kaipa et al., showed that all the

Study	Gender		Educational qualification	
	Male	Female	Graduate/ Pre-clinical	Post graduate /Clinical
Singh et al., [13]	224 (50%)	224 (50%)	118 (26.3%)	330 (73.7%)
p-value (knowledge)	0.001*		0.001*	
Kaipa et al., [14]	164 (74.5%)	56 (25.5%)	120 (54.5%)	100 (45.5%)
p-value (knowledge)	0.04*		0.001*	

[Table/Fig-3]: Distribution of subjects according to gender and educational qualification and association with knowledge scores in the studies.
*Statistically significant, Student's t-test (There was no mention regarding the association of knowledge scores with the gender and educational qualification in the third study. Therefore it is not mentioned.)

Studies	Swine flu vaccine	Steps taken by health authorities/government designated centres
Palwankar et al., [12]	108 (31.5%)	Not mentioned
Singh et al., [13]	Not mentioned	358 (80%)
Kaipa et al., [14]	181 (82.3%)	96 (43.6%)

[Table/Fig-4]: Awareness of subjects regarding swine flu vaccine and role of government health authorities.



[Table/Fig-5]: Perceived efficacy of various preventive methods for swine flu among subjects in different studies.

subjects (100%) were aware that swine flu is an air-borne disease but only 51.8% of the subjects were conscious of the fact that the disease can spread even during the prodromal period and not just after one develops the symptoms [14]. Awareness regarding transmission was reported by only 51% in the study findings of Palwankar et al., [12].

Awareness regarding vaccination and steps taken by health care authorities: More than 80% of subjects were aware regarding the availability of swine flu vaccine in the study reports of Kaipa et al., [14] as compared to study findings of Palwankar et al., [12] in which only 31.5% had awareness [Table/Fig-4]. Moreover, Singh et al., [13] observed in their study that nearly 80% of the subjects were of the opinion that health care authorities were taking necessary steps to control the risk of pandemic and 43.6% of subjects were aware of hospital near to their clinic that has been designated by the government for the treatment of swine flu in the study reports of Kaipa et al., [14].

Awareness regarding various preventive measures for swine flu: More than 50% of subjects in two studies [12,13] and 100% of subjects in the other study [14] were of the opinion that frequent hand washing and use of sanitizer are one of the effective methods to prevent swine flu [Table/Fig-5]. Wearing a surgical mask, undergoing vaccination for swine flu and quarantine were other less preventive methods cited by study subjects.

DISCUSSION

The emphasis of the present systematic review was on the knowledge and awareness regarding swine flu (H1NI) among dental professionals in India. The review focused on various parameters mentioned in different studies in order to accumulate information regarding swine flu among dental professionals which is evident from the results.

Strengths and weaknesses of the review: This systematic review involved the search of multiple electronic databases, with no restrictions regarding language or year of publication. The reference lists of literature reviews were searched for other studies that could also be included. However, it was not possible to search technical reports, papers from research groups or committees and preprints and it is possible that some relevant data may have been left behind. This could have accounted for some publication bias. Efforts were also made to find studies in which dental professionals could have been hidden as a confounder but not as main subject.

Moreover, there was under-reporting of some relevant information (descriptive data, questionnaire) related to knowledge, attitude and awareness among dental professionals in one study [12]. As a result of this, some important aspects pertaining to knowledge and awareness were not included and compared with other studies that were included in the review. Because of the marked variability in the questionnaire and outcomes of the included studies, it was not possible to combine the data and perform meta-analysis.

All investigations were cross-sectional studies. This type of design offers a lower degree of scientific evidence compared with case-control and cohort studies. Moreover, there are inherent limitations in terms of methodological issues, generalizability and internal validity when we are dealing with cross-sectional studies. However, the use of scales for quality assessment has limitations that should be considered.

All the studies used a close-ended questionnaire to obtain information about various aspects relating to swine flu. Such type of questionnaire reduces recall bias and such questions are easy to analyse and may achieve quicker response from the subjects. It cannot be verified that whether the responses given by the subjects in conjectural situations posed in different studies would accurately justify the subject' response in real circumstances. The final important issue is the lack of external validity. All the three studies offered no information regarding the sample size calculation and/or the analyzed population constituted a convenience sample.

Statement of principal findings: A significantly higher knowledge regarding swine flu was reported among males as compared to females in the study reports of Kaipa et al., [14]. This difference could be attributed due to more interactive and socialization aspect of males as compared to females. This holds particularly well for a country such as India where traditional norms and customs discriminate against females [15]. Influence of education was also seen on knowledge as subjects belonging to clinical categories had more knowledge scores as compared to their pre-clinical counterparts [13].

It was reported in two studies [12,14] that only 51% of subjects had correct knowledge regarding transmission of swine flu. This information is crucial as not knowing about this may lead dentists to inappropriately triage patients [16]. Diagnostic and treatment facilities were provided by Government of India at selected hospitals in the endemic states following pandemic alert by WHO in order to curb the misuse of the facilities by false positive cases [17]. A substantial proportion of subjects were aware of such a facility in the study reports of Kaipa et al., [14].

The best way to prevent the spread of swine flu virus is by washing hands frequently and avoiding patients having flu like symptoms [18]. Majority of subjects in all the three studies believed that frequent hand washing and use of sanitizer as an effective and preventive measure. However, wearing basic face masks cannot protect people from being infected.

CONCLUSION

Pandemic outbreak caused by H1N1 virus and other infectious disease agents still remains the biggest threat to human beings due to high mortality rate associated with their infections. The present review concluded that majority of the subjects had substantial knowledge regarding swine flu, yet there were notable deficiencies regarding the transmission, preventive measures and availability of vaccine. The present review emphasizes the need for appropriate training regarding infectious diseases during the undergraduate dental curriculum and continuous education programs after graduation.

Dental professionals and dental students must play an active role in ongoing research regarding swine flu and its prevention. This may increase the awareness of the disease amongst dentists, and may also highlight the important role that they can play in decreasing the mortality during future disease outbreaks. As only three studies have been assessed the validity reduces and we cannot generalize the results. As the present review only found three studies that were conducted among dental professionals' knowledge regarding swine flu, there is urgent need for similar studies to be conducted in every part of the country.

REFERENCES

[1] Dandagi GL, Byahatti SM. An insight into the swine-influenza A (H1N1) virus infection in humans. *Lung India.* 2011; 28:34-38.

[2] Fotedar S, Sharma KR, Bhardwaj V, Fotedar V. Precautions in dentistry against swine flu. *SRM J Res Dent Sci*.2013;4:161-63.

[3] Prevention of Swine Influenza A (H1N1) in the Dental Healthcare Setting. Available from: http://www.ct.gov/dph/lib/dph/oral_health. [Last accessed on 2016 Mar 12].

[4] Kamate SK, Agrawal A, Chaudhary H, Singh K, Mishra P, Asawa K. Public knowledge, attitude and behavioural changes in an Indian population during the influenza A (H1N1) outbreak. *J Infect Dev Ctries*. 2010; 4:7-14.

[5] World Health Organization. World Health Statistics. Available from: http://www.who.int /gho/publications/world_health_statistics/2015/en. [Last accessed on 2016 Mar 12].

[6] Ministry of Health and Family Welfare, Government of India. Available from: http://mohfw.nic.in/press_releases_on_swine_flu.htm. [Last accessed on 2016 Mar 12].

[7] India Environment Portal, Centre for Science and Environment, Government of India. Available from: http://www.indiaenvironmentportal.org.in/category/18777/thesaurus./swine-flu. [Last accessed on 2016 Mar 14].

[8] Centers for Disease Control and prevention: Guidelines for prevention of swine flu. Available from: http://www.cdc.gov/h1n1flu/ [Last accessed on 2016 Mar 14].

[9] Centre for Reviews and Dissemination. Systematic reviews: CRD's guidance for undertaking reviews in health care. York: University of York, 2009. Available from: http://www.york.ac.uk/inst/crd/systematic_reviews_book.htm. [Last assessed on 2016 Mar 14].

[10] STROBE Statement. Strengthening the reporting of observational studies in epidemiology. Switzerland. Available from: http://www.strobe-statement.org/index.php?id=available-checklists. [Last accessed on 2016 Mar 14].

[11] Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gotzsche PC, Ioannidis JP, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions. Explanation and elaboration. *J Clin Epidemiol*. 2009;62:e1-34.

[12] Palwankar P, Mehta V, Sheokand V, Palwankar D, Anand P. Knowledge, awareness, perception of H1N1 flu in urban dental fraternity. *Res J Pharm BiolChem Sci*. 2015;6:1566-72.

[13] Singh K, Bhat N, Chaudhary H, Asawa K, Sharda A, Agrawal A. Knowledge, attitude, behavioural response and use of preventive measures regarding pandemic H1N1 influenza outbreak among dental students in Udaipur city, India. *Oral Health Prev Dent*. 2012;10:339-44.

[14] 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;1:52-58.

[15] Kamate SK, Agrawal A, Chaudhary H, Singh K, Mishra P, Asawa K. Public knowledge, attitude and behavioural changes in an Indian population during the Influenza A (H1N1) outbreak. *J Infect Dev Ctries.* 2010;4:7-14.

[16] Di Giuseppe G, Nobile CG, Marinelli P, Angelillo IF. A survey of knowledge, attitudes, and behavior of Italian dentists toward immunization. *Vaccine*. 2007;25:1669-75.

[17] Media release, Ministry of health and family welfare, Government of India. Webpage available from: http://mohfw-h1n1.nic.in/link6.html. [Last Accessed on 2016 Mar 23].

[18] Centers for Disease Control and prevention: Guidelines for prevention of swine flu. Available from: http://www.cdc.gov/h1n1flu [Last Accessed on 2016 Mar 23].

PARTICULARS OF CONTRIBUTORS:

1. Reader, Department of Public Health Dentistry, Rayat and Bahra Dental College and Hospital, Mohali, Punjab, India.
2. Intern, Department of Medicine, Government Medical College and Hospital, Chandigarh, India.
3. Reader, Department of Periodontics, Bhojia Dental College and Hospital, Baddi, Himachal Pradesh, India.
4. Reader, Department of Oral Medicine and Radiology, Rayat and Bahra Dental College and Hospital, Mohali, Punjab, India.
5. Private Practitioner, Amloh, Punjab, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Ramandeep Singh Gambhir,
Reader and Head, Rayat and Bahra Dental College and Hospital, Mohali-140104, Punjab, India.
E-mail: raman2g@yahoo.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Mar 29, 2016**
Date of Peer Review: **May 24, 2016**
Date of Acceptance: **Jun 13, 2016**
Date of Publishing: **Sep 01, 2016**