

Dental caries prevalence among HIV adult population in India: A systematic review

Arunkumar Acharya¹, Shrikanth Muralidharan², Pramila Mallaiah³, S Geetha³

¹Department of Public Health Dentistry, Navodaya Dental College and Hospital, Raichur, ³Department of Public Health Dentistry, MR Ambedkar Dental College and Hospital, Bengaluru, Karnataka, ²Department of Public Health Dentistry, Madha Dental College and Hospital, Chennai, Tamil Nadu, India

Abstract

Dental caries is a universal disease. Untreated dental caries adds to the existing burden of diseases. It is necessary to have national data on the same, especially in HIV cases, to understand the epidemiological aspects and formulate a treatment plan for the population. Hence, a systematic review was carried out to collectively report the dental caries prevalence among this population. A systematic search for articles was done in PubMed and Google Scholar using the keywords: Dental Caries, India, HIV, AIDS and adults from January 1990 to December 2019. All freely available full-text articles were evaluated based on the inclusion criteria. Only four articles fulfilled the criteria based on qualitative analysis. Decayed, Missing and Filled Teeth index was used to record dental caries. Risk factors related to the same were not specified by any of the authors. Studies were not from different regions of India. More epidemiological studies are needed to understand the prevalence rate and correlated to dental caries among HIV-positive population in India.

Keywords: Dental caries, HIV, India

Address for correspondence: Dr. Shrikanth Muralidharan, Department of Public Health Dentistry, Madha Dental College and Hospital, Kundrathur, Chennai - 600 069, Tamil Nadu, India.

E-mail: shrikanthmuralidharan23@gmail.com

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INTRODUCTION

According to Nouaman *et al.*, “Oral diseases are defined as any morphological or functional abnormalities teeth and supporting structures. These are mainly dental caries resulting from the progressive decalcification of tooth hard tissue, periodontal disease due to inflammation of tooth-supporting tissues and pathologies of the oral mucosa.”^[1] The World Health Organization report states that dental diseases are high, especially in marginalized sections of the society due to their inability to afford treatment options.^[2] Dental caries is a universally present condition that adds to the disease burden.^[3] The last

epidemiological data related to nationwide dental caries information came way back in 2002, through the National Fluoride Mapping.^[4] The caries prevalence globally varies from 49% to 83% across different nations.^[5] Research suggests that the risk for dental caries increases by many folds among people living with HIV. There is infiltration of the salivary glands by CD8 lymphocytes, reducing the salivary secretion.^[6] Due to antiretroviral therapy (ART), the microbial flora of the oral cavity also changes, and patients are rendered more prone to caries activity.^[7] However, it is not a well-established relationship between ART and increased dental caries. In the Indian context, sparsely

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studies are reported regarding HIV and oral lesions, and dental caries does not always find a mention among those. Research usually tends to focus on soft tissues. With a lack

of national-level data for dental caries, reports on dental caries prevalence in HIV are also missing. It is necessary to understand the disease burden to help assist in the treatment planning and policy administration for the benefit of People living with HIV/AIDS (PLHIV). India has a vast diversity of population and geopolitical influences. The disease patterns are also varied^[8] and are highly influenced by sociocultural events. Understanding the prevalence pattern will ensure better deliverance of facilities. Unfortunately, there is no system to systematically report oral diseases in India. Hence, the present meta-analysis was carried out to pool data available on dental caries and HIV/AIDS patients from January 1990 to December 2019 to assist in understanding the present trends.

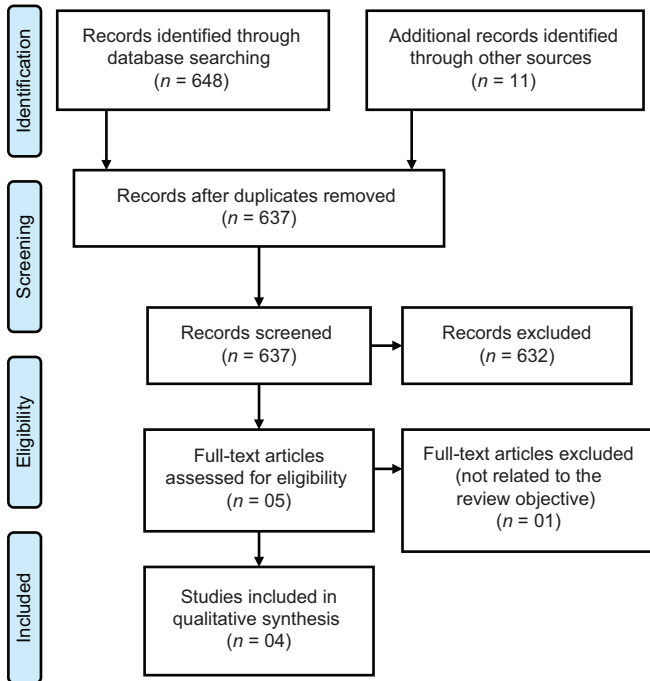


Figure 1: Search strategy

Table 1: Parameters for qualitative criteria to rate the studies included in the systematic review

| Parameter | Required explanation to be present in the report |
|------------------------------------|--|
| Place of study | Region of India |
| Study setting | College, hospital, NGO |
| Aim and objectives | Clearly mentioned |
| Sample size | Formula and estimation process clearly stated |
| Sample design | Mentioned which type of sampling design was followed |
| Index used for recording | DMFT or any other index |
| Calibration of the investigators | Calibration with the Kappa statistics for reliability and validity |
| Extrapolation | Clearly stated if generalizability is possible or not. If not, stated reasons for the same |
| Mentioned patients on ART or HAART | Clearly mentioned if the participants were on ART/HAART or just positive |
| Inclusion and exclusion criteria | Clearly stated the inclusion and exclusion criteria |
| Prevalence mentioned | In the form of percentage as well as mean and standard deviation |

ART/HAART: Anti Retro viral treatment/ Highly Active Anti Retro viral Treatment, NGO: Governmental Organization

Table 2: The study characteristics of the included studies

| Number | Author and year | Study population | Place of study | Dental caries prevalence | Index | Mean DT | Mean MT | Mean FT | Mean DMFT |
|--------|-------------------------------------|------------------|----------------|--------------------------|---------------|---------------|---------------|---------------|---------------|
| 1 | Dongade et al., 2017 ^[9] | 373 | Karnataka | 35 | Not specified | Not specified | Not specified | Not specified | Not specified |
| 2 | Hegde et al., 2016 ^[10] | 130 | Karnataka | 73.2 | WHO 1997 | Not specified | Not specified | Not specified | Not specified |
| 3 | Kumar et al., 2014 ^[11] | 126 | Madhya Pradesh | Not mentioned | DMFT | 4.9±4.5 | 6.3±5.21 | 1.63±0.64 | 12.83±9.6 |
| 4 | Muralidharan 2017 ^[12] | 170 | Karnataka | 79.4 | WHO 1997 | 8.4 | 1.7 | 0 | 10.1 |

DMFT: Decayed, Missing and Filled Teeth

MATERIALS AND METHODS

- Study design – Data analysis of the available literature on dental caries and HIV/AIDS adult patients
- Time period – January 1990 to December 2019.

Data source and search strategy

Data were obtained from PubMed and Google Scholar. The MeSH terms used were Dental Caries, India, HIV, AIDS and Adult. The PRISMA guideline for reporting systematic review was followed. The search for the literature was carried in the month of January 2020, and all the free fully available articles were selected for the review.

Inclusion criteria

1. Articles on dental caries from January 1990 to December 2019
2. Studies on adults (above 18 years) only done in India
3. Only those that are freely available as full texts were included.

No other search engines, unpublished data or gray literature was included in the analysis.

The initial assessment was done based on the title and the abstract by the first author. Then, the total 632 articles were peer-reviewed by all the authors, and finally, 4 were selected fulfilling the qualitative criteria required for the peer review [Figure 1]. The PRISMA guidelines were followed for reporting the review. No risk of bias assessment was

done at the start of the article selection. The entire review was completed in 1 month (January 2020).

Data extraction

The entire text was reviewed independently by the first author for data extraction. Data extraction was done on Microsoft Excel sheet. Eleven parameters were chosen to rate the studies [Table 1]. For the rating, a study ≤ 5 parameters was considered to be of low quality, a study between 6 and 8 parameters was considered to be moderately good, and if all parameters were satisfactorily reported, it was considered to be high.

RESULTS

Of the four studies, three were from Karnataka and only one was from Madhya Pradesh. One study did not mention the overall caries prevalence. The index used for measurement was mentioned in three studies. Mean values of DT, MT, FT and Decayed, Missing and Filled Teeth (DMFT) were not specified by Dongade *et al.*^[9] and Hegde *et al.* [Table 2].^[10] Table 3 shows the qualitative analysis of the included studies. All the studies mentioned the place, study setting and the aim/objectives involved. Only one study mentioned about the basis for sample size estimation and the sampling method used.^[12] Dongade *et al.* did not mention which index was used for the dental caries recording.^[9] Two studies mentioned about calibration of the examiners.^[9,12] Three studies did not state clearly if their data can be generalized or not. Based on the quality of evidence provided and the study types; two studies were in the moderate quality,^[9,10] one was of low^[11] and high quality, respectively.^[12] None of the studies correlated any specific cause with dental caries. Furthermore, data related to any form of experience with dental treatment was not reported.

DISCUSSION

The present study showed that there was a wide variation in the dental caries prevalence. No uniform pattern of reporting was present, as stated earlier. HIV, ART combined with poor oral hygiene, knowledge and maintenance are mainly responsible for dental caries.^[13] A higher mean DMFT score of HIV-positive individuals indicates their poor oral health status and warrants the need of special attention toward it.^[11] Surprisingly, the North East region of India has no mention in the entire search. Either there are no studies carried out or it is quite possible that they have not reported the prevalence rate. India has a national oral health policy that has been drafted. As yet, it is not under implementation. Norms of the National AIDS Control Organization do not explicitly mention

Table 3: Qualitative analysis of the included studies

| Author and year | Place of study | Study setting | Aim and Objectives | Sample size | Sample design | Index used for recording | Calibration of the investigators | Extrapolation | Mentioned patients on ART or HAART | Inclusion and exclusion criteria mentioned | Prevalence mentioned | Quality |
|---|----------------|---------------|--------------------|---------------|---------------|--------------------------|----------------------------------|---------------|------------------------------------|--|----------------------|----------|
| Dongade <i>et al.</i> , 2017 ^[9] | Mentioned | Mentioned | Mentioned | Not mentioned | Not mentioned | Not mentioned | Not mentioned | Not mentioned | Mentioned | Mentioned | Mentioned | Moderate |
| Hegde <i>et al.</i> , 2016 ^[10] | Mentioned | Mentioned | Mentioned | Not mentioned | Not mentioned | Mentioned | Mentioned | Not mentioned | Mentioned | Mentioned | Mentioned | Moderate |
| Kumar <i>et al.</i> , 2014 ^[11] | Mentioned | Mentioned | Mentioned | Not mentioned | Not mentioned | Mentioned | Not mentioned | Not mentioned | Not mentioned | Mentioned | Not mentioned | Low |
| Muralidharan, 2017 ^[12] | Mentioned | Mentioned | Mentioned | Mentioned | Mentioned | Mentioned | Mentioned | Mentioned | Mentioned | Mentioned | Mentioned | High |

ART/HAART: Anti Retro viral treatment/ Highly Active Anti Retro viral Treatment

anything about dental caries. In nations like Bangladesh, there is a national oral health policy in execution. Bhutan provides free access to oral health care to its citizens.^[14] Among all the studies irrespective of being selected for analysis, almost all of them used the DMFT index. No other indices were used People living with HIV/AIDS (like PUFA). Newer indices have an advantage that they can help to identify and group even the white spot lesions so that preventive therapies such as fluoride application or other demineralizing agents can be used rather than waiting for the lesion to progress to an irreversible form of dental caries. It is essential that studies mention the exact age group, risks factors for dental caries and the associated risk factors of the same. The present review is the first of its kind for reporting HIV and dental caries in the Indian adult population. It has certain limitations. We used only two search engines (PubMed and Google Scholar). We did not access any unpublished data or other gray literature. Hence, we may have missed data from the other regions of India. Furthermore, we had to exclude a lot of studies since they did not fit into the qualitative criteria set by us.

CONCLUSION

We can conclude from the review that more studies are needed for getting pooled data for dental caries among a special group like HIV. Data in terms of risk groups like sex workers, transgenders and intravenous drug abuse users also need to be presented separately for more tailor-made policies for those groups. A long-term strategic planning can be only them implemented at mass level to provide services for these people.

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Conflicts of interest

There are no conflicts of interest.

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