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Review Article

ORAL HEALTH INDICATORS – A REVIEW

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ABSTRACT

Oral health is an important contributor to overall health for individuals and the population. Maintaining good dental health is important not only because it prevents pain and suffering and the loss of work that results from dental disease, but also because tooth loss can adversely affect how the jaws and teeth functions. Furthermore, unhealthy teeth are considered unattractive, and negative responses to the appearance of any individual's teeth can impair the individual's social confidence. Dental caries both untreated and treated, tooth loss and other indicators of oral health can be used to monitor oral health status.

Keywords: Indicators, Oral health, Untreated dental caries, Self-reported dental health indicators.

INTRODUCTION

Oral health is more than just a "smile" essential for wellbeing, and is an important contributor to overall health for individuals and the population. Conversely, oral disease can lead to significant time lost from school, work and other activities which can reduce quality of life. Therefore it becomes important to have an oral health indicators which can aid us in prevention from the consequences due to oral diseases. Indicators are the things that indicates the state or level of something, while health indicators are the characteristics of an individual, population, or environment which is subject to measurement and can be used to describe one or more aspects of the health of an individual or population¹. Dental health indicators are the characteristics of an individual or population which are used as supporting evidence for describing the dental health of an individual or population.

This Oral Health Indicators article reviews several measures of dental health in the population and the evidence on population's dental health, who are at the highest risk of suffering the pain and consequences of untreated dental diseases.

NEED FOR DENTAL HEALTH INDICATORS

- To measure the dental health status
- To assess dental health care needs
- For allocation of scarce resources
- Monitoring and evaluation of dental health services.

- To measure the extent to which the objectives and targets of a programme are being attained.

CHARACTERISTICS OF INDICATORS

Indicators have been given scientific respectability; for example ideal indicators.

- a. Should be *valid* - they should actually measure what they are supposed to measure.
- b. Should be *reliable* and *objective* - the answers should be the same if measured by different people in similar circumstances.
- c. Should be *sensitive* - they should be sensitive to changes in the situation concerned.
- d. Should be *specific* - they should reflect changes only in the situation concerned.
- e. Should be *feasible* - they should have the ability to obtain data needed.
- f. Should be *relevant* - they should contribute to the understanding of the phenomenon of interest.

DENTAL HEALTH INDICATORS

According to Center of Disease Control (CDC) and *National Institute of Dental and Craniofacial Research* (NIDCR)², dental health indicators have been classified as

According to National Oral Health Surveillance System – CDC³:

A. Adult Indicators

1. Dental visits
2. Teeth cleaning
3. Complete tooth loss

4. Lost 6 or more teeth

B. Child Indicators

1. Dental sealants
2. Caries experience
3. Untreated tooth decay

C. Fluoridation status

1. Public water supply
2. Fluoridation growth

D. Oral Cancers: Cancer of oral cavity and pharynx

| Exam Indicators | Self-reported Indicators |
|---------------------------|----------------------------------|
| Dental caries | Dental visits |
| Oral cancer | Self assessed oral health status |
| Periodontal disease | Usual source of dental care |
| Sealants | Orofacial pain |
| Smokeless tobacco lesions | Tobacco use |
| Tooth loss | Dental insurance |

UNTREATED DENTAL CARIES

Untreated dental decay compromises one’s ability to eat well, sleep well, and function well at home and at work. The anaesthetic nature of untreated dental decay compromises the self-esteem and social development. Ramos JJ et al assessed for any association between untreated dental caries, considering stages and activity, and the impact on oral health related quality of life (OHRQoL) among preschool children and their parents/caregivers. Where it was observed that untreated severe decay, such as active lesions within visible dentin, extensive active and inactive cavity without pulp exposure or fistula, extensive cavity with pulp exposure and absence of fistula and root remnant, were associated with a negative impact on quality of life⁴. Sheiham. A. et al in 2006 to assess whether treating dental caries would affect growth and quality of life in preschool children revealed that children with severe caries weighed less than controls, and after treatment of decayed teeth there was more rapid weight gain and improvements in their quality of life⁵. From the previous literature it has been observed that most commonly used methods for measuring untreated dental caries are DMFT Index (WHO criteria), Significant caries (SiC) Index and International Caries Detection and Assessment System (ICDAS).

UNTREATED PERIODONTAL DISEASE

Periodontal diseases are a group of diseases that affect the tissues that support and anchor the teeth. If not treated, the bones, gums, and tissue that support the teeth are destroyed and the teeth may eventually become loose and have to be removed. Haris RJ, 2003 examined 30 patients in a private practice who were diagnosed with periodontal disease and did not complete any treatment. It was seen that there was a significant increase in probing depth (3.43 mm to 3.95 mm) and attachment loss (4.19 mm to 4.77 mm) and a significant decrease in the number of teeth present (23.37 to 22.67) and the rate of tooth loss was 0.32 teeth/patient/year⁶. Timmerman. M.F et al described the clinical periodontal condition at baseline (1987) and after a period of 7 years (1994) in which he assigned the subjects into progressive disease subjects (PDS) involving more than 1 site with loss of attachment more than 2mm and non-progressive disease subjects (NPDS), where significant difference in mean loss of attachment between NPDS and PDS both at baseline and follow-up was

observed and there was a significant increase in mean pocket depth between NPDS and PDS at follow-up⁷.

ORAL CANCER

Oral cancer is one of the most fatal health problems faced by the mankind today. Because of cultural, ethnic, geographic factors and the popularity of addictive habits, the frequency of oral cancer is high. The effect of oral cancer on oral health is fatal. Early sign may be a white patch (leukoplakia) or a red patch (erythroplakia) on the soft tissues of the mouth, burning sensation, sore on lip or in mouth that won't heal and bleeding, loose teeth, difficulty or pain when swallowing⁸. Oral cancer most of the times leads to changes in physical appearance which may cause depression, sleep difficulties, social stigma and guilt associated with their history of tobacco and alcohol use, as well as self-consciousness due to disfiguring effects of the disease and its treatment.

TOBACCO USE

Tobacco use continues to be prevalent globally in adults and teenagers. The use of tobacco impacts oral and systemic health and is associated with significant morbidity and mortality, with a proven cause-and-effect relationship for a number of diseases. Cigarette smoking and use of smokeless tobacco both result in oral lesions throughout the oral cavity and oropharynx. Oral cancer, leukoplakia and other mucosal lesions, periodontal disease, increased risk of tooth loss, and caries are all associated with tobacco use⁹.

TOOTH LOSS

It is likely that tooth loss, in most cases being a consequence of oral diseases, which affects Oral Health-Related Quality of Life (OHRQoL). Limitations in chewing, dissatisfaction with appearance, avoidance of social contacts, and trouble speaking are some of the problems which are faced due to tooth loss. According to Odusanya SA, 1987 the two major causes of tooth loss are periodontal disease (46.4%) and dental caries (43.9%)¹⁰. Tooth loss is associated with impairment of OHRQoL and location and distribution of tooth loss affect the severity of the impairment (Gerritsen AE et al 2010)¹¹.

DENTAL SEALANTS

Dental sealants are highly effective in preventing dental caries that occur on the surfaces of teeth that have pits and fissures. Fully retained sealants are 100% effective and a 60% decrease in tooth decay on the chewing surfaces of posterior teeth up to 5 years after sealant application¹². Amir Azarpazhooh et al

(2008) confirmed the efficacy of dental sealants in preventing dental caries in children, in both primary and permanent teeth¹³.

DENTAL VISIT

Dental visiting can have an important influence on an individual's oral health. It can provide an opportunity for the provision of preventive dental care to maintain existing oral health, as well as treatment services that may reverse disease or rehabilitate the teeth and gums after damage occurs. Regular visiting also increases the likelihood that disease will be detected in its early stages and can be managed before significant damage occurs to teeth and gums. Individuals who usually visit for a problem are more likely to lose teeth to decay (Thomson et al. 2000)¹⁴. Those who do not visit regularly have poorer oral health-related quality of life (McGrath & Bedi 2000)¹⁵, experience greater limitations in everyday activities such as eating, talking and sleeping (Gilbert et al. 1997)¹⁶.

DENTAL INSURANCE

According to statistics compiled by the National Health Centre for Statistics in its 'National Health Interview Survey', having dental coverage is the single greatest factor in determining whether a person sees a dentist¹⁷.

People with dental benefits coverage are:

- Almost twice as likely to visit a dentist in any given year (2.6 vs 1.7 visits/year)
- Far more likely to have multiple dental visits in a year (45% vs 28%) and
- More likely to have had a check-up during their last visit rather than treatment for a specific problem (48% vs. 30%).

Wang H et al in his study to provide national estimates of implementation effects of the State Children's Health Insurance Program (SCHIP) on dental care access and use for low-income children revealed that after implementation of SCHIP for more than 1 year, the probability of unmet dental care needs for low income children was lowered by 4 percentage points. Compared with their uninsured counterparts, those who had SCHIP or Medicaid coverage were less likely to report unmet dental need by 8 percentage points, and more likely to have visited a dentist within 6 or 12 months by 17 and 23 percentage points, respectively¹⁸.

SELF REPORTED ORAL HEALTH PROBLEMS

Self-reported problems which have been commonly observed are

- Tooth ache
- Loose tooth
- Tooth decay
- Bleeding gums
- Bad breath

Factors associated with self-reported oral health problems: Low annual household income, financial barriers to dental care access, complaints of dry mouth, smoking, improper tooth brushing techniques, and dental fear^{19,20}.

WATER FLUORIDATION

"Upward adjustment of the concentration of fluoride ion in a public water supply in such way that the concentration of fluoride in the water may be consistently maintained at 1 ppm

by weight to prevent dental caries with minimum possibility of causing dental fluorosis". Fluoridation of community drinking water is a major factor responsible for the decline in dental caries. Water fluoridation is especially beneficial for communities of low socioeconomic status who have a disproportionate burden of dental caries and have less access than higher income communities to dental-care services and other sources of fluoride²¹.

EUROPEAN GLOBAL ORAL HEALTH INDICATORS DEVELOPMENT (EGOHID) PROJECT

Developed under the auspices of the European Commission Health and Consumer Protection Directorate-General Community Action Programme on Health Monitoring.

The purpose was to establish priorities for oral health indicators in a specifically European context and to provide information to health information systems by establishing reference indicators. The short list of 40 oral health indicators was determined by discussions and a consensus (rate of agreement >70%) among the European experts members of the project²².

RECOMMENDATIONS

There is increasing burden of oral disease both in developed and developing countries. ADA and Department of health and human services have recognized oral health as a leading indicator of overall health as oral health is an integral part of general health. Hence, it is necessary to have an oral health indicators. Utilizing the data collected through oral health indicators, government can form policies and plan and implement national programmes for the betterment of oral health. Also, it can be used for effective oral health promotion.

CONCLUSION

Few of the oral health indicators are dental caries, oral cancer, periodontal disease, sealants, tobacco use, tooth loss, dental visit, dental insurance which are discussed in this review. Oral Health Indicators not only measures the oral health status but also indicates the general health status and hence the quality of life. Therefore, it is important to identify and develop a standardized and universal oral health indicators which should be quantifiable, comparable, feasible and easy to use so as to indicate the oral health status and prioritize it based on the severity and take necessary actions with minimum utilization of the resources. As economy of the country depends on the health of the population, so let us create a healthy country as "Health is Wealth"

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