

Review Article

Dental Neglect as a Behavioural Audit of Oral Health- A Systematic Literature Review

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ABSTRACT

Background: Oral health is largely determined by socio-behavioural factors. The purpose of the present study was to investigate the relationship between dental neglect & socio-demographic variables & to evaluate whether dental neglect assessment be considered as a behavioural audit of oral health using systematic review approach.

Materials & Methods: A literature search was conducted using Pubmed (Medline), Google Scholar for studies published till December 2014 using free text and MESH term search strategies. Studies confirming dental neglect identified using a valid & reliable index (DNS) was included and those studies in which dental neglect suspected or stated, with no supporting evidence were excluded. The initial search identified 385 potentially relevant articles. After screening of titles and abstract, 19 publications were revealed as relevant for further review. Eight articles focusing on dental neglect in relation to socio-demographic variables and behavioural audit were suitable for this review and considered for qualitative analysis. Eleven articles did not meet the previously determined quality criteria.

Results: Among 385 articles obtained through electronic search, only eight studies were eligible for systematic literature review. Dental neglect varied with age & gender. Low educational attainment together with low income & social class was associated with high dental neglect. People with negligent attitude & negative behavior towards oral health scored high on dental neglect scale.

Conclusions: There is a relationship between socio-demographic variables & dental neglect. Studies are indicative of dental neglect as a behavioural audit of oral health. However, this conclusion is based on cross-sectional studies. Further studies with rigid designs are suggested.

Keywords: Dental neglect, Dental Neglect Scale, Oral health, Sociodemographics, Systematic review.

INTRODUCTION

Oral health status is significantly related to oral health behavior. ^[1] Oral disease is one of the most costly diet & behaviour-related diseases. ^[2] The pattern of oral disease reflects systematic differences in lifestyle & risk profiles that are related to living conditions & environmental factors as well as differences in access to oral health services. ^[3]

It is well established that early diagnosis & appropriate treatment, including preventive & curative measures, can prevent dental diseases from reaching a stage of severe consequences which would force a person to seek professional dental care. However, the dental visit behaviour of many people is far from what dental professionals would think desirable. ^[4] It has been shown that individuals with stable favorable dental beliefs & positive

attitude have better oral health, while unfavorable dental health beliefs are related to poorer oral health. [5] Also widely acknowledged that the behavior of parents affects their children's health. [6] Dental Neglect has been found to be a predictor of poor oral health in children & adults. [7]

Dental neglect has been defined as "behavior & attitudes which are likely to have detrimental consequences for the individual's oral health or more specifically as failure to take precautions to maintain oral health, failure to obtain needed dental care & physical neglect of the oral cavity". [8] It is associated with increased oral functional limitations & social & physical disabilities [9] & overall quality of life. [10]

Studies in literature have reported dental neglect in different age groups [7,11-13] & social classes [14-16] using various tools. Dental Neglect scale (DNS) was used in most of the studies. [8,7,12 -16] In comparison with Dental Indifference scale, DNS was found to be easier to use as it did not require a complex algorithm to compute scale scores. [16] The scale has been found to act in similar ways in children, [14] adolescents [7,8,13] young adults [11,17] & adults [10,11] in general. DNS has been shown to correlate with a wide range of dental clinical & behavioural indicators. [10]

Hence the current systematic review was carried out to determine the role of dental neglect as a behavioural audit in oral health. The objectives of this study were to systematically review the current literature about dental neglect with the following research questions:

Is there a relationship between dental neglect & socio-demographic variables? Can dental neglect assessment be considered as a behavioural audit of oral health care?

MATERIALS & METHODS

Literature search

Based on the research questions, a literature search was performed using Pubmed/ MedLine & Google Scholar with following keywords: Neglect [All Fields] &

("dentistry" [MeSH Terms] OR "dentistry"[All Fields]). Dental [All Fields] & neglect [All Fields]. As dental neglect is a relatively recent explored form of maltreatment, it was decided that the search would include all the studies published till December 2014. Hence final search included articles published between 1996-2014. Manual search was performed by reviewing the reference lists of the selected publications for additional publications.

Inclusion & exclusion criteria

Inclusion criteria included studies confirming dental neglect which was identified using a valid & reliable index (DNS). Only published & accessible papers were considered. Exclusion criteria were studies in which dental neglect suspected or stated, with no supporting evidence. Case reports, reviews, protocols, brief/short communications & articles in languages other than English were excluded.

Evaluation of scientific articles using quality scoring system

The quality scoring system as reported in the previous study was used for quality evaluation. [18] The methodological quality of all papers was evaluated independently by two reviewers & scores were given. The quality scoring system comprise three items on the aim & research question, one item on the appropriateness of the study design, three items on population & sample size, three items on measurement instruments, two items on data analysis & one item on consistency of the conclusion. The scores ranged from 1 to 26. Discrepancy between scores was resolved through consensus.

Data Synthesis

Data extraction form was developed which included sociodemographic information & oral health behaviour characteristics. Sociodemographic variables included for review were age, gender, education, occupation, income & socioeconomic status. Variables attributed to attitude & behaviour was brushing, flossing, dental visit, reason for visit was evaluated. For each variable of interest, all

the descriptive data available were assimilated to understand its relationship with dental neglect. Further to assess dental neglect as an behavioural audit of oral health care, studies reporting relationship between DNS scores & oral health behaviour were included & the validity of DNS scores as a measure of behavioural audit was analysed.

RESULTS

A total of 385 articles were identified in the literature search. In the

screening phase, 48 studies were selected based on title. In the second phase based on relevance of abstract 19 studies were selected. Finally eight studies were included for systematic literature review that fulfilled the eligibility criteria & methodological quality. All studies describing various aspects of dental neglect were representative of different parts of world with different age groups, culture & values attached to oral health involved. Six publications taken for the second question used DNS to measure dental neglect. [Figure 1] [Table 1, 2].

Table 1: Study characteristics of the publications on dental neglect

Authors & Year	Sample characteristics		Study tool	Country
	Sample size	Age (in years)		
Thomson WM et al., ^[14] 1996	N= 769	10-11 & 14-15	DNS	South Australia
Thomson WM et al., ^[17] 2000	973	26	DNS	Dunedin, New Zealand
Jamieson LM et al., ^[12] 2002	458	18-65+	DNS	Dunedin, New Zealand
Skaret E et al., ^[8] 2007	1301	16-79	DNS	Norway
McGrath C et al., ^[11] 2007	800	25-44	DNS	Hong Kong
Coolidge T et al., ^[7] 2009	126	16-24	DNS	USA
Acharya et al., ^[15] 2013	316	18-42	DNS	India
Ajagannanavar SL et al., ^[13] 2014	600	15-18	DNS	India

Table 2: Study characteristics of the publications using Dental Neglect Scale

Author & Year	Sample characteristics		Study tool
	Sample size	Age (in years)	
Thomson WM et al., ^[14] 1996	769	10-11 & 14-15	DNS
Thomson WM et al., ^[17] 2000	980	26	DNS
Jamieson LM et al., ^[12] 2002	980	26	DNS
Skaret E et al. ^[8] 2003	263	16-79	DNS
Coolidge T et al., ^[7] 2009	117	12-18	DNS
Ajagannanavar SL et al., ^[13] 2014	600	15-18	DNS

Table 3: Socio-demographic variables associated with Dental Neglect mentioned in the publication included in the review

Socio-demographic variables	Publication
Age	Jamieson LM et al. ^[12] McGrath C et al. ^[11] Skaret et al. ^[8] Coolidge T et al. ^[7] Ajagannanavar SL et al. ^[13]
Gender	Thomson et al. ^[14] Thomson et al. ^[17] Jamieson LM et al. ^[12] Skaret et al. ^[8] McGrath C et al. ^[11] Coolidge T et al. ^[7] Ajagannanavar SL et al. ^[13]
Education	Thomson et al. ^[14] Jamieson LM et al. ^[12] McGrath C et al. ^[11] Acharya et al. ^[15]
Occupation	Jamieson LM et al. ^[12] Skaret et al. ^[8]
Income	Thomson et al. ^[14] McGrath C et al. ^[11] Ajagannanavar SL et al. ^[13]
Maternal Education	Thomson et al. ^[14]
Socioeconomic status	Thomson et al. ^[14] Acharya et al. ^[15]

Table 4: Variables for attitude & behavior associated with Dental Neglect scores mentioned in the publication included in the review

Variables for attitude & behaviour	Publications
Brushing	Thomson et al. ^[14] Jamieson LM et al. ^[12]
Flossing	Thomson et al. ^[14] Jamieson LM et al. ^[12] Skaret et al. ^[8]
Dental visit	Thomson et al. ^[14] Thomson et al. ^[17] Jamieson LM et al. ^[12] Skaret et al. ^[8] Coolidge T et al. ^[7] Ajagannanavar SL et al. ^[13]
Reason for visit	Thomson et al. ^[14] Thomson et al. ^[17] Jamieson LM et al. ^[12] Skaret et al. ^[8]
Self- reported oral health	Thomson et al. ^[17] Jamieson LM et al. ^[12] Skaret et al. ^[8] McGrath C et al. ^[11]

The studies included in review presents a wide range of age groups [10-79 years]. Association between age & dental neglect was reported by Coolidge T et al.,^[7]

Skaret et al., [8] McGrath et al., [11] Jamieson LM et al. [12] & Ajagannavar SL et al. [13] Pattern of dental neglect varied with age in these studies. Seven [7,8,11-14,17] out of eight studies reported dental neglect in relation to gender. The overall evidence for association between gender & neglect appeared equivocal. Four studies [11,12,14,15] have overtly mentioned the relation between education & dental neglect with one study concentrated on mother's education level & child dental neglect. Two [8,12] out of eight studies related dental neglect with occupation. Unemployed or lower

occupational group had higher dental neglect. Three [11,13,14] studies have reported income in relation to dental neglect. It was seen that higher dental neglect was prevalent in population with parents having lower level of income. Thomson et al. [14] & Acharya et al. [15] found subjects with low socioeconomic status had higher dental neglect. Dental Neglect assessment as a behavioural audit for oral health found that infrequent brushing, flossing, dental visit, & problem driven dental visit being associated with higher dental neglect scores.

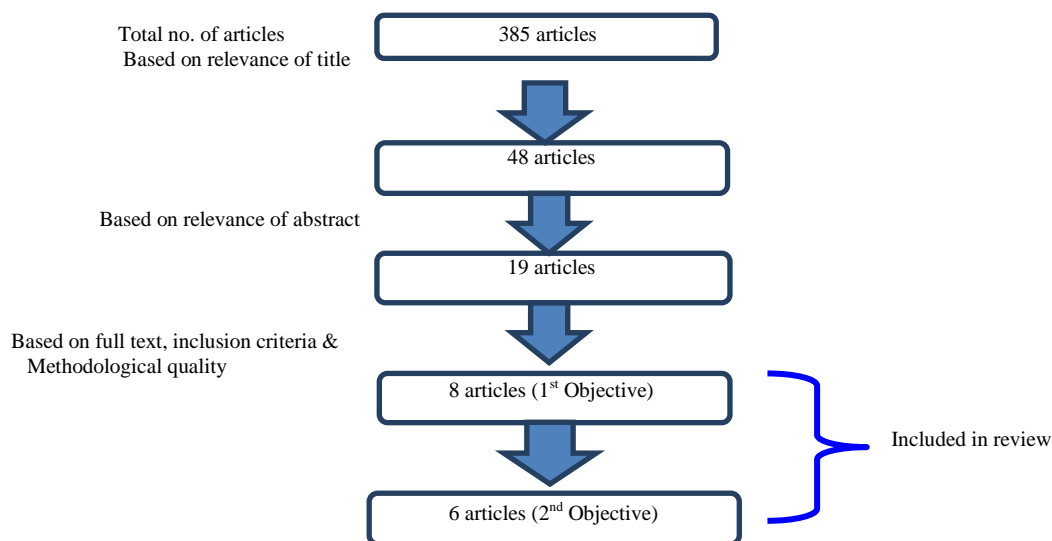


Figure 1: Flow diagram of publications included in the study

DISCUSSION

The literature was systematically reviewed to develop sound conclusions about the relationship between dental neglect & sociodemographic variables & also to ascertain the applicability of dental neglect as a behavioural audit for oral health. The sociodemographic variables were related almost in the same manner in all the studies with few exceptions.

Sociodemographic Variables & Dental Neglect

Age & Dental Neglect

Dental neglect among adolescents significantly varied with age. [7,11,13] Age increased the chances of dental neglect. This was attributed to their increased autonomy or poor oral health behaviors in

adolescence. [7] In a study among general population, [11] dental neglect was significantly associated with age wherein extreme age groups [16-24 & >65 years] had higher neglect scores than other age groups. This could be due to the confounding effect of income & educational level with age, as both these groups have lower income & education attainment. [11] Whereas in two studies [8,12] among general population, dental neglect decreased with increase in age. These studies implied that dependent population is more affected than others.

Gender & Dental Neglect

Out of seven studies, four [8,13,14,17] have reported statistically significant higher magnitude of dental neglect in males when compared to females. Females are usually

concerned about their body & are less tolerant to changes in their appearance & health. Likewise females tend to take better care of their oral health than males & are more likely to have regular dental check-ups, primarily due to gender-specific social norms. [3] Furthermore, this might also be due to the nature of their social environment. [19] In the current review the evidence for association between gender & neglect is equivocal. Further studies are required.

Education & Dental Neglect

In a study by McGrath C et al., [11] educational attainment was significantly associated with DNS scores, with marked differences between those with no formal or only primary education & those who attained secondary education or tertiary education ($p < 0.01$). No statistical difference was observed between those with secondary & tertiary education ($p > 0.05$).

Thomson et al. [14] reported that dental neglect was greater among children whose mother had less formal education. Mother's education is taken as proxy measure for children's dental neglect as mother's educational level influences in a number of ways. A significant effect of educational background on dental neglect was observed in population with low education.

Occupation & Dental Neglect

Very few studies have mentioned relationship of occupation & dental neglect. Skaret et al. [8] reported that subjects who had been unemployed from the past three months had higher DNS scores compared others with employment. Jamieson LM et al. [12] highlighted that dental neglect was higher in lower occupational group compared to middle & higher occupational group. Hence dental neglect reduced with rise in occupational ladder.

Income & Dental Neglect

Three [11,13,14] studies have reported income in relation to dental neglect. Two studies [13,14] reported that dental neglect is inversely proportional to family income. McGrath C et al. [11] reported an association

between income level & dental neglect score, with marked difference between the low income group & middle/high income groups. No statistical difference was observed between middle & higher income groups. This reflects a threshold level for dental neglect in the income groups.

Socioeconomic Status & Dental Neglect

Socioeconomic status is a composite measure that typically incorporates economic status, measured by income; social status measured by education; & work status measured by occupation. [20] Thomson et al. [14] & Acharya et al. [15] concluded that population groups in lowest socioeconomic status had the highest DNS scores thereby illustrating the inverse relationship among socioeconomic status & dental neglect.

Dental Neglect Assessment as a Behavioural Audit

Professional care is an important component for attaining & maintaining optimal oral health. [21] Behavioural audit is measured in terms of attitude & behavior towards oral hygiene practices & dental visits.

Dental Neglect & Brushing

Two [12,14] out of six studies are related to dental neglect & tooth-brushing habit. Thomson et al. [14] reported greater dental neglect score among those who brushed their teeth infrequently. Likewise dental neglect score was less in those who brushed once or more a day compared to less than once a day as reported by Jamieson LM et al. [12]

Dental Neglect & Flossing

Three [8,12,14] studies have explicitly mentioned the relationship between dental neglect & flossing. It was seen that dental neglect score was higher among those who never or seldom used floss compared to those who used often or more regularly.

Dental Neglect & Frequency of Dental Visits

Six studies [7,8,12-14,17] have mentioned the relation between dental neglect & frequency of dental visits. It was reported that dental neglect score was higher

among those who had not visited dentist in the recent past [7,14] or in last 2 [14] or 3 [7] or 5 years. [8,17]

Dental Neglect & Reasons for Dental Visits

Four [8,12,14,17] studies have related neglect & reasons for dental visits. In these studies dental neglect scores were higher among those who visited dentist with problem rather than check-up or preventive orientation of dental visiting behavior. Parents are the primary social force influencing child development in the early childhood years. [6] Thomson et al. [14] found that dental neglect was higher in children whose parental visiting pattern was symptom driven rather than routine.

Dental Neglect & Self-Reported Oral Health

Four studies [8,11,12,17] have mentioned association between self-reported oral health status & dental neglect score ($p < 0.001$). People with higher self reported oral health ratings had lower DNS scores.

Based on this review, sociodemographic factors like age, gender, education, occupation, income & class can be attributed as distal factors influencing outcome. Similarly factors incorporating risk behavior (oral hygiene factors like brushing, flossing) & use of oral health services (reasons of visits & frequency of visits) can be considered as proximal factors which are directly related to dental neglect. [21]

Dental neglect scale served as a proxy measure for measuring attitude & behavior for certain aspects of oral health. The DNS may have applicability in predicting & understanding variation in dental health, & in designing & targeting dental health promotion strategies. [14] It offers another method of pinpointing individuals & groups on whom health promotion efforts should be focused.

LIMITATIONS &

RECOMMENDATIONS

Search was limited to Google scholar, PUBMED/Medline & language to English. As a result, this review is restricted to the outcomes of those studies that are

included in final analysis. Hence the possibility of missing publications from other databases & languages cannot be ruled out.

This review has highlighted a paucity of studies addressing the characteristics of dental neglect in population, suggesting that the research community has neglected this aspect of maltreatment. Among the sociodemographic variables age, gender, education, occupation, income, socioeconomic status were considered. Other variables which would have influenced the outcome are not reviewed. Since only cross sectional studies are available for review, causal association could not be inferred. Further well-designed longitudinal studies & clinical trials are required using DNS in wide variety of settings to establish predictors of dental neglect.

The present review identified those vulnerable groups & delineates one of the major causes for delaying a routine dental check-up that is linked to attitude & behavior towards health (dental neglect). Intensive population-directed strategies for oral health promotion should be considered in order to further improve oral health attitude & behavior of the vulnerable population. Since health behaviors in parents are determinants of behaviors in their young children, promoting parents' knowledge & attitude could affect their children oral health behavior & status.

CONCLUSION

Socio-demographic variables seem to influence oral health attitude & behavior. Overall it may be concluded that among people with low education level, socio-economic status & incomes, dental neglect was significantly associated. Similarly people with negligent attitude & negative behavior towards brushing, flossing & dental visits are more likely to have higher chances of dental neglect. Hence Dental neglect may be considered as a behavioural audit in oral health. Further systematic reviews delineating behaviours arising out

of dental neglect and adverse oral health outcomes may be conducted.

REFERENCES

1. Freire MC, Sheiham A, Hardy R. Adolescents' sense of coherence, oral health status, and oral health-related behaviours. *Community Dent Oral Epidemiol.* 2001; 29(3):204-12.
2. Kwan SY, Petersen PE, Pine CM, Borutta A. Health-promoting schools: an opportunity for oral health promotion. *Bull World Health Organ.* 2005; 83(9):677-85.
3. Petersen PE, Kwan S. Equity, social determinants and public health programmes- the case of oral health. *Community Dent Oral Epidemiol.* 2011; 39(6):481-87.
4. Lo EC, Lin HC, Wang ZJ, Wong MC, Schwarz E. Utilization of dental services in Southern China. *J Dent Res.* 2001; 80(5):1471-74.
5. Broadbent JM, Thomson WM, Poulton R. Oral healthbeliefs inadolescence& oral health in young adulthood. *J Dent Res.* 2006; 85(4):339-43.
6. Bozorgmehr E, Hajizamani A, Malek Mohammadi T. Oral health behavior of parentsas a predictor of oral health status of their children. *ISRN Dent.* 2013; 741783.
7. Coolidge T, Heima M, Johnson EK, Weinstein P. The Dental Neglect Scale in adolescents. *BMC Oral Health.* 2009; 9:2.
8. Skaret E, Astrøm AN, Haugejorden O, Klock KS, Trovik TA. Assessment of the reliability & validity of the Dental Neglect Scale in Norwegian adults. *Community Dent Health.* 2007; 24(4):247-52.
9. Sanders AE, Spencer AJ, Slade GD. Evaluating the role of dental behaviour in oral health inequalities. *Community Dent Oral Epidemiol.* 2006;34(1):71-9.
10. McGrath C, Bedi R. Can dental attendance improve quality of life? *Br Dent J.* 2001; 190(5):262-65.
11. McGrath C, Sham AS, Ho DK, Wong JH. The impact of dental neglect on oral health: a population based study in Hong Kong. *Int Dent J.* 2007; 57(1):3-8.
12. Jamieson LM, Thomson M. Dental health, dental neglect, & use of services in an adult Dunedin population sample. *N Z Dent J.* 2002; 98(431):4-8.
13. Ajagannavar SL, Sequeira PS, Jain J, Battur H. Dental neglect among college going adolescents in Virajpet, J Indian Assoc Public Health Dent. 2014; 12:215-18.
14. Thomson WM, Spencer AJ, Gaughwin A. Testing a child dental neglect scale in South Australia. *Community Dent Oral Epidemiol.* 1996; 24(5):351-6.
15. Acharya S, Pentapati KC, Bhat PV. Dental neglect & adverse birth outcomes: a validation & observational study. *Int J Dent Hyg.* 2013; 11(2):91-8.
16. Jamieson LM, Thomson WM. The Dental Neglect & Dental Indifference scales compared. *Community Dent Oral Epidemiol.* 2002; 30(3):168-75.
17. Thomson WM, Locker D. Dental neglect & dental health among 26-year-olds in the Dunedin Multidisciplinary Health & Development Study. *Community Dent Oral Epidemiol.* 2000;28(6):414-8.
18. Bots-VantSpijker PC, Vanobbergen JNO, Schols JMGA, Schaub RMH, Bots CP, de Baat C. Barriers of delivering oral health care to older people experienced by dentists: a systematic literature review. *Community Dent Oral Epidemiol.* 2013; 42:113-121.
19. Al-Omiri MK, Barghout NH, Shaweesh AI, Malkawi Z. Level of education & gender-specific self-reported oral health behavior among dental students. *Oral Health Prev Dent.* 2012;10(1):29-35.
20. Adler NE, Boyce T, Chesney MA, Cohen S, Folkman S, Kahn RL, Syme SL. Socioeconomic status & health. The challenge of the gradient. *Am Psychol.* 1994; 49(1):15-24.
21. Petersen PE. Sociobehavioral risk factors in dental caries – international perspectives. *Community Dent Oral Epidemiol.* 2005; 33:274-79.

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