DOI: 10.7860/JCDR/2019/40580.12657

Original Article

Dentistry Section

Does Individual Deprivation Affect the Sense of Coherence and Oral Health Status of Individuals?

NESA AURLENE[1], R SINDHU[2], M SASIKALA[3], N DIVYALALITHA[4], D PRABU[5]

ABSTRACT

Introduction: Studies using deprivation status indicators are scarce in the field of oral health research. Deprivation indicators are poverty indicators that help to understand how poverty affects the health status of people in a community. Sense of coherence is a psychosocial construct that has been successfully used in healthcare research to predict subjective health outcomes.

Aim: To assess whether an individual's material and social deprivation status adversely affects the sense of coherence and oral health status.

Materials and Methods: A cross-sectional survey was conducted combining both a self-administered questionnaire to assess Sense of Coherence (SOC) and a face-to-face interview to assess the Individual Deprivation Measure (IDM) in the months of October 2017-December 2017 among 120 outpatients attending SRM Dental College and Hospital, India. The oral health status of patients was assessed using indices of Oral Hygiene Index-Simplified (OHI-S), Decayed Missing Filled Teeth (DMFT) and Decayed Missing Filled Surfaces (DMFS). The results were analysed using SPSS software for windows, version 20.0 (SPSS Inc., Chicago, IL, USA), ANOVA. Simple linear regression analysis was used to understand whether IDM was a good predictor of SOC in study participants.

Results: Mean sense of coherence was found to be higher among patients belonging to a less deprived category (43.29) in comparison to patients belonging to a more deprived category (26.4). Oral health status was also found to be poorer with a higher mean OHI-S (3.36), DMFT (10.5) and DMFS (32.3) among more deprived patients in comparison to lower mean OHI-S (1), DMFT (2.61) and DMFS (4.50) among less deprived patients. The mean SOC was found to be significantly different between people with differing deprivation status at $p<0.05$. In linear regression analysis, the IDM was found to be a good predictor of SOC among patients with low SOC ($r=0.64$).

Conclusion: The deprivation status of individuals affects the sense of coherence and adversely affects the oral health status of individuals. Initiatives must be taken to address the lack of material resources and barriers to participation in the social activities of a community that deprived people face so that the general health status and oral health status of deprived people in a community improves.

Keywords: Dentition status, Oral hygiene, Poverty, Salutogenesis

INTRODUCTION

It is a well-established fact, that health is not a one-dimensional concept and a multitude of factors influence the attainment and maintenance of health. Oral health is not dissimilar in this regard, and there are a number of factors that determine, whether an individual is capable of sustaining an adequate level of oral health in his life. Psychosocial and socioeconomic factors encompass two areas that are consistently and notably associated with the decline or ascent of oral health in individuals.

The salutogenic model as described by Antonovsky A, takes account of the resources that people have in life and their ability to cope with stressors and give meaning to life despite hardships or difficulties that they may encounter in life [1]. The sense of coherence construct is the keystone of the salutogenesis theory. It is a global orientation that measures how capable individuals are in utilising the resources at their disposal and making decisions pertaining to their health. These decisions and actions ultimately lead to the maintenance of good health or deterioration of health based on how an individual perceives and manages stressful events in his or her life [2].

Studies examining the association between SOC and health outcomes have generally found a positive association between strong SOC and subjective health outcomes [3,4]. Likewise, studies have found a positive association between SOC and oral health outcomes including oral health-related quality of life, tooth retention and dental caries [5-7].

In India, nearly 224 million people live below poverty line according to World Bank data [8]. The IDM is an index that permits to measure poverty at the individual level across 15 dimensions such as food, water, shelter, health care, education, energy, sanitation, family relationships, clothing and personal care, violence, family planning, environment, voice in the community, time-use and work [9]. Many studies have demonstrated the relationship between deprivation and oral health [10-12]. However, the deprivation indicators used in these studies are largely area-based indicators and cannot be used to determine deprivation status of each individual in a community. Hence, studies eliciting the association between individual deprivation and oral health are necessary to target public health programmes or policies to the most deprived section of the population in order to bridge the gap that exists between non-deprived and deprived people in terms of their oral health [13]. The Townsend's index, Carstairs index and Jarman Underprivileged area index are the indices most commonly used in health research to assess the relationship between deprivation and health status [14-16]. The present study uses the IDM to understand if deprivation status of an individual affects the sense of coherence and oral health status of study participants.

MATERIALS AND METHODS

A single institutional cross-sectional study was conducted among outpatients who attended SRM Dental College and Hospital, Ramapuram, Chennai in the month of October 2017-December 2017. Ethical clearance for the study was obtained from the Institutional Review Board with ethical approval number SRMU/M and HS/SRMDC/2017/S/011. The inclusion criteria were that patients aged 20 years or above, had full comprehension of the

local language Tamil or otherwise English, and gave consent to participate in the study. Physically handicapped and mentally challenged patients, patients with emergency dental problems such as dentoalveolar abscess, dental trauma or orofacial trauma were excluded from the study. A purposive sampling procedure was followed in recruiting patients for the study. A pilot study was conducted separately among 30 outpatients before the commencement of the study to validate the questionnaire and these questionnaires were not included in the final analysis. The sample size for the study was estimated using the standard deviation (5.58) of the sense of coherence observed in the pilot study. A power analysis was run using G*power software inputting an effect size of 0.4, alpha error probability of 0.05, sample size of 120 study subjects and 4 as the number of groups denoting four categories of deprivation for fixed effects, One-Way ANOVA. The power of the study was found to be 0.96. Some 150 outpatients agreed to participate in the study and signed informed consent forms. Out of these 30 participants were excluded from the analysis because of missing responses in the self-administered questionnaire for SOC. A total of 120 study subjects with complete data were included in the final analysis.

Intraoral examination including assessment of OHI-S, DMFT and DMFS was also performed. Kappa coefficients for intra-examiner reliability were found to be ≥0.85 for OHI-S, DMFT and DMFS in the pilot study. This study combined the use of a self-administered questionnaire to determine the demographic data and sense of coherence of study participants and a face-to-face interview to determine the Individual Deprivation Status of study subjects. All the face-to-face interviews were administered by the principal investigator.

The demographic variables that were included in the questionnaire were age, gender and educational status. Sense of coherence was measured using SOC-13 version of SOC scale which is the short version of the SOC scale [17]. The English version of the questionnaire was translated to Tamil version. The Tamil version was then back translated into English by a linguistic expert fluent in both Tamil and English. The back translated version was then compared with the English version to check that the questions were properly translated. The SOC-13 scale consists of 13 items with each item scored on a five-point Likert's scale. The SOC score for an individual is the sum of all the item codes with a possible range of 13-65 [18]. High scores indicate a strong SOC whereas low scores indicate a weak SOC. In the pilot study, the Cronbach's alpha for SOC-13 was found to be 0.78 showing good degree of internal consistency and homogeneity between items. The oral health status of the study participants was assessed using OHI-S and dental caries status was assessed using the DMFT and DMFS indices [19,20]. All intraoral examinations were carried out by a single trained and calibrated examiner using a No. 23 Sheperd's hook explorers and plain mouth mirror in the dental chair with overhead light illumination.

The IDM for each participant was assessed using direct face-to-face interviews by a single investigator. The IDM measures deprivation across 15 dimensions with a possible score range of 0-100. Individuals are categorised as extremely deprived, very deprived, deprived, somewhat deprived and not deprived if they score below 60, 60-69.9, 70-79.9, 80-89.9, 90-100 respectively [9].

STATISTICAL ANALYSIS

Data were entered into a computer and analysed using SPSS for Windows version 20.0 (SPSS Inc., Chicago, IL, USA). Statistical analysis was performed using One-Way ANOVA to compare mean SOC between different age groups, educational status. Independent t-test was used to test the differences in mean SOC between males and females and Pearson's correlation for continuous independent variables with a p-value of <0.05 considered as significant. Simple linear regression analysis was done to determine if IDM was good predictor of SOC with IDM as the independent variable and SOC as the dependent variable.

RESULTS

A total of 120 participants out of 150 had answered the questionnaire completely and were included for the analysis giving a response rate of 80%. Of this 58% (n=69) were males and 42% (n=51) were females. Majority of the participants were in the age range of 20-30 years (44%, n=53). Most participants were graduates having completed some undergraduate degree (48%, n=58). It was found that the SOC decreased as the deprivation status increased, OHI-S, DMFT and DMFS increased as the deprivation status increased [Table/Fig-1].

Variables	n	Mean SOC	Mean OHI-S	Mean DMFT	Mean DMFS
Male	69	40.53	1.37	3.55	9.81
Female	51	37.64	1.48	4.35	10.50
Educational status					
PG	16	46.68	0.96	2.06	2.87
G	58	42.82	0.88	2.15	2.64
HSC	10	34.4	2.21	5.4	14.4
HSP	21	35.05	1.89	4.95	13.66
PC	3	30.33	2.3	7	22
PP	12	26.25	2.94	10.83	38.25
Age in years					
20-30	53	41.50	0.93	2.28	4.26
31-40	23	40.21	1.53	4.30	8.95
41-50	24	41.04	1.39	3.45	8
51-60	10	28	2.57	9.9	37.8
61-70	7	34	2.61	5.28	19.43
71 and above	3	29.66	2.73	9.33	25
IDM					
Very Deprived	10	26.4	3.36	10.5	32.3
Deprived	11	29.81	2.19	7.36	25.18
Somewhat Deprived	35	38.68	1.39	3.25	9.08
Not Deprived	64	43.29	1	2.61	4.60

[Table/Fig-1]: Demographic details of study participants.
n: Number of samples; SOC: Sense of coherence; G: Graduate; HSC: High school completed; HSP: High school partially completed; PC: Primary school completed; PP: Primary school partially completed; IDM: Individual deprivation measure

The mean sense of coherence for the study sample was found to be 39.3. The results were found to be significant at p<0.05, males had a stronger SOC in comparison to females. The age of the study participants ranged between 20-80 years. The mean SOC between different age groups were found to be significant at p<0.05. Study participants in the age ranges of 20-50 years exhibited almost similar mean SOC's in comparison to older age groups who exhibited lesser mean SOC's [Table/Fig-2]. One-Way ANOVA yielded significant results when mean SOC was compared between study participants with differing educational status [Table/Fig-3].

Age in years	n	Mean SOC	SD	f-value	p-value
20-30	53	41.50	7.47		
31-40	23	40.21	7.79		
41-50	24	41.04	9.32	3.156	0.04*
51-60	10	28	5.27		
61-70	7	34	5.56		
71 and above	3	29.66	4.04		

[Table/Fig-2]: One-way ANOVA comparing mean SOC among different age groups.
n: Number of subjects, SOC: Sense of coherence, SD: Standard deviation, *-significant

The median SOC score in this study was found to be 40. Accordingly, participants were dichotomised as having low SOC if they scored below 40 and high SOC if they scored 40 or above. In the present

Educational status	n	Mean SOC	SD	f-value	p-value
PG	16	46.68	6.84		
G	58	42.82	6.18		
HSC	10	34.4	4.83	15.479	<0.001**
HSP	21	35.05	7.63		
PC	3	30.33	2.31		
PP	12	26.25	2.14		

[Table/Fig-3]: One-Way ANOVA comparing mean SOC among participants with differing educational status.
n-Number of subjects; SOC: Sense of coherence; SD: Standard deviation; PG: Post graduate, G: Graduate; HSC: High school completed; HSP: High school partially completed; PC: Primary school completed; PP: Primary school partially completed; **-highly significant

study, 48.3% (n=58) subjects were found to have low SOC and 51.7% (n=62) subjects were found to have high SOC. A simple linear regression analysis was carried out with SOC as the dependent variable and IDM as the independent variable separately among subjects classified as having low SOC and high SOC. Among subjects with low SOC, a positive correlation was found between SOC and IDM (r=0.64) and the regression model predicted 41% of the variance. The results were found to be highly significant with a p-value <0.005. Among subjects with high SOC a weak positive correlation was found between SOC and IDM (r=0.31) and the regression model predicted 10% of the variance. The results were found to be significant with a p-value of 0.016 [Table/Fig-4]. The IDM was found to be a good predictor of SOC only among people having low SOC.

SOC	n	Unstandardised beta (B)	Standardised beta	R^2	p-value
Low	58	0.29	0.64	0.41	<0.005**
High	62	0.30	0.31	0.10	0.016*

[Table/Fig-4]: Linear regression model with SOC as dependent variable and IDM as independent variable among subjects with low and high SOC.
SOC: Sense of coherence; n: Number of subjects; R2: Correlation coefficient; **-highly significant, *-significant

In this study, a majority of participants were found to belong to the not deprived category (53%, n=64). One-Way ANOVA was used to test the differences in mean SOC among subjects belonging to different levels of deprivation and the results were found to be highly significant with p<0.001 [Table/Fig-5].

IDM	n	Mean SOC	f-value	p-value
Very deprived	10	26.4		
Deprived	11	29.81	27.819	p<0.001**
Somewhat deprived	35	38.68		
Not deprived	64	43.29		

[Table/Fig-5]: One-way ANOVA comparing mean SOC among participants with differing deprivation status.
n: Number of subjects, SOC: Sense of coherence; **-highly significant

DISCUSSION

The aim of this study was to investigate the complex inter-relation between sense of coherence, deprivation status and oral health status among a purposive sample of study subjects attending the dental clinic for various oral health ailments. There is a deficiency of number of studies that examine the association between material deprivation, social deprivation and oral health status and tries to understand if the sense of coherence is affected by an individual's deprivation status, which in turn leads to oral health behaviours that are not conducive to maintain an adequate level of oral health.

In the present study, the mean sense of coherence was found to be higher among males in comparison to females. This finding is in accordance with a study conducted by Shilpa M et al., here mean sense of coherence was higher among male adolescents than female adolescents [21]. The results are in contrast to a study conducted by Volanen SM et al., in Finland where SOC was found to be gender neutral [22]. Males having a higher sense of coherence could be attributed to a number of factors including increased social, cultural and academic pressure to do well in life in comparison to females. In the Indian context, this pressure is further magnified by a particularly patriarchal society where male members who are unable to support their families are most often considered disreputable. In this study, the mean sense of coherence was found to be higher among younger age groups than older age groups. This can be because age related multi-morbidity, cognitive impairment and physical disability lead to a deterioration in psychological well-being as older people become dependent on others for their general care as well as health care. Likewise, older participants were found to have a higher mean OHI-S, DMFT and DMFS. Although this may be attributed to age related processes, a low sense of coherence among older participants aged 51 years and above may impede their motivation for maintenance of oral hygiene and their ability to make decisions regarding their oral health care.

The sense of coherence was found to be higher among participants with a postgraduate or graduate degree in relation to participants who had lower educational status. Likewise, poor oral health status was also found to be more common among subjects with lower educational status in the present study with a high mean DMFT, mean DMFS and mean OHI-S in comparison to subjects with a higher educational status. This finding is in accordance with a study conducted by Bernabe E et al., who found a positive association between number of years of education and number of teeth present among Finnish adults [23]. It stands to reason, that subjects who had attained a high educational status are more able to make appropriate decisions regarding their oral health in addition to being able to comprehend instructions and information in any form of oral health promotional material than less educated subjects. Education is one of the most important factors that help people to sustain jobs and a productive lifestyle probably aids in the development and maintenance of a strong sense of coherence in people. Further, it can also be postulated that subjects who have achieved a high educational status must have had access to amenities in early life that enabled them to pursue and attain an adequate level of education. This is notable because the theory of salutogenesis strongly implicates childhood living conditions as one of the factors necessary for the development of a strong sense of coherence [17].

Studies assessing the relationship between deprivation status and oral health have thus far implicated a strong association between deprivation and poor oral health in people. Notable among these studies include Provart SJ and Carmichael CL, study which tested the ability of the Townsend's index of material deprivation to act as an indicator for caries experience among children belonging to different deprivation categories [24]. A significant difference was found between dental caries experience in children and deprivation status with mean DMFT increasing from 1.1 in more advantaged group to 1.9 in the deprived group. Studies conducted by Sweeney PC et al., and Jones C M et al., using the Carstairs index to measure deprivation also found a positive association between deprivation status and dental caries experience among Scottish school children [25,26].

The IDM is a novel and effective method for determination of the poverty status of an individual, which allows for a more thorough understanding of the effect of poverty on people's lives. In the present study, it was found that people belonging to the very deprived and deprived categories had poorer oral health status with a higher mean OHI-S, DMFT and DMFS in comparison to people belonging to the somewhat deprived or not deprived category. The study finding is similar with Kramer AC et al., study who found that the odd's ratio for having a carious lesion was higher among children and adolescents belonging to a lower Socio-Economic Status (SES) quintile when compared to high SES quintile [27]. Another study was

done by Östberg AL et al., has also found that the incidence rate ratio for dental caries was five times higher in more deprived areas in comparison to less deprived areas [28]. This is not an unusual finding as many studies exist to support the association between low socioeconomic position, area-based deprivation and poorer oral health outcomes [12,29,30]. People with a lack of socioeconomic resources are hard pressed to take account of their general as well as oral health, as they face an increased burden in terms of material and social deprivation which directs their focus towards maintaining an adequate income and sustaining their position enough to at least meet their basic necessities in life. As a consequence of this, health care and practising healthy lifestyle behaviours take a back seat in terms of priorities in life which ultimately results in greater morbidities among people in a deprived status.

In the present study, the deprivation status was found to be a better predictor for sense of coherence only among people with a low sense of coherence. The mean differences in SOC among various deprivation categories was found to be statistically significant with higher mean SOC among somewhat deprived and not deprived groups in comparison to deprived and very deprived groups. This is similar to a study conducted by Packard CJ et al., among 666 Scottish subjects examining the interaction between social deprivation, mental well-being, health behaviours and personality traits. The study's results found high levels of neuroticism, psychoticism, low self-esteem, low sense of coherence, low self-efficacy and unhealthy behaviours such as smoking and sedentary lifestyle among subjects belonging to highly deprived areas in comparison to areas with low deprivation [31]. Similarly, Lang IA et al., found that among adults in England belonging to various neighbourhood deprivation categories, the relative risk of using dental services only when symptoms of dental ill health was higher among people living in more deprived areas, whereas those living in less deprived areas had more likelihood of going for regular dental check-ups [32].

The sense of coherence enables a person to look at life as comprehensible, manageable and meaningful and helps one to mobilise resources at their disposal for maintenance of well-being. Material and social resources may act as general resistance resources enabling people who experience less deprivation in life to use the resources at their disposal to make better decisions regarding their health care, avail and understand the health information given to them, follow instructions of health-care workers or physicians and practice healthy lifestyle behaviours that is conducive to attaining and maintaining good health. A low sense of coherence among subjects experiencing more deprivation would facilitate them in viewing their life as chaotic and incomprehensible thereby leading to difficulties in making the right decisions about their oral health care in addition to a lack of motivation to avail dental services regularly [32]. This ultimately leads to a deterioration in oral health among subjects with a low sense of coherence and high deprivation status. This study proves that there is an interaction between sense of coherence, individual deprivation status and oral health status among adults attending a dental outpatient department in Chennai, India.

LIMITATION

The limitations of this study are that it was conducted in a single institution and therefore area wise variations in SOC and deprivation status could not be assessed. This study was conducted among a purposive sample of study subjects who gave consent for participating in the study; this may have led to introduction of biases in the study. There was an over representation of subjects in the somewhat deprived and not deprived category in this study and an under representation of subjects in the very deprived and deprived category which could have resulted in not capturing the psychosocial elements and oral health inequalities among the more deprived. Similarly, there was an over representation of study subjects who were graduates and postgraduates in comparison to subjects who had attained lesser educational qualification in this study. Periodontal indices were omitted in this study due to time constraints. However, this study was largely exploratory in nature and the study findings can be used as a basis for conducting more extensive research with a stratified random sampling technique to understand the complex interplay between materialistic deprivation, psychosocial resources and oral health status of individuals. The IDM used in this study is not the latest version of the IDM and the IDM project is still in its developmental stages and is not ready for global use at present. Researchers interested in using the IDM in research studies are advised to contact the IDM team with the website referenced below for information on how to use the IDM in their studies [33].

CONCLUSION

This study ascertained that an association exists between deprivation status of individuals and their sense of coherence. Furthermore, this study also proves that both the sense of coherence and deprivation status have an influence on the oral health status of individuals. In lieu of this evidence, more studies in this area are required to understand how oral health programmes and policies can be targeted and formulated to serve the deprived sector of a society better.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge Dr. Janet Hunt, Associate Professor, Individual Deprivation Measure Program, Development Policy Centre, Crawford School of Public Policy, Australian National University for critically reviewing the manuscript for appropriate and correct usage of the IDM and recommending corrections where necessary. The authors declare no conflicts of interest and no source of funding from any agency or individual.

REFERENCES

[1] Antonovsky A. Health, stress and coping. San Francisco: Jossey-Bass; 1979.
[2] Lindström B, Eriksson M. Salutogenesis. Journal of Epidemiology and Community Health. 2005;59(6):440-42.
[3] Boeckxstaens P, Vaes B, De Sutter A, Aujoulat I, Van Pottelbergh G, Matheï C, et al. A high sense of coherence as protection against adverse health outcomes in patients aged 80 years and older. Ann Fam Med. 2016;14(4):337-43.
[4] Sairenchi T, Haruyama Y, Ishikawa Y, Wada K, Kimura K, Muto T. Sense of coherence as a predictor of onset of depression among Japanese workers: a cohort study. BMC Public Health. 2011;11(1):205.
[5] Savolainen J, Suominen-Taipale AL, Hausen H, Harju P, Uutela A, Martelin T, et al. Sense of coherence as a determinant of the oral health-related quality of life: a national study in Finnish adults. Eur J Oral Sci. 2005;113(2):121-27.
[6] Bernabé E, Watt RG, Sheiham A, Suominen AL, Vehkalahti MM, Nordblad A, et al. Childhood socioeconomic position, adult sense of coherence and tooth retention. Community Dent Oral Epidemiol. 2012;40(1):46-52.
[7] Viswanath D, Krishna AV. Correlation between dental anxiety, Sense Of Coherence (SOC) and dental caries in school children from Bangalore North: A cross-sectional study. J Indian Soc Pedod Prev Dent. 2015;33(1):15-18.
[8] India | Data [Internet]. Data.worldbank.org. 2018 [cited 16 August 2018]. Available from: https://data.worldbank.org/country/india
[9] Bessell S. The individual deprivation measure: Measuring poverty as if gender and inequality matter. Gender & Development. 2015;23(2):223-40.
[10] Ellwood RP, O'Mullane DM, Ellwood RR. Identification of areas with high levels of untreated dental caries. Community Dent Oral Epidemiol. 1996;24(1):1-6.
[11] Bower E, Gulliford M, Steele J, Newton T. Area deprivation and oral health in Scottish adults: a multilevel study. Community Dent and Oral Epidemiol. 2007;35(2):118-29.
[12] Da Rosa P, Nicolau B, Brodeur JM, Benigeri M, Bedos C, Rousseau MC. Associations between school deprivation indices and oral health status. Community Dent and Oral Epidemiol. 2011;39(3):213-20.
[13] Locker D. Deprivation and oral health: a review. Community Dent and Oral Epidemiol: Commissioned review. 2000;28(3):161-69.
[14] Townsend P, Beattie A, Phillimore P. Health and deprivation: Inequality and the North, London: Croom Helm Ltd. 1988.
[15] Carstairs V, Morris R. Deprivation and health in Scotland. Health bulletin. 1990;48(4):162-75.
[16] Jarman B. Identification of underprivileged areas. Br Med J. 1983;286:1705-09.
[17] Mittelmark M. The handbook of salutogenesis. 2017.
[18] Vettore MV. Sense of coherence modifies the association between untreated dental caries and dental pain in low-social status women. Community Dent Health. 2016;33(1):54-59.

[19] Greene JG, Vermillion JR. The simplified oral hygiene index. The Journal of the American Dental Association. 1964;68(1):7-13.
[20] Klein H, Palmer CE, Knutson JW. Studies on dental caries: I. Dental status and dental needs of elementary school children. Public Health Reports (1896-1970). 1938;53(19):751-65.
[21] Shilpa M, Naik SP, Potdar S, Reddy SG, Patwardhan PK, Shree SS. Sense of coherence and oral health status among 16 to 17-year-old Pre-university students of Virajpet Taluk: A cross-sectional study. J Contemp Dent Pract. 2016;17(5):388-93.
[22] Volanen SM, Lahelma E, Silventoinen K, Suominen S. Factors contributing to sense of coherence among men and women. Eur J Public Health. 2004;14(3):322-30.
[23] Bernabé E, Watt RG, Sheiham A, Suominen-Taipale AL, Uutela A, Vehkalahti MM, et al. Sense of coherence and oral health in dentate adults: findings from the Finnish Health 2000 survey. J Clin Periodontol. 2010;37(11):981-87.
[24] Provart SJ, Carmichael CL. The use of an index of material deprivation to identify groups of children at risk to dental caries in County Durham. Community Dent Health. 1995;12(3):138-42.
[25] Sweeney PC, Nugent Z, Pitts NB. Deprivation and dental caries status of 5 year old children in Scotland. Community Dent Oral Epidemiol. 1999;27(2):152-59.
[26] Jones CM, Woods K, Taylor GO. Social deprivation and tooth decay in Scottish school children. Health Bulletin. 1997;55(1):11-15.
[27] Kramer AC, Petzold M, Hakeberg M, Östberg AL. Multiple Socioeconomic Factors and Dental Caries in Swedish Children and Adolescents. Caries Res. 2018;52(1-2):42-50.
[28] Östberg AL, Kjellström AN, Petzold M. The influence of social deprivation on dental caries in Swedish children and adolescents, as measured by an index for primary health care: the Care Need Index. Community Dent Oral Epidemiol. 2017;45(3):233-41.
[29] Wang L, Cheng L, Yuan B, Hong X, Hu T. Association between socio-economic status and dental caries in elderly people in Sichuan Province, China: a cross-sectional study. BMJ Open. 2017;7(9):e016557.
[30] Shekar BC, Reddy CV. Oral health status in relation to socioeconomic factors among the municipal employees of Mysore city. Indian J Dent Re. 2011;22(3):410-18.
[31] Packard CJ, Cavanagh J, McLean JS, McConnachie A, Messow CM, Batty GD, et al. Interaction of personality traits with social deprivation in determining mental wellbeing and health behaviours. J Public Health (Oxf). 2012;34(4):615-24.
[32] Lang IA, Gibbs SJ, Steel N, Melzer D. Neighbourhood deprivation and dental service use: a cross-sectional analysis of older people in England. J Public Health (Oxf). 2008;30(4):472-78.
[33] IDM- Individual Deprivation Measure. (2018). Individual Deprivation Measure: IDM. [online] Available at: http://www.individualdeprivationmeasure.org/ [Accessed 10 Aug. 2018].

PARTICULARS OF CONTRIBUTORS:
1. Postgraduate Student, Department of Public Health Dentistry, SRM Dental College and Hospital, Ramapuram, Chennai, Tamil Nadu, India.
2. Postgraduate Student, Department of Public Health Dentistry, SRM Dental College and Hospital, Ramapuram, Chennai, Tamil Nadu, India.
3. Postgraduate Student, Department of Public Health Dentistry, SRM Dental College and Hospital, Ramapuram, Chennai, Tamil Nadu, India.
4. Postgraduate Student, Department of Public Health Dentistry, SRM Dental College and Hospital, Ramapuram, Chennai, Tamil Nadu, India.
5. Professor and Head, Department of Public Health Dentistry, SRM Dental College and Hospital, Ramapuram, Chennai, Tamil Nadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Nesa Aurlene,
Postgraduate Student, Department of Public Health Dentistry, SRM Dental College and Hospital,
Ramapuram, Chennai-89, Tamil Nadu, India.
E-mail: aurlenej@gmail.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Dec 14, 2018**
Date of Peer Review: **Jan 04, 2019**
Date of Acceptance: **Jan 23, 2019**
Date of Publishing: **Mar 01, 2019**