Oral Morbidity Pattern and its Behavioural Determinants among Adults of Urban Slums of Siliguri, India

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ABSTRACT

Introduction: Understanding oral health and not merely dental health are becoming priorities as mouth often offers first sign and symptoms of many localised and systemic diseases. Like any other urban slums, Siliguri slum peoples were also prone for many illnesses and oral health was a different concern because offering areca nut with betel leaves to guests was a common practice in that particular area.

Aim: To find out oral morbidity pattern among study subjects and to ascertain few behavioural determinants of oral morbidity.

Materials and Methods: The present community based cross-sectional study was performed in slums of Siliguri city, West Bengal, India, from January 2017 to January 2019. As Siliguri is a large city with more than five lakh population and 154 slums, cluster sampling was adopted to choose samples from each cluster slum. Total 210 samples were studied derived from World Health Organisation (WHO) sample size formula and applying principles of 30 cluster sampling and data regarding socio-demographic profile, behaviour details and clinical history and examination was collected via self-structured, pretested schedule. Results were analysed in Statistical Package for the Social Sciences (SPSS) version 20.0 software and was presented in frequency tables, Chi-square test was applied for testing statistical significance.

Results: Out of 210 study subjects, 154 of them (73.3%) had any form of oral morbidities, 136 study subjects (64.8%) had dental morbidities. Bleeding was commonest symptom for 96 study subjects (62.3%). A total of 59 study subjects (28.1%) had irregular brushing habit and 132 subjects (62.9%) did not wash their mouth after each major meal. A total of 94 subjects (44.8%) had the habit of any form addiction.

Conclusion: Adult slum dwellers of Siliguri reported a huge proportion of oral morbidities, majority of which was dental morbidities, irregular brushing habit, lack of mouthwash after meal and addiction were associated with oral morbidities.

Keywords: Addiction, Cluster sampling, Dental morbidity, Habits, Siliguri municipal corporation

INTRODUCTION

Oral health is a key indicator of overall health, well-being and quality of life. It encompasses a range of diseases and conditions that include dental caries, periodontal (gum) disease, tooth loss, oral cancer, oro-dental trauma, noma and birth defects such as cleft lip and palate [1]. Standard of oral health enables an individual to eat, speak and socialise without active disease, discomfort or embarrassment and which contributes to general well-being [2]. The term "Oral" refers to the whole mouth-the teeth, gums, hard and soft palate, linings of the mouth and throat, tongue, lips, salivary glands, chewing muscles, and upper and lower jaws. Oral cavity is intimately related to the health of the rest of the body and often is the first signs of problems elsewhere in the body such as infectious diseases, immune disorders, nutritional deficiencies, and cancer [3,4]. Oro-facial pain, a condition itself and as a symptom of untreated dental and oral problems, is a major source of diminished quality of life. Considering the importance of the mouth and teeth in verbal and non verbal communication, diseases that disrupt their functions are likely to damage self-image and alter the ability to sustain and build social relationships [5]. Studies have shown that health behaviours like tobacco and alcohol use, sedentary lifestyle, general hygiene habits and diet were major risk factors to chronic disease [6] and may also be linked to oral health [7-9]. Any deviation from the normal oral health condition leads to morbidity of oral region and reasons for that may be single or multifactorial. Major risk factors for oral morbidity or ill health or poor oral health are improper diet and nutrition, poor oral hygiene, tobacco and alcohol abuse, injury, infections, precancerous and cancerous lesions etc.,

Worldwide, 60-90% of school children and nearly 100% of adults have dental cavities [10]. It's prevalence in India [11], is 50-60%.

Severe periodontal (gum) disease, which may result in tooth loss, is found in 15-20% of middle-aged (35-44 years) adults [10]. Complete loss of natural teeth is widespread and particularly affects older people. An older study on Siliguri slum people showed overall prevalence of dental caries was found to be 57.47% [12] but the situation may get worse if we look for futuristic phenomena predicted by WHO, that oral health conditions will increase by 25% over the next decade [13].

Siliguri, a connecting city of North-Eastern India, is part of ritual of offering areca nut with betel leaves to guests which could make oral health a concern. A compact study was much needed in that area that would include all aspects of oral health, not merely dental health as because this type of study was still deficient, particularly in the underprivileged population like slum people.

Thus, the study was conducted to gather data regarding variation of disease prevalence and association so that health policy makers can implement region specific strategy to cop oral health problem. This study was conducted among adult population of Siliguri slums to find out the oral morbidity patterns, also to ascertain few behavioural determinants of oral morbidity.

MATERIALS AND METHODS

A community based cross-sectional study was undertaken in urban slums of Siliguri. Siliguri is a municipal corporation (SMC) of West Bengal, having the population of 5,13,264 [14], and have 154 slums with 1,75,411 slum population (by indigenous survey by SMC). Siliguri is a connecting city of north-eastern India, connects districts of West Bengal, also connects few states (Bihar, Assam, Sikkim) and even few countries (Nepal, Bhutan, Bangladesh) to West Bengal. Study was performed from January 2017-January 2019 after

obtaining ethical clearance from Institutional Ethics Committee (IEC) of North Bengal Medical College, IEC reference no dated 1/08/2016.

Inclusion criteria: Permanent resident of Siliguri slums, aged 18 years or more, having a valid government identity card were included in the study.

Exclusion criteria: Subjects with severe systemic illness were excluded from the study.

Sample size calculation: According to WHO global burden of diseases report 2008, prevalence of dental caries was 50% [11]. As dental caries is one of the important diseases in relation to oral morbidity, taking its prevalence, sample size was determined by the formula [15].

$$\{Z^2_{(1-\alpha/2)} PQ\}/L^2$$

Thus, the sample size=(3.84*50*50)/(10*10)=96.

As sampling technique was cluster sampling, the sample size had been multiplied by two as design effect. Thus, the sample size came to be 96*2=192. As the 30 cluster was taken into account, number of study subjects per cluster was 192/30=6.4. So, seven samples had been taken from each cluster slum to make the sample representative one.

Study Procedure

To select 30 cluster slums from 154 slums a complete list of 154 slums with name, population and cumulative population was made first. Sampling interval was derived from dividing total slum population by 30. Total slum population of Siliguri was 1,75,411. So, sampling interval came to be (1,75,411)/30=5848. Next step was to take a random number that valued less than equals to sampling interval. Random number was chosen by random number table and it came to be 5000. That first cumulative frequency which contained random number (5000) was the first cluster. Then sampling interval was added with the random number to find out next cluster and for the consecutive times sampling interval was added with previous count to find out all the remaining clusters. Next step was to draw seven study subjects from each cluster. In each cluster, a landmark was chosen from where right-sided path was taken. Samples were taken from consecutive houses. Only one sample was taken from each house. In case of more eligible study subjects in a house, study subject was chosen by simple random sampling technique. When there was no availability of study subject in a house or refusal to give consent, next house was taken to draw study subject. In that way, seven study subjects were chosen from each cluster with no chance of drop out/non response.

Data was collected in a self-structured, pretested schedule. The questionnaire/schedule was made by reviewing related literature and by consensus of experts from Department of Community Medicine, Physiology and Oral Pathology (Dentist). The schedule was divided in three parts i.e., socio-demographic profile, behaviour details and clinical history and examination. The schedule was validated first, then gone through a pilot study on the 30 samples of same sampling frame. After few rectifications, final data collection took place. Pilot study samples were not included in the final sample. Total 21 questions were drafted in English. As it was a schedule and data was collected by investigators themselves (Along with Expert dentist of NBDC) at site and face to face, no issue raised, and questions were asked in local language (Bengali, Hindi, Nepali wherever applicable). Data filled up required both interview and clinical examination (face to face) simultaneously as per the study need after gaining verbal informed consent from subjects. SMC health workers helped us to reach destination.

STATISTICAL ANALYSIS

Data set was put into IBM SPSS (SPSS 20 Chicago Inc.) data sheet and was analysed by IBM SPSS 20 software. Results were presented by applying principles of descriptive statistics in form of frequency and percentage in tables. At 95% CI, significance was set at p-value <0.05. Besides frequency and percent distribution, Chi-square test was applied to test the level of significance.

RESULTS

A total of 210 study subjects were studied within a period of two years from 154 slums of Siliguri city. Males were more (56.2%) than females, young adults (20-39 years) and middle age group (40-59) peoples were more among study samples i.e., 46.7% and 38.1%, respectively. Hindu comprised of 71% of study population and most of the study subjects were unskilled workers (36.7%). Unemployment proportion was surprisingly very low (1.5% only). Fifty-one percent (51%) of the study population were having primary education. Joint family were the most (53.8%) among different family type. Majority of the study population belonged to Class III socio-economic status (32.8%) as per modified Dr BG Prasad scale [Table/Fig-1].

Socio-demographic variables	n (%)
Gender	
Male	118 (56.2)
Female	92 (43.8)
Age group (in years)	
<20	4 (1.9)
20-39	98 (46.7)
40-59	80 (38.1)
≥60	28 (13.3)
Religion	
Hindu	149 (71.0)
Muslim	51 (24.2)
Others (Christian, Jain, Buddhist etc.)	10 (4.8)
Occupation	
Skilled worker	20 (9.5)
Unskilled worker	77 (36.7)
Student	32 (15.2)
Housewife	50 (23.8)
Businessman	17 (8.1)
Unemployed	3 (1.5)
Others (Not revealing, not fitting any of the above etc.)	11 (5.2)
Educational status	
Illiterate	29 (13.8)
Non formal education	19 (9.0)
Primary	107 (51.0)
Secondary	31 (14.8)
Higher secondary and above	24 (11.4)
Family type	
Joint	113 (53.8)
Nuclear	97 (46.2)
Socio-economic status (Modified BG Prasad scale 2018)	
I	5 (2.4)
II	69 (32.8)
III	84 (40.0)
IV	51 (24.3)
V	1 (0.5)

[Table/Fig-1]: Distribution of the study population by socio-demographic characteristics (N=210).

A total of 154 study subjects (73.3%) were suffering from any oral morbidities. Study also showed that 64.8% of the subjects had oral morbidities with involvement of teeth (i.e., dental morbidities) whereas 16.7% with involvement in oral mucosa (i.e., oral mucosal

morbidities) and only 9% had involvement in tongue (i.e., tongue morbidities) [Table/Fig-2]. Out of 154 oral morbidity patients, commonest presenting symptom was bleeding (62.3%), followed by pain (47.4%), swelling (31.8%) etc., [Table/Fig-3].

Variables		n (%)
Oral morbidity	Present	154 (73.3)
	Absent	56 (26.7)
	Total	210 (100.0)
Site of oral morbidity*	Teeth	136 (64.8)
	Oral mucosa	35 (16.7)
	Tongue	19 (9.0)

[Table/Fig-2]: Distribution according to oral morbidities and different site of involvement.
*Multiple responses

Symptom	N* (%)
Pain	73 (47.4)
Swelling	49 (31.8)
Bleeding	96 (62.3)
Ulcer	6 (3.9)
Bad breath	25 (16.2)
Others**	8 (5.2)
No symptom	31 (20.1)

[Table/Fig-3]: Distribution of study subjects with oral morbidities according to presenting symptoms.
n=154
*Multiple responses, **Others include fever, difficulty in opening mouth etc

Prevalence of dental caries in study population was 39.5% whereas periodontal disease was 64.3% and malocclusion of teeth was 26.2%. Most prevalent oral mucosal diseases among the study population were ulcer 7.1%, abscess 5.2% and leukoplakia 3.3%. The study also revealed most prevalent tongue diseases was candidiasis 5.2% [Table/Fig-4].

Site of morbidity		N* (%)
Dental diseases Total (n) 136*	Dental caries	83 (39.5)
	Periodontal disease	135 (64.3)
	Malocclusion of teeth	55 (26.2)
Oral mucosal diseases Total (n) 35*	Leukoplakia	7 (3.3)
	Lichen planus	1 (0.5)
	Erythroplakia	4 (1.9)
	Ulcer in oral mucosa	15 (7.1)
	Trauma in oral mucosa	2 (1.0)
	Candidiasis of oral mucosa	7 (3.3)
	Abscess in oral mucosa	11 (5.2)
	Oral submucosal fibrosis	1 (0.5)
	Other oral mucosal disease (Warts, Sjogren, Bechet etc.)	6 (2.9)
Diseases of tongue Total (n) 19*	Erythroplakia of tongue	2 (1.0)
	Leukoplakia of tongue	1 (0.5)
	Candidiasis of tongue	11 (5.2)
	Ulcer in tongue	4 (1.9)
	Other (Erythema migrans, BMS etc.)	6 (2.9)

[Table/Fig-4]: Morbidity according specific site wise involvement (Dental, Oral mucosa and Tongue).
*Multiple responses for all site-wise involvement of morbidities; BMS: Burning mouth syndrome

A 28.1% of the study population had irregular brushing habit of their teeth and 62.9% of the study population did not wash their mouth after each major meal. Interestingly, 44.8% of the study population had the habit of any form addiction [Table/Fig-5].

Oral morbidities were significantly higher p-value <0.001 in the study population who did not brush regularly. Oral morbidities were

Variables		n (%)
Behaviour	Regular	151 (71.9)
	Irregular	59 (28.1)
	Total	210 (100.0)
Mouthwash after each major meal	Yes	78 (37.1)
	No	132 (62.9)
	Total	210 (100.0)
Addiction	Present	94 (44.8)
	Absent	116 (55.2)
	Total	210 (100.0)

[Table/Fig-5]: Distribution according to brushing habit, mouthwash after each major meal and any form of addiction.
N=210

also significantly higher (p-value=0.045) who did not wash mouth after each major meal. Study subjects having any form of addiction also revealed significantly higher p-value <0.001 oral morbidities [Table/Fig-6].

Behavioural habit	Oral morbidity		
Brushing habit of teeth	Present n (%)	Absent n (%)	Total n (%)
Regular	96 (63.6)	55 (36.4)	151 (100)
Irregular	58 (98.3)	1 (1.7)	59 (100)
Total	154 (73.3)	56 (26.7)	210 (100)
χ^2=26.165, df=1, p-value <0.001			
Mouthwash after each major meal			
Yes	51 (65.4)	27 (34.6)	78 (100)
No	103 (78)	29 (22)	132 (100)
Total	154 (73.3)	56 (26.7)	210 (100)
χ^2=4.009, df=1, p=0.045			
Addiction			
Present	93 (98.9)	1 (1.1)	94 (100)
Absent	61 (52.6)	55 (47.4)	116 (100)
Total	154 (73.3)	56 (26.7)	210 (100)
χ^2=57.042, df=1, p-value <0.001			

[Table/Fig-6]: Association between oral morbidities with behavioural habits.

DISCUSSION

A total of 210 study subjects interviewed and were examined to find out oral morbidity pattern and to ascertain few behavioural determinants among adult slum dwellers of Siliguri, which revealed that overall prevalence of oral morbidity was found to be 73.3%, which was almost 3/4th of the study population. A very recent study by Ghosal S et al., showed even more prevalence in Indian background [16]. Most probable reason of much higher prevalence by the later study was it only included ≥45 year age group. Commonest presenting symptom was bleeding (62.3%) which was far low than a study by Jürgensen N and Petersen PE which revealed prevalence of gingival bleeding was 99% [17]. Next commonest presenting symptom was pain (47.4%) which was very close with a study by Jiang H et al., which revealed 41% had experienced toothache or symptoms during the previous 12 months [18].

Prevalence of dental caries of the study was 39.5% which was far low in comparison to other studies. Study conducted by Shah N showed prevalence of dental caries in India is 50%-60% [11]. WHO also reports caries prevalence in school age children at 60-90% and as virtually universal among adults in the majority of countries [19]. A study by Chakraborty M et al., of same geographic location also revealed high prevalence of dental caries [12]. Comparatively low prevalence of dental caries may be due to improved oral health status and awareness among slum population of Siliguri. Prevalence of periodontal disease was 64.3% which was higher than studies

by different authors. According to WHO, severe periodontal (gum) disease, which may result in tooth loss, was found in 15-20% of middle-aged (35-44 years) adults [11]. High prevalence might be due to inclusion of all adults even the geriatric age group also. Prevalence of malocclusion of teeth was 26.2% which was close to a Text book by Taneja DK who reported prevalence of malocclusion among children was found to be 30% [20]. Study finding of leukoplakia was consistent with many study results where it was found that annual incidence of oral leukoplakia was reported as 0.2% to 11.7% in different populations of India [21,22]. Results on erythroplakia (1.9%) in the study was higher in comparison with a study conducted Reichart PA and Philipsen HP which revealed prevalence of oral erythroplakia was 0.2%, that ranged between 0.02% and 0.83% [23]. Higher prevalence of erythroplakia was due to more use of smokeless and smoking tobacco (addiction) among study subjects as it is a well-established fact that use of tobacco causes erythroplakia [23]. Prevalence of oral ulcer and candidiasis was high and prevalence of trauma was low in comparison with a study conducted by Inamdar IF et al., which revealed prevalence of ulcer, candidiasis and trauma was 5.71%, 0.68% and 8.21%, respectively [24]. Prevalence of oral submucosal fibrosis (0.5%) was consistent with a study conducted by Phatak A that revealed overall prevalence rate in India to be about 0.2-0.5 % [25]. Prevalence of lichen planus (0.5%) in this present study was very low in comparison to a study conducted by Bokor-Bratie M and Picuric I which revealed overall prevalence of lichen planus was 1.6% [26]. Geo-cultural variation might be responsible most probably.

Majority of the study subjects (71.9%) had regular brushing habit. Proportion of regular brushing was far more than a similar type of study conducted by Abdulla HA [27]. A well-known fact that regular brushing of the teeth and gums from an early age with a fluoride toothpaste will help prevent tooth decay and periodontal disease [28]. This study also revealed that proportion of study population who used to brush regularly had less proportion of oral morbidities (63.6%), whereas oral morbidities were as high as 98.3% among those who used to brush irregularly. Distribution was found to be statistically significant (p-value <0.001).

A 62.9% of the study population did not to wash their mouth after each major meal which was low in comparison with a study conducted by Inamdar IF et al., [24]. Proportion of study population who used to wash mouth after each major meal had oral morbidities of 65.4% whereas it was as high as 78% among those who not used to wash mouth after each major meal. Distribution was found to be statistically significant (p-value=0.045). A web article stated to rinse mouth with water after every food/meal [29]. Water neutralises the effects of acidic and sugary foods. Rinsing removes food particles left behind on/between the teeth and thus will prevent cavities. So, it is a well-established fact that washing mouth after meal dislodges retained food particles inside the mouth and thus prevents bacterial colonisation and improves oral hygiene. Bad oral health after irregular mouthwash after each meal resulted more oral morbidities in the present study.

It is a well-known fact that addiction leads to bad oral hygiene which leads to oral morbidities. Combined use of alcohol and tobacco exert a synergistic effect that substantially increases the risk for many oral diseases [30]. Addiction especially due to tobacco causes many oral mucosal changes and diseases [31-34]. Present study also showed similar findings i.e., 98.9% study population having any form of addiction were suffering from oral morbidities, chi-square test revealed that distribution was statistically significant (p-value <0.001).

Limitation(s)

Though cross-sectional study is not a best way of determining oral morbidity, binary logistic regression could have taken place to ascertain behavioural determinants after inclusion of few more

behavioural habits like material used for brushing, type of toothpaste, different addictive agents and their duration of use etc.

CONCLUSION(S)

Adult slum dwellers of Siliguri reported a substantial proportion of oral morbidity. Dental morbidity was commonest among those three oral parts; however, it was less than comparative studies. Bleeding from any site was commonest symptom of oral morbidities. Irregular brushing of teeth, lack of mouthwashing after each major meal and any form of addiction were associated with oral morbidities.

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