

## Oral health status and Treatment Needs of Leprosy Patients in Chengalpattu – A Cross-sectional study

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### Abstract:

The objectives of the present study were, to assess the oral health status and oral hygiene behavior of the treated leprosy patients and thereby ascertain their normative dental treatment needs. Forty-four treated leprosy patients participated in this cross-sectional study conducted at a leper's colony in Chengalpattu. A structured interview was done regarding their sociodemographic characteristics, oral health behavior, and perceived oral health status. Clinical examination was done to assess oral health status, and the findings were recorded using the World Health Organization (WHO) Oral Health Assessment Form for Adults (2013). Appropriate descriptive statistics were used to summarize the variables. Majority of the patients presented with physical disabilities affecting eyesight, hands, and legs. Periodontitis was a predominant finding followed by edentulousness and dental caries. Most of the patients had perceived their oral health status to be average and a substantial proportion brushed once daily while others never brushed owing to hand disabilities. The leprosy patients in this study lacked knowledge about oral hygiene maintenance and awareness of their dental issues. The normative treatment needs of leprosy patients were high. These findings advocate incorporating oral health education and services into current leprosy rehabilitation programmes.

**Keywords:** Leprosy, Oral Health status, Treatment Needs, Oral Hygiene Behavior

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### 1. Introduction

Leprosy has been affecting and scaring people all over the world because it was once seen as an untreatable, spreading, and demeaning disease. In 1948, the World Health Organization (WHO) recognized leprosy's magnitude and enlisted leprosy control work as its sixth priority. In the early 1980s, Multi Drug Therapy (MDT), which included rifampicin, allowed the length of treatment to be cautiously reduced to a fixed period of 24 months by the early 1990s and to a fixed period of only 12 months by the end of that decade. MDT became an effective cure and was freely supplied to more than 100 endemic countries[1]. In 1991, WHO resolved to "eliminate leprosy as a public health problem (Prevalence Rate (PR)- less than 1 leprosy case per 10,000 population) by the year 2000". In 2000, the World Health Assembly resolution identified leprosy as eliminated. Although, the disease continued to be a public health challenge worldwide, especially in developing and underdeveloped nations. Evidence over the ages has listed the non-modified factors contributing to the deteriorated Quality of Life (QoL) of leprosy patients: perceived stigma, fewer years of education, physical deformities, and a lower annual income[2–5].

In India, the southern states of Tamil Nadu and Andhra Pradesh had the loftiest prevalence of leprosy cases during the 1980s. Lately, with earlier detection, MDT, timely Release From Treatment (RFT), better nutrition, awareness, and improved hygiene had reduced the prevalence among southern states. Today, the northern and eastern states are India's most endemic areas of leprosy cases. Leprosy was declared eliminated on January 1, 2006, with a prevalence of 0.98/ 10,000 population in India[6]. Although, a leprosy survey undertaken in 2010 in 8 districts of Haryana (low endemic) and Uttar Pradesh (high endemic), suggested that the New Case Detection Rate (NCDR) of leprosy could be 4.41 per 10,000 population compared to government records PR of 1.09 per 10,000 population[7]. Thus, India still records the highest number of fresh cases (accounting for more than 60 percent of all new cases globally). Regarding the oral health of leprosy-affected patients, three possible concerns that exists can be emphasized. At the outset, poor oral health status is a potential risk factor for disease transmission and the occurrence of leprosy reactional episodes[8]. Furthermore, oral lesions secondary to the disease that occur

in patients with LL form are otherwise uncommon. Involvement of the oral cavity in leprosy is variable and seen in 19 - 60% of the patients[9,10]. Nevertheless, it is not fully indistinct whether these changes are related to the disease or poor oral health compounded by the lifestyle of a leprosy patient[11]. Last and most notable was dentists' awareness of managing leprosy patients who are unable to give an accurate account of symptoms such as pain due to nerve involvement and their added burden of disabilities affecting their oral hygiene behavior[12]. Studies on the knowledge and attitude of dentists and dental students on oral manifestations and management of leprosy showed poor knowledge about leprosy[13], and that dental professionals lack an understanding of tropical infectious diseases and oral health, which might bring hidden danger to oral and public health. A systematic review highlighted that the oral cavity is involved in leprosy pathogenesis, hence the screening of oral changes must be mandatory considering its potential to reduce morbidity[14].

The oral health of people with treated leprosy had been ignored to a great extent. These can be either a failure to provide education and services to them or even neglected treatment. Accordingly, the oral health and treatment needs of leprosy-affected have not been explored in many regions of India, especially in the current study population. Concerning this, the present study aims at assessing the oral health status and treatment needs of people with leprosy.

## 2. Materials and methods

A descriptive cross-sectional study was conducted to assess the oral health status of the leprosy-treated patients observed in a Leper's settlement Colony surrounding the Central Leprosy Training and Research Institute (CLRTI), Chengalpattu district. The study protocol was approved by the Institutional Ethical Committee, (IHEC-I/1196/22), and permission was also obtained from the founder of the colony. The study was conducted in August 2022. All forty-four patients who currently resided at the leprosy colony, already undergoing Multidrug Therapy (MDT) for leprosy when they were approached, and those who were able to self-report, understand verbal communication, and follow instructions and gave consent for examination were included in the present study. The purpose of the study was explained to the patients, and informed consent was obtained.

The leprosy patients were classified according to the classification proposed by Ridley Jopling classification which was already used in their medical records into Tuberculoid (TT), Lepromatous (LL), Borderline (BB), Tuberculoid (BT) or Lepromatous (BL) Borderline characteristics[15]. Relative information collected includes the patient's sex, age, education, occupation, income, cohabitation, habits, type of leprosy along with oral hygiene behavior, perception of oral health status, and oral findings. Oral Health status was evaluated with WHO Oral Health Assessment Form for Adults- 2013. The investigator was adequately trained and calibrated to assess oral health status with the assessment form. The Cohen's Kappa value for intra-examiner reliability was found to be 0.87, measured over a time interval of 15 days. Privacy was ensured before interviewing to minimize influence or interference from others.

Participants were examined while sitting in a semi-supine position in an ordinary chair using daylight supplemented

with an examination torch. Full-mouth periodontal examinations were performed, and information was recorded. Microsoft Office Excel 2019 Software is used for data entry. IBM Statistical Package for Social Sciences (SPSS) version 20.0 (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp) was used for analyzing data. Descriptive statistics - Frequency and Percentage [n (%)], Mean, and Standard Deviation (S.D), were used appropriately to summarize the responses throughout the study.

## 3. Results and Discussions:

This cross-sectional study was conducted to assess the oral health status and treatment needs of 44 leprosy-treated patients, residing in Leper's settlement colony, Chengalpattu district of Tamil Nadu. The mean age of the study participants was  $64.67 \pm 9.2$  years ranging from 40 to 80 years. There were 23 (52%) males and 21 (48%) females. Education-wise, 33 (75%) were illiterate while the rest had primary school education. More than half i. e., 33 (66.1%) were unemployed, while 12 (27.3%) had elementary occupations. All 44 (100%) belonged to the lower socioeconomic status class (scored according to the Modified Kuppusamy Socioeconomic scale for 2022). Almost 40 (90.9%) were living alone, while 4 (9.1%) were cohabiting. Out of the study participants, 21 (47.7%) reported having no habits. Among those with habits, 13 (29.6%) of them were smokers, 6 (13.6%) were smokeless tobacco chewers and 1 (2.3%) used both, and 3 (6.8%) were betel nut chewers. [Table 1]

In the current study, 26 (59.1%), 9 (20.5%), 8 (18.2%), 1 (2.3%), and nil were recorded as affected by LL, BL, TT, BT, and BB leprosy types, respectively. Eye, hand, and leg disabilities were recorded in 26 (59.1%), 33 (75%), and 28 (63.6%) participants, respectively. Of all the participants, 33 (70.5%) perceived their oral health status to be average, 8 (18.2%) rated it as good, and only 5 (11.4%) rated it as poor. [Figure 1] Apart from the completely edentulous 9 (20.5%) individuals, 14 (31.8%) reported never brushing and 21 (47.7%) had brushed once daily. [Figure 2] The mean Decayed- Missing- Filled Teeth (DMFT) score of the study group was found to be  $15.30 \pm 10.47$ . [Table 2] Among the study participants, the mean number of teeth with gingival bleeding was  $4.82 \pm 5.69$ , shallow pocket (4-5 mm) was  $7.32 \pm 7.33$ , and deep pocket ( $\geq 6$  mm) was  $0.82 \pm 1.808$ . Loss of attachment of 0-3 mm was noted in a mean number of  $1.00 \pm 1.73$  teeth, 4-5 mm in  $1.39 \pm 1.70$  teeth, 6-8 mm in  $1.52 \pm 1.89$  teeth, and 9-11 mm in a mean number of  $0.41 \pm 0.95$  teeth. [Table 3] In terms of intervention urgency, the majority i.e., 31 (70.5%) needed a referral for a comprehensive evaluation, whereas 8 (18.2%) of them needed immediate treatment and 5 (11.4%) required prompt treatment.

In the present study population, 30 (68.2%) needed pulp care and restorations. Apart from the 9 (20.5%) completely edentulous, the rest 35 (79.5%) required oral prophylaxis. Prosthetic rehabilitation was needed for 25 (56.8%) participants. [Figure 3] Almost all had one or more oral mucosal lesions/conditions. The most commonly observed (apart from periodontitis) was oral melanosis in 16 (36.5%) followed by others, summarised in Figure 4. Regarding the location of the lesion, the palate was affected in 26 (59.1%) followed by buccal mucosa in 23 (52.3%).

**Table 1: Sociodemographic characteristics**

Variables		Frequency (n)	Percent (%)
Gender	Male	23	52.3
	Female	21	47.7
Living alone	No	4	9.1
	Yes	40	90.9
Years in school	0	28	63.6
	3	8	18.2
	4	3	6.8
	5	2	4.5
	8	2	4.5
	12	1	2.3
Education	Illiterate	33	75.0
	Primary school	11	25.0
	Middle school	0	0
	High school	0	0
	Intermediate or diploma	0	0
	Graduate	0	0
	Profession or honors	0	0
Occupation	Unemployed	33	72.7
	Elementary Occupation	12	27.3
	Plant & Machine Operators/ Assemblers	0	0
	Craft & Related Trade Workers	0	0
	Skilled Agricultural & Fishery Workers	0	0
	Skilled Workers and Shop & Market Sales Workers	0	0
	Clerks	0	0
	Technicians and Associate Professionals	0	0
	Professionals	0	0
	Legislators, Senior Officials & Managers	0	0
	Socioeconomic status	Lower (V)	44
Upper Lower (IV)		0	0
Lower Middle (III)		0	0
Upper Middle (II)		0	0
Upper (I)		0	0
Habits	Not Reported	21	47.7
Habits Type	Smoking	13	29.6
	Smokeless	6	13.6
	Both	1	2.3
	Betel nut	3	6.8

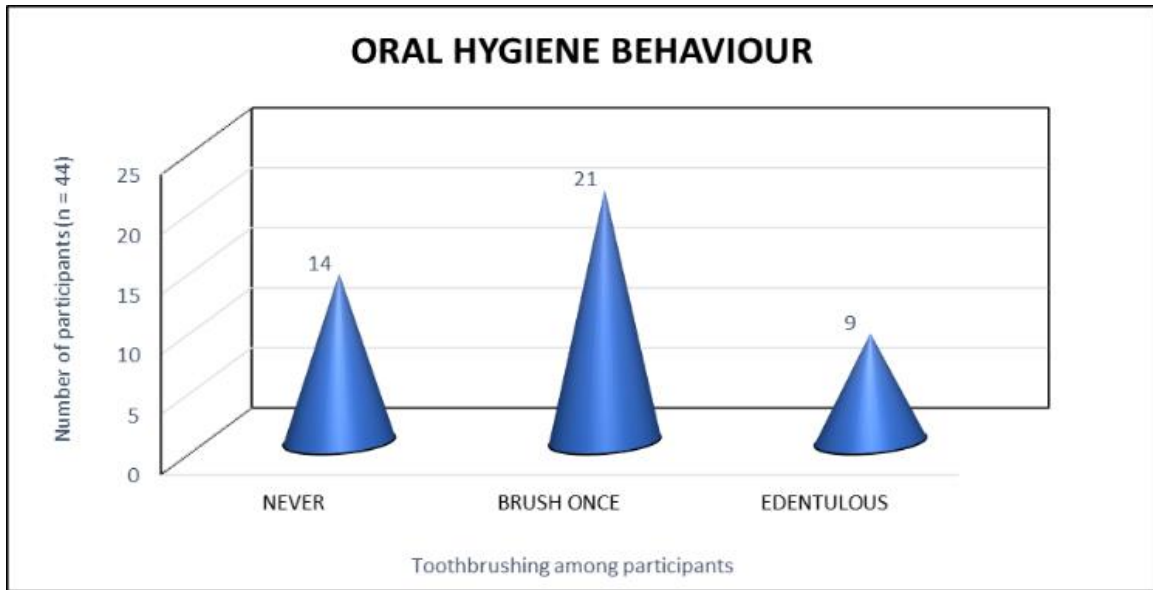
**Table 2: Dentition status among the study participants**

Dentition Status	Frequency (n)	Mean	S.D
DMFT*	44	15.30	10.474
DT†	30	4.45	4.305
MT‡	36	10.84	11.806

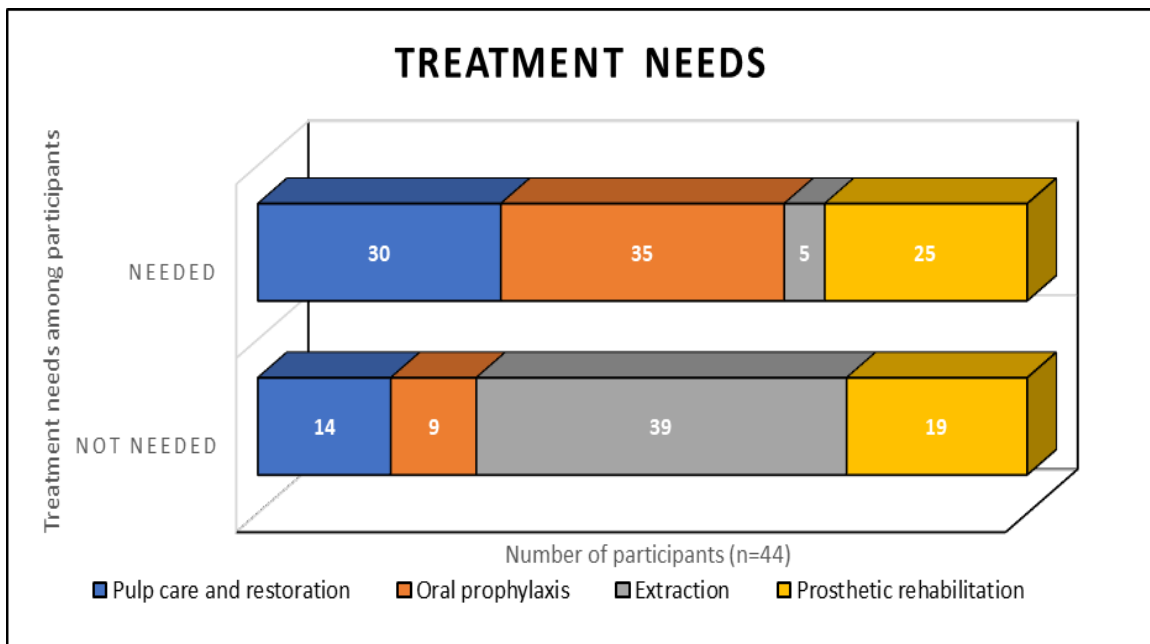
\*DMFT= Decayed- Missing- Filled Teeth; † DT= Decayed Teeth; ‡ MT= Missing Teeth

**Table 3: Periodontal status among the study participants**

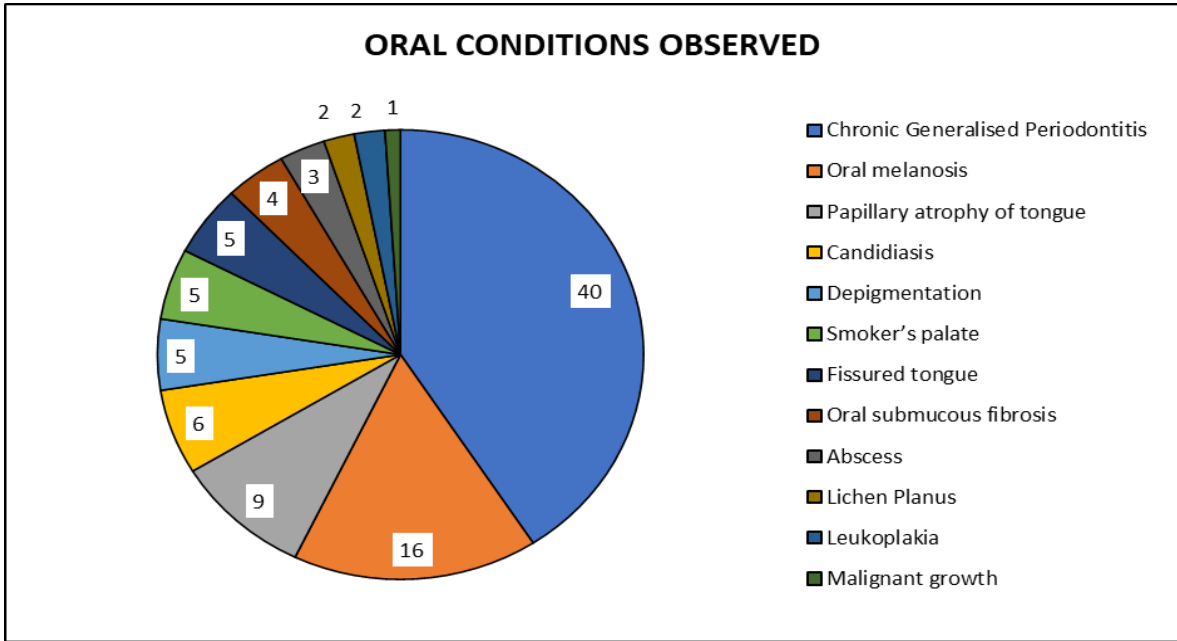
Periodontal status- CPI Modified		Mean	S.D
Gingival Bleeding	Absence of condition	15.02	10.411
	Presence of condition	4.82	5.687
	Tooth not present	10.48	11.655
Periodontal pocket	Absence of condition	11.98	9.849
	Pocket 4-5 mm	7.32	7.326
	Pocket 6 mm or more	0.82	1.808
	Tooth not present	10.20	11.729
Loss of attachment	0-3 mm	1.00	1.725
	4-5mm	1.39	1.701
	6-8mm	1.52	1.898
	9-11 mm	0.41	0.948
	12 mm or more	0.07	0.334
	Tooth not present	1.48	2.328



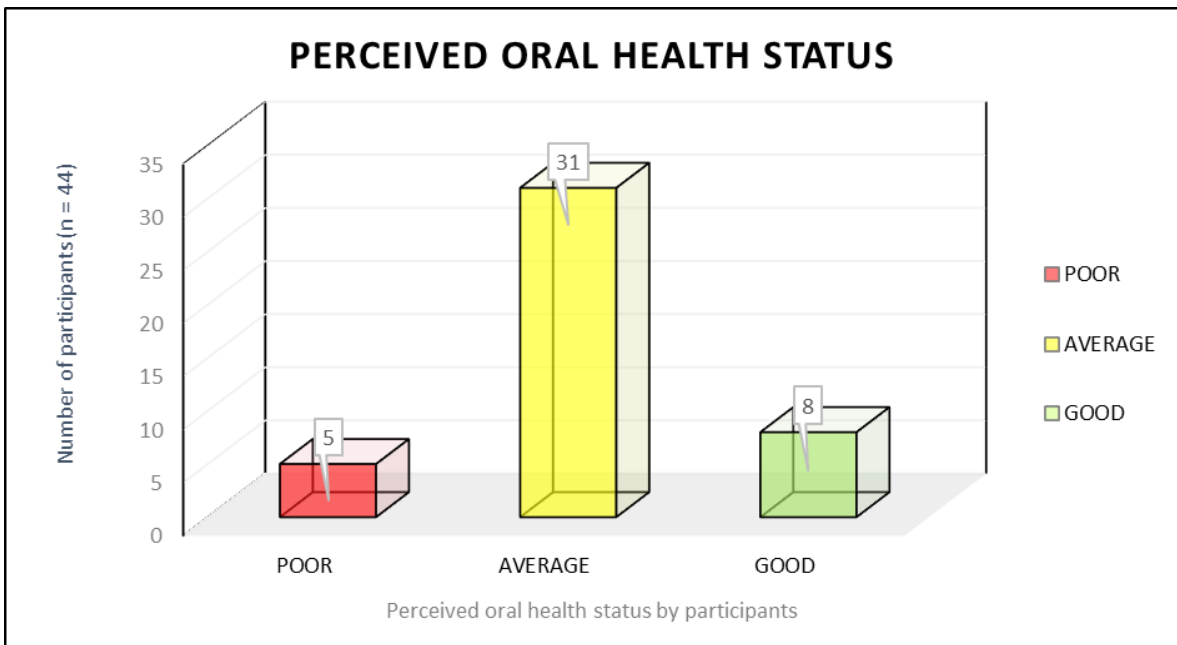
**Figure 1:** Perceived oral health status among study participants



**Figure 2:** Prevalence of oral hygiene behavior among study participants



**Figure 3:** Prevalence of treatment needs among study participants



**Figure 4:** Prevalence of oral conditions among study participants

Concerning the male/female ratio, proportionally more men were affected with increasing ratios from Borderline Tuberculoid (BT) toward Lepromatous Leprosy (LL)[16]. The present study also had 23 (52 %) males and 21(48%) females. A study by Majumder N in 2015[17] showed that 78% were illiterates and stated that this seems to have resulted in the respondent's low level of awareness about the disease, and consequential delayed treatment. Another study by Guo et al. in 2017[18]. showed that most patients were illiterate (46.6%) or had only primary school education (45.8%). This was similar to the present study where 33 (75%) participants were illiterate and the rest only had primary education.

Leprosy is commonly seen as a disease of poverty and global data is also supportive of the same. All of the current study's participants belonged to low socioeconomic status whereas in a study done by Singh et al. in 2009[19] in which the Aggarwal socioeconomic scale (2005) was used, 57.1% of the respondents belonged to poor socioeconomic status followed by lower-middle (21.6%). This difference could have been due to the limited sample size and the scale used for assessment. Concerning occupation, the majority of respondents were unemployed and 26.1% did manual labor/work in the study done by Singh et al. in 2009[19]. The current study also showed comparable results as most (66.1%) of the participants were unemployed, and 27.3% had been employed in elementary occupations.

In the study done by Majumder N in 2015 [17] in Jharkhand, 64% of the Leprosy-affected persons had been isolated from their families and villages due to societal pressure on their family members. Similarly, the present study participants were found to be living alone except a very few (9.1%). A study done by Dave and Bedi in 2013[12] showed only 12% smoked but 47% chewed tobacco. This was in contrast to the current study where smoking (29.5%) was higher than chewing (13.6%).

Clinicopathologic profile studies [20–23] across India had identified Borderline tuberculoid (BT) leprosy as the commonest type, followed by borderline lepromatous (BL) leprosy, Lepromatous (LL) leprosy, Tuberculoid (TT) leprosy and very rarely Mid-borderline (BB) type. Similarly, the current study identified LL as the most common, followed by BL, TT, BT, and BB types not seen in any of them.

According to a 2011 study by Van Brakel et al., the feet (47% of the impairment) were the most affected, followed by the hands (31%), and the eyes (11%)[24]. Congruently the present study more than half of the participants had leg (33: 75%), hand (28: 63.6%), and eye (26: 59.1%) disabilities. Of all the study participants, the majority (70.5%) perceived their oral health status to be average, while 18.2% of them stated good and only 11.4% perceived their oral health status as poor. Similar results were observed in the study by Dave and Bedi in 2013[12] in which 70% reported satisfaction with their current oral health and only 7% rated it as 'poor'.

In studies on the oral health status of leprosy patients, a lack of proper oral hygiene measures has been seen among leprosy patients, which contributed to their poor oral health. Poor oral hygiene was found to be attributed to peripheral neuropathy leading to high-grade hand disorder[25,26]. The present study participants also had hand and feet deformities in the form of claw hands, making maintenance of oral hygiene difficult. In a 2017 study by Guo

et al.,[18] a toothbrushing frequency survey revealed that 49.3% of patients brushed their teeth once a day and 28.1% never did, which is similar to the present study where 27.3% reported never brushing while 47.7% had brushed once daily.

#### 4. Conclusions

The treatment needs of leprosy patients are extremely high and poor oral health would lower their quality of life further. The majority lacked knowledge about oral hygiene maintenance and awareness of dental issues of their own. These findings advocate effective strategies for leprosy rehabilitation programs which must also include oral health. It also elucidates the importance of oral evaluation by dentists, since the oral lesions may act as a source of infection which is pivotal in preventing both the spread of disease and reactionary episodes.

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