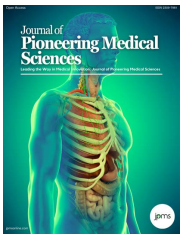
Journal of Pioneering Medical Sciences
Received October 02, 2024 Accepted November 29, 2024 Published January 05, 2025.
Volume 13, Issue 07, Pages 37-42

DOI https://doi.org/10.47310/jpms2024130707



Promoting Oral Health Practices among Tribal Irulas children from Nilgiris Hills of Tamil Nadu: An Interventional Approach and its Effects

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Abstract **Objectives:** Oral health refers to the condition of the mouth and its various components, including the teeth, gums, tongue and other oral tissues. It encompasses the absence of diseases or disorders in the oral cavity and the overall well-being of these structures. Tribals of Tamil Nadu have very limited access to dental care and has an immediate need to be studied. Therefore the aim was the present study was to assess the oral health status, dental caries experience and oral hygiene habits of the Irula tribal children in the Gudalur area and to improve the oral hygiene habits and oral hygiene status by giving health intervention and education. **Materials and Methods:** This interventional trial was conducted in the Gudalur tribal area of Nilgiris district, Tamil Nadu, between June and August 2023. The study involved 110 students from three randomly selected high schools. Children from grades 8 to 10 were chosen . Baseline data was collected using a pre-validated questionnaire covering oral hygiene habits and dental exams were conducted by a qualified dentist using the WHO oral health survey method. The DMF and OHI-S indices were used to assess dental health and oral hygiene. After three months, the same dentist re-examined the students and changes in the DMFT and OHI-S scores were analyzed. Data was analyzed using SPSS software, with statistical significance set at $p<0.05$. **Results:** Boys constituted 68.56% of the participants, while girls constituted 31.44%. Brush and paste were used by almost 85.65% of students to clean their teeth, while 7.35% used finger-toothpowder. Some used neem sticks, masheri, or fingers for teeth cleaning. Additionally, 85.25% of students brushed their teeth once daily, while only 14.75% brushed twice a day. Oral hygiene status signficantly improved after the health intervention. **Conclusion:** It is evident that tribal students require improved oral health practices, as highlighted by the study. Toothache emerged as the most common oral health problem among them, emphasizing the necessity of preventive measures and regular dental check-ups.

Key Words Oral health , dental caries, OHIS index, DMFT index, tribals, irular, irula

INTRODUCTION

Background

Oral hygiene refers to the maintenance of the mouth and its various components, including the teeth, gums, tongue and other oral tissues. It encompasses the absence of diseases or disorders in the oral cavity and the overall well-being of these structures [1,2]. Good oral health is essential for overall health and quality of life. Maintaining good oral health involves various practices, such as regular brushing and flossing to remove plaque and prevent tooth decay and gum disease [3,4].

Furthermore, it's critical to schedule regular examinations and cleaning with a dentist in order to discover and treat oral health problems early on. Oral health is significantly influenced by proper eating as well [3]. A balanced diet high in vitamins and minerals promotes the health of your gums and teeth. On the other hand, consuming sugary foods and beverages in excess can aggravate oral health issues including tooth decay [3,4].

Overall, prioritizing oral hygiene and seeking regular dental care are key components of maintaining optimal oral health and preventing oral diseases. Dental caries, commonly known as tooth decay or cavities, is a prevalent oral health condition characterized by the demineralization of the tooth structure, primarily caused by acid-producing bacteria in the mouth [5-7]. Dental caries occur when bacteria in the mouth

metabolize sugars and fermentable carbohydrates from food, producing acids that attack the tooth enamel [8,9].

Several factors increase the risk of developing dental caries, including poor oral hygiene, frequent consumption of sugary foods and beverages, inadequate fluoride exposure, dry mouth (xerostomia), certain medications and genetic predisposition [10]. In the early stages, dental caries may not cause noticeable symptoms. As the condition progresses, symptoms may include toothache, sensitivity to hot, cold, or sweet foods, visible holes or pits in the teeth and discoloration [11,12].

Prevention Strategies for Dental Caries Include

Practicing good oral hygiene, including brushing with fluoride toothpaste and flossing daily. Limiting sugary snacks and beverages, particularly between meals. Drinking fluoridated water and using fluoride-containing dental products [13,14]. Regular dental check-ups and professional cleanings to detect and treat caries early. Dental sealants, which are protective coatings applied to the chewing surfaces of molars to prevent decay [15,16]. Dental caries can be trwated based on the extent of the decay , the treatment may include dental fillings, crowns, root canal therapy (for advanced decay involving the pulp), or tooth extraction in severe cases [17,18]. Overall, dental caries is a preventable condition that can be effectively managed through proper oral hygiene practices, dietary modifications and regular dental care. Early detection and intervention are key to preventing complications and preserving oral health [19].

Rationale and Knowledge Gap

There is a significant health disparities in tribal communities, especially in rural and isolated areas like the selected area of Gudalur in Nilgiris district of Tamil Nadu. These communities often lack access to healthcare services, including dental care, leading to untreated dental issues such as caries and gingivitis [20]. Limited awareness of oral health practices, reliance on traditional methods and poor nutrition contribute to the prevalence of oral diseases among children. Their cultural practices include tobacco use from a very young age as a part of their tradition. These may hinder the adoption of modern medical and dental care [21].

Thus the intervention should target tribal children at a critical stage in their development, aiming to instill healthy habits that can prevent dental diseases and improve long-term health outcomes. Limited access to dental products and healthcare also exacerbates the problem. By overcoming these barriers, the study hopes to bridge the gap and improve oral health practices, reduce dental issues and enhance the quality of life for tribal children, ultimately contributing to better health outcomes in these communities [22].

Aim and Objectives

Thus the aim of the present study was to assess the oral health status, dental caries experience and oral hygiene habits of the Irula tribal children in the Gudalur area and to improve the oral hygiene habits and oral hygiene status by giving health intervention and education. The objectives of the study was to assess the dental caries experience by DMFT index, oral hygiene status by OHIS index and daily oral hygiene habits by a pre validated questionnaire.

METHODS

This interventional trial was conducted in the Gudalur tribal pocket in Nilgiris district of Tamil Nadu in the month of June - August 2023. The study was conducted in 3 schools which was selected by simple random sampling out of the high schools present in the area. The study size was estimated to be 110 from a study done by Ghosh *et al.* [23] in the year 2019 with power of 95 with the help of G power software. The children of 8th to 10th was chosen for the following reasons. The main reason was that it was the age when the mixed dentition starts to transform to permanent dentition; Second was that it was the age the children started using tobacco and also it was the age when the children can understand and differentiate from their cultural practices to healthy practices and would be able to make cognitively right decisions.

Since it was a interventional trial, prior to baseline data collection, students were briefed about the study's purpose and methodology in the presence of their class teacher and any queries were addressed by the research team. A meeting was conducted with the parents and only the children whose parents agreed to take part in the research were included. Only students belonging to the Irula tribe were included. Informed consent was taken in written form from the parents and the anonymity of the children were maintained.

A baseline survey assessed students' oral health hygiene practices using a pre validated semi-structured questionnaire from a study by Kuppuswamy *et al.* [24] covering demographic information, oral hygiene routines, frequency and method of teeth cleaning and dietary habits. A qualified dentist from the research team conducted oral examinations using the WHO oral health survey method, noting observations on brushing techniques. Dental status was evaluated using the DMF index and oral hygiene was assessed with the OHI-S score.

DMFT was calculated by identifying the number of decayed, missing and filled teeth and graded according to Henry Klein, Carole Palmer and Knutson from 1938 [25]; OHIS index was graded according to the Green and Jack[26] Vermillion Criteria from 1964. Each person was graded as good, fair and poor oral hygiene according to the original scoring criteria.

When the baseline data were being collected, subsequently, three one-hour classes were conducted for each class, along with separate sessions for teachers and caretakers. These sessions covered topics such as maintaining good oral hygiene practices, including rinsing mouth after meals, brushing twice daily and proper tongue cleaning

techniques, demonstrated using audiovisual aids. Peer demonstrations of the brushing technique were also performed to ensure understanding. Caretakers were trained to supervise students and weekly follow-ups were conducted to ensure compliance. After three months, the same dentist re-examined the students to minimize bias and changes in DMFT index and OHI-S scores were compared.

Using SPSS software version 25.0, data was analysed. Differences in the options of questions were analysed one way ANOVA and the differences in the OHIS and DMFT index before and after intervention was analysed by Paired t test with significance level at less than 0.05

RESULTS

Out of 110 students, the age range of the students was between 14 and 16 years and the mean age of 15.23 0.54. Boys constituted 68.56% of the participants, while girls constituted 31.44% (Figure 1).

Toothache was the most common morbidity experienced by the students. Only 25(22.72%) students visited the dentist at least once in the last year (Table 1). Toothbrush and paste were used by almost 85.65% of students to clean their teeth, while 7.35% used finger-toothpowder. Some used neem sticks, masheri, or fingers for teeth cleaning. Additionally, 85.25% of students brushed their teeth once daily, while only 14.75% brushed twice a day.

A statistically significant difference ($p = 0.035$) was observed in the frequency of brushing between girls (62.12% brushing twice a day) and boys (22.56% brushing twice a day). Horizontal strokes were used by 71.23% for brushing, 13.54% used vertical strokes and 15.23% used both. Majority (61.23%) replaced their toothbrushes only after the bristles were frayed.

Students who changed their toothbrushes regularly, utilized both vertical and horizontal strokes when brushing and went to the dentist at least once in the previous year had significantly lower DMF index scores, according to multivariate analysis (one-way ANOVA) (Table 2).

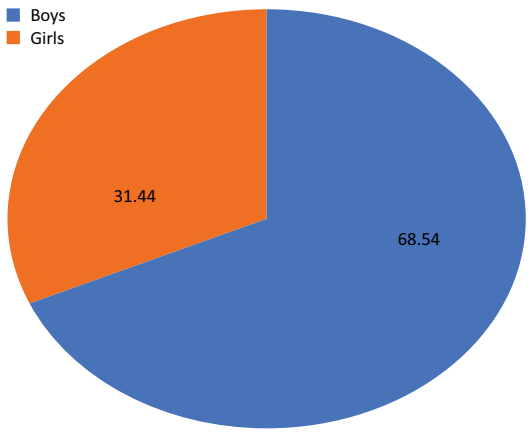

Figure 1: Gender distribution of study participants

According to multivariate analysis (one-way ANOVA), students who regularly washed their mouths had mean debris index scores that were considerably lower (Table 3). Furthermore, multivariate analysis using one-way ANOVA showed that students reporting toothaches had considerably higher oral hygiene index scores than their peers (Table 4).

Paired t-test revealed that OHIS index score significantly reduced after the intervention which means that the oral hygiene status of the children has been improved post intervention (Table 5).

DISCUSSION

Key Findings

Out of 110 students aged 14 to 16, toothache was common and only 25 visited a dentist in the past year. Most students used a toothbrush and paste, with 85.25% brushing once daily. Girls brushed more often than boys. Those who replaced their toothbrushes regularly, used both brushing strokes and visited the dentist had better dental health. After the intervention, students showed significant improvement in oral hygiene.

Table 1: Oral morbidities among the students

Morbidity	N (%)
Toothache	25 (22.72%)
Gum bleeding	20 (18.18)
Periodontitis	2 (1.81)
Halitosis	5 (4.54)

Table 2 : Difference between the oral hygiene habits among the students and its association with DMF index

Parameters	Mean±SD	f-value	p-value
Dental visit in last 1 year			
Yes	1.56±0.86	8.267	0.001
No	3.96±1.06		
Type of brushing strokes			
Horizontal	5.26±2.63	5.568	0.001
Vertical	3.52±1.22		
Both	2.85±1.21		
Frequency of change of brush			
3 monthly	2.59±1.52	15.533	0.000
6 monthly	3.58±1.89		
Till it gets frayed	5.56±2.75		

Table 3: Difference between the mouth rinsing habit among the students and its association with Debris index scores

Rinse mouth after meals	Mean±SD	f-value	p-value
Yes	2.23±1.02	7.56	0.02
No	0.56±0.0012		
Sometimes	1.57±0.62		

Table 4: Difference between the tooth ache pattern among the students and its association with OHIS index

Toothache	Mean±SD	f-value	p-value
Often	2.56±1.52	11.235	0.000
Occasionally	3.85±1.20		
Rarely	1.89±0.54		
Never	1.32±0.23		

Table 5: Difference between the pre and post intervention OHIS Scores

Scores	Mean±SD	t-value	p-value
OHIS index pre intervention	2.44±1.58	7.58	0.04
OHIS index post intervention	1.20±0.58		

Strengths and Limitations

The major strength of the study is that the present study tapped into the most vulnerable and malleable children in Tamil Nadu. It was one of the kind of its study because of the interventional study design. There were three main limitations to the present study. One main limitation was that the sample size of the present study was too less to generalise with other tribal population. Another limitation was that the trial period was only 3 months and it was not followed up for longer duration. Another drawbrack was that it was a subjective type of study there was a possibility of self report bias, recall bias or hawthorne effect.

Comparison with Similar Researches

In the present study, students were mostly in the age group of 12 to 16 years. Moses et al in his study compared oral hygiene and socioeconomic status .Most of the children were using tooth brush and fluoridated toothpaste .Compared to boys, more girls were brushing their teeth twice a day. According to research on brushing frequency by Greene and Jack et al. [26] 85% of tribal school children brushed once a day they went on to say that 58.2% of Indian students clean their teeth just once a day[10].In another study, Nordstorm and Dowen et al. [27] found that 87% of the girls and 67% of the boys brushed twice a day.

According to Al-Omiri et al. [28] toothache is the main reason people visit the dentist. The current study suggests that fewer visits may have resulted from dentists' unavailability. There was less debris in the mouths of students who rinsed after eating. Water removes food particles from in between teeth and may have stopped debris from accumulating. In our investigation, moderate OHI-S scores were found. The calculus scores were slightly lower than the debris results [29]. According to Asif *et al.* [30] oral hygiene status ratings (OHIs -1.42) were lower. When we compared the oral hygiene scores from before and after the intervention, we saw a substantial drop in the latter, indicating that the students' dental hygiene had improved.

The students' calculus scores did not significantly improve, which might be explained by the fact that calculus is created when debris calcifies and needs to be removed by specialized dental care. It was discovered that raising pupils' awareness. It's possible that the female student's increased brushing frequency and excellent hygiene habits caused this [31]. Lesser DMF scores were obtained by students who brushed with both horizontal and vertical strokes, changed their brushes every three months and saw a dentist at least once a year. When combined with preventative dental appointments, following prescribed oral hygiene habits can help to prevent or postpone the buildup of debris in the mouth, which may have contributed to the loss of teeth [32]. There was less debris in the mouths of students who rinsed after eating. Water removes food particles from in between teeth and may have stopped debris from accumulating. In our investigation, moderate OHI-S scores were found. The calculus scores were slightly lower than the debris results [33].

Explanation of the Key Findings

It's possible that the female student's increased brushing frequency and excellent hygiene habits caused this. Lesser DMF scores were obtained by students who brushed with both horizontal and vertical strokes, changed their brushes every three months and saw a dentist at least once a year. When combined with preventative dental appointments, following prescribed oral hygiene habits can help to prevent or postpone the buildup of debris in the mouth, which may have contributed to the loss of teeth. Inadequate dental health can have a serious detrimental effect on students' personalities and performance, which will ultimately damage their well-being [34].

Implications and Action Needed

Therefore, with the assistance of family doctors and community physicians, schools can host awareness campaigns about the value of maintaining good oral hygiene and how to do so. Teachers and other caregivers can receive training on how to support and mentor students in using these techniques as well as screen for common morbidities Using the public-private partnership (PPP) paradigm, mobile dental clinic services can be established at the residential school to offer curative care [35-37].

CONCLUSION

It is evident that tribal students require improved oral health practices, as highlighted by the study. Toothache emerged as the most common oral health problem among them, emphasizing the necessity of preventive measures and regular dental check-ups. However, it is evidential that students with toothaches had notably higher oral hygiene index scores, indicating a potential link between oral health issues and inadequate hygiene practices.

Targeted education for tribal children is essential to improve oral health in these communities. The study shows that while many students use toothbrushes and toothpaste, a significant number still rely on traditional methods, indicating a lack of knowledge about proper oral hygiene practices. There is a clear need for awareness about the importance of regular brushing, fluoride toothpaste and dental visits. The study also highlights gender differences in oral health habits, suggesting the need for gender-sensitive educational initiatives.

Comprehensive oral health education can help break the cycle of poor hygiene, addressing common issues like toothaches and cavities. This education should emphasize brushing twice a day, correct brushing techniques, regular

toothbrush replacement and a healthy diet. Schools, local health workers and community leaders can play a crucial role in delivering this message in culturally relevant ways.

Additionally, improving access to dental services is vital and children should be encouraged to visit a dentist regularly. A combined approach of education, awareness and better healthcare access is key to improving long-term oral health and reducing dental diseases in tribal communities.

Ethical Statement

Ethical clearance was obtained from Institutional ethics committee, Saveetha University with the number SRB/SDC/UG-1997/23/PHD/211.

REFERENCES

[1] Fejerskov, Ole and Bente Nyvad. "*Dental Caries: The Disease and Its Clinical Management*. John Wiley and Sons, 2009. https://www.wiley.com/en-us/Dental+Caries%3A+The+Disease+and+its+Clinical+Management%2C+4th+Edition-p-9781119679417

[2] Shankar, Kiran S., et al. "Effectiveness of Oral Health Education Interventions Using Braille on Oral Health among Visually Impaired Children: Proposal for a Systematic Review." *Journal of Pharmacy and Bioallied Sciences*, vol. 16, no. 1, 2024, pp. S97–S101. https://doi.org/10.4103/jpbs.jpbs_892_23

[3] Bimstein, E. *Periodontal and Gingival Health and Diseases: Children, Adolescents and Young Adults*. Thieme, 2001.

[4] Sowmya, S. and R. Sangavi. "Effectiveness of Oral Health Education and Interventions in Improving Oral Health Outcomes in Type II Diabetes Mellitus Patients: A Prospective Study". *Cureus*, vol. 16, no. 4, 2024, e58227.

[5] Sprod, A.J., et al. *Effective oral health promotion: literature review*. Cardiff: Dental Public Health Unit, Health Promotion Wales. Technical report; 20. 1996. https://www.ncbi.nlm.nih.gov/books/NBK66717/

[6] Janani, K., et al. "Awareness of oral hygiene among policemen in mayiladuthurai." *Journal for Educators, Teachers and Trainers*, vol. 13, no. 6, 2022. https://doi.org/10.47750/jett.2022.13.06.005.

[7] Kumaraguru, Mahalakshmi, et al. "Oral Health Status and Oral Health Risks Among Tribes in Tamil Nadu, India: An Epidemiological Study." Cureus Vol. 15, no. 11, 2023, e48721. https://doi.org/10.7759/cureus.48721

[8] Carra, Maria Clotilde, et al. "Promoting behavioural changes to improve oral hygiene in patients with periodontal diseases: A systematic review." *Journal of Clinical Periodontology*, vol. 47, no. S22, 2020, pp. 72-89. https://doi.org/10.1111/jcpe.13234

[9] Chellapa, Lalitha Rani, et al. "Biogenic nanoselenium synthesis, its antimicrobial, antioxidant activity and toxicity." *Bioinspired, Biomimetic and Nanobiomaterials*, vol. 9, no. 3, 2020, pp. 184-189. https://doi.org/10.1680/jbibn.19.00054.

[10] Doshi, Sharat. *An epidemiological study of dental disease and dental health behaviour of school children 6-7 and 13-14 years of age in rural Newfoundland, Canada*. 1990. Master's thesis, Memorial University of Newfoundland. https://research.library.mun.ca/5646.

[11] Bilbilova, Efka Zabokova, *Dental Caries*. IntechOpen, 2021, Pages: 142. https://www.intechopen.com/books/10126

[12] Chellappa, Lalitha Rani, *et al*. "Prevalence and dependency of tobacco use among tribal gypsies in thoothukudi district - a cross sectional study". *Journal of Family Medicine and Primary Care*, vol. 10, no. 2, February 2021, pp. 738-744. http://dx.doi.org/10.4103/jfmpc.jfmpc_1344_20.

[13] Berg, Joel H. *Early Childhood Oral Health*. 1st Edn., John Wiley and Sons, 2015, https://onlinelibrary.wiley.com/doi/book/10.1002/9781119101741

[14] Priyadharshini, G. et al. "Unveiling the unspoken: Exploring oral manifestations of psychological disorders." Cureus, vol. 26, no. 1, January 2024. http://dx.doi.org/10.7759/cureus.52967.

[15] Virdi, Mandeep. *Oral Health Care - Pediatric, Research, Epidemiology and Clinical Practices*. 1st Edn., IntechOpen, 2012, Pages: 316. https://www.intechopen.com/books/1442

[16] Mathew, Mebin George and Ganesh Jeevanandan. "The evaluation of postoperative complications and oral health-related quality of life following dental general anesthesia for early childhood caries." *Cureus*, vol. 15, no. 10, October 2023. http://dx.doi.org/10.7759/cureus.47325.

[17] Keratiotis, Georgios, *et al*. "A 22 year follow up cross sectional study on periapical health in relation to the quality of root canal treatment in a belgian population." *International Endodontic Journal*, vol. 57, no. 5, February 2024, pp. 533-548. http://dx.doi.org/10.1111/iej.14032.

[18] Chellappa, Lalitha Rani, *et al*. "A qualitative study on attitude towards smoking, quitting and tobacco control policies among current smokers of different socio-economic status." *Journal of Family Medicine and Primary Care*, vol. 10, no. 3, March 2021, pp. 1282-1287. http://dx.doi.org/10.4103/jfmpc.jfmpc_1628_20.

[19] Harris, Norman O. *Primary Preventive Dentistry: Pearson New International Edition*. 8th Edn., Pearson, 2013, Pages: 552. https://www.amazon.com/Primary-Preventive-Dentistry-Pearson-International/dp/1292040610.

[20] Sunny, Roshina, *et al*. "Determinants of nutritional status among under-five children in the tribal population of the Nilgiris, southern India: A cross-sectional study." *Indian Journal of Community Medicine*, vol. 46, no. 3, December 2020, pp. 554-0. http://dx.doi.org/10.4103/ijcm.ijcm_118_21.

[21] Vyas, Navya and S Rithu. "Assessment of infant and young child feeding practices among mothers of paniya tribal children aged 0–23 months in gudalur block, nilgiris district." *Indian Journal of Public Health*, vol. 67, no. 2, December 2022, pp. 320-0. http://dx.doi.org/10.4103/ijph.ijph_1159_22.

[22] Gandhi, Sumirtha. "Health seeking behaviour among particularly vulnerable tribal groups: A case study of Nilgiris." *Journal of Public Health and Epidemiology*, vol. 9, no. 4, April 2017, pp. 74-83. https://academicjournals.org/journal/JPHE/article-full-text-pdf/69CA2F663334.

[23] Ghosh, Soumitra and Sarika A. Varerkar. "Undernutrition among tribal children in palghar district, maharashtra, India." *PLOS ONE*, vol. 14, no. 2, February 2019. http://dx.doi.org/10.1371/journal.pone.0212560.

[24] Kuppuswamy, Vyshalee L. "Oral hygiene status, knowledge, perceptions and practices among school settings in rural South India." *Oral Health Dental Management*, 2014 vol. 13, no. 1, March 2014, pp. 146-154. https://pubmed.ncbi.nlm.nih.gov/24603932.

[25] Klein, Henry and Carroll E. Palmer. "Studies on dental caries." *Journal of Dental Research*, vol. 20, no. 3, June 1941, pp. 203-216. http://dx.doi.org/10.1177/00220345410200030501.

[26] Greene, John G. and Jack R. Vermillion. "The simplified oral hygiene index." *The Journal of the American Dental Association*, vol. 68, no. 1, January 1964, pp. 7-13. http://dx.doi.org/10.14219/jada.archive.1964.0034.

[27] Nordström, Anna and Dowen Birkhed. "Attitudes and behavioural factors relating to toothbrushing and the use of fluoride toothpaste among caries-active swedish adolescents-a questionnaire study." *Acta Odontologica Scandinavica*, vol. 75, no. 7, July 2017, pp. 483-487. http://dx.doi.org/10.1080/00016357.2017.1344876.

[28] Al-Omiri, Mahmoud K. "Oral health attitudes, knowledge and behavior among school children in North Jordan." Journal of Dental Education, vol. 70, no. 2, February 2006, pp. 179-87. https://pubmed.ncbi.nlm.nih.gov/16478932.

[29] Deyessa, S. *Oral Health Knowledge, Attitude and Practice Among School Children*. 1st Edn., LAP Lambert Academic Publishing, 2012.

[30] Asif, Shaik Mohammed, *et al*. "Oral hygiene practice and periodontal status among two tribal population of Telangana state, India- an epidemiological study." *BMC Oral Health*, vol. 19, no. 1, January 2019. http://dx.doi.org/10.1186/s12903-018-0705-1.

[31] Parkar, Sujal. *Oral Health of Mentally Challenged Individuals in Ahmedabad, India*. LAP LAMBERT Academic Publishing, 2013, Pages: 64. https://www.amazon.com/Health-Mentally-Challenged-Individuals-Ahmedabad/dp/3659383430

[32] Raju, P. Krishnam, *et al*. "Oral Hygiene Levels in Children of Tribal Population of Eastern Ghats: An Epidemiological Study." *Journal of International Oral Health*, vol. 7, no. 7, 2015, pp. 108-110. https://pmc.ncbi.nlm.nih.gov/articles/PMC4513761/pdf/JIOH-7-108.pdf

[33] Jaidka, R and S. Jaidka. *Evaluation of Oral Health Status in Rural Area*. LAP Lambert Academic Publishing, 2014.

[34] Haque, Hasibur Zaman, *et al*. "A cross-sectional study on oral hygiene among santhal tribal adults in a rural area of west Bengal." *Journal of Family Medicine and Primary Care*, vol. 10, no. 8, August 2021, pp. 2859-2861. http://dx.doi.org/10.4103/jfmpc.jfmpc_2335_20.

[35] Singh, A and B. Purohit B. *Tribal Oral Health- an Indian Perspective*. LAP Lambert Academic Publishing, 2012.

[36] Prathiba, Reichal C. "A Qualitative Study on Attitude Towards Smoking and Quitting Among Smokers in Tribal Gypsies Dwelling from Chennai." *Journal of Pioneering Medical Sciences*, vol. 12, no. 2, December 2023, pp. 4-9. https://doi.org/ 10.61091/jpms20231222.

[37] Pradeep, V.R. "Assessment of Oral Health Beliefs and Oral Hygiene Practices Among Tribal Gypsies in Tamil Nadu." *Journal of Pioneering Medical Sciences*, vol. 12, no. 3, December 2023, pp. 11-14. https://doi.org/10.61091/jpms20231233

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