Original Article

Evaluating oral health status in elderly Irula tribes of Tamil Nadu by using the Geriatric Oral Health Assessment Index

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Abstract

Introduction: Oral diseases are a significant global health issue, with over 3.5 billion cases worldwide. Caries and periodontitis are primary contributors to tooth loss, which not only incurs significant rehabilitation costs but also profoundly affects overall well-being. Tribal communities represent a notable indigenous segment, comprising 8.6% of India's total population, primarily concentrated in the central and western regions. This study assesses the oral health-related quality of life (OHRQoL) among the elderly Irula population by using the Geriatric Oral Health Assessment Index (GOHAI). **Methods:** A cross-sectional research was undertaken in the Irula settlements of Thiruvallur district, Tamil Nadu, focusing on inhabitants over 60 years who had lived there for at least 6 months. People who were chronically ill or who refused to agree were excluded. Data were gathered using a questionnaire that included demographic information, economic status, personal habits, and health issues. OHRQoL was evaluated using the GOHAI, and descriptive statistics such as range, mean, and standard deviation (SD) for continuous variables were used. To account for possible confounders such as age, education, and socioeconomic status, multivariate analysis was performed using logistic regression. **Results:** This study results comprised mostly females (76.4%) and individuals aged 60–64 years (44.8%). Most participants were Hindu (94.1%), married (72.5%), and illiterate (61.9%). A majority lived in nuclear families (87.6%) and were agricultural laborers (60.0%). Many participants never experienced limitations in eating due to dental issues (64.0%). Gender, education, and physical comorbidities significantly influenced OHRQoL, with females and those with higher education reporting better quality of life. **Conclusion:** The study underscores the significant impact of oral health on the quality of life among the elderly Irula population. Factors such as gender, education, and physical comorbidities play crucial roles in OHRQoL. The findings highlight the need for targeted oral health interventions and further research to address disparities and improve oral health outcomes in this underserved population.

Keywords: Elderly, quality of life, tribes

Introduction

Oral diseases impose a substantial worldwide health and economic burden, profoundly affecting the well-being of those affected.[1,2] With over 3.5 billion cases globally, many oral diseases are preventable, yet their risk and severity are exacerbated by the rising prevalence of chronic conditions, particularly among older adults.[3] Caries and periodontitis are primary contributors to tooth loss, which not only incurs significant rehabilitation costs but also profoundly affects overall well-being.[4] Tribal communities represent a notable indigenous segment, comprising 8.6% of India's total population, primarily concentrated in the central and western regions.[5] Often residing in remote, mountainous areas with limited access to technology,

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education, and economic opportunities, tribal communities experience significant marginalization.[6] In Tamil Nadu alone, 1.1% of the total population belongs to Scheduled Tribes, with 36 distinct groups identified. Among them, the Kattunayakan, Kotas, Irulas, Paniyas, Kurumbas, and Todas are designated as particularly vulnerable tribal groups by the Indian government.[6]

The Irula community, whose name originates from the Tamil word "Irul," meaning darkness, predominantly inhabits districts like Tiruvallur, Kancheepuram, and Tiruvannamalai.[7] Research on the Irula tribe reveals a high prevalence of chronic illnesses and poor oral health, yet studies on the irula oral health are relatively limited compared to other tribal populations.[8-10] Given the substantial disease burden within the Irula community, prioritizing oral health research is crucial to developing effective preventive strategies and addressing disparities in oral health outcomes.[11]

This cross-sectional study focuses on the Irula tribes in Tamil Nadu, India, with the main goal of investigating their oral health-associated quality of life (OHRQoL). Given the high risk in indigenous populations, including the Irula tribes, due to a lack of awareness about oral health, there is a high prevalence of periodontal disease and dental caries among the Irula, compounded by a lack of previous dental care, high treatment needs, and limited access to oral health services.

Methods

Study design and setting

The cross-sectional study was carried out among Irula tribes in Thiruvallur district, Tamil Nadu, India. Participants above the age of 60 years and participants who have been residing for a minimum duration of 6 months were included. Chronically ill patients with restricted movements and subjects who did not give consent to the examination were excluded from the study.

Sample size

Using a prevalence rate of 50.1% from a study by Shah *et al.*, the sample size was calculated with a confidence interval (CI) of 98%, a 5% error term, a design effect of 2%, and a 10% non-response rate, resulting in an overall sample of 881 individuals.

Sampling technique

The study employed a multistage sampling method to select a representative sample of elderly individuals from the Tiruvallur Districts. Initially, the district, which consists of nine taluks, was the primary focus. From these, two taluks were randomly chosen using a lottery method, considering the number of villages in each taluk to ensure a balanced representation. The selected taluks, Pallipattu and Tiruttani, encompassed a total of 21,366 Irula households. In the final stage, one eligible elderly individual was randomly picked from each household in these taluks. This selection process was continued until the required sample size was achieved, ensuring that the sample was representative of the elderly population in the Irula community within the specified region.

Study variables

Dependent variable was quality of life, and independent variables included socioeconomic factors and physical co-morbidities.

Study procedure

A single examiner who had received training prior to the study performed the interviews. The objective of the research was described, and participants provided signed informed consent. The questionnaire in the local language (Tamil) included demographic, educational, and familial information, as well as facts on economic status, personal habits, general health and medical disease, oral health and dental illness, dental care awareness, and so on.

Study tool

The Geriatric Oral Health Assessment Index (GOHAI) comprises 12 questions, nine negative and three positive, designed to discourage response compliance. These questions evaluate several elements of oral health.

1. Items G1, G2, G3, and G4 examine physical functions such as eating, talking, and swallowing.
2. Items G6–G11 cover psychosocial issues such as self-esteem, social disengagement, and dental health concerns.
3. Items G5, G8, and G12 measure symptoms of oral disorders, including the usage of pain relievers. Each question has four response categories with assigned scores:
   - 0 = Never
   - 1 = Sometimes
   - 2 = Frequently
   - 3 = Always

The GOHAI score is calculated by reversing the responses to nine items (limiting food due to dental problems, trouble biting and chewing, medication use, temperature sensitivity, nervousness due to teeth, uncomfortable eating with people, prevented from speaking, worried about teeth, and limited contacts with people). This ensures that a higher overall score reflects better dental health.

The responses to the 12 statements are summarized to produce an overall score ranging from 0 to 36, reflecting the impact of oral disorders on health-related quality of life (OHRQoL), including functional and psychosocial effects. A higher GOHAI score (maximum of 36) indicates satisfactory oral health. For the quality of life (QOL) assessment, a median score of 2 is used as a reference point. Scores below 2 indicate poor quality of life, while scores above 2 suggest a good quality of life.

Data analysis

Data were entered, cleaned, and saved in Microsoft Excel before being analyzed statistically using SPSS version 22. Unadjusted odds ratios (OR) and 95% CI were used to identify variables that influence quality of life. To account for possible confounders

such as age, education, and socioeconomic status, multivariate analysis was performed using logistic regression.

Results

The study sample comprised predominantly of individuals aged 60–64 years, representing 44.8% of the population, followed by those aged 65–69 years at 30.6%. The study sample constituted 76.4% of females compared to 23.6% of males. A substantial majority identified as Hindu (94.1%), while a minority identified as Christian (5.9%). Marital status analysis revealed that the majority of participants were married (72.5%), whereas 27.5% were widowed. Educational attainment within the population showed that a large segment was illiterate (61.9%). Those with primary education accounted for 11.1%, while 10.2% had completed high school. The family structure predominantly consisted of nuclear families (87.6%), with a smaller proportion living in joint family arrangements (12.4%). The majority of the population were agricultural laborers (60.0%), followed by housewives (20.4%) and those who were unemployed or retired (6.7%). Most individuals resided in semi-pucca houses (62.4%), with 33.9% living in katcha houses. Monthly income distribution showed that a significant portion of the population earned less than Rs. 5000 (54.9%), followed by those with incomes between Rs. 5001 and Rs. 10,000 (39.3%). The sociodemographic characteristics are shown in Table 1.

Table 2 shows the oral health quality of life as measured by GOHAI index responses. The majority were found to never limit their meals due to dental issues (64.0%), have trouble chewing (58.8%), or take medication for mouth discomfort (66.6%). A sizable minority, in contrast, was found to be always impacted by issues such as dietary limitation due to teeth/dentures (21.9%), chewing trouble (20.7%), and sensitivity to hot, cold, or sweet foods. Furthermore, the majority were found to be unaffected by dental worries in social contexts, such as limiting interactions with others (67.1%) or feeling awkward eating in front of others (68.0%).

Table 3 shows the associations between social demographic factors and quality of life. Education and physical comorbidities were significantly associated with the quality of life, with illiterate individuals having significantly lower odds of a higher quality of life compared to graduates (adjusted OR: 0.163, $P = 0.003$). Similarly, those with only primary education also showed significantly lower odds (adjusted OR: 0.186, $P = 0.01$) compared to graduates. Individuals with higher secondary education had significantly lower odds of a lower quality of life (adjusted OR: 0.203, $P = 0.03$). The presence of physical comorbidities was associated with higher odds of a lower quality of life (adjusted OR: 1.594, $P = 0.006$). These findings underscore the impact of education and physical health on quality of life.

Table 1: Sociodemographic variables of the participants (*n*=881)

Category	Subcategory	Percent
Age	60–64 years	44.8%
	65–69 years	30.6%
	70–74 years	10.8%
	75–79 years	9.2%
	80–84 years	3.1%
	85–89 years	1.5%
Gender	Female	76.4%
	Male	23.6%
Religion	Christian	5.9%
	Hindu	94.1%
Marital Status	Married	72.5%
	Widow	27.5%
Educational Qualifications	Can read	0.5%
	Can read and write	0.5%
	Diploma	1.0%
	High School	10.2%
	Higher graduation	0.2%
	Higher secondary	4.1%
	Illiterate	61.9%
	Middle school	8.5%
	Primary education	11.1%
	Undergraduate	2.0%
Family Type	Joint family	12.4%
	Nuclear family	87.6%
Type of Occupation	Agricultural laborer	60.0%
	Housewife	20.4%
	Others specify	0.3%
	Own cultivation	4.9%
	Own cultivation and laborer	1.6%
	Private	1.7%
	Small business/petti shop/tea shop	4.4%
	Unemployed/retired	6.7%
Type of House	Katcha	33.9%
	Pucca	3.6%
	Semi-pucca	62.4%
Monthly Income	Above Rs. 20,000	0.2%
	<Rs. 5000	54.9%
	Rs. 10,001–20,000	5.6%
	Rs. 5001–10,000	39.3%

Discussion

In 1983, the International Association of Gerontology recognized the unique demands of older dental treatment and established Gerodontology as a separate field within dentistry.[12] Maintaining excellent dental health is crucial for the entire quality of life among the elderly as it is inextricably related to their overall health.[13] However, indigenous communities have significant health inequalities, with their socioeconomic position often lower than that of the general population, despite several government measures targeted at improving their health outcomes.[14]

The GOHAI complements clinical indices by assessing patients' physiological, physical, and psychological problems.[15] Despite its importance, research on OHRQoL among Indian tribal groups is scarce.[16] According to studies, while physical activities such as eating and speaking are less affected, psychological issues—such as dissatisfaction with the look of teeth or dentures, worry about dental disorders, and pain or discomfort—are more common.[17]

Table 2: GOHAI items and responses (*n*=881)

Question	Always (%)	Frequently (%)	Never (%)	Sometimes (%)
Limit kinds/amounts of food due to teeth/dentures	21.9	1.2	64.0	12.8
Trouble biting or chewing different kinds of food	20.7	1.7	58.8	18.8
Able to swallow comfortably	21.0	4.0	48.9	26.1
Teeth/dentures preventing speaking the way desired	19.1	2.4	65.0	13.5
Able to eat anything without feeling discomfort	19.8	4.7	63.2	12.4
Limit contact with others due to teeth/dentures	18.0	1.9	67.1	12.9
Pleased/happy with the looks of teeth and gums or dentures	19.4	2.3	64.6	13.7
Use medication to relieve pain or discomfort around the mouth	18.0	2.3	66.6	13.1
Worried or concerned about problems with teeth, gums, or dentures	18.3	2.6	66.2	12.9
Nervous or self-conscious because of problems with teeth, gums, or dentures	18.6	2.0	66.6	12.7
Uncomfortable eating in front of others due to teeth or dentures	18.3	1.9	68.0	11.8
Teeth or gums sensitive to hot, cold, or sweet foods	21.6	5.7	51.6	21.1

Table 3: Multivariate logistic regression of GOHAI with the sociodemographic status

Variables		Unadjusted Odds ratio (95%CI)	*P*	Adjusted Odds ratio (95%CI)	*P*
Age (85–89 Years)	60–64 years	1.024 (0.338–3.101)	0.967	0.912 (0.246–3.381)	0.890
	65–69 years	0.571 (0.187–1.747)	0.326	1.659 (0.441–6.237)	0.454
	70–74 years	0.875 (0.274–2.799)	0.822	1.026 (0.261–4.034)	0.971
	75–79 years	0.320 (0.097–1.056)	0.061	2.022 (0.492–8.305)	0.329
	80–84 years	0.923 (0.245–3.477)	0.906	0.739 (0.150–3.641)	0.710
Gender (Female)	Male	0.734 (0.537–1.002)	0.052	0.652 (0.418–1.016)	0.059
Education (Graduate)	Illiterate	4.266 (1.417–12.841)	0.01*	0.163 (0.048–0.546)	0.003*
	Primary School	7.012 (2.203–22.321)	0.001*	0.186 (0.052–0.667)	0.01*
	Middle School	2.255 (0.687–7.401)	0.180	0.397 (0.107–1.472)	0.167
	High School	1.919 (0.592–6.228)	0.278	0.304 (0.083–1.107)	0.071
	Diploma	2.125 (0.365–12.385)	0.402	0.404 (0.056–2.923)	0.369
	Higher Secondary	2.833 (0.786–10.211)	0.111	0.203 (0.048–0.860)	0.03*
Type of Family (Joint)	Nuclear	1.274 (0.853–1.904)	0.237	1.113 (0.718–1.725)	0.631
Type of House (Pucca)	Katcha	0.892 (0.672–1.182)	0.425	0.983 (0.448–2.156)	0.966
	Semi Pucca	0.653 (0.318–1.339)	0.245	0.160 (0.310–1.950)	0.784
Physical Comorbidities (No)	Yes	0.424 (0.324–0.556)	0.001*	1.594 (1.144–2.220	0.006*
Oral Comorbidities (No)	Yes	1.973 (0.680–5.727)	0.211	0.895 (0.402–1.991)	0.785

**P* value <0.05 is said to be significance

Swallowing difficulties in the elderly are commonly linked to xerostomia, which can be caused by medicine or chronic sickness.[18]

Gender, education, and income are all significant demographics influencing OHRQoL. In the current study, males reported worse OHRQoL, which might be related to their overall lack of interest in oral health. This observation supports the conclusions of Ingle *et al.* and Atieh *et al.*[19] Oral health deteriorates with age, leading to tooth loss, attachment loss, and poor oral cleanliness.[20] Psychological challenges, financial restraints, reliance, a lack of family support, systemic health problems, and polypharmacy all compound the situation.[21] Steele *et al.* discovered that both tooth loss and age had an independent effect on OHRQoL; this study also demonstrated a deterioration in OHRQoL perception with increasing age.[22]

Another significant variable is educational level, with more education being associated with better oral health and OHRQoL, most likely due to increased socioeconomic position and health awareness. This study's findings are consistent with those of Paulander *et al.*, who indicated that those with greater socioeconomic class have better dental health.[23] However, one weakness of this study was that it only judged economic position based on monthly income.

Despite the fact that dental treatment is included in basic health care in India, only a few clinics provide it.[24] Dental insurance is in its early stages, and the bulk of the population cannot afford private dental care; therefore, people typically seek dental treatment only when they are in pain.[25] None of the research participants followed a regular dentist appointment schedule. Compared to earlier investigations, this study discovered that senior respondents reported greater physical functional problems and fewer psychosocial problems, most likely due to a high frequency of untreated dental abnormalities.[26-28] There was a substantial difference in OHRQoL among older and extremely elderly persons. This group of senior people did not see poor dental health as a substantial impediment to social connections.

Limitations

The study has several limitations that should be acknowledged. First, the cross-sectional design restricts the ability to establish

causality. In addition, recall bias is a concern as participants may inaccurately remember or report past oral or health issues. However, efforts were made to minimize this bias by using probing questions to clarify responses, and participants were prompted to recall information from within the past 1-month period to enhance accuracy.

Conclusion

This study found that perceptions of physical challenges with dental health differed significantly among age groups in the senior population. Individuals aged 75 years and older reported more severe physical difficulties than the other age groups. Furthermore, dental care was not perceived as a priority issue among the elderly. Although these findings suggest that evaluating the clinical and oral health of older patients is critical for effective dental care, additional studies in larger populations are required to assess geriatric oral health.

Ethics approval

Ethical clearance was obtained from the Institutional Ethics Committee at the SRM School of Public Health (IEC Protocol Number 0039/IEC/2023), ensuring adherence to ethical standards throughout the study process.

Consent to participate

The authors certify that all appropriate participant consent forms were obtained. The participants understand that their names and initials will not be published.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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