

# Community-based early detection of oral precancerous lesion, accessibility and utilization of oral healthcare services among Irular tribes residing at union territory of Pondicherry

D. Dorai Raghav<sup>1</sup>, G. Shobana<sup>2</sup>, S. Senthilnathan<sup>3</sup>, K. Lokeshwaran<sup>1</sup>

<sup>1</sup>CRRI, Sri Venkateshwaraa Dental College, Ariyur, Puducherry, India, <sup>2</sup>Department of Public Health Dentistry, Sri Venkateshwaraa Dental College, Ariyur, Puducherry, India, <sup>3</sup>Department of Periodontology, Sri Venkateshwaraa Dental College, Ariyur, Puducherry, India

## ABSTRACT

**Background:** The present study was conducted to estimate the prevalence of oral carcinoma and precancerous lesion, oral healthcare seeking behaviour and identify accessible areas of tobacco cessation centres and oral healthcare facilities among Irular adult tribes residing in Pondicherry. **Objectives:** 1. To estimate the prevalence of oral carcinomas and precancerous lesion by using toluidine blue solution. 2. To determine their oral healthcare seeking behaviour in terms of utilizing oral healthcare facilities. 3. To identify accessible tobacco cessation centres and oral healthcare centres for prevention of oral cancer. **Materials and Methods:** A cross-sectional study is designed to identify oral carcinomas, oral health-care seeking behaviour among Irular tribes of Pondicherry. 1% toluidine blue solution prepared for detection of oral precancerous lesion. Data was collected using a questionnaire and clinical examination. The collected data was subjected to statistical analysis. **Results:** Out of 587 study population, oral mucosal lesion among the study population was 46 (7.8%) leukoplakia and 18 (3.1%) candidiasis. Positive health seeking behaviour 24 (41.7%) was observed. **Conclusion:** The study concluded that low prevalence of oral precancerous lesion and oral healthcare seeking behaviour is poor.

**Keywords:** Irular, oral cancer, oral healthcare seeking behaviour, oral hygiene practices, precancerous, toluidine blue solution, tribes

## Introduction

The tribal people in India form a heterogeneous group with a huge diversity. Yet the one common among tribal communities in India is that they have poor health indicators, greater burden of morbidity and mortality and very limited access to healthcare services.

**Address for correspondence:** Dr. G. Shobana, Department of Public Health Dentistry, Sri Venkateshwaraa Dental College, Ariyur - 605 102, Puducherry, India. E-mail: shobana@svdcpondy.ac.in

Received: 14-08-2023

Revised: 11-12-2023

Accepted: 30-12-2023

Published: 22-04-2024

### Access this article online

#### Quick Response Code:



**Website:**  
<http://journals.lww.com/JFMPC>

**DOI:**  
10.4103/jfmpe.jfmpe\_1334\_23

Tobacco, alcohol and drugs threaten the tribal people by increase the incidence of serious illness and mortality, reduce productivity and increase poverty, disrupt family and community harmony and constitute a major out of pocket expenses and adversely affect the family economy among tribal people. This might be partly responsible for the increasing incidence of non-communicable disease like hypertension and cancer, including mental stress and addictions are unexpectedly growing among tribal populace.<sup>[1]</sup>

Puducherry has numerous group of tribal namely the Irulars (including Villi and Vettaikaran), Kattunayakans,

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**How to cite this article:** Dorai Raghav D, Shobana G, Senthilnathan S, Lokeshwaran K. Community-based early detection of oral precancerous lesion, accessibility and utilization of oral healthcare services among Irular tribes residing at union territory of Pondicherry. J Family Med Prim Care 2024;13:1511-6.

Malaikuravars and Kurumans. Irulars are one of the local tribal communities of Puducherry. The previous study concluded that awareness about oral cancer and precancer is inadequate among Narikuravar tribal population of Pondicherry.<sup>[2]</sup> The previous study concluded that the reason for practicing these habit of smoking, tobacco chewing, alcohol as a measure to combat the cold, relieving stress and body pain after work and the lack of awareness of the hazards of the materials used in Malayali tribes, Tamil Nadu.<sup>[3]</sup> Hence, there is no studies related to oral health status among Irular tribes in Pondicherry. Oral healthcare data creates bridging the current gap and roadmap for the future to provide oral preventive health services in the primary care setting and reinforce the referral process. Oral healthcare seeking behaviour/utilization is the actual involvement of members of the public at healthcare facilities that reflects the number of visits every year or the number of individuals with at least one visit in the previous year as a significant method for oral health policy decision-making.<sup>[4]</sup>

Keeping in mind, our main goal is to controlling the use of tobacco and provides de-addiction centres to decrease the incidence of cancers. The present study aimed to estimate the prevalence of oral carcinoma and precancerous lesion, oral healthcare seeking behaviour and identify accessible areas of tobacco cessation centres and oral healthcare facilities among Pondicherry Irular adult tribes.

## Materials and Methods

The present study is a cross-sectional study designed to identify oral carcinomas and pre-cancerous lesions and oral healthcare seeking behaviour among Irular tribes of Pondicherry. Irular population statistics was collected from Adi Dravidar welfare and Scheduled Tribes Welfare Department, Pondicherry [Table 1]. Ethical clearance to conduct the study was obtained from the Institution Ethics Committee (No: 08/SVMCH/IEC-cert/June22) of Sri Venkateshwaraa Medical College Hospital and Research Centre. The present study makes minimal risk to the study participants (based on ICMR Code on Ethical Guidelines). Informed consent was obtained from all the study subjects. 1% toluidine blue preparation was done by Technician of Department of General Pathology, Sri Venkateshwaraa Medical college Hospital and Research Centre. The natives belonging to the adult Irular tribes residing at the villages of Pondicherry state who are willing to participate were included. Children with <18 years of age and pregnant and lactating women were excluded from the study.<sup>[5]</sup> The household door-to-door survey planned to conduct for the study period of 2 months (August to September 2022) after approval from Institutional Ethical Committee. A pilot study was carried out with 25 subjects in order to test questionnaire items understandability and content validity. Data was collected using a Survey Proforma which comprised of a pretested questionnaire items to assess the oral mucosal lesions, oral healthcare seeking behaviour and Type-III clinical examination as recommended by American Dental Association (ADA)

specification which was followed after obtaining informed consent. The internal consistency was assessed by Cronbach  $\alpha$ . The result of the pilot study showed a good consistency with  $\alpha$  values higher than 0.9.

## Preparation of toluidine blue (TB)

TB is prepared in 1% concentration for oral application. 100 ml of 1% TB consists of 1 gram TB powder, 10 ml of 1% acetic acid, 4.19 ml absolute alcohol and 86 ml distilled water to make up 100 ml. The pH is regulated to 4.5.

## Staining protocol

After oral examination, rinsing the mouth twice with water for 20 seconds to remove the debris. Application of 1% acetic acid for 20 seconds to remove any ropey saliva. 1% TB solution given for 20 seconds as a rinse. Application of 1% acetic acid to reduce the extent of mechanically retained stain. Finally mouth was rinsed with water. Interpretation of the TB stain into dark blue stain was considered as positive for lesions suspicious of malignancy, light blue retention was considered as positive for premalignant lesions, and the lesions without any retention of stain were considered as negative.<sup>[6]</sup>

The methodology of the study is to identify adult Irular tribes in Pondicherry. First step was screened; all the participants' oral soft tissues were recorded by using WHO Oral Health Assessment Form for Adults, 2013. Clinically suspected oral cancerous and precancerous lesions were identified by using 1% TB solution. Blue dye uptake was recorded as positive malignant lesion and photographed. Oral healthcare seeking behaviour pretested structured questionnaire was filled through door to door interview method. Accessible tobacco cessation centres and oral healthcare facilities through Geotag (GPS Map Camera Lite app) and Google map for the prevention of oral cancer were identified. The participants will give assurance on the confidentiality of their personal information. Statistical analysis is analysed by using IBM SPSS 26.0 version, and Chi-square test will be used and statistical significance of  $P < 0.05$  with 95% confidence level.

## Results

The present study was done to identify oral carcinomas and pre-cancerous lesions and oral healthcare seeking behaviour among Irular adult tribes residing in Pondicherry. The reference population comprised of around 758 adults, among whom this study was done on a population of 587 [Table 1]. The study population was obtained from two taluks of Pondicherry.

Table 2 shows that the study population consisted of 38.7% males, 61.3% females and 0% third gender. Based on age groups, among 587 study population, majority 37.5% participants in the age group of 29–48 years, 31.2% participants in 49–68 years, 21.1% participants in 18–28 years and 10.2% participants in above 69 years were participated in this study. Based on socioeconomic status, among 587 study population, majority 59.8% participants are lower class.

**Table 1: Distribution of Irular adult tribes in Pondicherry**

| Adi Dravidar welfare and Scheduled Tribes Welfare Department,<br>Statistics, Pondicherry |                      |               |       | Actual study sample  |
|--|----------------------|---------------|-------|--|
| S. No  | Place                | No. of Adults | Total | New Data – There is Physical Mismatch after repeatedly visited to the Community Field  |
| Villianur  | 1. Chettipet         | 7             | 501   | Migrants=42<br>Death=13<br>Females married and moved to other state=15<br>Bed ridden older adults=2<br>Pregnant women=4<br>Lactating women=1<br>No Irular family identified in Sanyasikuppam   |
| Taluk  | 2. Koonichampet      | 31            |       |  |
|  | 3. Mannadipet        | 61            |       |  |
|  | 4. Vadhanur          | 60            |       |  |
|  | 5. Kuppam            | 135           |       |  |
|  | 6. Kodathur          | 10            |       |  |
|  | 7. Vambupet          | 19            |       |  |
|  | 8. Thetampakkam      | 51            |       |  |
|  | 9. Sedarapet         | 9             |       |  |
|  | 10. Ramanathapuram   | 26            |       |  |
|  | 11. Thirubuvanai     | 6             |       |  |
|  | 12. Thiruvandarkovil | 72            |       |  |
|  | 13. Uruvaiyaru       | 8             |       |  |
|  | 14. Sanyasikuppam    | 2             |       |  |
|  | 15. Thondamanatham   | 4             |       |  |
| Bahour taluk   | 1. Bahour            | 62            | 257   | Migrants=64<br>Death=22<br>Females married and moved to other state=3<br>Bed ridden older adults=3<br>Pregnant women=0<br>Lactating women=2<br>No Irular family identified in Kuruvinatham 197 |
|  | Parikalpet           | 6             |       |  |
|  | Kuruvinatham         | 7             |       |  |
|  | Irulanchandhai       | 88            | 758   | Sample Size=587<br>(171 Irular tribes are not involved in the Study due to above reason)   |
|  | Selaimedu            | 54            |       |  |
|  | Korkaadu             | 40            |       |  |

**Table 2: Distribution of study population based on demographic details**

|                       | Total | Percentage |
|-----------------------|-------|------------|
| Gender                |       |            |
| Male                  | 227   | 38.7%      |
| Female                | 360   | 61.3%      |
| Third gender          | 0     | 0.00%      |
| Age groups            |       |            |
| 18-28 years           | 124   | 21.1%      |
| 29-48 years           | 220   | 37.5%      |
| 49-68 years           | 183   | 31.2%      |
| >69 years             | 60    | 10.2%      |
| *Socioeconomic status |       |            |
| Upper middle          | 8     | 1.4%       |
| Lower middle          | 13    | 2.2%       |
| Upper lower           | 215   | 36.6%      |
| Lower                 | 351   | 59.8%      |

\*Socioeconomic scale-Modified Kuppusamy scale for the year 2022<sup>14</sup>. \*P=0.000 (significant)

Table 3 shows the distribution of study population based upon the oral mucosal condition. There were cases of 7.8% leukoplakia, 3.1% candidiasis, 0.7% lichen planus and 0.3% other cases like aphthous ulcers present. Statistically, there existed a significant difference ( $P = 0.005$ ). Based on the location of oral mucosal condition, majority of study population 6.1%, 3.2%, 2.0%, 0.3% and 0.2% lesions are located in buccal mucosa, tongue, sulci, palate and lips, respectively. Statistically, there existed a significant difference ( $P = 0.003$ ).

Table 4 shows differences in participants response on oral health seeking behaviour that there is 41.4% of study population had visited dentist. 40.5% of the study population visited dentist to treat dental problems. 35.6% of study population visited paramedical for dental problems. 33.9% of study population took self-medication for dental problem ( $P = 0.01$ ). 79.2% of the study population preferred government hospital for dental treatment. 53.2% of the study population gave majority reason for preferred government hospital because of less expenditure and accessibility. 92.7% of the study population got treatment for painful tooth ( $P = 0.001$ ). 49.1% of the study population mentioned barrier for not undergone dental treatment as cost expensive. 43.3% of the study population opinion on their oral status is below average. 73.3% of the study population neglected to improve their oral health.

The third objective of the study is to analyse various available accessible, affordable oral cancer prevention and treatment facility in nearest area (within said radius); there are two community health centres, 10 primary health centres, 7 registered tobacco cessation centres under NTCP, 1 government dental college and 2 government education and health institutes. Eighteen private dental clinics are accessible for prevention of oral cancer.

## Discussion

The present study was done to identify oral carcinomas and precancerous lesions and oral healthcare seeking behaviour among Irular adult tribes residing in Pondicherry. Out of 587

**Table 3: Distribution of study population based on oral mucosal lesions**

|                         | Total | Percentage | P     | Chi square value |
|-------------------------|-------|------------|-------|------------------|
| <b>Condition</b>        |       |            |       |                  |
| No abnormal condition   | 517   | 88.1%      | 0.005 | 15.034           |
| Malignant tumour        | 0     | 0%         |       |                  |
| Leukoplakia             | 46    | 7.8%       |       |                  |
| Lichen planus           | 4     | 0.7%       |       |                  |
| Ulceration              | 0     | 0%         |       |                  |
| ANUG                    | 0     | 0%         |       |                  |
| Candidiasis             | 18    | 3.1%       |       |                  |
| Abscess                 | 0     | 0.00%      |       |                  |
| Other conditions        | 2     | 0.3%       |       |                  |
| <b>Location</b>         |       |            |       |                  |
| No conditions           | 517   | 88.1%      | 0.003 | 17.806           |
| Commissures             | 0     | 0.00%      |       |                  |
| Lips                    | 1     | 0.2%       |       |                  |
| Sulci                   | 12    | 2.0%       |       |                  |
| Buccal mucosa           | 36    | 6.1%       |       |                  |
| Floor of the mouth      | 0     | 0.00%      |       |                  |
| Tongue                  | 19    | 3.2%       |       |                  |
| Hard and soft palate    | 2     | 0.3%       |       |                  |
| Alveolar ridges/gingiva | 0     | 0.00%      |       |                  |

P - Not significant

study population, male-to-female ratio was with 38.7% males and 61.3% females. Majority of the males migrated to other state for agricultural occupation and for other reasons.

Majority of the participants had oral mucosal lesions like leukoplakia (7.8%), candidiasis (3.1%) and lichen planus (0.7%). Prevalence of oral mucosal lesions in the study population was due to usage of tobacco and alcohol; there is lack of awareness regarding the deleterious effects of the products used. Tobacco is known to contain >60 cancer causing materials. These chemicals accelerate the inflammatory process when they come in contact with oral mucosa. The finding was similar to the study done by S Kadanakuppe (2013) Iruliga tribal community, the prevalence of leukoplakia (0.12%),<sup>[7]</sup> and the present study revealed a relatively low prevalence. Srisakthi Dorai Kannan, (2020) On clinical examination, leukoplakia and smokers melanosis were the most common lesions observed in the 15–55+ years age group.<sup>[8]</sup>

To analyse the performance of an oral healthcare system and to make it more accessible particularly in developing countries, it is imperative to study the oral health seeking behaviours and factors determining utilization of oral healthcare services.<sup>[9]</sup> This study was an attempt to understand the oral healthcare seeking behaviour among Irular adult tribes in Pondicherry.

Of the total study population, 41.4% of study population had visited dentist for dental treatment once in a year. This was similar to the study done by Nija M.A(2020) who reported that 68% of the participants visited a dentist for dental care when faced oral problems.<sup>[10]</sup> Similar findings were observed in other study. The reason for majority study population not visiting dentist may be

due to low priority to dental health and lack of awareness on dental health.

The present study reported that 79.2% of the study population preferred government hospitals for dental treatment. The reason for majority study population preferred government hospitals because of less expenditure and more accessibility. Accessibility was one of the main reason for chosen the specific healthcare centres. This was similar to the previous study reported that 94.16% preferred private dental clinic and private dental institution. The reason may require a degree of economic stability at an individual level.<sup>[4,10]</sup>

The present study reported that 92.7% of the study population got treated for painful tooth. The reason may be ‘There is no need unless pain was present’. The patient perceived need to visit a dentist was only if they had symptoms such as pain or emergency. This was similar to the study done by Gupta (2015) reported that 89.97% participants visited dentist for painful tooth.<sup>[11]</sup> This was similar to the study done by Bommireddy VS(2017) who reported that toothache was the most common reason for seeking dental care.<sup>[12]</sup> The reason may be oral healthcare services were elective unless there was pain in the view of majority of the rural population.

The present study reported that 46.4% of the study population reported that cost expensive, 43.6% of the study population reported fear as barrier for not undergoing dental treatment. The reason may be lower socioeconomic status and lower education for a longer time been well recognized as a barrier to utilization of oral health care. This was similar to the study done by Nija M.A (2020) who reported that fear was the key barrier for availing oral care.<sup>[10]</sup> Poor accessibility or distance to the dental care facility was reported as a barrier. This was similar to the study done by Fotedar S (2020) who reported that lack of time was reported as a barrier for not visiting a dentist.<sup>[13]</sup>

The present study reported that 43.3% of the study population reported that opinion on their oral status is below average. 73.3% of the study population neglected to improve their oral health. The reason may be lack of awareness about importance of oral health among the study population due to lower education qualification. Positive health seeking behaviour was seen in 39.2% males and 43.3% females. Positive health seeking behaviour was observed in 245 (41.7%) participants.

### Study limitation

The diagnosis of premalignant lesions of present study was not confirmed by taking biopsy.

### Conclusion

This study concluded that prevalence of oral precancerous lesion is relatively low. Oral healthcare seeking behaviour is poor. Future recommendations may throw more light in this field to gain a more detailed understanding of oral health problems of Irular tribes of Pondicherry.

**Table 4: Oral healthcare seeking behaviour**

| No. | Questions   | Response                          | n (%)       | Male        | Female      | Chi-square | P      |
|-----|---|-----------------------------------|-------------|-------------|-------------|------------|--------|
| 1.  | Have you experience any dental problem?               | Yes                               | 342 (58.3%) | 138 (60.8%) | 204 (56.7%) | 0.975      | 0.323  |
|     |   | No                                | 245 (41.7%) | 89 (39.2%)  | 156 (43.3%) |            |        |
| 2.1 | Have you visited dentist before?                      | Yes                               | 243 (41.4%) | 101 (44.5%) | 142 (39.4%) | 1.463      | 0.226  |
|     |   | No                                | 344 (58.6%) | 126 (55.5%) | 218 (60.6%) |            |        |
| 2.2 | Frequency of visiting dental clinic in a year         | Once                              | 152 (25.9%) | 69 (30.4%)  | 83 (23.1%)  | 5.329      | 0.149  |
|     |   | Twice                             | 56 (10.1%)  | 23 (10.1%)  | 33 (9.2%)   |            |        |
|     |   | When Needed                       | 35 (6.1%)   | 10 (4.4%)   | 25 (6.9%)   |            |        |
| 3.  | Have you visited dentist to treat dental problem?     | Yes                               | 238 (40.5%) | 98 (43.2)   | 140 (38.9%) | 1.059      | 0.303  |
|     |   | No                                | 349 (59.5%) | 129 (56.8%) | 220 (61.1%) |            |        |
| 4.  | Have you visited paramedical for dental problems?     | Yes                               | 209 (35.6%) | 83 (36.6%)  | 126 (35.0%) | 0.149      | 0.700  |
|     |   | No                                | 378 (64.4%) | 144 (63.4%) | 234 (65.0%) |            |        |
| 5.  | Have you took self-medication for dental problems?    | Yes                               | 199 (33.9%) | 96 (42.3%)  | 103 (28.6%) | 11.626     | 0.001* |
|     |   | No                                | 388 (66.1%) | 131 (57.7%) | 257 (71.4%) |            |        |
| 6.  | Where have you preferred place of treatment?          | Government Hospital (Dental Wing) | 465 (79.2%) | 181 (79.7%) | 284 (78.9%) | 0.115      | 0.944  |
|     |   | Private Dental Clinic             | 89 (15.2%)  | 33 (14.5%)  | 56 (15.6%)  |            |        |
|     |   | Private Dental Colleges           | 33 (5.6%)   | 13 (5.7%)   | 20 (5.6%)   |            |        |
| 7.  | What is the reason for preferring particular centre/s | Others Advice                     | 47 (8.0%)   | 12 (5.3%)   | 35 (9.7%)   | 7.791      | 0.051  |
|     |   | Accessibility                     | 158 (26.9%) | 70 (30.8%)  | 88 (24.4%)  |            |        |
|     |   | Less Expenditure                  | 312 (53.2%) | 113 (49.8%) | 199 (55.3%) |            |        |
|     |   | Quality Treatment                 | 70 (11.9%)  | 32 (14.1%)  | 38 (10.6%)  |            |        |
| 8.  | What were you got treated for                         | Painful Tooth                     | 544 (92.7%) | 209 (92.1%) | 335 (93.1%) | 13.541     | 0.004  |
|     |   | Mobile Tooth                      | 21 (3.6%)   | 3 (1.3%)    | 18 (5.0%)   |            |        |
|     |   | Decayed Tooth                     | 17 (2.9%)   | 12 (5.3%)   | 5 (1.4%)    |            |        |
|     |   | Cleaning the tooth                | 5 (0.9%)    | 3 (1.3%)    | 2 (0.6%)    |            |        |
|     |   | Bleeding Gums                     | 0 (0.0%)    | 0 (0.0%)    | 0 (0.0%)    |            |        |
|     |   | Bad Breadth                       | 0 (0.0%)    | 0 (0.0%)    | 0 (0.0%)    |            |        |
| 9.  | What was the barrier for not undergoing treatment?    | Fear                              | 230 (39.2%) | 73 (32.2%)  | 157 (43.6%) | 12.893     | 0.024  |
|     |   | Cost Expensive                    | 288 (49.1%) | 121 (53.3%) | 167 (46.4%) |            |        |
|     |   | Distance                          | 26 (4.4%)   | 12 (5.3%)   | 14 (3.9%)   |            |        |
|     |   | No time                           | 26 (4.4%)   | 15 (6.6%)   | 11 (3.1%)   |            |        |
|     |   | Previous Bad Experience           | 7 (1.2%)    | 1 (0.4%)    | 6 (1.7%)    |            |        |
|     |   | Dentist Attitude                  | 10 (1.7%)   | 5 (2.2%)    | 5 (2.2%)    |            |        |
| 10. | Opinion on your state of oral cavity                  | More than average                 | 97 (16.5%)  | 30 (13.2%)  | 67 (18.6%)  | 8.881      | 0.031  |
|     |   | Average                           | 228 (38.8%) | 83 (36.6%)  | 145 (40.3%) |            |        |
|     |   | Below Average                     | 254 (43.3%) | 113 (49.8%) | 141 (39.2%) |            |        |
|     |   | No Opinion                        | 8 (1.4%)    | 1 (0.4)     | 1 (1.9%)    |            |        |
| 11. | Need to improve your oral health                      | Yes                               | 157 (26.7%) | 63 (27.8%)  | 94 (26.1%)  | 0.192      | 0.662  |
|     |   | No                                | 430 (73.3%) | 164 (72.2%) | 266 (73.9%) |            |        |

\*P=0.001 (significant)

## Acknowledgement

The authors acknowledge the encouragement and guidance received from Prof. Dr. S. Senthilnathan, MDS - Principal, Sri Venkateshwaraa Dental College, Puducherry. Authors acknowledge Dr. Varsha Murthy, MDS - Professor and Head of the Department, Department of Prosthodontics, Sri Venkateshwaraa Dental College, Puducherry, for constant support throughout the research. Authors acknowledge Dr. Karuna Jyothi., MDS - Reader, Department of Oral and Maxillofacial Surgery, Sri Venkateshwaraa Dental College, Puducherry, for getting the Irular population statistics from Adi Dravidar welfare and Scheduled Tribes Welfare Department, Pondicherry. We like to thank Mr. Govindaraj., MD - Professor and Head of the Department and Mr. Muthuraman - Technician, Department of Pathology, Sri Venkateshwaraa Medical College and Research Centre who helped for preparation of 1% TB

solution. Authors acknowledge Dr. Arun Varghese, MDS, Dr. J. Sundar, MBA, PhD (NGO) - Global trust, Cuddalore, Ln. Er. Suresh (NGO) Lions Club of Pondicherry Central for supporting to reach the Irular people.

## Financial support and sponsorship

Indian Council of Medical Research (ICMR) - Short Term Studentship (STS) - 2022. Reference ID: 2022-09933.

## Conflicts of interest

There are no conflicts of interest.

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