Prevalance of Oral Disease in A Tribal Village At the Siruvani Foothills, Coimbatore - A Pilot Study

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ABSTRACT:- **Dental caries or dental decay is an international physical challenge, especially amongst young children and unaware adults due to their daily diet consumption. This work is focused on a tribal group living at the foothills of Siruvani area (Singampathy, Tribal village, Tamil Nadu, India). Every family indulged their 80% earnings on Alcohol, Betel Chewing, Tobacco or other native drugs which expresses reduced health conditions. Samples were collected and preliminary microbiological tests were conducted. The resultant colony morphology obtained after processing was evidential of a plethora of bacterial colonies, possibly normal microflora and certainly the etiology (Mutans Streptococci). The significant finding was that in addition to Dental disease the unawareness of proper oral hygiene was suggestive of initial stages of Oral leukoplakia. A correlation with the association of childhood feeding practices and daily living, diet and habits have encouraged us to emulate many such studies in the above said tribal areas.**

Key words: Dental caries, Mutans streptococci, Diet, Habits, Tribal

1. INTRODUCTION:

The mouth is an important organ with different functions. It is also prone to a variety of medical and dental disorders.

1.1 Motivation and Background:

Malnutrition is widespread as a chief result of dietary inadequacy and unhealthy life styles. Population living in drought prone rural areas, urban slums, and those belonging to the socially backward groups like scheduled castes and tribal communities are highly susceptible to nutrition[1]. Landless labourers are also at high risk .Tribal population in India is 84.51million, in Tamil Nadu – 551143 comprising of Scheduled Caste and Schedule Tribe in rural areas and 9544 in urban areas. In Coimbatore district 19559 in rural area and 9544 in urban area .Oral disease burden among the tribal people in Siruvani area, Coimbatore[2].

1.2 Dental Caries as a Disease

Dental caries also known as tooth decay is a bacterial infection that causes demineralization and destruction of hard tissue. The bacteria most responsible for dental caries are the *Mutans streptococci*, most prominently *Streptococcus mutans*. If untreated the disease can lead to pain, tooth loose and infection (Fig 1).

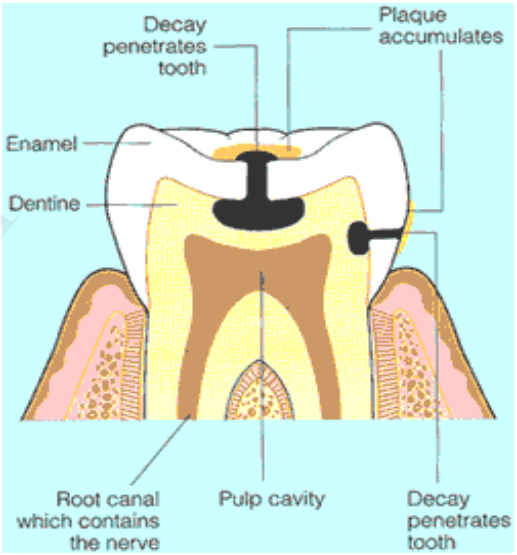

Figure 1 A cross section of a tooth showing how the enamel is eroded as decay penetrates.

In 1996, 39% of Australian 6yr old children had dental caries and since that time caries experience in Australian children in all states and territories has increased[3, 4, 6]. Hospitalization rates for the removal or restoration of decayed teeth among New South Wales children less than 5yrs from 1989-2007 has increased by 90%. As a consequence the need for general anesthesia (GA) the waiting list are long and the cost per case in Australia is AU$ 2011[8]. In the year 2006-2007,1720 children aged between 0-4 yr received dental treatment under GA at a cost of approximately 3.5 million Australian dollars .These data highlight the fact that dental caries is the most costly diet related chronic disease ahead of coronary heart disease, obesity, hypertension and diabetes[4, 8]. The 2002 child dental health survey of Australia reported that 45% of 5 yr olds had one or more decayed or missing teeth and 10% of those children examined where found to have more than seven decayed teeth. Data from United States of

America tells a similar story; from 1988-1994 and 1999-2002, there was no change in the prevalence of dental caries among children aged 2-11 year.

In this study we concentrate on 70 families of a particular tribal village, people living adjacent to the Siruvani hills. These peoples were checked for their dental disorders, unbalanced diet and drug consumption. They had decayed teeth and simple microbiological isolation was done using their saliva sample collected aseptically and a screening was done observing heavy colonization.

2. MATERIALS AND METHODS:

2.1. Sampling Design:

The present study is concentrated mainly on the socially disadvantaged group of people living next to Siruvani hills, Coimbatore. Dietary survey on these people has been done on total recall method. The samples have been collected from these people for further analysis.

2.2. Processing of Samples:

The samples were processed within 12 hours of collection and inoculated into Todd-Hewitt broth tubes and incubated under anaerobic condition (10% H2, 10% CO2 and 80% N2, Anaero Packs, Hi Media, Mumbai) for 48-72hrs at 37ºC[10, 11, 12]

2.3. Media:

Saliva samples contain a lot of microorganisms, which should be introduced into the prepared peptone broth. This broth contains, Peptone – 5g/l, Meat extract – 1g/l, Yeast extract – 2g/l, and Sodium chloride (NaCl) – 5g/l. All the above chemicals were bought from Hi Media Pvt. Ltd., Mumbai. They were taken in required amount and dissolved in distilled water. It is then suspended into test tubes and cotton plugged. Sterilization of the broth is done. The broth is sterilized at 121˚C, 15psi. Thus the broth can be prepared and stored in refrigerator for a long time after sterilization.

2.4. Culture conditions:

According to the number of samples, the peptone broth is calculated and prepared. The saliva samples were aseptically transferred into broth, that is a loop full of sample is taken and suspended into the test tube containing peptone broth. Then the sample inoculated broth is kept for incubation @ 37˚C for a period of 24 hours. The next day it was observed for turbidity, indicating bacterial growth. Saline solution is used for serial dilution of the culture. Serial dilution is done so that the number of colonies formed can be counted. Else the colonies formed will be too numerous to count. Therefore serial dilution helps in counting of the colonies formed.

2.5. Nutrient Agar

Nutrient agar is a microbiological growth medium commonly used for cultivation of non-fastidious bacteria. It is useful because it remains solid even at high temperature. Bacteria is grown on the surface and is clearly visible as small colonies. NA contains, Peptone – 5g/l, Beef extract – 3g/l, Agar – 17g/l, Sodium chloride – 5g/l, and pH is adjusted to 7. The above prepared agar solution is sterilized. The sterilized agar solution is cooled till 45-50˚C. Suspended in sterile petri plates and kept for solidification. All these steps are carried out in aseptic condition. The plates are then stored (refrigerated) for further plating[15].

The culture that is formed after 24 hours of incubation, is serial diluted in saline. 10 test tubes containing 9ml saline, is taken. 0.1ml culture is transferred aseptically into the first test tube containing 9ml of saline, becomes 10ml and is mixed well. And later 1ml from this 10ml saline containing culture is transferred in other test tube and so on. The concentrations are like 10^{-1}, 10^{-2}, and so on to 10^{-715}.

2.6. Spread Plating

The serially diluted culture is now spread in the agar plated petri plates. 1ml of each concentrations are spread plated using L- rod. 1ml of culture is taken in micropipette and put in the middle of petri plate containing agar. It is then spread with L shaped rod. This step is replicated for standardization of dilution concentration. Culture, spread plates are now kept for incubation (37˚C) for 24 hours

2.7. Colonization:

After 24 hours of incubation plates are checked for colonies formed. According to the concentrations the numbers vary in all the plates. CFU analysis is done after colonization for each single sample.

3. RESULTS AND DISCUSSION:

The relevance of the present pioneering study makes it possible to help recognize vulnerable individuals. The lifestyles of bountiful enjoyed by developed countries and the livelihood of paucity not much enjoyed by developing or underdeveloped countries throws the disease into complete uncertainty of a decent and proper research for preventive recommendations whatsoever. The lifestyle is a normal one but with unawareness and simplicity. This is one example, which cries out loud but no one is there is hear. Dental caries was the disease in question but because of leaving it unattended. Sometimes consequences are very brutal like shown here (Fig 2).

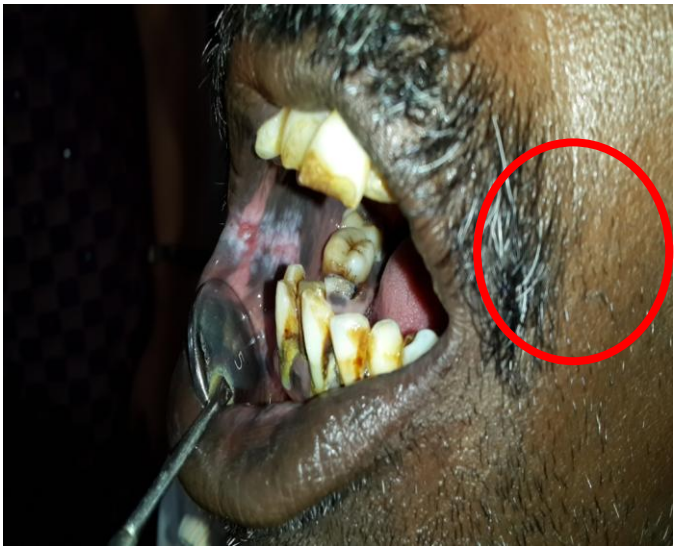

Figure 2 A file photo of a Villager having Dental Caries and initial stages of Leukoplakia.

3.1.Observation and Colonization:

After 24 hours of incubation, growth of microbes was observed in the plates. These organisms that are found in the plates were identified as *Streptococcus mutans* by performing presumptive biochemical test. Phylogenetic identification was not done due to time constraints. The colonies were measured in CFU/ml[12, 15, 16, 17, 18]. The number of organisms in the dilution 10^4 is noteworthy and significant (Fig 3, Table 1).

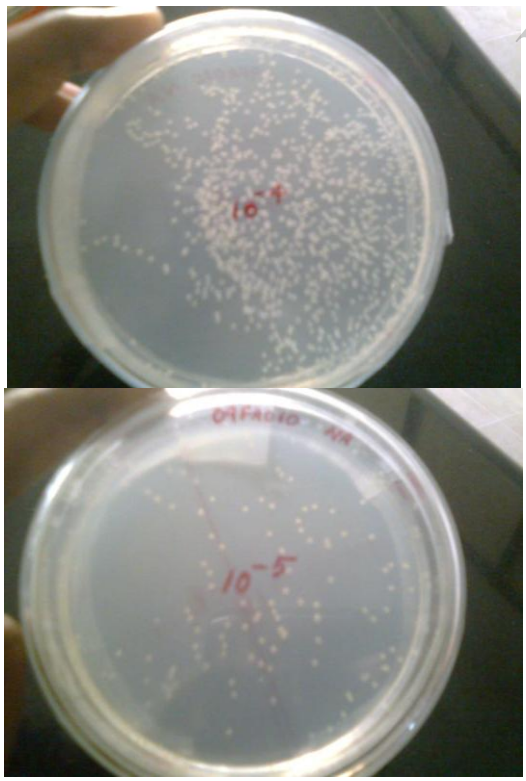

Figure 3 Plates showing significant growth on dilutions 10^{-4} and 10^{-5}

Table 1 Enumeration of viable cells in all the samples collected.

S. NO	DILUTION	COLONY COUNT				CFU/ml
		Sample 01	Sample 02	Sample 03	Sample 04	
1	10^{-2}	TNTC	-	-	-	
2	10^{-3}	TNTC	-	-	-	
3	10^{-4}	98	TNTC	154	108	$154\times10_4$
4	10^{-5}	87	101	88	95	$101\times10_5$
5	10^{-6}	57	8	-	-	8×10^6

This study will help in providing evidence of association of early childhood feeding practices not only in children, but also in elders, due to their dietary habits. The group of people that were sampled seemed to have an inappropriate diet consisting of cheap hard sugar candies and a daily diet devoid of nutritious food. These tribal residing in the areas next to Siruvani seemed to be consuming drugs, tobacco, beetle on a daily basis completely unaware of its consequences.

In this study mostly every individual in the village, at least one in each family seemed to have decayed teeth. The demonstration of bacterial specificity in dental decay is difficult given the complexity and variability of the plaque flora and the fact that the putative etiologic agents, *Mutans Streptococci* (MS) and *Lactobacillus* sp. (LB), appear to be present on all dentitions. In this study evidence shows that MS, which in most instances would be *Streptococcus mutans* and *Streptococcus sobrinus.* The physiologic characteristics of these organisms which might be determinants of their cariogenicity will be examined from the vantage point of identifying strategies for the prevention or control of dental decay in further studies by this research group[17]. The results obtained from the biochemical tests concluded that growth of the principle etiology *Streptococcus mutans* possibly defines the gravity of the situation and diseased conditions of the tribal which may be due to the poor nourishment and unavailability of balanced diet these people seemed to have dental disorder.

4. CONCLUSION:

This study a record high percentage of people seemed to have dental caries. Thus people of this area were prone to this dental disorder due to their dietary system and so it is suggested they have regular checkup and keep themselves disease free. The significant finding though was the incidence of Leukoplakia to an unaware villager. Poor nourishment or malnutrition and unavailability of balanced diet were certainly reasons for these disorders among the villagers. Therefore, the villagers were informed and cautioned about their condition and requested them to seek help as soon as possible.

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