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#### Periodontal Health Status of Fishermen of Coastal Odisha, India

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Conflicts of Interest: Nil

#### Abstract

Background: There is a constant strive among epidemiologists to gather data regarding oral health of community on basis of which the various programs related to oral health promotion or preventive programs can be planned and executed effectively. Fishermen form one such community with distinct features. A data have not been recorded previously among Fishermen of coastal districts of Odisha; so this data was gathered for comparing prevalence of periodontal disorders in them with other fishermen as well as general population of India as well as other countries.

Aim & Objectives: To assess the periodontal health status and its co-relation various lifestyle habits among fishermen of coastal Odisha.

**Materials and Method:** A multistage cluster sampling technique was used to conduct the survey in six coastal districts of Odisha. A sample size of 821 was considered

for the study. Prior to the clinical examination demographic data was collected using pre-designed Proforma. A Type III clinical examination was carried out to record Community Periodontal Index (CPI) and Loss of Attachment (LOA) for all the subjects by a single examiner using modified WHO Oral Health Assessment Form 1997. Chi saquare test was used to compare the proportion and mean values were compared using Student t-test. ANOVA, Kruskal-Wallis ANOVA and Mann Whitney U- test were used for the group comparison and statistical analysis was done using SPSS version 19.0.

**Results:** The study population had very low socioeconomic status, low literacy rate, poor oral hygiene habits and very high prevalence of deleterious habits.

The periodontal status as assessed using the Community Periodontal Index and measurement of Loss of Attachment showed that 100% of the study subjects were suffering from one or the other form of periodontal

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disease. 90.26% of the study participants were consuming either smoke or smokeless form of tobacco. Alcoholism was also seen in 78.81% of study subjects.

**Conclusion:** The periodontal health status of fishermen of Odisha was very poor. The study concluded that there is a constant need to improve the periodontall health of fishermen community of Odisha. Oral health education and awareness programmes about the ill effects of the deleterious habits which persist in this community had to be planned and implemented.

Keywords: Oral health, fishermen, deleterious habits.

#### Introduction

Fishing community of India belongs to poor socioeconomic class, residing in defined geographic area along the coastline. It is said that fisher folk use tobacco products to avoid seasickness and to stay awake during the night while working out in sea and have the habit of consuming alcohol after a day's long hard work. Most of the people in this community have only minimal education, low income and are unaware of the effect of risk factors like tobacco and alcohol abuse on health.

Health is a fundamental human right and is the essence of productive life. Health implies the relative absence of pain and discomfort and a continuous adaptation and adjustment to the environment to ensure optimal function.<sup>1</sup>Health is multi-factorial, the factors which influence health lie both within the individual and externally in the society in which he or she lives.<sup>2</sup>

The marine fisheries sector in Orissa is perhaps unmatched elsewhere in India in term of its diversity. The great heterogeneity of livelihood systems in the sector is a result of the differences in geographical and linguistic origin of the people, the nature of the habitations and work environment, and social and cultural factors (such as integration into mainstream society and gender roles).<sup>3</sup> Unfortunately, this complexity means that many facets of the lives and livelihoods of fishers are largely unexplored or underexplored, and it remains a challenge to develop a full picture of the sector and the players within it. These groups, representing linguistic, geographic or occupational minorities, are also often the poorest and the most invisible in the sector. The need to be located close to the sea often makes fishers isolated which is coupled with the poor and inadequate transport services to such areas. The lack of access to and availability of productive assets makes fishers poor, their poverty is reflected in their quality of life – housing and sanitation, clean drinking water and access to services.<sup>3</sup>

A key characteristic of fishing communities in Orissa is the widespread prevalence of disease. Fishers attribute their poor health to the unsafe, unhealthy and unhygienic working and living environment at sea, the landing and processing centres and their homes, as well as to poor access to health care facilities and basic necessities such as clean drinking water.<sup>3</sup>

Oral health is a vital part of general health and is a valuable asset of every individual. Oral health status has a direct impact on general health and conversely general health also influences oral health. Though oral and dental diseases are rarely life threatening, but they do have an impact on the quality of life<sup>4</sup>.

Odisha was chosen as the state of interest because very few data is available about the oral health status of the general population of this state as a whole and no data in particular of the fishing community. Marine fishing in Odisha is almost entirely is carried out by men, while women's role is confined largely to post harvest or other shore based activities. Hence this study was undertaken on male fishermen of Odisha to assess their periodontal health status and associated risk factors. It will also

provide a baseline data for planning oral health programmes for fishermen of Odisha.

With this contextual support current study was carried out with an aim to assess the periodontal health status of fishermen of coastal Odisha. A data regarding the risk factors like tobacco chewing, smoking and alcohol consumption and their effect on the periodontal status of fisher folk communities of coastal Odisha will also be assessed.

#### Materials & Methodology:

A community based cross-sectional survey was conducted from September to November 2013. The study population constituted full time marine male fishermen of coastal Odisha. For estimating the sample size, the minimum expected prevalence of dental disease was considered as 73%. This was based on results obtained during the pilot study conducted in study area. The sample size was estimated to obtain for 99% confidence level was 821 subjects.

Ethical clearance for the study was granted by Institutional Ethical Committee. Written consent was also obtained from the heads "*mukhias*" of all the surveyed villages and informed consent was obtained from the subject. Inclusion criteria for subjects included - Fishermen in the age group of 18 to 55 years, Fishermen residing in the coastal villages of Odisha since 10 years, Fishermen fulltime actively involved in fishing since 5 years and Fishermen present on the day of examination. Exclusion criteria included- Fishermen who are physically challenged/medically compromised.

All the 6 coastal districts of Odisha were taken in to consideration for the purpose of the study. Multistage cluster sampling was done for the collection of samples; where the villages form the natural clusters. Taking into consideration the feasibility of data collection it was decided to collect samples from 20 randomly selected villages from 641 maritime villages. Number of villages from each district was based on probability- proportional to enrolment size of villages in each district. Number of samples to be collected from each district is also based on probability- proportional to enrolment size of population in each district.

A self-designed questionnaire was made to record the data pertaining to the study. It had six sections - *demographic details, oral hygiene practices, dietary habits, deleterious habits, details of dental visits & presence of systemic diseases and to* assess the periodontal health status, a modified Oral Health Assessment Form, WHO (1997)<sup>5</sup> was used to collect the information regarding oral health status and treatment needs of the fishermen.

The proforma was scrutinized for its feasibility and validity by conducting a pilot study involving 10% of calculated sample size. After taking feedback from the respondents, few modifications in the questionnaire in terms of rephrasing, certain additions and deletions were made before finalizing it to improve its sense, clarity and flow.

The clinical examination of every fishermen was carried out by a single investigator himself. Before the start of the survey, the examiner was trained and calibrated at the department of Public Health dentistry, Kothiwal Dental College and Research Centre under the guidance of professor (gold standard) in order to limit the intra examiner variability. A sample of 50 subjects was selected who possessed collectively the full range of conditions expected to be assessed in the survey. Kappa coefficient value for inter- examiner reliability ranged from 0.77-0.85 and for intra examiner reliability Kappa coefficient value ranged from 0.82-0.92 with respect to different variables of WHO oral health Proforma .

After obtaining the informed consent; information regarding socio-demographic details, socio-economic

status (SES)[ accordance to "Prasad's Classification"]<sup>6-10</sup>, oral hygiene practices, dietary habits, deleterious habits, dental visits and systemic health conditions were recorded in the pre-designed & pre-tested questionnaire by the trained recording clerk. A Type III clinical examination was carried out throughout the survey. The subjects were made to sit comfortably on a chair with back rest and the oral cavity was examined under natural lighting condition. Clinical examination of the study subjects included recording of Periodontal status [Loss of Attachment (LOA) and Community Periodontal Index (CPI)], using plain mouth mirror and CPI probe based on WHO standard criteria(1997)<sup>5</sup>.

Portable equipment was used to ensure ease of transportation to the examination sites. An adequate infection control was maintained throughout the survey. The cold sterilization procedure was carried out in the survey with glutaraldehyde (15%) solution by immersing the instruments for about 20-30 min. The examinations were conducted in selected areas which were having adequate illumination and had minimum of noise disturbances to have proper examination and recording. The digital manipulation of the oral tissues was avoided where it was found unnecessary to reduce the risk of cross infection.

IBM SPSS. Statistics Windows, Version 20.0. (Armonk, NY: IBM Corp) was used for the descriptive as well as inferential statistical analysis. The statistical significance was determined by Kruskal Wallis ANOVA, Mann-Whitney U test, and level of significance was set at P < 005. Multiple regression analysis was also done to find out association of LOA and CPI with the socio-demographic factors recorded.

#### **Discussion:**

The periodontal status was assessed using the Community Periodontal Index and measurement of Loss of

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Attachment. The prevalence of periodontal diseases among study subjects overall was 100% that means all of the study population were suffering from one the other form of periodontal disease. This was in agreement to the results of National Oral Health Survey & Fluoride Mapping<sup>11</sup> for Odisha adult population age group 35-44 years but was higher than the national prevalence of 89.2% as reported in the same study. Our results were also higher than the results of former studies done on fishermen of other states of India like that of Kutch, Gujrat (85.4%)<sup>12</sup>, Tamil Nadu (93.1%)<sup>13</sup> and Kerala (86.8%)<sup>14</sup>.

Similar to study by Asawa K et al.<sup>12</sup> the findings of our study showed Code 3 (pocket 4-5mm) to be most prevalent for periodontal status. It is in contrast with results of studies done by Saravanan N et al. in Kerala<sup>14</sup> and Tamil Nadu<sup>13</sup> who found Code 2 (calculus) as the most prevalent finding. Most of the study population belongs to Code 3 (41.09%) and Code 4 (35.08%). This very poor periodontal status can be because of their poor educational background and low socio-economic status along with exposure to certain risk factors such as smoking, chewing tobacco and use of indigenous oral hygiene methods for cleaning teeth which are more prevalent in rural population. Also lack of oral hygiene awareness among the rural population must have contributed to the increased risk of periodontal disease among them $^{15}$ .

The present study showed that a significantly higher proportion of fishermen population had maximum LOA score 0 (60.54%), score 1 was seen in 21.56%, score 2 in 13.52% and in rest 4.38% it was not recorded in edentulous patients. A study done by Saravanan N et al.<sup>13</sup> showed comparable results of 64.3% for score 0 and 24.6% for score 1. Another study by Saravanan N et al.<sup>14</sup> had reported higher proportion of subjects with code 0 and

rest other codes were fewer. A different trend was seen in study done by Asawa K et al.<sup>12</sup> where only 19.5% of fishermen had score 0 for LOA.

The mean CPI score for the study population increased with age similar the trend as noticed in National Oral Health Survey & Fluoride Mapping<sup>11</sup>. It was also in accordance with studies done by Bhat M et al<sup>16</sup> and Singh et al.<sup>17</sup> as they also reported that the percentage of periodontal disease increased with increasing age in population. The explanation for this particular finding can be that there is greater inflammatory response in older subjects, greater size of infiltrated connective tissue and increased gingival crevicular fluid flow <sup>18</sup>. However the current view sees that greater periodontal destruction in elderly as reflecting lifetime disease accumulation rather than an age-specific condition <sup>19</sup>. Cumulative exposures might include chronic mechanical trauma from tooth brushing or iatrogenic damage from unfavorable restorative dentistry or repeated scaling and root planning 18

Individuals at the higher socioeconomic class are generally believed to have better periodontal health and this is in consonance with the general belief that people in upper socio-economic classes have healthier behaviour and lifestyles than do people in lower classes<sup>20</sup>. This has been adduced to the better oral health awareness brought about by literacy level of the individuals. Our findings in the present study contradict this popular belief as here it was seen that mean CPI score increases with increase in socioeconomic status. In fishermen society, oral health awareness is generally poor and should not be assumed to correlate with general literacy or socioeconomic status. One explanation for this trend can be credited to the fact with increase in socioeconomic status exploitation towards deleterious habits and sedentary lifestyle increase which have a direct effect on oral health or indirectly by increase in systemic disease incidences.

Mean CPI in the present study increases with presence of systemic disease which can be reasoned to the fact that systemic factors modify periodontitis principally through their effects on the normal immune and inflammatory defences. Good examples of systemic factors are a reduction in number or function of polymorphonuclear leucocytes (PMNs), which results in an increased rate, and severity of periodontal destruction. Thus the possible role of systemic diseases in initiating or modifying the progress of periodontal disease is clearly complex <sup>21</sup>.

In the present study the mean CPI score was statistically higher in those using datum and charcoal to clean their teeth contrasting the findings of Bhat PK et al.<sup>22</sup> who had reported better periodontal health in stick users than toothbrush users in their study on Iruliga tribal community residing at Ramanagar district, Karnataka, India. The possible explanation for this is the fibers of the datum and the aggressiveness of the method employed to clean teeth may have negative impact on gingiva and other periodontal tissues.

Contrast to previous study<sup>23</sup>, which states that vegetarians had good periodontal health our study population showed better periodontal health in non-vegetarians. Evidence from various animal models and clinical studies has reported that omega-3 fatty acids have a beneficial effect in inflammatory diseases<sup>24</sup>.Omega -3 is a polyunsaturated fatty acid known to lessen the severity and minimize symptoms of chronic inflammatory diseases<sup>25</sup> like periodontitis. Being fishermen, fish is the main nonvegetarian item consumed by our study participants. A Japanese longitudinal study has reported that fish oil which has an anti-inflammatory action may benefit periodontal health. According to this study fish intake was positively associated with intake of polyunsaturated fatty

acids and therefore intake of fish may contribute in protecting against periodontal disease progression <sup>26</sup>. In this study mean CPI score was least for those without any deleterious habit followed by smokers and tobacco chewers. Highest score was recorded for those who had both form of tobacco. With increase in duration of smoking, Chewing tobacco and consuming alcohol mean CPI score had increased. These findings are in accordance with previous literature <sup>27, 28</sup>.

The reason for such finding can be due to nicotine which leads to increase in secretion of prostaglandin E2 via upregulation of lipopolysaccharide mediated pathways. More over smokers also tend to have a poorer oral hygiene status than non-smokers. Smoking also reduces antibodies in saliva and leads to xerostomia which can cause many oral health problems. The vasoconstrictive effect of nicotine causes a reduction in gingival blood flow, which translates into a weakening of defenses of gingiva. Smoking also depresses level of circulating antibodies, of chemotactic and phagocytic activities oral polymorphonucleocytes<sup>27</sup>.

The current study showed that the mean CPI was higher in tobacco users than the tobacco non users. Similar results were seen in study done by Parmar et al<sup>29</sup>, the occurrence of periodontal pockets, gingival lesions and gum recession, were significantly higher in quid-chewers than in non-chewers. A review did by Jacob et al<sup>30</sup> have a citation of study done by Doifode et al that reported significant association between tobacco chewing and periodontal disease. Another review done by Agarwal et al<sup>31</sup> had cited a study done by Sumanth et al who reported that deep pockets were more in pan chewers with tobacco than in pan chewers without tobacco, approximately four times more.



Relation between smoking and periodontal disease<sup>32</sup> It was seen that alcoholic subjects were more affected by periodontal disease than non-alcoholic subjects. A study done by Krustrup et al<sup>33</sup> shows similar results, it has been cited that there is a positive association between excessive alcohol intake and periodontitis. A study done by Reddy et al<sup>98</sup> reported that maximum gingival bleeding scores were observed in alcoholic group and the least in tobacco smoking group among the various groups of substance users. Alcohol has toxic effect on the liver and as a result the prothrombin production, vitamin K activity, and clotting mechanism may be disrupted. Haemorrhage may occur and this may lead to exaggerated gingival response and bleeding with slightest provocation in alcoholics <sup>34</sup>.

In a multiple logistic regression model oral hygiene practices, frequency of chewing tobacco, frequency of smoking and duration of smoking are independent positive risk factors for the dependent variable CPI score. Negative independent risk factors are oral hygiene aids, frequency of sweet consumption and form of tobacco consumption.

This shows that these factors are significantly associated with periodontal diseases.

In a study done on fishermen of Gujrat; <sup>12</sup> the predictors for periodontal disease as identified by the stepwise linear regression were: occupation, educational status, oral hygiene practices and gender. Occupation was found to be the best predictor for periodontal diseases, which may be attributed to the fact that majority of fishermen had low educational status, poor oral hygiene practices and increased tobacco consumption. A study done by Sakki et al.<sup>35</sup> showed that while performing stepwise logistic regression analysis with occurrence of periodontal pockets deeper than 3mm as dependent variable, most significant variables were dietary habits, alcoholic consumption, tobacco smoking and tooth brushing frequency. A study done by Krustrup et al.33 showed that while performing multivariate linear regression analysis of dependent variable percentage of teeth with certain periodontal condition showed that age, education and dental visit habits were significantly related. A study done by Brodeur et al.<sup>36</sup> reported that while performing logistic regression model for predilection of people with at least one pocket  $\geq$ 6 mm according to various characteristics, after controlling the confounding factors, only sex and family income were associated with periodontal problem.

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Table 1: Comparison of LOA and CPI according to different age groups, socio economic status, dental visits & presence of systemic diseases.

_				Los	s of Attachmen	t	СРІ				
Factors	Number	Percentage (%)	Mean	SD	Statistics	p-value	Mean	SD	Statistics	p-value	
Age groups											
18-27yrs	216	26.31	0.07	0.38			2.7	0.5			
28-37yrs	185	22.53	0.13	0.34	395.4156@	0.00001*	3.0	0.5	333.8518@	0.00001*	
38-47yrs	214	26.07	0.59	0.75			3.2	0.8			
48+yrs	206	25.09	1.34	0.57			3.9	0.3			
SES		L	1		L		1	1	L	1	
SES 3	73	8.89	1.51	0.85			3.8	0.4			
SES 4	572	69.67	0.53	0.71	35.91222@	0.00001*	3.2	0.8	40.9531@	0.00001*	
SES 5	176	21.44	0.23	0.52			3.0	0.6			
Dental vis	it	I	1	1	L	I			L	I	
Never	467	56.88	0.37	0.61	5 10 001 //	0.00001.#	3.1	0.7			
When required	354	43.12	0.72	0.83	-5.12691#	0.00001*	3.3	0.7	5.12851#	0.00001*	
Presence of systemic disease											
Yes	315	38.37	0.93	0.75	-11.2138#	0.00001*	3.7	0.5	-13.6551#	0.00001*	
No	506	61.63	0.27	0.60			2.9	0.7			
Total	821	100.0	0.51	0.73			3.2	0.7			

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@ applied Kruskal Wallis ANOVA, # applied Mann-Whitney U test, \*p<0.05

### Table 2: Comparison of LOA and CPI according to different types of oral hygiene factors and dietary factors.

Factors	Number	Percentage		СРІ							
Tactors	Nullider	(%)	Mean	SD	Statistics	P value	Mean	SD	Statistics	P value	
Oral hygiene pra	ctices	I						I	1		
Brush	409	49.82	0.38	0.69		0.00001*	3.0	0.7	57.3777@	0.000 01*	
Finger	25	3.05	0.64	0.49	36.6530@		3.3	1.0			
Dantun	387	47.14	0.65	0.76	-		3.4	0.6			
Oral hygiene aids	S	I						I	I		
Toothpaste	224	27.28	0.29	0.53			3.0	0.7			
Tooth powder	259	31.55	0.67	0.88	26.5345@	0.0001*	3.1	0.8	21.5674@	0.000 1*	
Charcoal	129	15.71	0.43	0.50	20.5545@	0.0001	3.4	0.6			
Nothing	209	25.46	0.62	0.80	-		3.3	0.7			
Frequency of clea	Frequency of cleaning teeth										
Once	764	93.06	0.91	0.67			3.1	0.8	62.1446@	0.000 01*	
Twice	24	2.92	0.47	0.73	49.7805#	0.00001*	3.0	0.8			
Sometimes	33	4.02	0.91	0.67	_		3.4	0.6			
Type of diet									<u> </u>		
Vegetarian	88	10.72	0.91	0.67	49.7805#	0.00001*	3.6	0.6	-6.13459#	0.000 001*	
Non vegetarian	733	89.28	0.47	0.73	49.7803π	0.00001	3.1	0.7			
Frequency of com	suming swee	ets									
No	24	2.92	0.67	0.48			3.7	0.5			
Occasionally	500	60.90	0.70	0.79	_		3.4	0.7		0.000	
Weekly once	8	0.97	0.00	0.00	105.8401@	0.00001*	3.0	0.0	110.977@	0.000	
More than once a week	289	35.20	0.19	0.52	-		2.8	0.6			
Total	821	100	0.51	0.73			3.2	0.7			
@ applied Kruska	l Wallis ANC	DVA, # applied N	l /Iann-Whitr	ney U test, * <sub>1</sub>	p<0.05	<u> </u>		1	<u> </u>	1	

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14010 5. 00			CPI						nacti	Loss of Attachment			
Factors	Number	Percentage (%)	Mean SD Statistics p-valu		lue	Mean	SD	Statistics	p-value				
Form of tobacco you consume													
Smokeless	217	26.43	3.1	0.8					0.5	5 (	).79		
Smoke	112	13.64	3.0	0.8	62.1446@		0 0000	)1*	0.43	3 (	).73	27.2557@	0.00001*
Both	412	50.18	3.4	0.6			0.0000	0.5		5 (	).70	21.2337@	0.00001
None	80	9.74	2.7	0.6					0.20	) (	).60		
Frequency of che	wable tobacc	o per day		1									
<5	32	3.90	2.8	0.4					0.0	) (	0.00		
5 to 10	250	30.45	2.9	0.7	193	.6668	0.00001*		0.29	) (	).63	143 4251@	0.00001*
>10	347	42.27	3.6	0.5		@			0.84	4 (	).73	1.01.201.0	-
None	192	23.39	2.9	0.7					0.34	4 (	).69		
Duration of chewing tobacco													
<5 years	96	11.69	2.8	0.4		215.1021 @			0.0	0.00	0.00	206.0734@ (	
5 to 10 years	137	16.69	2.8	0.6	215			)1*	0.13	3 (	).51		0.00001*
>10 years	396	48.23	3.6	0.6				0.8	0.8	5 (	).75		
None	192	23.39	2.9	0.7					0.34	4 (	).69		
Frequency of sm	oking tobacco	) per day		L									
5 to 10	281	34.23	3.0	0.7					0.2	5 (	).55		
>10	243	29.60	3.7	0.5	142	0847 @	0.0000	)001*	0.9	1 (	).73	116.6763@	0.00001*
None	297	36.17	3.0	0.8					0.4	5 (	).76		
Duration of smol	king tobacco												
<5 years	24	2.92	2.7	0.5				0.0	0.0	) (	).00		
5 to 10 years	137	16.69	3.2	0.5	51.	51.4851@		0001 ( * (	0.2	3 (	).42	58.3426@	0.00001*
>10 years	363	44.21	3.4	0.7					0.70	) (	).77		
None	297	36.18	3.0	0.8				F	0.4	5 (	).76		
Total	821	100	3.2	0.7					0.5	1 (	).73		
@ applied Kruskal Wallis ANOVA, # applied Mann-Whitney U test, *p<0.05													

#### able 3: Comparison of LOA and CPI according to different of deleterious habit practices.

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Table 4: Multiple logistic Regression showing association of CPI with age, socio economic status, education, oral hygiene practices, oral hygiene aids, type of diet, frequency of sweet consumption, dental visit, systemic diseases, form of tobacco consumption, frequency of chewing tobacco, duration of chewing tobacco, frequency of smoking & duration of smoking. \*p<0.05

Independent variables	Estimates	SE of estimates	Z-value	P-value	
Constant	3.4325	2.6144	1.3100	0.1890	
Age	-0.2214	0.2622	-0.8400	0.3980	
Socio economic status	-0.1518	0.3410	-0.4500	0.6560	
Education	-0.0063	0.2070	-0.0300	0.9760	
Oral hygiene practices	1.4574	0.4235	3.4400	0.0010*	
Oral hygiene aids	-1.4261	0.3133	-4.5500	0.00001*	
Type of diet	0.1464	0.4313	0.3400	0.7340	
Frequency of sweet consumption	-1.1222	0.2027	-5.5400	0.00001*	
Dental visit	-0.2256	0.1712	-1.3200	0.1880	
Form of tobacco consumption	-0.3318	0.1672	-1.9800	0.0470*	
Frequency of chewing tobacco	0.5084	0.2502	2.0300	0.0420*	
Duration of chewing tobacco	0.0557	0.2858	0.1900	0.8460	
Frequency of smoking	3.9669	0.6750	5.8800	0.00001*	
Duration of smoking	-4.0731	0.6488	-6.2800	0.00001*	

Table 5: Multiple logistic Regression showing association of LOA with age, socio economic status, education, oral hygiene practices, oral hygiene aids, type of diet, frequency of sweet consumption, dental visit, systemic diseases, form of tobacco consumption, frequency of chewing tobacco, duration of chewing tobacco, frequency of smoking & duration of smoking.

Independent variables	Estimates	SE of estimates	Z-value	P-value
Intercept	-6.1102	2.6907	-2.2700	0.0230*
Age	2.7797	0.3280	8.4800	0.00001*
Socio economic status	0.3096	0.3672	0.8400	0.3990
Education	1.4105	0.2257	6.2500	0.00001*
Oral hygiene practices	-2.2138	0.3809	-5.8100	0.00001*
Oral hygiene aids	1.5249	0.3452	4.4200	0.00001*
Type of diet	-0.8180	0.8822	-0.9300	0.3540
Frequency of sweet consumption	-1.4709	0.2653	-5.5400	0.00001*
Dental visit	0.6671	0.1660	4.0200	0.00001*
Form of tobacco consumption	-1.6278	0.2597	-6.2700	0.00001*
Frequency of chewing tobacco	-0.0776	0.4029	-0.1900	0.8470
Duration of chewing tobacco	1.2176	0.4104	2.9700	0.0030*
Frequency of smoking	4.2266	0.5599	7.5500	0.00001*

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\*p<0.05

Figure 1: Demographic profile of study population (Fishermen).



Figure 2: Distribution of study population (Fishermen) according to CPI score.



Figure 3: Distribution of study population (Fishermen) according to Loss of Attachment (LOA).

