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RESEARCH ARTICLE

TOBACCO AND BETEL NUT CHEWING HABITS AMONGST FIJIANS OF INDIAN DESCENT LIVING IN SUVA, FIJI.

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Abstract

Tobacco and betel nut chewing have been associated to causing oral potentially malignant disorders (OPMDs) and increased risk to developing oral squamous cell carcinoma (OSCC).

Objective:i) To determine the prevalence of chewing betel nut and smokeless tobacco amongst Fijians of Indian descent living in Suva, Fiji. ii) To determine the incidence rate of OPMDs in Fijians of Indian descents living in Suva, Fiji.

Methods: This was a cross sectional study, designed to analyze if Fijians of Indian descent are exposed to OSCC risk factors. Firstly, a structured questionnaire was used to interview participants in order to gather information on their chewing habits. Participants included Fijians of Indian descent staying in Suva from the age of 18 and above. Thereafter, an oral examination was carried out for all participants to identify the presence of any OPMDs.

Result: This study revealed that out ofthe120participants, 45% consumed either tobacco or betel quid. Furthermore, 14.2% of the participants were chewing smokeless tobacco, 20% chew betel quid or paan masala and 32.5% of the participants smoked tobacco. No OPMD's were detected in the sample.

Conclusion: There was a moderate prevalence of individuals chewing smokeless tobacco and betel quid/ paan masala (45%). There were no OPMDs detected in the sample.

Introduction:-

Cancers of the head and neck region worldwide accounts for an estimated 984,430 cases annually (Stensonet al., 2017). Oral squamous cell carcinoma or oral cancer is defined by WHO as an invasive epithelial neoplasm having varying degrees of squamous differentiation and a propensity to early and extensive lymph node metastases. It occurs predominantly in alcohol drinkers and tobacco smokers and is often diagnosed during the 5th and 6th decade of their life (Barnes et al., 2005).

The lips, tongue, buccal mucosa, gingiva, palate and floor of the mouth are intra oral sites which are affected by oral cancer. Approximately half of the head and neck malignancies occur in the oral and oropharyngeal regions. Cancers developing in the tonsils and pharynx are classified as oropharyngeal carcinomas (Barnes et al., 2005).

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Oral cancer is a debilitating condition that affects people resulting in increased burden as it causes facial deformity resulting in the need to have advanced surgical intervention, hospitalization for adjuvant therapy, psychological effects together with diminished quality of life and physical function in the community.

There is an alarming increase in the number of oral cancer cases around the globe with varying incidence rates depending on the associated risk factors, gender and ethnic distribution. India is regarded to have the highest number of new oral cancer cases in the world (Curadoet.al., 2007; Parkinet.al., 2005). The high incidence in the Indian subcontinent is mainly due to the social habit of tobacco chewing together with the use of betel quid that may result in oral submucous fibrosis (Pindborg, 1978). This practice will put individuals at risk of developing oral potentially malignant disorders (OPMDs).The Fiji National Non-Communicable Disease Risk Factors STEPS survey reported that 16.6% of Fijians smoked everyday (Ministry of Health, 2017) whilst another report carried out in Viseisei, Fiji reported that daily smoking was higher in men 33% compared to women 14% (Gyaneshwar,2016).

Indian nationals came to the Fiji Islands as indentured labourers from 1879 to 1916. Some came alone while others with families as cheap labour during the British Colonial era. A total of 42 ships made 87 voyages from India bringing in a grand total of 60,965 passengers, however only 60,553 arrived in Fiji. The indentured labourers who disembarked were the first immigrants to arrive from the Indian sub-continent and these people formed the core of the Fiji Indian community that now accounts for over thirty per cent of Fiji's population. Suva is heavily populated with Fijians of Indian descent that have moved to the Central division for education, better jobs and opportunities for their families as some families may have left their original localities after their land leases have expired and not renewed.

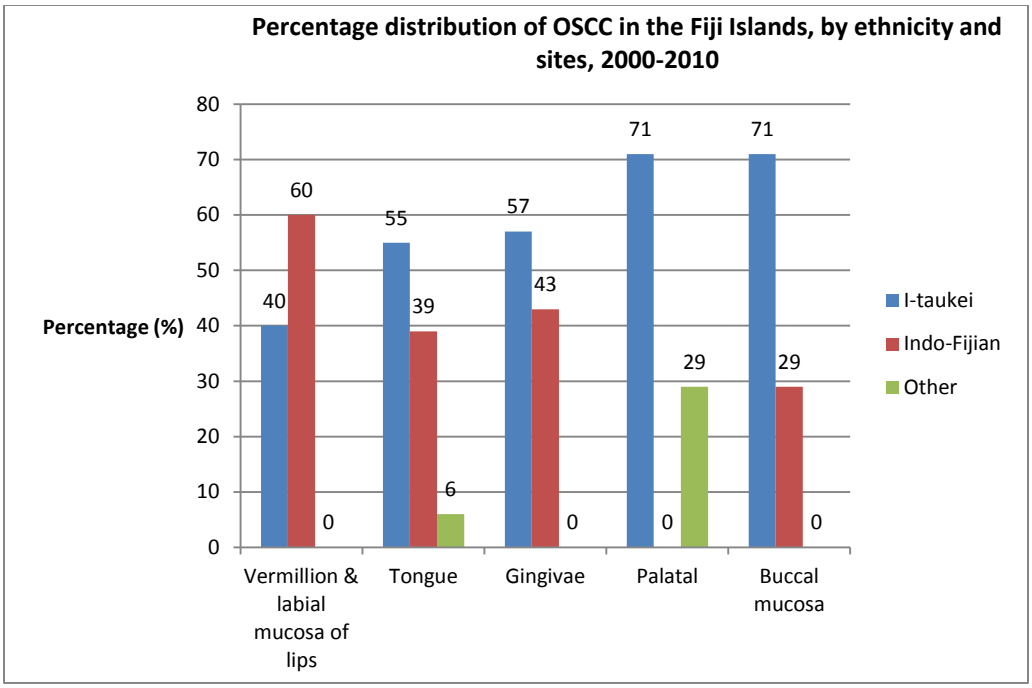
Picture:- Courtesy of National Library of Australia.

The increased incidence of oral cancer amongst the population in the subcontinent of India is alarming. The challenging habits e.g. betel chewing, Gutkha, pan masala that these Indian population practice is difficult to modify as some of these habits are part of their daily social wellbeing. In addition, previous studies in Fiji have reported that urban Indian population were 16% more likely to be smokers compared to rural Indian population. These habits have been associated to increased risk in developing oral submucous fibrosis classified as oral potentially malignant disorder (OPMD). Over time, patients may develop oral cancer if no intervention is instituted. It starts as intolerance to spicy food, rigidity of lip and tongue, hardening of the submucosal fibres, and whitening of the area (leukoplasia) (Balasubramaniam.D, 2015).

Picture:- Courtesy of the World Health Organization International Agency for Research on Cancer 2004.

There are a staggering number of OSCC cases being reported around the globe with varying incidence rates depending on geographic locations, ethnicity and habits. In the Fiji Islands, there is no detailed data analysis of the occurrence of OSCC since 2013. A study reported that out of the 134 Fijian cases of oral and oropharyngeal carcinomas recorded from 2000 to 2010; 124 cases (93%) were identified as OSCC (Gavidi, 2013).

The graph below shows proportional distribution of OSCC in relation to oral cavity sites and the ethnic groups. It is clearly seen that majority of the cases with OSCC were present amongst ITaukei population. Cancer of the vermilion and labial mucosa of the lips was the most common condition amongst Fijians of Indian origin while palatal and buccal mucosal cancers were common amongst the ITaukei population. Hence the prevalence of OSCC is significantly high for small island nation of Fiji with a population of approximately 800,000 thus increasing the need for a detailed analysis of the association of risk factors with OSCC in Fiji.



(Ref: Gavidiet al, 2013)

OSCC could be preceded by clinically evidentoral potentially malignant disorders (OPMDs), particularly erythroplakia and some leukoplakia. These OPMDs have a variety of clinical features and signs. Certain risk factors are known to cause OPMDs whereas others tend to aid in the transformation of OPMDs to OSCC.

The clinical presentations of OPMDs are variable ranging from white and red patches. Some of these oral lesions are homogenous while others are non-homogenous. Homogenous lesions are uniformly flat thin patches with shallow cracks of surface keratin while non-homogenous types are of variable colour and texture which may include speckled, nodular and verrucous or corrugated surfaces.

Thetraditional risk factors for oral cancer include tobacco, alcohol and betel quid use whereas (UV) radiation is the main risk factor for cancer of the skin and vermillion of the lip (Coglianoet.al, 2010). Oral cancer risk factors are grouped according to decreasing levels of evidence supporting their carcinogenicity from established, strongly suggestive, possible and speculative.

Risk factors for oral cancer and precancer

Established	Strongly suggestive	Possible	Speculative
Smoking	Sunlight (lip)	Viruses	Mouthwashes
Chewing tobacco	Radiation	Immune deficiency	Mate drinking
Snuff dipping		Dentition?	Periodontal disease
Alcohol misuse		Ethnicity?	
Betel quid syphilis			Familial

(Ref: Warnakulasuriya, 2008)

With reference to the table the established group of risk factors include tobacco, alcohol and betel nut quid chewing. In light to recent development in studies in the field of oral cancer some oral microbes, particularly Porphyromonasgingivalis and Fusobacteriumnucleatum, show strong oral carcinogenic potential in vitro and in animal studies. Bacteria are thought to contribute to oral carcinogenesis via inhibition of apoptosis, activation of cell proliferation, promotion of cellular invasion, induction of chronic inflammation, and production of carcinogens (Perraraet al, 2016)

The aim of this study is to determine if Fijians of Indian descents living in Suva still chew tobacco in the form of betel quid, "gutkha" and "Pan Masala" as well as to determine the occurrence of OPMDs amongst them.The objectives included determining the prevalence of chewing betel nut and smokeless tobacco and the incidence rate of OPMDs in Fijians of Indian descent living in Suva, Fiji.

Materials and Methods:-

This was a cross sectional study designed to analyse ifFijians of Indian descent are exposed to OSCC risk factors limited to smokeless tobacco, betel quid and pan masala in Suva and also record presence of OPMDS.

The variables of the study were:
Dependent Variables:

1. Fijians of Indian origin
2. Tobacco and betel quid chewing habits
3. Signs of OPMDs

Independent Variables:

1. Age
2. Gender
3. Area of residence

Firstly, an interview was conducted using a structured questionnaire amongst all participants to gather information on their chewing habits. The participants included Fijians of Indian descent staying in Suva from the age of 18 and above.

The second part of the survey included an oral examination of all participants to identify the presence of any OPMDs. The examiners checked for the presence of any red or white lesions on the buccal mucosa, floor of the mouth, palate, gingiva, upper and lower labial mucosa as well as the dorsal/lateral and under surfaces of the tongue. All the findings were recorded in the oral examination section of the questionnaire.

A multi-staged cluster sampling method was used. Using simple random sampling, 3 city wards in Suva were chosen. The city wards in Suva included Tamavua, Raiwaqa, Nabua, Samabula, Muanikau and Central Business District. Four areas were then chosen within each ward using systematic sampling. From each chosen area, five households (Fijians of Indian descent) were chosen using simple random sampling. Access to the households was gained once the participant agreed to undergo the interview and examination was done after presentation of the information sheet with a verbal summary (informing about the relationship of tobacco /pan masala/ betel quid to oral

cancer and how important early detection is in regards to treatment) of the assessment to be carried out. All Fijians of Indian descent who were over 18years of age were selected to participate in this study.

From the selected households, research information sheet was distributed, which clearly described the research proceedings. Households were then revisited for collection of consent and registration of participants and also to confirm the date and time for data collection according to the family's convenience. The visits to households of the potential participants were done in between the timeframe of 12pm to 4pm.The sample size was 120 people.

Oral examination on all consented participants was carried out using disposable instruments from the teaching clinic, while keeping infection control in mind with reasonable proper personal protective equipment which included gloves and face masks. The information was recorded in the oral examination section of the questionnaire. Upon examination if any participants showed signs of developing oral cancer lesions there was a plan in place for them to be referred to the Oral Health Teaching Clinic.

All data collected was entered into a spread sheet using Microsoft Excel and descriptive statistical analysis was made with Epi info (Version 3.5.3) using means, frequencies, and ranges. Prevalence rate and relative risks was calculated. Significance was set at $p < 0.05$.

Ethical Considerations:
A separate participant data sheet containing the patients' detail and address was stored by the principle investigator. The questionnaires had identification numbers that de-identified the participants.

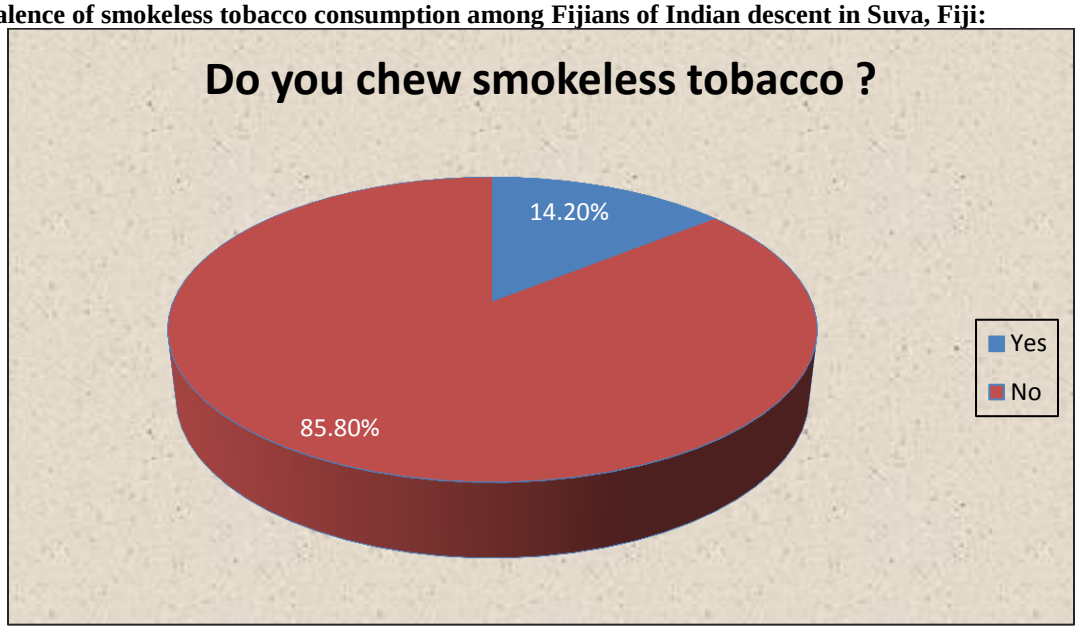
Participants gave informed consent prior to taking part in the survey.

Results:-

A total of 120 participants were interviewed and examined. It was revealed that 45% of the participants consumed either tobacco or betel quid, 14.2% of the total participants were chewing smokeless tobacco. Furthermore, 20% chew betel quid or paan masala and 32.5% smoked tobacco.

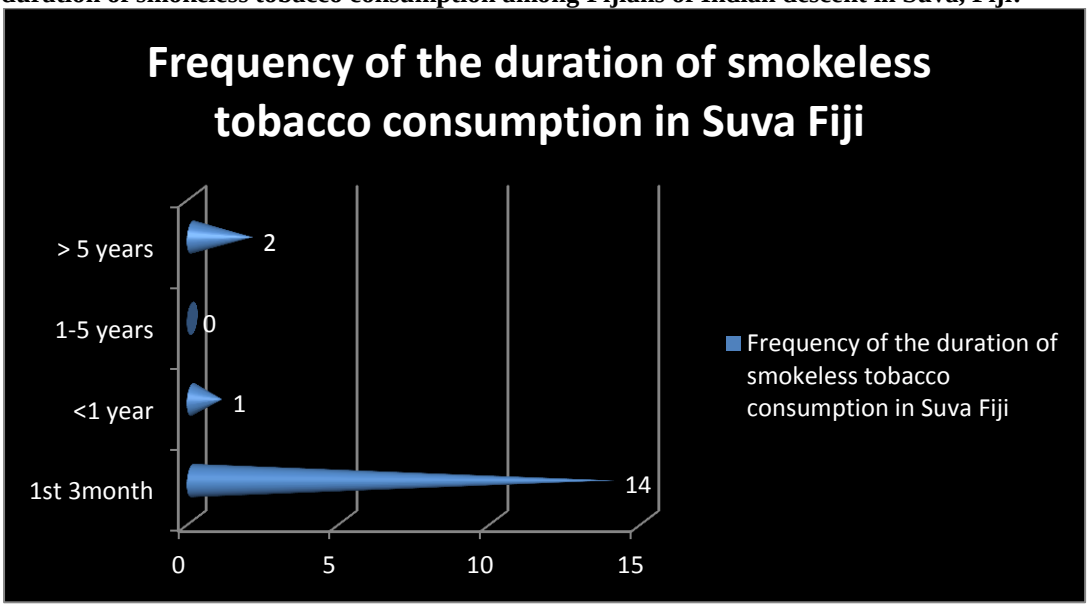
Upon clinical examination no OPMDs were detected amongst the 120 participants examined. The epidemiological data were further analysed using the demographic and disease parameters listed below:
i)Prevalence of smokeless tobacco consumption among Fijians of Indian descent in Suva, Fiji.
ii) The duration of smokeless tobacco consumption among Fijians of Indian descent in Suva, Fiji.
iii) Age specific ranges of smokeless tobacco consumers among Fijians of Indian descent in Suva, Fiji.
iv) Awareness of the risk of cancer associated with tobacco versus consumption of smokeless tobacco among Fijians of Indian descent in Suva, Fiji.
v)Prevalence of betel quid or paan masala consumption among Fijians of Indian descent in Suva, Fiji.
vi) The duration of betel quid / paan masala consumption among Fijians of Indian descent in Suva, Fiji.
vii) Age specific ranges of betel quid/ paan masala consumers among Fijians of Indian descent in Suva Fiji
viii) Awareness of the risk of cancer associated with tobacco v/s betel quid and paan masala consumption among Fijians of Indian descent in Suva, Fiji.
ix) Oral examination for OPMDs among Fijians of Indian descent in Suva, Fiji.
x) Prevalence of smoked tobacco users among Fijians of Indian descent in Suva, Fiji.
xi) Age specific ranges of smoked tobacco users among Fijians of Indian descent in Suva, Fiji.
xii) Awareness of the risk of cancer associated with tobacco versus the consumption of smoked tobacco among Fijians of Indian descent in Suva, Fiji.

i) Prevalence of smokeless tobacco consumption among Fijians of Indian descent in Suva, Fiji:



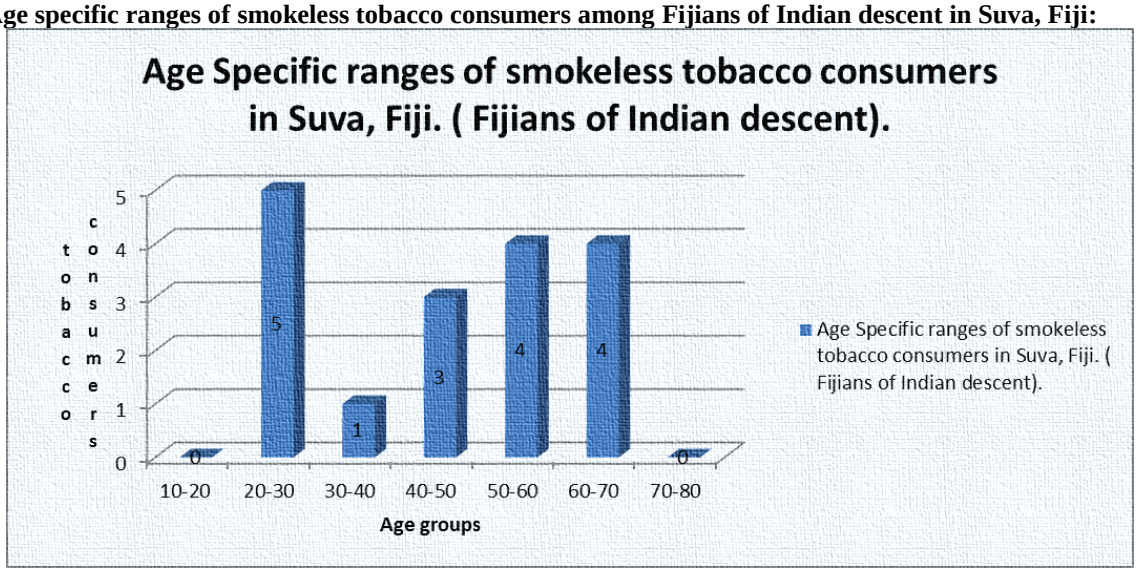
This study revealed that 14.2% (17) of the 120 participants interviewed did chew smokeless tobacco.

ii) The duration of smokeless tobacco consumption among Fijians of Indian descent in Suva, Fiji:



Out of the 17 (14.2%) participants that chew smokeless tobacco; 14 of them consumed it for 3 months, 1 for less than a year and for more than 5 years.

iii) Age specific ranges of smokeless tobacco consumers among Fijians of Indian descent in Suva, Fiji:



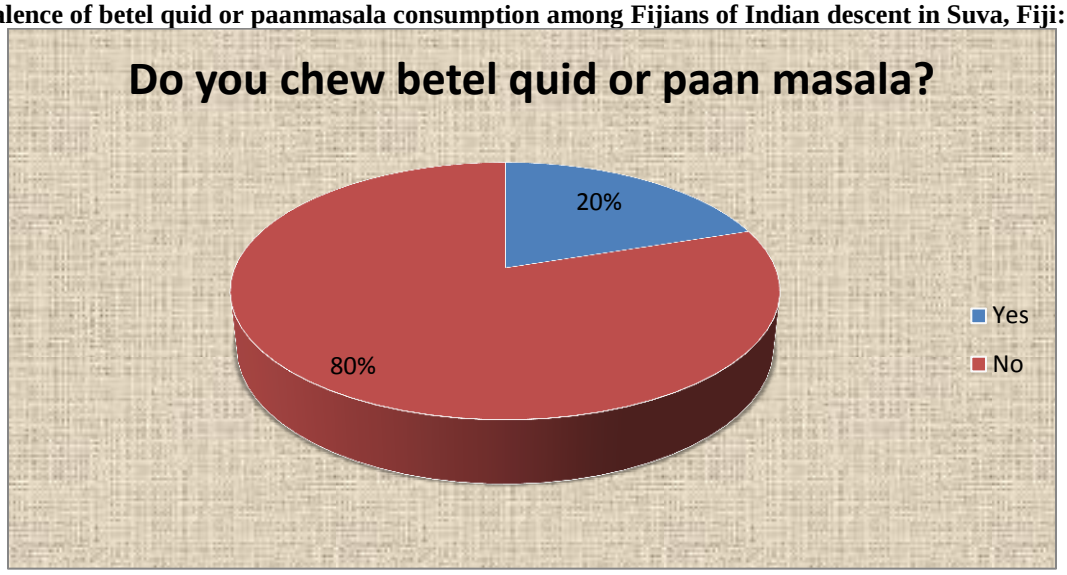
The trend of smokeless tobacco consumption was prevalent in various age groups ranging from 20-30 to the 60-70 age groups. Majority of the consumers belonged to the 20 -30 age group, which indicated that the consumption of smokeless tobacco was not just limited to the elderly or youth but it in fact was prevalent in most age groups.

iv) Awareness of the risk of cancer associated with tobacco versus consumption of smokeless tobacco among Fijians of Indian descent in Suva, Fiji:

Are you aware of the risk of cancer associated smokeless tobacco?	Yes	No	Total
Have you ever chewed smokeless tobacco?			
Yes	2	15	17
No	52	51	103
Total	54	66	120

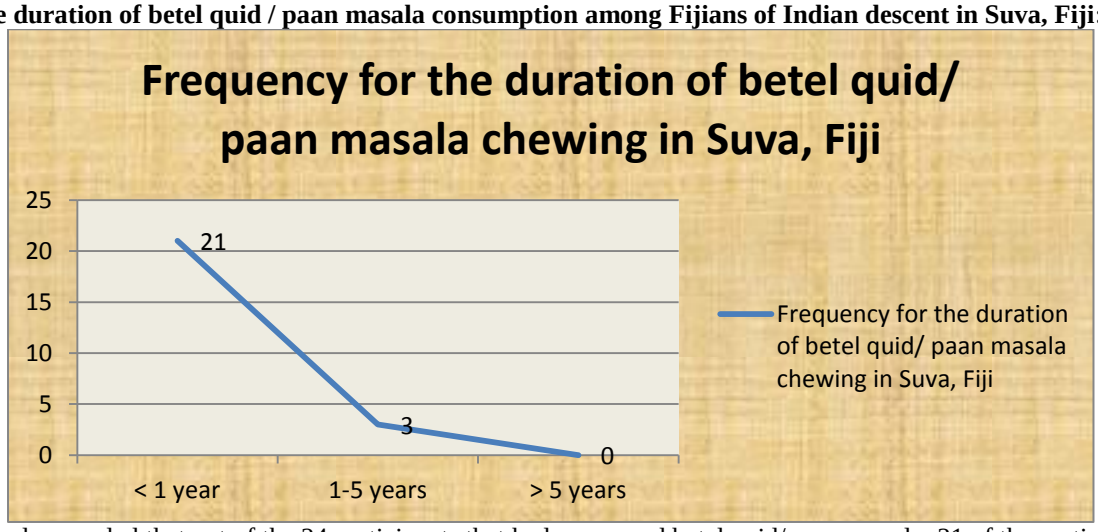
This table demonstrated that 88% (15) of the participants consuming smokeless tobacco were not aware of the risk associated with it. Overall 14.2% (17) of the 120 participants do consume smokeless tobacco. The relative risk ratio is 0.16, since the ratio < 1 which depicts there is less risk of chewing tobacco when individuals are aware of the risk of tobacco associated with cancer.

v) Prevalence of betel quid or paanmasala consumption among Fijians of Indian descent in Suva, Fiji:



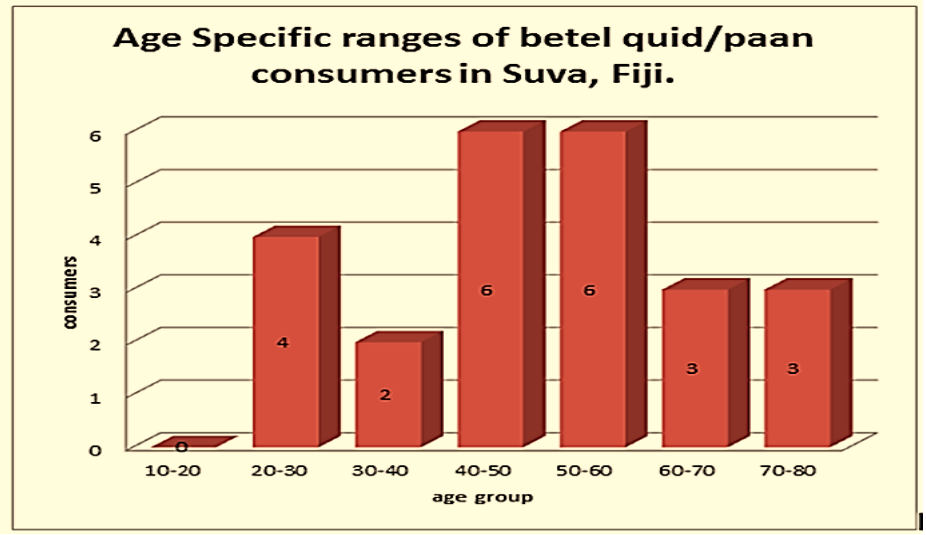
The study revealed that 20% (24) of the 120 participants chew paan masala / betel quid.

vi) The duration of betel quid / paan masala consumption among Fijians of Indian descent in Suva, Fiji:



The study revealed that out of the 24 participants that had consumed betel quid/ paan masala; 21 of the participants consumed betel quid/ paan masala for less than 1 year and 3 participants fell in between 1-5 years range, whereas no participants practiced betel quid / paan masala chewing for more than 5 years.

vii) Age specific ranges of betel quid/ paan masala consumers among Fijians of Indian descent in Suva Fiji



Thegraph illustrates the consumption of paan and betel quid was a widespread habit in many age groups with an onset at the 20-30 age group, which peaked at the 40 -60 age group.

viii) Awareness of the risk of cancer associated with tobacco versus betel quid and paan masala consumption among Fijians of Indian descent in Suva Fiji:

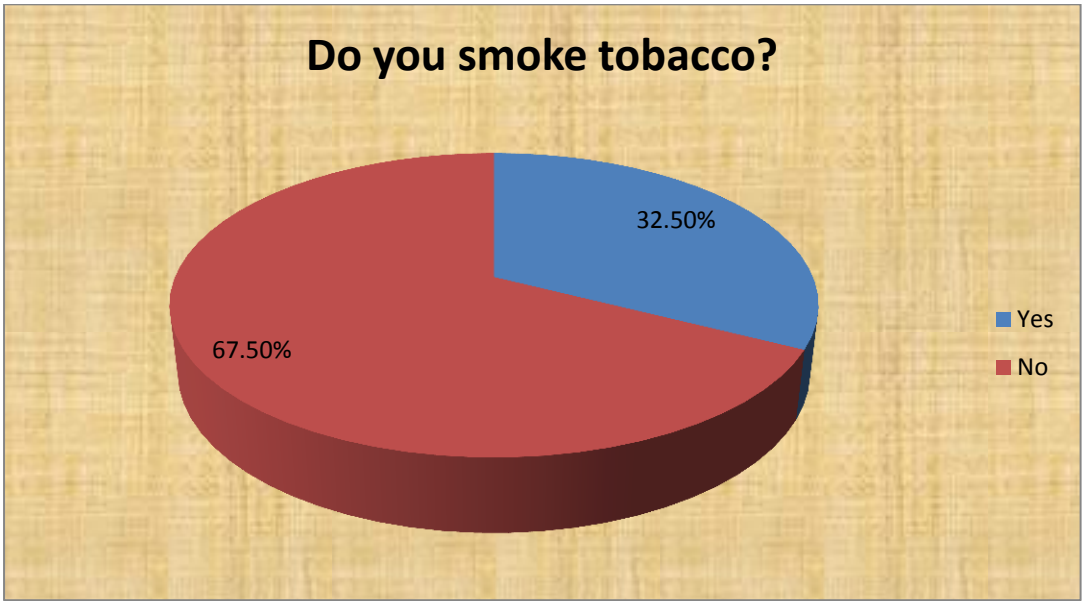
This table demonstrates that 87.5% of the participants that chew paan masala or betel quid were not aware of the risk of cancer associated with tobacco. It also shows that 20% of the participants do chew either betel quid or paan masala. The relative risk ratio is 0.18, and since the value is < 1 it demonstrates that there is significantly less risk for people to uptake paan masala / betel quid chewing behaviours if they are made aware of the risk of tobacco associated with cancer.

Are you aware of the risk of cancer associated with tobacco?	Yes	No	Total
Have you ever chewed betel quid or paan masala?			
Yes	3	21	24
No	51	45	96
Total	54	66	120

ix) Oral examination for OPMDs among Fijians of Indian descent in Suva, Fiji:

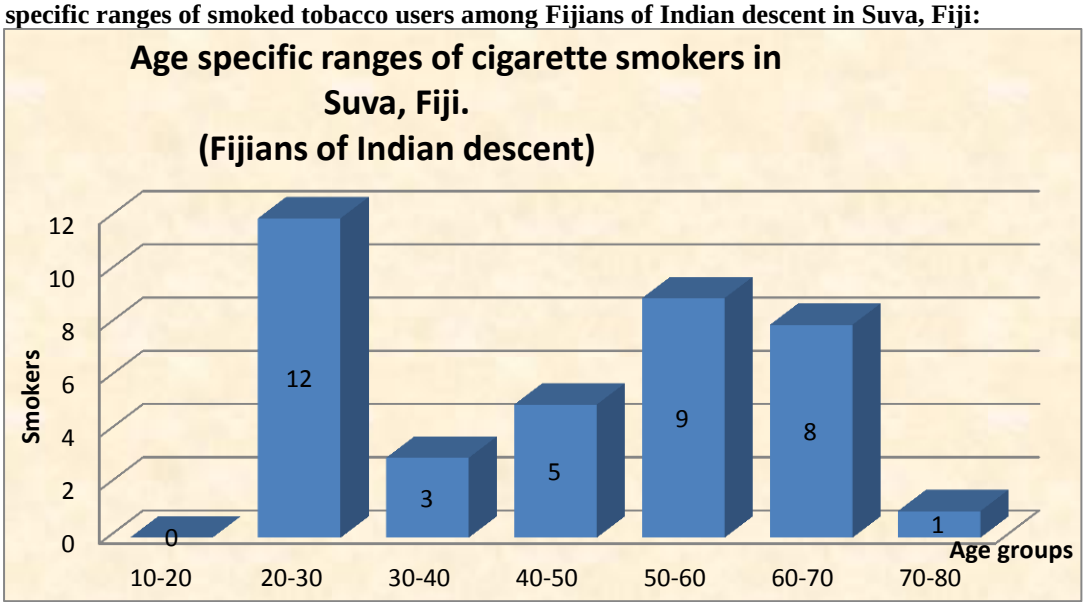
There were no occurrences of OPMDs amongst the study population.

x) Prevalence of smoked tobacco users among Fijians of Indian descent in Suva, Fiji:



This study revealed that 32.5% of the 120 participants did smoke tobacco, which in fact was the most prevalent OSCC risk factor in this survey.

xi) Age specific ranges of smoked tobacco users among Fijians of Indian descent in Suva, Fiji:



This graph depicts that consumption of smoked tobacco was most prevalent in the 20-30 age group, although it did have significant numbers in the older age groups as well. In all, it demonstrated a widespread effect.

xii) Awareness of the risk of cancer associated with tobacco versus consumption of smoked tobacco among Fijians of Indian descent in Suva, Fiji

Are you aware of the risk of cancer associated with tobacco?	Yes	No	Total
Do you smoke tobacco?			
Yes	7	32	39
No	47	34	81
Total	54	66	120

As the table shows 82.1 % (32) of the individuals that did smoke cigarettes were not aware of the risk of cancer associated with tobacco. In addition, 32% (39) of the total participants did smoke tobacco. The relative risk was 0.27, since the value is< 1 it demonstrates that there is significantly less risk of individuals smoking tobacco if they are aware of the risk of tobacco associated with tobacco.

Discussion:-

This current research on oral cancer risk factors and prevalence of OPMDS amongst Fijians of Indian descent was based on the fact that there has not been any study conducted on these health issues in the Fiji Islands. In addition, since the practice of tobacco usage is highest amongst the Indian population, where 57% of men and 11% of women between the ages of 15-49 used some form of tobacco (G.Mishra, 2015).

Moreover, tobacco is used in a wide variety of smokeless forms in India, which include betel quid chewing, mishri, khaini, gutka, snuff, and as an ingredient of pan masala.

Betel quid is a combination of betel leaf, areca nut, slaked lime, tobacco, catechu and condiments according to individual preferences. Tobacco is an optional component. Its use is prevalent all over India. However, there are differences in the components used in different regions of India.

Khainiconsists of roasted tobacco flakes mixed with slaked lime. This mixture is prepared by the user keeping the ingredients on the left palm and rubbing it with the right thumb. The prepared pinch is kept in the lower labial or buccal sulcus. Its use is common in eastern India.

Mawais a mixture of areca nut, tobacco and slaked lime and is chewed. Its use is common in rural areas of Gujarat province. It is quite popular among the young population of ages 15–19.

Snuff is a black-brown powder obtained from tobacco through roasting and pulverization. Snuff is used via nasal insufflation and is popular in eastern parts of the country. It is also applied on the gum by finger (this practice is usually initiated as a dentifrice) in the Western India, where it is known as bajar and mishri.

Gutkais a manufactured smokeless tobacco product (MSTP), a mixture of areca nut, tobacco and some condiments, marketed in different flavours in colourful pouches.

Pan masala is a betel quid mixture, which contains areca nut and some condiments, but may or may not contain tobacco. The mixture is chewed and sucked. Unlike cigarettes, tax levied on pan masala is low. Low cost and not being associated with smoke have led to an enormous increase in the use of all types of areca nut and smokeless tobacco among the Indian population including adolescents. It has also been promoted as a "post meal mouth freshener", making it quite popular. Initially, it was more popular in the Northern India, but with a massive advertising, it is now being used all over the country. Pan masala is as harmful as smoking, although the nature of harmful effects is different. Its use has been associated with high risk of oral cancer and submucous fibrosis in mouth, which also has a high potential for cancer development. It is made by the use of waste tobacco, mid-ribs of tobacco leaves and floor sweepings from cigarette factories. It is available in the forms of small packets and cans, sold at affordable prices with attractive, shiny coloured wrappings. (Chadda, 2003)

This study revealed that Fijians of Indian descent do practice betel quid/ paan masala and tobacco chewing. From a total of 120 participants, 45% either consumed tobacco or betel quid. Which depicts a concerning issue for the communities of Suva, Fiji.

Furthermore, 14.2% out of the total participants chewed smokeless tobacco, 20% chewed betel quid/paan masala and 32.5% smoked tobacco. Moreover, when analysing the data further it was found that there is no distinctive age predilection associated with consumption of smokeless tobacco. The most popular pattern of smokeless tobacco used was betel quid or paan masala, which could be the case due to the fact paanmasala is used in some Indian cultural practices. In the cases of most participants that do consume smokeless tobacco and betel quid/ paan masala majority of the users reported to be consuming them for less than a year and very few individuals were long term smokeless tobacco consumers which were placed under the bracket of more than 5years.

Interestingly, despite the fact there were some surprisingly significant levels of tobacco and betel quid / paan masala consumption no OPMDs were detected upon oral examination of the 120 participants.

In addition, the study also showed that a great majority of the participants practicing smokeless tobacco and paan masala/ betel quid chewing were not aware of the risk of tobacco associated with cancer which is depicted in fig (v), (xiii) & (xii). This is concerning in many aspects as it demonstrates that there is not much awareness regarding oral cancer risk factors in Fijians of Indian descent in Suva, Fiji. These statistics could indicate this being an issue with the general public.

Conclusion:-

In all, this research is unique for the Fiji Islands as it is the first study on oral cancer risk factors in a niche population. It has brought to light some key findings which include the fact that Fijians of Indian descent still practice tobacco chewing and consume paan masala / betel quid. There is lack of awareness in regard to the association of tobacco in it is different preparations to the risk of developing OPMDs / oral cancer. In addition, it was also found that despite the heavy taxations smoked tobacco is still the most readily consumed form of tobacco. The study has also highlighted that consumption of tobacco in participants did not follow a distinct trend in regards to age and was more of a widespread phenomenon.

Based on this information, it is recommended that health agencies and the government uptake the task of raising more oral cancer awareness in terms of risk factors (including different preparations of tobacco). The Ministry of Health and Medical Services in Fiji should also aid in pushing through policies which could make it more difficult to gain access to smokeless tobacco and other carcinogenic ingredients. Smokeless tobacco like commercial paan masala is banned in Fiji yet there are individuals who sell/use it. One recommendation for policymakers could be heavy fines for individuals who sell smokeless tobacco. Lastly, the results of this study warrant more studies to be done in this area in a wider scale to aid in getting a better understanding of the tobacco use situation.

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