A COMPARATIVE STUDY OF ECG FINDINGS OF GUTKHA CHEWERS AND NON-TOBACCO USERS

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ABSTRACT

As per the world health report of 2002, tobacco is one of the chief causes of cardiovascular deaths worldwide. The important cause of coronary artery disease is smoking cigarettes. A very little research development has been done on smokeless tobacco and the current work is to assess the status of electrocardiograph for non-tobacco users and those who chew tobacco (gutkha). This is to have a comparative analysis of their respective electrocardiogram status.

The objective of the study is to study the variations in ECG waveforms among Gutkha Chewers and compare that with the ECG status of Non-users of tobacco. 120 male respondents have participated in the given research. The age group of these participants is in between 19-35 years. There are 60 gutkha chewers and 60 non-tobaccousers in the study. These 60 male gutkha chewers are consuming gutkha for more than 6 months. Further, to present data in a tabular form, SPSS version 25 software is used. This infers that as the number of gutkha consumption increases, problems of the ECG parameters will increase significantly. In the finding, no age impact had been observed regarding the number of years of tobacco or gutkha consumption and the ECG parameters. However, overall, variations had been observed in the ECG waveforms among gutkha-chewers (case group) vs. non-tobacco chewers (control group).

Keywords: Tobacco, Chewing, Smoking, Cardiovascular Risk

I.   INTRODUCTION

A.   Background of the Study

People around the world have been using tobacco for thousands of years. It is taken orally and with ingredients. Consumption of tobacco is done in various ways in India. Patti (dried leaves), Pan (Betel quid), Khiani, Marwa (lime tobacco), Kiwan, and Zarda (paste) are some examples. Rejuvenation has been taken since 1970 to make Gutkha and its use is seen to be common in parts of Central Asia and India. A high amount of tobacco usage has been observed in high school and college students and it is a growing health concern shown in these groups. The outcome of this addictive nature is a cumulative health hazard in the long run. The method of chewing is not considered dangerous rather it is perceived as "socially less evil". The most sought after substitution for a smoking cigarette is smokeless tobacco. However, it has been found that there are many health risks in the consumption of Gutkha and it needs to bring down. Reports describe the harmful long-term effects of nicotine on the human body. A very little is known about the effect on cardiopulmonary parameters from Gutkha. Studies have been made on the effect of Gutkhaon aerobic capacity and its susceptibility towards adverse risk factors. The effect of the common form of smokeless tobacco (gutkha) on the parameters of cardiopulmonary in India is still very much unknown [1].

The use of nicotine is one of the greatest causes of disability and death in the world presently. The rate of consumption of nicotine has increased dramatically in developing countries and posing a big threat to the present and future health of the developing world. The challenge for consumers of nicotine is to quit any forms of using it, which can be a qualitative aspect for health improvement. Health professionals and doctors encourage smokers to quit leading to positive health effective results in the lives of these patients with more longevity.

Ingestion of tobacco can be done in two ways and that is either by smoking or chewing. Chewing is done by putting a tobacco plug in the gingival buccal mucosa or by just chewing it. Smokers can be found around the world while

chewers of tobacco are detected in some geographical regions such as Central Asia and India. Smoking and chewing of tobacco are seen mostly in both the adults and youths among the males and also in the females. Tobacco is taken in many forms like gutkha, khaini and pan masala [2].

Nicotine is an addictive drug according to the American heart association. Nicotine hasa significant effect on the brain that leads to psychological addiction. Every year more than 130,000 die due to cardiovascular problems which arise from cigarette smoking as per the American heart association. The chewing of tobacco results in cardiac issues such as the constriction of blood vessels and higher blood pressure. Nicotine releases chemicals known as catecholamines which produce negative effects on the heart increasing the heartbeat. This shows that nicotine is the chief contributor to the whole cardiovascular system which further produces problems like precipitate ischemic issues and atherogenesis. Coronary thrombosis occurs from cigarette smoking which increases the level of carbon monoxide in the body that induces fatty substances in the arteries causing blockages.

The Centre for Disease Control and Prevention declares tobacco consumption is a major cause of premature death and illness in the United States of America. Smokeless tobacco, Cigars, Cigarettes, passive smoking, and pipes contributed to more than 440,000 deaths every year. According to the reports of the American cancer society, usage of tobacco generated mortality more than road accidents, AIDS, murder, suicide, drugs & alcohol combing. Multiple effects in organs arise from consumption of nicotine and tobacco making severe damages. On average, a lifespan of a smoker reduces by fourteen years and even there is a high possibility of a low lifespan for Gutkhausers. The major reason for cardiac arrests is using tobacco. It increases the chances of peripheral vascular disease, abdominal aortic aneurysm, and blood clots. It brings impotency in men and is a big factor for severe disability and stroke [3].

The world health report says that tobacco is a significant cause of cardiovascular deaths around the globe as well as for pulmonary diseases. Nicotine is the main substance that is present in tobacco-producing toxicity on the cardiovascular system. Tobacco increases the risks of gastrointestinal and oral cancers but no study has been made on the risks of tobacco chewers with respect to cardiovascular diseases

B. Effects of Gutkha on Heart Rate Variability

Gutkha can be used orally and has been done for thousands of years. It gained popularity in many parts of the world. The form of using Gutkha is chewing and dipping. Gutkha is used in Pakistan, India, United Kingdom, and south-east Asia. Manufacture of Gutkha is done in factories and this has a longer shelf life. The magnitude of using gutkha has surpassed smoking cigarettes in India and is widely been observed among the younger population of males and females.

Gutkha contains nicotine as one of its major constituents which is carcinogenic. There isthe presence of benzopyrene, N-nitrosamines, lead, cadmium nitrate, nickel, chromium, and arsenic in tobacco. Many adverse health problems like oral leukoplakia, periodontitis, submucous fibrosis, anomalies in gastrointestinal tracts, oropharyngeal, pancreatic cancer, and esophageal have been connected to the use of smokeless tobacco. Toxicity in immune, cardiovascular and reproductive systems may include the adverse potential health problems due to smokeless tobacco.

One of the major causes of death globally is cardiovascular issues. There are seventeen million deaths due to the disease. There is an estimation of about 10% of cardiovascular disease arises from using tobacco. The evidence-based on epidemiological for cardiovascular disease that is responsible from smoking cigarette is a compelling one. The relation between types of Gutkha and cardiovascular disease is unknown and limited. Analysis and systematic review show risks of stroke and myocardial infarction associated withthe consumption of smokeless tobacco. This is found in both developed and developing countries. Gutkha users are prone to acute myocardial infractions compared to the general people who do not smoke.

The rate of cardiovascular disease can prompt an impact in public health problems throughout the countries that have a high frequency in the usage of smokeless tobacco. Tobacco use in all forms is high among adults and youth in both males and females in India according to some studies. The percentages being 19% for women and 34% for men which seems to be frequent for both genders. Gutkha is consumed by the school and college students representing a growing health concern in the country that is needed to be taken care of.

The cardiovascular system is influenced by the autonomic nervous system (ANS). Few researchers have thrown light on possible acute autonomic effects [4] and hemodynamic changes of ST in the form of heart rate variability (HRV)[25-29] and various studies as well document the consequence of addictive qualities of ST often changing into a lifelong habit with cumulative and more deleterious effects on health.[5]

Although gutkha chewing is popular among the people in India, no serious approach has been made to studying the problems causing due to tobacco and gutkha chewing. A part of the population is estimated to chewing tobacco and smoke nicotine. Some surveys have been done where harmful effects from consuming Gutkha exist rather than possessing short-term effects of Gutkha on the heart and lungs. Providing the growing rate in using tobacco and

popularization of its among people and culture, an investigation is undertaken to assess the acute problems and illness from chewing tobacco

C. Need of the Study

Guṭkha is a chewing tobacco preparation made of crushed areca nut, tobacco, paraffin wax, and slaked lime. Owing to its easy availability and as a cheap alternative to cigarettes, it is immensely popular in India, especially among the youth of low socioeconomic status. Apart from being carcinogenic, it has detrimental effects on Heart. Several studies have shown the relationship between tobacco smoking and cardiac illnesses. Only a few studies have been conducted on this form of Gutkha and its effects on cardiovascular health. The present study is undertaken to compare the ECG status of the Gutkha chewing population and Nontobacco users. It is an attempt to create awareness among tobacco users and motivating them to abstain from tobacco consumption.

D. Research Objectives

The objective of the study

- To study the variations in ECG waveforms among Gutkha Chewers and compare that with ECG status of Non-users of tobacco.

E. Research Hypothesis

- H_0^1: There are no variations in ECG waveforms among Gutkha Chewers.
- H_1^1: There are variations in the ECG waveforms among Gutkha Chewers.

II.   REVIEW OF LITERATURE

Afreen Begum et al[6], conducted a study on gutkha chewing young adult males. It was concluded that Gutkha is closely associated with traditional cardiovascular risk factors.

Sampath[7] conducted a similar study and the results pointed at the relation between gutkha consumption and acceleration of cardiovascular disease.

Salman S Siddiqui[8] studied the ECG status of Tobacco chewers and found that tobacco consumption does lead to cardiovascular morbidity.

Another study was done by Ritesh Gupta[9] also showed that the adverse cardiovascular effects of Gutkha use are more than those found in nonusers.

Tabrej et al (2015) made a proposal to expose the reactions of chewing tobacco and its consequences to cardiovascular ailments. They did a comparison of the findings of control subjects and smokers in a controlled environment. Methods followed– 180 subjects were taken into a study which was conducted in Jawaharlal Nehru medical college at Aligarh. The division of the subjects was made into three groups. Each group consisted of sixty subjects. Group-I consisted of tobacco chewers and nicotine chewers. Group II consisted of cigarette smokers and smokers of nicotine. Group III consisted of the control subjects. There was recording on the parameters of various cardiovascular and anthropometric. This was compared among the three groups.

Results of the study was as followed - Body mass index (BMI) and weight between control subjects and smokers were distinguishable (p<0.001). Upon comparing the tobacco chewers and control subjects, it was found that tobacco chewers havea higher rate of pulse (p<0.001) significantly along with mean arterial pressure (p<0.001), diastolic (p<0.004), and systolic blood pressure levels (p<0.011). The difference was less between smokers and chewers of tobacco. Conclusion – According to this study, it shows that smoking nicotine and chewing tobacco have the same effect on the cardiovascular system. Users of tobacco have higher risks of having cardiovascular diseases than non-tobacco users [10].

The research work of Pakkala et al (2013) was focused on the modernization and lifestyle changes in rural belts and its impact on addiction level. The population in the urban and rural areas have been affected by the lifestyle in the modern time which has to lead to addiction among the people. There is more or less no social taboo on using smokeless tobacco. This is considered by the people in the rural region. Stress develops from physical exhaustion. Mental health deteriorates as well and this results from chewing tobacco or gutkha. It is important to take notice of these problems which are prevailing in both social and economical standards for the developing countries. Variability in heart rate of the specific tobacco users is measured which is designed for a current study. 15 men were enrolled and taken as subjects from the rural regions. They are from a farming background who chews gutkha regularly. There was no physical and mental problem found in them. Analysis of heart rate variability was done on these men. The analysis was done on day 1. The second observation on these farming men was made after 3 months. After 6 months, the heart rate variability was finally analyzed. The number of parameters analyzed was two. The domain of time and Domain of frequency. The pair of T-tests were compared and evaluated. The heart rate variability parameters of frequency and time domain exhibited a low level in the values for the periods of 3rd and 6th month that were recorded respectively to the recording of the first week. The 6th month showed less value than that of the 3rd month when an extended comparison was made. There was a substantial decrement in the interval of

relative rate, heartbeat, low frequency, and very low frequency during the first week and this was compared to that of the recording in the third month. The values of relative rate interval were also found to be decreased when the comparison was made between the sixth month and first week. Gutkha users were found to have gone through a lot of mental and physical stress. This, in turn, has affected their household lives and induced stress from their occupation. Electrocardiogram recording is used to analyze the heart rate variability and detecting the changes as a result of stress. The parameters of heart rate variability measured all these and the results were low for the farming people who were taken as the test subjects [11].

The research work of Itigai et al(2016) was focused on the use of Gutkha among adolescents. An increase in the use of Gutkha is found among the students of high school, college, and University. A significant number of tobacco users are found in adolescents. Limited examinations and tests have undergone despite the popularization of using gutkha and tobacco in India. Hence, a study is undertaken to detect the breathing and cardiovascular problems of chewing gutkha and smokeless tobacco among the youth population of India. Sixty youths were incorporated in a test. They were asked to chew tobacco at intervals of 5, 15, and 30 minutes. This was needed for the analysis of heart rate variability. The objective of this test is to determine the acute effects of chewing gutkha. Short-term recording of ECG was utilized to measure the parameter of heart rate variability (Itagi et.al, 2016). Pairing T-test was used to do a one-way analysis for assessing the changes time after time. During the chewing of tobacco, it was seen that the rate of the heartbeat has increased. The baseline measurement of the mean heart rate was 73.0 +- 6.2 bpm. At 5 minutes, the mean heart rate escalated to 84.0 +- 9.0 bpm. After 15 minutes, the mean heart value decreased towards the baseline. It was followed with slight or no changes till 30 minutes. The ratio of low frequency/high frequency and very low frequency was higher after 5 minutes. However, a very high frequency was observed over the period of 5 minutes while chewing Gutkha. Gutkha chewing has always posed as a high-risk factor for cardiovascular ailments. The parameters of heart rate variability were seen to display increased values on chewing tobacco determining transient sympathetic enhancing activity [12].

According to Nisha et al(2020), tobacco chewing and smoking are a cause for a major number of deaths around the world. The risk of coronary artery disease remains high since it alters the lipid profile. Cardiac problems such as vascular atherosclerotic disease are linked to chewing tobacco and cigarette smoking. The ankle-brachial index is a simple and reliable test for determining the possible risks in coronary veins and arteries. This test aims to examine the lipid profile among tobacco chewers and smokers. It also aims to correlate the habit of individuals connected to problems in the coronary artery. During the yearly session of 2018-19, a total of 125 patients, admitted to the Mallareddy hospital were the control subjects in this test (Nisha et.al, 2020). A group of 5 agings between 20 to 70 years from both genders has taken for conducting a test. Everyone has a body mass index of above 27. Each group contains 25 people. Post overnight fasting, the ankle-brachial index, and lipid serum profile were carried out. The grading of coronary artery disease and the ankle-brachial index was done by correlating the groups. The concentration of coronary artery disease and dyslipidemia was high in tobacco chewers and cigarette smokers. The rate of coronary artery diseases is observed more in the users of tobacco with their continuous habit in the number of years and this as per the grading of ankle-brachial index [13].

Conclusion – Smokers and tobacco users are severely prone to the risks of having chronic heart ailments concerning non-tobacco users and the particular people who don't smoke. This method of ankle-brachial index displays its usefulness for the assessment of heart problems and risk in atherosclerosis According to Pakkala et al [11]cigarettes smokers face multiple issues. As the number of cigarette smokers are increasing there is a serious health concern with the increase in the number of cigarette smokers. Nicotine that enters the body the cigarettes cause hundreds of different hazards. People develop addiction when they start smoking regularly and as the time passes they couldn't live without cigarettes. This leads to chronic and cumulative effects on human bodies. The use of Gutkha has been recommended over cigarette smoking but this does not eradicate the health risks. It needs to be prohibited and discouraged. Addiction to tobacco and gutkha is widespread in the rural regions affecting the modern lifestyle.

Variability in heart rate of the specific tobacco users is measured which is designed for a current study. 15 men were enrolled and taken as subjects from the rural regions. They are from a farming background who chews gutkha regularly. There was no physical and mental problem found in them. Analysis of heart rate variability was done on these men. The analysis was done on day 1. The second observation on these farming men was made after 3 months. After 6 months, the heart rate variability was finally analyzed. The number of parameters analyzed was two. The domain of time and Domain of frequency. The pair of T-tests were compared and evaluated. The heart rate variability parameters of frequency and time domain exhibited a low level in the values for the periods of 3rd and 6th month that were recorded respectively to the recording of the first week. The 6th month showed less value than that of the 3rd month when an extended comparison was made. There was a substantial decrement in the interval of relative rate, heartbeat, low frequency, and very low frequency during the first week and this was compared to that

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According to Gupta et al (2018), there is a connection of cardiovascular disease with smokeless tobacco. The researchers collected secondary data from many nations. Analyzing the data, the researchers found that the users of Gutkha show higher risks of stroke and myocardial infarction according to some meta-analyses. Previous reviews have not been made before for hypertension linked to smokeless tobacco. The global literature provides evidence for an undertaken systematic review with associating Gutkha with cardiovascular ailments like stroke, heart attack, and hypertension. A literature review was done in Scholarly articles and PubMed till October month of 2017 with the implementations of exclusion and inclusion criteria (Gupta et.al, 2018). Studies lead to the extraction of data and incorporated the reviews done by two authors. For the purpose of primary data collection, the researchers sampled 50 people, where 23 of them had heart disease, 15 of them had strokes earlier, and 12 patients of hypertension. Most of the studies that evaluated stroke and heart problems were tested in the regions of Europe and no associations were found between the results and usages of smokeless tobacco. 70% of the studies made on hypertension were revealed from the areas of South-East Asia. It displayed higher risks of hypertension in the users of smokeless tobacco. Variability in methodological constraints and results led to incomplete evidence for the connection between cardiovascular problems and smokeless tobacco. Compact studies and well-designed research are required in making a provision of evidence to the policymakers. Banning products consisting of Gutkha is advised to the patients in regards to heart and cardiovascular problems [14].

According to Raghavendra etal(2013), increase in the use of Gutkha is found among the students of high school, college, and Universities. A significant number of tobacco users were found to be adolescents. Limited examinations and tests have undergone despite the popularization of using gutkha and tobacco in India. Hence, a study is undertaken to detect the breathing and cardiovascular problems of chewing gutkha and Gutkha among the youth population of India [15].

Tests like pulmonary function test (PFT) and exercises related to treadmills were carried out previously in assessing the cardiopulmonary efficacy for two groups. PFT is a useful test in scaling the extent of pulmonary dysfunctions among tobacco users. It is used all over the world. One group were the gutkha chewers and the second group were smokers off nicotine or cigarette smokers. TMT (Trade Mill Testing) and PFT (Pulmonary Function Test) were performed to test the cardiopulmonary condition of the two groups. While studying and comparing the efficiency of cardiopulmonary of the two groups, it was found the resting heart rate was found to be significantly high among the smokers and delta heart rate was significantly high in the gutkha chewers. This makes it clear that gutkha chewers were more vulnerable to cardiovascular issues.

Niaz et al (2017) opined that the consumption of Gutkha is widespread across the globe. This generates chronic illnesses such as Submucous oral fibrosis (OSMF) categorized as a long-term disease. Conditions of malignancy are found in oral cavities. The role of paan, smokeless tobacco, and gutkha is critical for the occurrence of oral submucous fibrosis-inducing further to oral cancer. The article list was made using the tools and citations from scholarly articles, Scopus and PubMed. Frequent swallowing of gutkha and chewing of paan stimulates the disease of fibrosis in the tissues of submucosal layers (Niaz et.al, 2017).Oral submucosal fibrosis occurs from the multiple factors contributed by betel quid, smokeless tobacco, and areca nuts. These are used in gutkha and paan. The number of oral cancer is higher in females than the males of the South Asian countries. Genotoxic and carcinogenic effects are detected in the oral epithelial cells of human beings. It results from the consumption of areca nut and betel quid. Chemicals like nitrosamines, 3-methylnitrosaminoproprionitrile, and nicotine stimulate the species of reactive oxygen giving rise to fibroblast. Cancer is common in such cases since the RNA and DNA in cellular levels alter. The cytochrome P450 enzyme gives metabolic activation and forms N-nitrosonornicotine, the main micronuclei carcinogenic in nature. It damages DNA further and leads to oral cancer [16].

III. RESEARCH METHODOLOGY
A. Materials & Methods

This study was conducted on behalf of the Department of Physiology, VIMS, Ballari. 100 young adult males in the age group of 18 to 35 years were being selected for the study. 60 males who have the habit of exclusively chewing gutkha for at least 6 months formed one group. And 60 males of the same age group without a history of smoking or tobacco chewing formed the control group.

B. Source of Data

The participants for the study were selected from attendees of Free Medical Camps set up by the Principal Investigator in his private clinic located in Bandimote, APMC Road, Ballari. Karnataka.

Sufficient Clinical material/sample available

(Declaration based on last 3 years average in hospital/department)? Yes

Is the study novel? Yes

Are the outcomes relevant to practice and benefit patients? Yes

C. Inclusion Criteria

- Young adult males in the age group of 18 to 35 years, who have been exclusively consuming Gutkha for at least 6 months.
- Young adult males in the age group of 18 to 35 years, who are neither Tobacco smokers nor Tobacco chewers.

D. Exclusion Criteria

- Subjects who have the habit of tobacco smoking.
- Subjects with known Respiratory illnesses and Cardiac disorders.
- Subjects who alcohol addiction.
- Subjects who addiction to drugs.

E. Method of Collection of Data (Including Sampling Procedure, if Any)

60 Gutkha chewers and 60 Non-tobacco users, each between the ages 18-35years were selected. Following a description of the nature and purpose of the study, willing male subjects were motivated to participate in the study. And, after obtaining informed consent, detailed history was collected from these men and their demographics, weight, height, and body mass index were noted. This was followed by a detailed physical examination which was performed by the Co-investigator. The subjects were categorized into cases and controls based on the inclusion and exclusion criteria. This study is a comparative study and was conducted over a period of 3.5 months i.e., January 2021 to April 2021. All the norms of COVID appropriate behavior were strictly followed and ECG was recorded by the Principal Investigator in these male participants using WELLNESS 12 Lead Simultaneous, CE-certified, Portable, ECG Machine. The ECG machine used for the study is owned by the Principal Investigator. Wellnest ECG is a Bluetooth-enabled electrocardiograph machine that captures medical-grade patient heart data. With a responsive 500 Hz refresh rate and the latest Bluetooth 5.0 technology, the ECG capturing is simultaneous and accurate. ECGparameters like Heart rate,QRS complex, ST segment; QTinterval, PRinterval andQT$_c$ interval were derived in a printable format. The above parameters were tabulated results and the comparison and statistical analysis of the data was done by using SPSS version.21 software. (Standard deviation, mean and unpaired student t Test). Microsoft Word 7 and Microsoft Excel 7 were used to create tables, etc.

F. Design of Study

This is acase control study.

G. Mention Sample Size with Details

Sample size is 120 participants. These participants were selected from general population attending the free health checkup camps set up by the principal investigator in a private establishment near APMC, Ballari, which is busy market place in Ballari. 60 men in the age group of 18 to 35 who have been consuming Gutkha for a minimum period of 6 months were selected and categorized as the study group. Another 60 men in the age group of 18 to 35 years who have never smoked or chewed tobacco, were considered as the Control group.

H. Primary Outcome& Secondary Outcomes

Primary outcome anticipated in the Study group is the Change in ECG parameters found due Gutkha consumption. While ECG parameters in the control group are expected to show no deviation from the normal.

IV. RESULTS

- **Methodology:**120 male respondents have participated in the given research.The age group of these participants is in between 19-35 years. There are 60 gutkha chewers and 60 non-gutkha chewers in the study. These 60 malegutkha chewers were consuming gutkha for more than 6 months. Further, in the study,these gutkha chewersare named as thecase group, and non-Gutkha chewers are called the control group. That is why this study is designated as a case-control group study of gutkha chewers. The Principal Investigator has collected data from the attendees of Free Medical Camps in his private clinic located in Bandimote, APMC, Ballari.

  Further, to present data in a tabular form,SPSS version 25 software is used. The bar graph is plotted to illustrate the demographic statistics of the case-control group. Convenience random sampling has been adopted to gather data of 120 male respondents. Statistical methods like mean, standard deviation, Pearson

correlation, Chi-Square χ2, logistic regression is used in the study to assess the variations in ECG waveforms among gutkhachewers and non-Gutkha chewers.

- **Data Analysis and Interpretation:**In the comparative case-control study, ECG data of gutkha chewers and non-tobacco users have been collected. This data is gathered in between January'2021-April'20201. It took 3.5 months to collect information on ECG parameters from the respondents. ECG parameters were recorded via "WELLNEST 12 Lead Simultaneous". This is aportableCE-certified ECG Machine. The wellnest ECG is a Bluetooth enabled electrocardiograph machine that captures medical-grade patient heart details. The ECG capturing is simultaneous and found accurate with a 500 Hz response rate. ECG parameters like Heart rate (H.R (bpm)), QRS complex (QRS (ms)), ST-segment (ST (ms)), QT interval (QT (ms)), PR interval (PR (ms)) and QTc interval (QTc (ms)) were derived in a printable format.

In table-1 association between the gutkha chewing habits and the socio-demographic characteristics of the participants has been calculated wherein demographic attributes like age, weight, height, BMI and gutkha consumption yearfor case-control groups has been looked at. As per the information, the average male age is 25.93 years, whereas the control age is 26.83 years. There is no significant impact found in the age of the case-control group with a probability value greater than 0.05. Regarding weight and height, in the case group, reading are like 58.60 & 160.89, whereas in the control group, the reading are 53.83 & 161.77. This infers that males who consume Gutkha (weight 53.83kg) have significantly lesser weight than those who don't. Body mass index is also found considerably more inferior than the control group (20.54). The probability value is also less than 0.05. Hence it can be inferred that males who consume Gutkha have less weight and BMI than those who don't consume gutkha (tobacco). The average number of gutkha consumption years is close to 5.9 years.The above results align with the professor (Daniel N. Willis et. al., 2014) results. According to him, exposure to Gutkha will indeed reduce the heart,body and liver weightcompared to the case group.

Further, regarding body mass index, in the data, BMI for Gutkha chewer (control group) found significantly lesser (20.54). The author (Mangesh S Pednekar et. al., 2006) illustrated BMI as a relative weight, and according to him, overall BMI is a good indicator forthe nutritional status of any individuals health. In his study, BMI low is found for the individuals who either consume tobacco, in cigarettes or beedis form or chewed. He further added that tobacco consumption will exert a significantly strong impact on the body mass index (BMI).

Table-1Association between the Gutkha Habits and theSocio-demographic Characteristics of the Participants

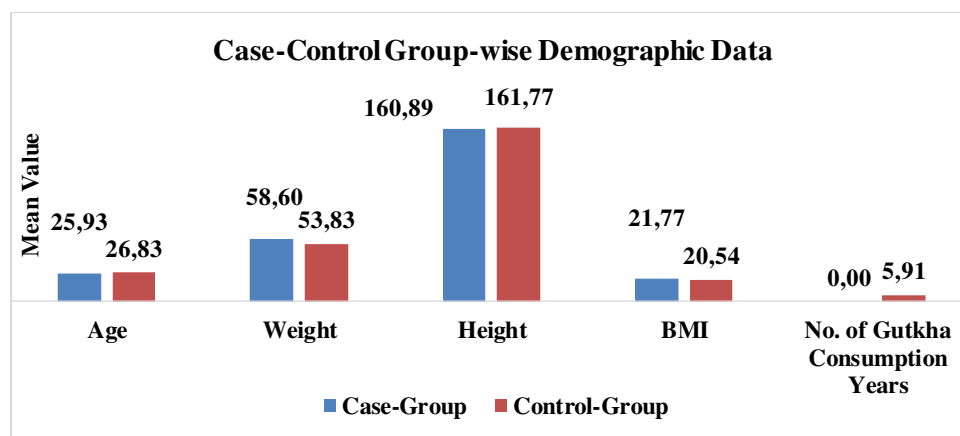| Characteristic	Tobacco Users		Chi-Square χ2	Sig.	Results (P-value)
	Case	Control			
Age	25.93±4.47	26.83±4.33	13.354	0.647	≥ 0.05
Weight	58.60±6.16	53.83±4.17	42.357	0.016	≤ 0.05
Height	160.89±21.57	161.77±5.85	42.633	0.005	≤ 0.05
BMI	21.77±1.57	20.54±0.93	106.98	0.003	≤ 0.05
Gutkha Consumption Year	0	5.91±2.20	120	0.000	≤ 0.05

Figure-1 Descriptive Statistics of the Demographic Variables of the Gutkha Users and Non-Users

Lateron, the impact of years of gutkhaconsumption has been evaluated on the ECG parameters and then the Correlation at 95% confidence level. As per the data results, out of six parameters, four parameters such as H.R (bpm) (p=0.000), ST (ms)(p=0.021), QT (ms)(p=0.003), and PR (ms)(p=0.054) have shown a significant impact. The probability values of these parameters are less than 0.05. Pearson Correlation is also found positive but moderate. This infers that as the number of gutkha consumption increases, problems on the ECG parameters increases significantly.

Table-2: Impact of Years of Gutkha Consumption on the ECG Parameters and its Correlation

ECG Parameters	Pearson Correlation	Years of Gutkha Consumption			
		Pearson Chi-Square	df	Asymptotic Significance (2-sided)	P-value
H.R (bpm)	0.734**	1420.938[a]	1035	0.000	≤ 0.05
QRS (ms)	.288**	2552.095[a]	2461	0.098	≥ 0.05
ST (ms)	.259**	2558.578[a]	2415	0.021	≤ 0.05
QT (ms)	0.152	2559.429[a]	2369	0.003	≤ 0.05
PR (ms)	0.003	2622.000[a]	2507	0.054	≤ 0.05
QTc (ms)	.397**	2657.000[a]	2576	0.130	≥ 0.05
**Correlation is significant at the 0.01 level (2-tailed)					

In table-3, logistic regressionis applied to determine ECG parameters influencing the control group. Participants age has not shown any correlation with the number of years of gutkha consumption; which is why these two variables have not been taken in the analysis. As per the logistic regression results, $r^2$of the data lies between 63% to 84%. This infers that the variance of 63% to 84% in the data can be explained from the gathered ECG parameters. Either method like Cox & Snell R^{Square} and NagelkerkeR^{Square} could be adopted to present the data variance of 120 chewers.

Table-3 Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	46.701[a]	0.630	0.840
a. Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.			

In the table-4 below, the Wald test is adopted to evaluate the statistical significance level of each independent variable. As per the results, beta coefficient and significant values of each ECG parameters are as follows H.R (bpm) (β=0.329, sig=0.000), QRS (ms) (β=0.057, sig=0.022), ST (ms) (β=0.004, sig=0.031), QT (ms) (β=0.007, sig=0.905), PR (ms) (β=0.058, sig=0.001) and QTc (ms) (β=0.021, sig=0.007). Out of six parameters, there is one parameter (QT) where a significant value is greater than 0.05. Hence, variations arefound in the ECG waveforms among gutkha-chewers (control group) vs non-Gutkha chewers (case group).

Table-4: Logistic Regression Analysis to Evaluate the Factors Influencing Effecting ECG Parameters (N=120)

Variables in the Equation							
Tobacco Users	ECG Parameters	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a] (Control)	H.R (bpm)	0.329	0.092	12.700	1	0.000	1.390
	QRS (ms)	0.057	0.037	2.386	1	0.022	1.059
	ST (ms)	0.004	0.004	1.015	1	0.031	0.996
	QT (ms)	0.007	0.057	0.014	1	0.905	1.007
	PR (ms)	0.058	0.017	11.251	1	0.001	1.060
	QTc (ms)	0.021	0.048	0.199	1	0.007	0.979
	Constant	34.466	11.480	9.014	1	0.003	0.000
a. Variable(s) entered on step 1: H.R (bpm), QRS (ms), ST (ms), QT (ms), PR (ms), QTc (ms).							

Discussion: Thisresearchwas conducted on behalf of the department of physiology, VIMS, Ballari, wherein 120 young maleadultswith the age group of 19 to 35 years were selected. Out of 120 male adults, 50% were gutkha chewers, and the remaining were non-gutkha chewers. Despite of noticeable increase in the Indian population, there is a remarkable decline in gutkhausers. As per the collected data, the average age group of gutkha chewers was27 years, wherein most of the tobacco eaters (35%) were from the age group of 21-25 years,followed by 26-30 years(31.6%), and 31-35 years(26.7%). Data also revealed that 6.7% of participants started consuming Gutkha at the age of 19-20 years. Further, weight and BMI parameters had also been examined wherein both the parameters found more petite than the non-gutkha chewers. The control group participants' average weight was 53.83kg, as compared to the casegroup, 58.60 kg, whereas BMI for the controlled group was (20.54) than the case group (21.77).

Lateron, therewas an impact of years of gutkhaconsumption found on the ECG parameters with a positive but moderate correlation. This infers that as the number of gutkha consumption increases, problems of the ECG parameters will increase significantly. In the finding, no age impact had been observedregarding the number of years of tobacco or gutkha consumption and the ECG parameters. However, overall, variations had been observed in the ECG waveforms among gutkha-chewers (case group) vs non-tobacco users (control group).

V.   CONCLUSION

People around the world have been using tobacco for thousands of years. It is taken orally and with ingredients. Consumption of tobacco is done in various ways in India. The method of chewing is not considered dangerous rather it is perceived as "socially less evil".A very little is known about the effect on cardiopulmonary parameters from Gutkha. Studies have been made on the effect of Gutkha on aerobic capacity and its susceptibility towards adverse risk factors. The effect of the common form of smokeless tobacco (gutkha) on the parameters of cardiopulmonary in India is still very much unknown. Gutkha contains nicotine as one of its major constituents which is carcinogenic. There is the presence of benzopyrene, N-nitrosamines, lead, cadmium nitrate, nickel, chromium, and arsenic in tobacco. Guṭkha is a chewing tobacco preparation made of crushed areca nut, tobacco, paraffin wax, and slaked lime. Owing to its easy availability and as a cheap alternative to cigarettes, it is immensely popular in India, especially among the youth of low socioeconomic status. Apart from being carcinogenic, it has detrimental effects on Heart. Several studies have shown the relationship between tobacco smoking and cardiac illnesses. Only a few studies have been conducted on this form of Gutkha and its effects on cardiovascular health. The present study is undertaken to compare the ECG status of the Gutkha chewing population and Nontobacco users. It is an attempt to create awareness among tobacco users and motivating them to abstain from tobacco consumption. Out of 120 male adults, 50% were gutkha chewers, and the remaining were non-gutkha chewers. Despite of noticeable increase in the Indian population, there is a remarkable decline in gutkha users. As per the collected data, the average age group of gutkha chewers was27 years, wherein most of the tobacco eaters (35%) were from the age group of 21-25 years, followed by 26-30 years(31.6%), and 31-35 years(26.7%). Data also revealed that 6.7% of participants started consuming Gutkha at the age of 19-20 years. Further, weight and BMI parameters had also been examined wherein both the parameters found more petite than the non-gutkha chewers. The control group participants' average weight was 53.83kg, as compared to the case group, 58.60 kg, whereas BMI for the controlled group was (20.54) than the case group (21.77).However, overall, variations had been observed in the ECG waveforms among gutkha-chewers (case group) vs non-tobacco users (control group).

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