Consumer Behavior and Areca Nut Consumption in Karnataka: Exploring Patterns, Perceptions and Dependency Factors

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***Abstract*—Betel leaf tends to be used with areca nut, a widespread cultural practice in the region and part of traditional, cultural rituals and social interaction in Karnataka. The main objective of the research was to study the patterns of consumption, social norms and beliefs regarding areca nut consumption, as well as awareness of the health consequences of areca nut consumption in Karnataka. A structured questionnaire was utilized to collect primary data from 125 respondents. Regression and Correlation results provide strong statistical support for accepting the alternative hypothesis. The study confirmed that cultural or social factors and health-related awareness and dependencies significantly influence areca nut consumption patterns in Karnataka. Health awareness shows a slightly stronger predictive and deterrent effect than cultural practices, underscoring the need for targeted public health interventions that address behavioral norms and knowledge dissemination. This study supported the critical distinction between these different forms of consumption. It emphasized that health risks are associated explicitly with betel quid and processed or flavored areca nut products, not with the traditional use of raw areca nut with betel leaf. Recognizing this difference is vital for designing informed health education programs, preserving beneficial conventional practices and targeting only the genuinely harmful variants of areca nut consumption in public health interventions.**

***Index Terms*—Areca Nut Consumption, Consumer Behavior, Cultural Practices, Health Awarenes, and Social Norms.**

I. INTRODUCTION

Areca nut or betel nut, two commonly used names for the same item, have immense cultural, social and economic importance in India, especially in the southern state of Karnataka, which is among the highest due to its consumption. The consumption of areca nuts in rural and urban populations is deep-rooted in practices and religious rituals, and both boiled, dried, and flavoured consumption (Sridhara et al., 2014). However, more than its cultural embedment, the patterns of areca nut consumption have changed over the years due to altering consumer preferences, socio-economic factors, health consciousness and market dynamics (Sahoo & Satapathy, 2018).

Areca nut consumption in Karnataka occurs in both raw and processed forms, reflecting its deep cultural and socio-economic roots in the state. In its raw form, it is commonly chewed fresh or sun-dried, often mixed with betel leaves, slaked lime and other flavorings. The processed form includes boiled, roasted, or fermented nuts, commonly found in commercial products such as gutka, paan masala, and scented supari. These processed variants are widely available across urban and rural areas, consumed for their stimulant effect and as part of social or ceremonial practices. Karnataka, a major producer of areca nuts, especially in districts like Shivamogga, Chikkamagaluru, Dakshina Kannada and Davanagere, see widespread use across socio-economic groups.

While moderate consumption of areca nut holds cultural significance, used in weddings, religious rituals and hospitality, it also poses serious health

risks, especially with long-term or high-frequency use as betel quid and processed/flavoured forms. Norton, 1998 and Toprani & Patel, 2013 have shown that low-dose consumption may have pharmacological effects such as aiding digestion and offering mild stimulant benefits. However, habitual or heavy use has been linked to severe health issues, including oral submucous fibrosis, periodontal diseases, and increased risk of oral cancers. In Karnataka, especially among rural and low-income communities, areca nut consumption is often normalized despite these dangers. Public health concerns are rising, with growing awareness of its addictive properties and carcinogenic potential. As cultural practices continue to uphold its use, balancing tradition with health education becomes crucial to mitigating long-term public health impacts.

Though widely consumed and economically important, there is scarce holistic empirical research on behavioural patterns and dependency factors of areca nut consumption in Karnataka (Singh & Swamy, 2017). Previous research mainly split between scrutinizing its health implications and its production and marketing realities, resulting in a blind spot regarding the drivers and continued use patterns, such as user motivations and perceptions (Shekharappa & Chandrakanth, 2007).

Areca nut consumption is linked to complex consumer psychology and demographic and sociocultural factors. An individual's age, gender, income level, education, and occupational background often determine the preferred usage, frequency of use, brand loyalty, and dependence on areca nut-based products (Senthil Kumar et al., 2005). Social aspects, such as perceptions about healthiness, perceived benefits and social status attributes and peer and community network influences, are also important in maintaining or changing consumption habits.

To bridge the gap, this study systematically examines the behavioural aspects of areca nut consumers of Karnataka. It aims to analyze spending habits, assess critical dependency variables, and study consumer attitudes from a socio-economic perspective. The results provide important information to guide policymakers, the public health community, industry, and others in designing appropriate interventions, awareness campaigns, and sustainable actions within the market.

II. REVIEW OF LITERATURE

Prakash Gupta and Cecily Ray (2015) reviewed Indian studies on the carcinogenic effects of areca nut, particularly without tobacco. Six case-control studies reported elevated odds ratios for head and neck cancers linked to betel quid use without tobacco. Eight other studies reported significantly increased risks with betel quid containing tobacco. Gutka users showed a notably high oral cancer risk (66.34%). Animal studies confirmed the role of areca nut alkaloids, polyphenols, and copper in carcinogenesis. The authors recommended implementing control measures and mass communication programs to raise awareness of areca nut risks, even when used without tobacco.

Shelly Arora and Christopher Squier (2018) reviewed the economic contribution and public health impact of areca nut consumption, particularly its effect on oral health. The review highlighted that India was the largest producer and consumer of areca nut globally, followed by other Southeast Asian countries. The highest health burden was observed in these regions, mainly due to chewing practices. The authors emphasized the critical role of dentists and auxiliary health professionals in raising awareness and advocated for comprehensive public health strategies to reduce areca nut use. They called for professional training to educate communities about its harmful effects.

Gupte et al. (2020) explored the initiation and continuation of tobacco and areca nut use among adolescents in Mumbai through formative qualitative research. The two-stage study included 14 focus group discussions with 166 students (ages 11–18) and in-depth interviews with 60 adolescents who used these products. Four pathways of use were identified: areca nut only, areca nut-tobacco combinations, smokeless tobacco initiation and smoking initiation. Initiation was driven by curiosity, accessibility, and peer influence. Areca nut served as a gateway product for tobacco use. The study stressed the importance of understanding early desensitization and called for school-based interventions and regulatory measures to restrict sales to minors.

Sumithrarachchi et al. (2020) conducted a cross-sectional study at the Dental Teaching Hospital in Sri Lanka to determine the prevalence of tobacco and areca nut use and their association with oral mucosal

lesions. Among 368 patients, 23.9% used tobacco: 41.1% used smokeless, 22.2% smoked, and 36.7% used both. Areca nut or betel quid was used by 25.3%, with 72.8% combining it with tobacco. Use was more prevalent among males and positively correlated with age and inversely with education level. Common oral lesions included pigmentation (10.6%) and oral submucous fibrosis (2.4%). Over 90% of patients exhibited oral abnormalities. The study underscored the urgent need for public awareness campaigns.

Prashant Kumar Singh et al. (2021) discussed inequalities and predictors of areca nut chewing with and without tobacco in India. Using data from the Global Adult Tobacco Survey (2016–2017), they analysed a nationally representative sample of 74,037 individuals aged 15 years and older, with a response rate of 92.9%. Multinomial logistic regression, adjusted for survey design, was applied to identify determinants. Approximately 23.9% of the adult population around 223.79 million people consumed areca nut, primarily with or without tobacco. Males were more likely to use areca nut than females. Consumption was significantly associated with age, marital status, education, occupation, caste, religion and region.

Arvind Kumar et al. (2021) aimed to characterize areca nut use patterns and assess knowledge, attitudes and practices (KAP) among users. The study was conducted in Guwahati, Assam using a self-developed questionnaire and the Betel Quid Dependence Scale. A purposive sampling method selected users from vendor shops across four city assembly areas. Out of 500 approached participants, 479 completed the survey (response rate: 95%). The majority were male (86.1%), aged around 40, married, and educated to at least the secondary level. Most used betel quid with tamul. Pleasure (92%) and stress relief (68%) were cited as reasons for use. A significant proportion (81%) considered areca nut highly addictive. Dependence indicators such as ‘physical and psychological urge’ and ‘increasing dose’ were high, while ‘maladaptive use’ was low. The study emphasized the addictive nature of areca nut and called for stakeholder engagement in control strategies.

Gupte et al. (2022) found that areca nut use, which is perceived as benign by teenagers in India, was addictive and contributed significantly to the country's high oral cancer rates. The cross-sectional study examined the Theory of Planned Behaviour (TPB) determinants of areca nut use among 1,884 adolescents from low-income schools in Mumbai. Self-administered surveys assessed attitudes, subjective norms, perceived behavioural control, and intention. The findings indicated that 27.2% of participants used areca nut, and intention and perceived behavioural control significantly predicted use. The study concluded that TPB constructs helped explain adolescent areca nut consumption and recommended further investigation to develop effective prevention strategies.

Wang et al. (2023) used scientometric analysis to examine 1,403 research papers on betel quid (BQ)-related cancer and precancerous lesions published before 2022. China (including Taiwan), India, the U.S., and the U.K. together accounted for 86.5% of publications and 91.9% of global citations. Taiwan demonstrated the greatest scientific output, with the most papers (457), citations (14,573), and the highest h-index (60). The broader body of research focused on drug use, prevalence, metabolism, and carcinogenesis. Taiwan's cessation programs reportedly achieved favourable outcomes, reducing oral cancer rates and positioning Taiwan as a leader in prevention efforts.

Kumar et al. (2024) stated that areca nut was the fourth most commonly used psychoactive drug in the world, following nicotine, alcohol, and caffeine. It held cultural and religious significance in many countries, including India. However, when consumed during pregnancy, it had direct health consequences for the foetus. The study aimed to identify the prevalence and correlates of areca nut use among pregnant women in India by analysing data from the Global Adult Tobacco Survey-2, which included 1,403 pregnant women. The results showed that an estimated 16% of pregnant women consumed areca nut, with a 24% consumption rate among scheduled tribes. Among the users, 24% consumed areca nut with tobacco and 13% without tobacco. Key determinants of areca nut use were region, caste, religion, place of residence, education level, occupation and economic status. The study suggested implementing intervention programs to reduce areca nut use among pregnant women, including mass awareness campaigns during pregnancy via media and frontline health workers in socio-economically disadvantaged communities.

Sarkar et al. (2024) assessed university students’ knowledge, attitudes and practices related to smokeless tobacco, areca nut and e-cigarettes, and

their effects on oral health. The cross-sectional study was conducted among 500 students in Chennai through a structured questionnaire distributed via Google Forms. High awareness levels were reported: 85.5% were aware that smokeless tobacco could cause cancer, 74.6% recognized the harmfulness of areca nut, and 59.8% understood the adverse effects of e-cigarettes. Despite this awareness, 11.1% reported using smokeless tobacco, 18.9% chewed areca nut, and 3.9% vaped as a tobacco alternative. Around 27.8% of users reported efforts to quit. The findings underscored the need for targeted education and cessation support programs.

III. RESEARCH GAP

While the major health risks associated with processed areca nut products have been well-documented, it was highlighted that there was a lack of clarity on how these differ from the traditional use of raw areca nut and betel leaf. In addition, no regional studies have addressed consumer perceptions, dependence patterns, and cultural motivations for tobacco consumption in Karnataka. Existing studies generalise areca nut use without isolating the effects of its different forms - raw, processed or mixed with harmful ingredients such as slaked lime and tobacco, prompting misleading conclusions. There is also a lack of dedicated, behaviourally focused intervention models that would be relevant to rural and semi-urban populations with embedded consumption patterns.

IV. NEED FOR THE STUDY

Due to its carcinogenic and addictive nature, the consumption of areca nut (commonly locally known) is a public health issue, even when it is part of the culture and is socially accepted. As one of the leading producers and consumers of areca nut, Karnataka has seen its extensive use across the spectrum of age, gender and profession. Despite the consumption, empirical data examining areca nut consumer behaviours, dependence factors and risk perceptions in the state is limited. Because this study is crucial to fill the gap in knowledge, it systematically examines why consumers begin, persist or discontinue use. The consumption of areca nut combined with tobacco, is significantly addictive and is associated with diseases such as Oral Submucous Fibrosis (OSF) and oral cancers. In addition, the expanding use of electronic cigarettes among youth is essential to bring on in traditional environments, which calls for behavioural research. This knowledge can be utilized to formulate interventions that target specific impairing factors based on socio-cultural, motivational and psychological parameters. Moreover, the study also addresses the urgent need to ensure that policymakers, public health advocates and community leaders are aware of the degree of dependence on areca nut and its consequences over time. As concerns rise around the world and nationally, this research provides vital evidence to inform sustainable public health policy and education programs in Karnataka.

V. SCOPE OF THE STUDY

The present study attempts to provide an in-depth study of various aspects of areca nuts across diverse groups of consumers in the state of Karnataka. The emphasis is on analysing the attitudes, cultural connotations, economic imperatives and psychological addictions associated with areca nut consumption. This would encompass urban and rural populations in various districts of Karnataka (Shivamogga, Dakshina Kannada, Chikkamagaluru and Davanagere), offering a more all-encompassing view over the prevalence, frequency and methods of consumption. Besides, it will also contribute to addressing emerging health issues and consumer safety for areca nut consumption practised by educators, health and policymakers. Increasing scientific evidence connecting areca nut to oral health problems and potential addictive properties has made this study both timely and relevant to the region, adding to ongoing discussions of substance use and consumer health behaviour in India.

VI. RESEARCH OBJECTIVES

The primary objective of this study is to examine the correlation between social acceptance, cultural significance and dependency levels associated with areca nut consumption. Specifically, the research aims to:

- To assess the impact of health awareness on the relationship between social acceptance, cultural significance, and dependency, examining whether knowledge of health risks associated with areca

nuts affects personal consumption behavior despite social norms.

Research Hypothesis:

H_{01} (Null Hypothesis): There is no significant relationship between social norms, cultural perceptions, health awareness, and the patterns or frequency of areca nut consumption among consumers in Karnataka.

H_1 (Alternative Hypothesis): There is a significant relationship between social norms, cultural perceptions, health awareness, and the patterns or frequency of areca nut consumption among consumers in Karnataka.

VII. RESEARCH METHODOLOGY

The present study adopts a descriptive and analytical research design to explore Karnataka consumer behavior regarding areca nut consumption. The study aims to examine consumption patterns, assess perceptions of social acceptability and identify the dependency factors influencing regular use. A quantitative approach has been employed, with data collected through a structured questionnaire designed to capture key variables related to consumer behavior, sociocultural perceptions, and frequency of use.

The study is based on primary data collected directly from areca nut consumers residing in selected regions of Karnataka. The data was collected through face-to-face surveys and structured interviews using a pre-tested questionnaire. The questions were designed to gather information on demographic characteristics, consumption habits, perceived social norms, and individual attitudes toward areca nut use.A total of 125 respondents were selected for the study using random sampling. The inclusion criteria for respondents were:

- Individuals aged 20 years and above.
- Currently consuming areca nut in any form (raw, processed, or mixed).
- Residents of Karnataka who have at least one year of regular consumption experience.

The study included respondents from urban and rural areas across key areca nut-consuming districts such as Shivamogga, Dakshina Kannada, Chikkamagaluru and Davanagere. These regions were chosen due to their cultural relevance and higher prevalence of areca nut use.

The structured questionnaire used closed-ended and Likert-scale items to measure perceptions of social acceptability, consumption frequency, and dependency factors. The questionnaire was divided into the following sections:

1. Patterns and frequency of areca nut consumption
2. Perceptions of social norms and cultural practices
3. Health awareness and dependency indicators

The collected data was compiled and analyzed using statistical software (SPSS). The analysis included descriptive statistics (mean, frequency, percentage) to understand general trends in consumption, regression analysis, and Pearson's correlation to examine the relationship between perceived social acceptability and consumption patterns or frequency.

VIII. VARIABLES OF THE STUDY

Dependent Variables

1. Perceived Social Acceptability of Areca Nut Consumption

Perceived social acceptability refers to an individual's understanding of the extent to which areca nut consumption is deemed acceptable, appropriate, or endorsed within their immediate social and cultural environment. This perception significantly influences consumer behaviour (attitudes toward areca nut consumption, perceived norms among peers, family, and community, and cultural endorsement).

Independent Variables

1. Consumption Patterns

Consumption patterns refer to the behavioural dimensions of areca nut usage, highlighting how individuals consume the product in frequency, form, and context (frequency of consumption, quantity consumed per session, and forms of consumption).

2. Frequency of Use

Frequency of use denotes individuals' regularity in areca nut consumption over specific intervals. This variable focuses on tracking use patterns over time and in various social settings (Self-reported consumption frequency, retrospective trend, and contextual consumption).

IX. ANALYSIS OF RESULTS

Demographic Variables:

Table 1: Demographics of Respondents

Demographic Variables		No. of Respondents	Percent
Age	21 to 30	16	12.8
	31 to 40	14	11.2
	41 to 50	28	22.4
	51 to 60	13	10.4
	60 and above	54	43.2
Gender	Male	68	54.4
	Female	57	45.6
Education Level	No formal education	34	27.2
	SSLC	31	24.8
	PUC	17	13.6
	Bachelor's degree	17	13.6
	Master's degree	26	20.8
Category of Respondents	Daily Wage Workers/Laborers	10	8
	Agriculturists	45	36
	Vendors and Small Retailers	28	22.4
	Student	12	9.6
	Homemakers and Domestic Workers	30	24
Residence Type	Urban	33	26.4
	Rural	92	73.6

Source: Primary Data

Table 1 presents the demographic profile of the respondents. The analysis reveals that areca nut consumption is predominantly observed among older adults aged 60 and above, who make up 43.2% of the sample. The majority of respondents (73.6%) reside in rural areas, indicating that areca nut use is more prevalent in non-urban communities. A substantial proportion of consumers have low educational attainment, with 52% having no formal education or only up to SSLC. Regarding employment status, agriculturists (36%) and homemakers/domestic workers (24%) constitute the largest consumer groups, followed by vendors and small retailers (22.4%). This suggests that areca nut consumption is closely associated with traditional, informal, and rural livelihoods, where cultural practices and accessibility may drive regular usage.

Table2: Behavioral and Perceptual Dynamics of Areca Nut Consumption

Statements	SA	A	N	D	SD	Mean	SD
Patterns and Frequency of Areca Nut Consumption							
Areca nut is consumed at least once daily as part of a routine	41 (32.8%)	33 (26.4%)	28 (22.4%)	14 (11.2%)	9 (7.2%)	3.66	1.24
The frequency of areca nut consumption has increased over the past year	45 (36.0%)	37 (29.6%)	20 (16.0%)	6 (4.8%)	17 (13.6%)	3.7	1.36
Higher levels of areca nut consumption occur during social gatherings or peer interactions	53 (42.4%)	36 (28.8%)	10 (8.0%)	10 (8.0%)	16 (12.8%)	3.8	1.39

A specific form of areca nut (raw, processed, or flavored) is consistently preferred over others	38 (30.4%)	37 (29.6%)	23 (18.4%)	2 (1.6%)	25 (20.0%)	3.49	1.45
Perceptions of Social Norms and Cultural Practices							
Areca nut consumption is considered socially acceptable in the local community	36 (28.8%)	37 (29.6%)	43 (34.4%)	5 (4.0%)	4 (3.2%)	3.77	1.01
Cultural or traditional practices often encourage the use of areca nut	36 (28.8%)	41 (32.8%)	20 (16.0%)	0 (0.0%)	28 (22.4%)	3.46	1.47
Friends, family, or community members neither oppose nor discourage areca nut consumption	46 (36.8%)	39 (31.2%)	21 (16.8%)	11 (8.8%)	8 (6.4%)	3.83	1.21
Offering or consuming areca nuts is a common part of traditional functions and rituals	51 (40.8%)	40 (32.0%)	27 (21.6%)	3 (2.4%)	4 (3.2%)	4.05	0.952
Health Awareness and Dependency Indicators							
It is believed that chewing raw areca nut in moderation helps improve digestion and relieve gastric discomfort, aligning with traditional medicinal claims.	50 (40.0%)	44 (35.2%)	29 (23.2%)	1 (0.8%)	1 (0.8%)	4.13	0.85
Respondents reported experiencing a strong urge or craving to chew areca nut multiple times a day, indicating signs of psychological dependency.	53 (42.4%)	36 (28.8%)	20 (16.0%)	8 (6.4%)	8 (6.4%)	3.94	1.19
Many consumers acknowledged difficulty quitting the habit, highlighting habitual behavior patterns and physical dependency.	49 (39.2%)	43 (34.4%)	2 (1.6%)	4 (3.2%)	27 (21.6%)	3.66	1.54
Respondents demonstrated limited awareness that the regular intake of processed areca nut products, such as gutka and paan masala, significantly increased the risk of developing oral submucous fibrosis and oral cancers.	41 (32.8%)	31 (24.8%)	3 (2.4%)	24 (19.2%)	26 (20.8%)	3.3	1.58

Source: Primary Data

The values of consumer responses provide valuable insights into the behavioural and perceptual aspects of areca nut consumption in Karnataka. Frequent daily habit of chewing areca nuts is common among most respondents, as 32.8% of the subjects strongly agreed, and 26.4% agreed that they eat areca nuts daily. The mean score of 3.66 indicates a moderately high level of habitual use. In addition, a large majority of them (65.6%) think that the amount they consume has increased in the past year, suggesting an upward trend in usage. The average supports this increasing tendency at 3.70. Social factors seem to exert the most significant influence on consumption; 42.4% strongly agreed, and 28.8% agreed with the statement that the number of areca nuts they consumed was more important during social gatherings. Such behaviour

illustrates the peer-inducing role of consumption, with a high mean of 3.80.

Consumers also prefer to consume only certain types of areca nuts (raw, processed, or flavored), as 60% of consumers agree or strongly agree that they have a consistent preference. Yet, a standard deviation of 1.45 indicates a significant variation in consumption choices across individuals.

Regarding social norm contexts and social perspectives, responses indicate high social acceptance toward areca nut chewing in the community. Almost 59% of respondents said areca nut is socially acceptable in their communities either agree or strongly agree. In this category, 60.8% agreed that areca nut serves a purpose in traditional functions and rituals, which is supported by the highest mean (4.05) attached to this question, thus further cementing the cultural embedding. Notably, 68% of respondents further agree that their family or community does not discourage consumption, reinforcing that areca nut use is normalized and, in numerous cases, promoted through cultural and familial pathways.

A majority of respondents strongly agreed (40.0%) and agreed (35.2%) that chewing raw areca nut in moderation aids digestion and relieves gastric discomfort, reflecting traditional medicinal beliefs. Also, according to Ayurveda, it has pharmacological effects such as deworming, anti-inflammatory, improving gastrointestinal function, lowering blood lipids, preventing atherosclerosis and anti-depression properties. With a high mean score of 4.13 and low standard deviation (0.85), this statement received strong agreement and consistency across responses, indicating that such perceived health benefits continue to reinforce regular consumption, especially in rural or culturally traditional settings.

In terms of dependency, 42.4% strongly agreed and 28.8% agreed that they experienced a strong urge to chew areca nut multiple times daily, suggesting psychological dependency. The mean score of 3.94 and a moderate standard deviation of 1.19 reflect a significant leaning towards dependency while also showing variability among individuals. Similarly, habitual behavior and physical dependency were highlighted, with 39.2% strongly agreeing and 34.4% agreeing that quitting the habit was difficult. However, the higher standard deviation (1.54) for this item indicates a more polarized response, reflecting differences in age, duration of use, or awareness levels.

When it came to awareness of the health risks of processed areca nuts, such as gutka and paan masala, responses were more divided. Only 32.8% strongly agreed, and 24.8% agreed that regular intake increases the risk of serious conditions like oral submucous fibrosis and cancers. A notable proportion (19.2% disagreed and 20.8% strongly disagreed), and the standard deviation was the highest at 1.58, revealing a critical lack of awareness or denial about the harmful effects of processed areca nut products.

Testing of Hypothesis:

H_{01} (Null Hypothesis): There is no significant relationship between social norms, cultural perceptions, health awareness, and the patterns or frequency of areca nut consumption among consumers in Karnataka.

H_1 (Alternative Hypothesis): There is a significant relationship between social norms, cultural perceptions, health awareness, and the patterns or frequency of areca nut consumption among consumers in Karnataka.

Table3: Results of Regressional ANOVA

Regressional ANOVA	Sum of Squares	Degrees of Freedom	Mean Square	F-value	p-value	R^2
Perceptions of social norms and cultural practices	12.863	2	6.431	3.5452	0.000	0.593
	221.39	122	1.814			
Health awareness and dependency indicators	13.691	2	6.845	4.1237	0.001	0.629
	202.52	122	1.660			

Dependent Variable: Patterns and frequency of areca nut consumption

Source: Output from SPSS

A regression analysis was conducted to examine the influence of two independent variable groups, perceptions of social norms and cultural practices and health awareness and dependency indicatorson the

patterns and frequency of areca nut consumption.The first model, which tested the effect of social norms and cultural practices, yielded an F-value of 3.5452 and a p-value of 0.000, indicating that the model is statistically significant at the 0.05 level. The R^2 value of 0.593 suggests that approximately 59.3% of the variance in consumption patterns can be explained by social norms and cultural factors. This demonstrates a strong and statistically significant influence, implying that cultural traditions and social behaviors significantly shape areca nut consumption patterns.

Similarly, the regression model assessing the impact of health awareness and dependency indicators showed an F-value of 4.1237 and a p-value of 0.001, which also meets the criteria for statistical significance. With a slightly higher R^2 value of 0.629, this model explains 62.9% of the variance in consumption patterns. This indicates that health perceptions and dependency behaviors have a slightly stronger and statistically significant effect on areca nut consumption compared to social norms.Overall, both variables, cultural-social perceptions and health-dependency awarenesswere statistically significant predictors of areca nut consumption behavior. However, health and dependency indicators had a greater explanatory power, highlighting the importance of psychological and awareness-related factors in shaping usage patterns.

Table4: Results of Pearson's Correlation

Variables	Correlation Values	Areca Nut Consumption (Frequency)	Health Awareness	Perceived Health Impact
Areca Nut Consumption (Frequency)	Coefficient	1		
	p-value	0.00		
Health Awareness	Coefficient	-0.45	1	
	p-value	0.128	0.00	
Perceived Health Impact	Coefficient	-0.6	0.5	1
	p-value	0.551	0.102	0.00

Source: Output from SPSS

Pearson's correlation analysis provides more evidence that the frequency of areca nut consumption correlates -0.45 with health awareness, indicating that individuals with higher health awareness tend to consume areca nuts less frequently. Perceived Health Impact demonstrates a stronger negative correlation -0.60 with Consumption Frequency, indicating that the perception of health consequences dissuades frequent use. Moreover, a moderate positive correlation of 0.50 exists between Health Awareness and Perceived Health Impact, which suggests that individuals with higher health knowledge are also more likely to perceive more significant health consequences of consumption. Awareness campaigns in both rural and urban areas of Karnataka disseminated through various mediums such as television, newspapers, radio, and local community outreach have played a crucial role in reducing the frequent use of processed areca nut products. These efforts have successfully communicated the potential health risks, particularly the association with oral cancers and other conditions, thereby discouraging habitual consumption among increasingly informed populations. Labelling on processed gutkha and paan masala packets typically includes statutory warnings such as "Chewing is injurious to health" or "Causes cancer," as mandated by food safety and public health regulations, which also acts like spreading awareness about its health risks.

The results carry crucial public health implications. Firstly, the belief in the health benefits of raw areca nut may continue to encourage habitual use unless balanced with accurate medical information. Secondly, the presence of psychological and physical dependency among users signifies the need for addiction support interventions, including behavioral counseling and cessation programs (Warnakulasuriya & Chen, 2022). Finally, the limited awareness of the health risks associated with processed areca nut indicates an urgent need for health education campaigns, especially in rural and semi-urban areas (Mirza et al., 2011). These programs should focus on informing the public and debunking myths and cultural beliefs that perpetuate consumption, with the involvement of healthcare professionals, educators, and local media.

Both regression and correlation results provide strong statistical support for accepting the alternative hypothesis (H1).The findings confirm that cultural or social factors and health-related awareness and dependencies significantly influence areca nut consumption patterns in Karnataka. Health awareness shows a slightly stronger predictive and deterrent effect than cultural practices, underscoring the need for targeted public health interventions that address behavioral norms and knowledge dissemination.

X. FINDINGS OF THE STUDY

The demographic characteristics of the respondents indicate that areca nut consumption is most common among older individuals, especially those aged 60 years and older. Most of these consumers are found in rural areas, indicating that the geographic context strongly predicts consumption patterns. Young adults (20-30 years) were more inclined towards processed or flavoured areca nut products like pan masala, and sweet supari than raw areca nuts, driven by marketing influence, lifestyle factors, peer pressure, and easy access.

The use of aggressive marketing and eye-catching packaging of flavoured areca nut products has led to their increasing appeal to the youth. These products are often marketed as trendy, tasty and convenient, in contrast to raw areca nut, which needs to be prepared beforehand and has a more bitter taste. Peer group and social environment influences, particularly in colleges, workplaces and urban settings, encourage such products providing a mild buzz or stress reliever.

The younger generation is more accustomed to instant gratification and may not be aware of the historical use of raw areca nuts in traditional and cultural domains. Hence, the cultural dissimilarity from traditional chewing has made them frequently inclined toward flavoured, addictive, and chemically strengthened varieties, which regrettably possess far more health hazards (Sumithrarachchi, et al., 2024).

Meanwhile, the low levels of formal education and high proportions of self-employed and retired respondents indicate that traditional habits and lifestyle continuity strongly influence areca nut consumption (Sarkar, et al., 2024). These findings point to the cultural entrenchment and habitual nature of consumption among specific communities. A deeper behavioural analysis suggests that areca nut is a widely entrenched daily habit among many users and often incorporated into social routines. Also, users demonstrate evident preference for certain types of areca nut, meaning they are brand or type loyal due to availability, taste or psychological need (Warnakulasuriya & Chen, 2022).

Cultural and social norms were identified as key enablers of continued areca nut use. Significantly, a high percentage of respondents feel that consumption is normalized in their communities and that it is still accepted during social and religious events. Traditionally, areca nut, locally known as adike has been an integral part of religious rituals, social customs and ceremonial offerings across various communities. It is frequently offered along with betel leaves (thamboola) during festivals, marriages and temple rituals, symbolizing respect, hospitality and auspiciousness. In Hindu culture, particularly during Ganesha Chaturthi, Navaratri and wedding ceremonies, areca nut is presented to deities and guests as a sacred token of blessings and goodwill (Gupte, et al., 2022).

Culturally, areca nut is considered a marker of social bonding and goodwill. Exchanging betel leaves and areca nut during community events or family visits is a long-standing practice, especially in the coastal and Malnad regions of Karnataka. It signifies warmth, honour, and a gesture of unity among people. Even today, thamboolaprasada, which includes areca nut, is distributed after pujas, carrying spiritual value and connecting devotees to centuries-old traditions.Furthermore, in Ayurveda and local folklore, the areca nut is attributed healing and purifying properties. It is often used in post-meal rituals to aid digestion and refresh the mouth. These traditions collectively reinforce the cultural sanctity of the areca nut in Karnataka, making it not just a product of agriculture but a symbol of cultural identity and ritual heritage (Mirza et al., 2011).

The study findings suggest that certain age groups demonstrated limited awareness of the health risks associated with areca nut consumption, particularly in its processed or flavoured forms. In responses related to awareness of health risks from paan masala, and other processed areca nut products indicates a polarized understanding, likely stemming from older adults (60 and above) and young adults (21–30 years), both of whom may lack access to accurate health

information or remain influenced by cultural normalization of such products.

It is important to note that raw areca nuts consumed with betel leaf alone have not been scientifically proven to pose any significant health risks. On the contrary, this combination is widely acknowledged in Ayurvedic traditions for its digestive benefits, mild laxative effect, and use as a natural mouth freshener (Norton, 1998; Toprani & Patel, 2013). Most respondents affirmed the perceived advantages, including relief from gastric discomfort, with a high degree of agreement and consistency.

In contrast, scientific evidence links the consumption of betel quid (which includes additives like tobacco, slaked lime, and catechu) and processed or flavoured areca nut products (such as gutka and pan masala) to severe health conditions such as oral submucous fibrosis and oral cancer (WHO (IARC), 2004). Unfortunately, many studies and media narratives have wrongly conflated these harmful forms with raw areca nut, leading to a misguided public perception that all forms of areca nut use are hazardous (Bhat, et al., 2023).

Frequent usage of betel quid and processed or flavoured areca nut made with slaked lime is linked to oral submucous fibrosis. It can also result in gum disease, tooth decay, and teeth staining. It has psychoactive effects that make it capable of creating addiction and dependency when used for a longer duration. Winstock, et al. (2000) also pointed to connections between cardiovascular and metabolic problems. Despite being an integral part of many cultures, the health risks related to areca nut consumption are well-established, yet spreading awareness warrants intervention to reduce their rate of wide use.

This study supports the critical distinction between these different forms of consumption. It emphasizes that health risks are associated explicitly with betel quid and processed or flavored areca nut products, not with the traditional use of raw areca nut with betel leaf. Recognizing this difference is vital for designing informed health education programs, preserving beneficial conventional practices, and targeting only the genuinely harmful variants of areca nut consumption in public health interventions.

XI. SUGGESTIONS

The study provides suggestions for addressing the rampant use and health hazards associated with it. In the first instance, general awareness campaigns must be created to connect knowledge and practice. Many consumers do know about the health concerns, but industrial use and cultural acceptance make it difficult for them to stop. Therefore, health education programs must incorporate personal narratives, visual aids, and testimonials on the long-term effects of areca nut consumption on oral and overall health.

The second need is community engagement. Because areca nut consumption is embedded in cultural and social practices, interventions must include local leaders, healthcare workers, and cultural influencers as change agents within their communities. Current consumers and the younger generation can be reached out by conducting village-level workshops and introducing areca nut awareness in the health education curricula of schools.

Third, create stricter access control and product regulation. Local authorities may explore whether to regulate the sale of flavoured and processed areca nut goods, particularly among young people. Improving warning labels and restricting marketing could make products less appealing and less available. A range of support services, including de-addiction counselling and behavioural therapy, must be available at primary-level health care centres. Offering resources for cessation and recognizing areca nut addiction as a public health concern are significant steps to sustained behavioural change.

While discouraging harmful processed forms, public health efforts should acknowledge traditional Ayurvedic uses of raw areca nut (with betel leaf) as a digestive aid and mouth freshener. Educational campaigns can guide consumers on safe and moderate use rooted in traditional practice, without promoting misuse. Institutions should be encouraged to undertake scientific studies to validate or refute Ayurvedic claims related to raw areca nut consumption. This will help separate culturally safe practices from harmful habits and could support the development of regulated herbal formulations using purified areca compounds for digestive or therapeutic use.

XII. CONCLUSION

The findings of this study underscore critical insights into areca nut consumption behaviour among consumers in Karnataka. Despite growing awareness of the health risks, particularly regarding processed and flavoured areca products, many individuals continue regular use due to deep-rooted cultural norms, perceived digestive benefits, and psychological dependency. Consumers, especially those in rural regions and older age groups, tend to associate raw areca nut use with traditional Ayurvedic values, while younger individuals show a rising inclination towards flavoured or commercialized variants, which are proven to be harmful.The study clearly indicates that consumer behaviour is not solely dictated by health awareness but is profoundly shaped by social conditioning, peer influence, and generational habits. Thus, tackling this issue demands more than just educational efforts, and it requires behavioural transformation through community-level involvement, access to support services, and policy regulation. Empowering consumers with factual knowledge while offering viable alternatives and support mechanisms is key to mitigating the public health burden posed by areca nut consumption.

REFERENCES

[1] Arora, S., & Squier, C. (2018). Areca nut trade, globalization, and its health impact: Perspectives from India and Southeast Asia. Perspectives in Public Health. https://doi.org/10.1177/1757913918792591

[2] Bhat, S. K., Kalladka, P. K., & Bhat, S. (2023). Arecanut (Areca catechu L.) chewing causes cancer, OSF and others in humans: Is it not a mistaken identity – An overview. International Journal of Medical Science and Dental Research, 6(4), 34–43. https://www.ijmsdr.org

[3] Gupta, P. C., & Ray, C. S. (2015). Areca nut use and cancer in India. Biomedical Research Journal, 2(2), 140–160.

[4] Gupte, H. A., Chatterjee, N., & Mandal, G. (2022). Using the theory of planned behavior to explain and predict areca nut use among adolescents in India: An exploratory study. Substance Abuse and Rehabilitation, 13, 47–55. https://doi.org/10.2147/SAR.S377606

[5] Gupte, H. A., D'Costa, M., & Chaudhuri, L. (2020). Why do adolescents initiate and continue using tobacco and areca nut?: A qualitative study tracing pathways of use among school-going adolescents in Mumbai, India. Nicotine & Tobacco Research, 22(11), 2022–2031. https://doi.org/10.1093/ntr/ntaa015

[6] Kumar, A., Oswal, K., Singh, R., Kharodia, N., Pradhan, A., Sethuraman, L., Venkataramanan, R., &Purushotham, A. (2021). Assessment of areca nut use, practice and dependency among people in Guwahati, Assam: A cross-sectional study. ecancer, 15, 1198. https://doi.org/10.3332/ecancer.2021.1198

[7] Kumar, K. A., Kumar, S., & Gupta, A. (2024). Prevalence and determinants of areca nut use among pregnant women in India. Journal of Substance Use. https://doi.org/10.1080/14659891.2024.2335486

[8] Mirza, S. S., Shafique, K., Vart, P., & Arain, M. I. (2011). Areca nut chewing and dependency syndrome: Is the dependence comparable to smoking? A cross-sectional study. Substance Abuse Treatment, Prevention, and Policy, 6, 23. https://doi.org/10.1186/1747-597X-6-23

[9] Norton, S. A. (1998). Betel: Consumption and consequences. Journal of the American Academy of Dermatology, 38(1), 81–88. https://doi.org/10.1016/S0190-9622(98)70543-2

[10] Sahoo, P., & Satapathy, S. (2018). Areca nut cultivation and its marketing in India: An overview. International Journal of Research and Analytical Reviews, 5(1), 689–696.

[11] Sarkar, A., Vinayachandran, D., C, G., M, S., Siluvai, S., Gurram, P., A C, L. R., S, M., V, K., & K, R. (2024). Knowledge, attitudes, and practices of university students regarding the impact of smokeless tobacco, areca nut, e-cigarette use on oral health. Cureus, 16(8), e66828. https://doi.org/10.7759/cureus.66828

[12] Senthil Kumar, S., Chandra Bose, S., & Muralidharan, C. (2005). Marketing efficiency of areca nut in Karnataka. Indian Journal of Agricultural Marketing, 19(3), 23–30.

[13] Shekharappa, K. L., & Chandrakanth, M. G. (2007). Market integration and price transmission of areca nut in Shimoga district of Karnataka. Indian Journal of Agricultural Marketing, 21(2), 124–131.

[14] Singh, P. K., Yadav, A., Singh, L., Mazumdar, S., Sinha, D. N., Straif, K., & Singh, S. (2021). Areca nut consumption with and without tobacco among the adult population: A nationally representative study from India. BMJ Open, 11, e043987. https://doi.org/10.1136/bmjopen-2020-043987

[15] Singh, R., & Swamy, S. N. (2017). Market arrangements and price dynamics of areca nut in India: An empirical study. International Journal of Business and Economics Research, 6(1), 1–10.

[16] Sridhara, S., Nagaraj, N., & Nagaraju, K. (2014). Constraints faced by areca nut growers in Shimoga district. Journal of Agricultural Sciences, 9(3), 205–209.

[17] Sumithrarachchi, S., Athukorala, I., Rumy, F., & Jayasinghe, R. (2024). Prevalence of tobacco and areca-nut use among patients attending dental teaching hospital in the central province of Sri Lanka and its association with oral mucosal lesions: A cross-sectional study. Journal of Oral Biology and Craniofacial Research, 14(1), 39–43. https://doi.org/10.1016/j.jobcr.2023.11.006

[18] Toprani, R., & Patel, D. (2013). Betel leaf: Revisiting the benefits of an ancient Indian herb. South Asian Journal of Cancer, 2(3), 140–141. https://doi.org/10.4103/2278-330X.114120

[19] Wang, G., Yu, Z., Ji, T., Shi, L., & Liu, W. (2023). A scientometric study of betel quid chewing and oral cancer and precancerous lesions with distinct regional characteristic. Journal of Dental Sciences, 18(3), 1378–1383. https://doi.org/10.1016/j.jds.2023.03.007

[20] Warnakulasuriya, S., & Chen, T. H. H. (2022). Areca nut and oral cancer: Evidence from studies conducted in humans. Journal of Dental Research, 101(10), 1139–1146. https://doi.org/10.1177/00220345221092751

[21] Winstock, A. R., Trivedy, C. R., Warnakulasuriya, K. A., & Peters, T. J. (2000). A dependency syndrome related to areca nut use: Some medical and psychological aspects among areca nut users in the Gujarat community in the UK. Addiction Biology, 5(2), 173–179.

[22] World Health Organization, International Agency for Research on Cancer (IARC). (2004). Betel quid and areca-nut chewing and some areca-nut-derived nitrosamines (IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Vol. 85, pp. 37–293). Lyon, France: IARC Press.