



Health Implications of Tobacco and Betel Quid Chewing – an Etiological Survey in The Chittoor District of Andhra Pradesh, India

KEYWORDS

Betel quid, Tobacco, Health ailments

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ABSTRACT

The health implications of tobacco and betel quid chewing were investigated through an etiological survey in the Chittoor district of Andhra Pradesh, India. The sample survey, carried out on 305 individuals, has revealed that both tobacco chewing and betel quid chewing habits are common among women (~ 81%) and rural people (92%). The study highlighted that 60% of the people suffer from knee-joint pains, ~23% from dental disorders, ~18% from gastro-enteric disorders, ~7% from diabetes, 5% from respiratory disorders, ~3% from heart problems, 2% from urinary disorders and less than 1% from the mental disorders. Most of the disorders are found in tobacco chewers (48 to 74%) and non-chewers (29 to 52%), while their prevalence is significantly low in betel quid chewers (zero to 11%). The study recommends that limited chewing of betel quid is good for health and keeps people away from routine health ailments.

INTRODUCTION

The habit of chewing betel quid and tobacco has become traditional food habit of over 10% population of all ages including the daily wage-earners, artisans, agricultural labourers and other workers (Boucher *et al.*, 2002; Gupta and Sen, 2001). The belief that the chewing habit suppresses hunger, quench-thirst and gives relaxedness prompted people to adopt this food habit. The betel quid is a combination of betel leaf (*Piper betel*: Piperaceae), areca nut (*Areca catechu*: Arecaceae) and slaked lime. Quite often tobacco and some condiments are added to it by some individuals. The habit varies from individual to individual and from region to region. While some individuals chew it on special occasions like marriages and festivities, most people adopted it as a daily practice. Among daily consumers, the habit appears in two formats; while some consume it after meals and on special occasions; most others do so throughout the day. Quite often, betel quid chewing is associated with the usage of tobacco in smoke and smokeless forms. The prevalence of several health problems among the people is attributed to the chewing habit (Boffetta *et al.*, 2008). The positive and negative effects of tobacco and betel quid have been highlighted by several authors (Eg. Sarkar *et al.*, 2008; Fatilah *et al.*, 2009). But, so far no attempt was made to correlate the chewing habits of people with the occurrence of common health ailments. The present survey was taken up with a two-fold objective of ascertaining the chewing habits among the people vis-a-vis their impact on nine common health disorders.

MATERIAL AND METHODS

The present survey was conducted through a non-probability sampling procedure called quota sample method, using a structured questionnaire. Under the system, the research team approached the people at their own places and elucidated the details from them through the questionnaire. The questionnaire included questions on the place of living, age, sex, health problems, chewing habits etc. While, the literate people were asked to fill the questionnaire themselves, the illiterates were interviewed and their answers were recorded

on the questionnaire by the research team. The data, so collected were analyzed statistically using online software (www.graphpad.com/quick_calcs/index.cfm/) / (www.percent-change.com/index.php) and MS Excel platforms.

FINDINGS

The finding of the present study are compiled using three methodological approaches, namely the prevalence and distribution of chewing habits, prevalence and distribution of health problems and relation between the chewing habits and the occurrence of health problems in the population and presented in tables 1 and 2 and figure 1.

Prevalence and distribution of chewing habits

As shown in table 1, out of 305 persons from whom the data have been obtained, 226 (~74%) were identified as chewers and 79 (~26%) as non-chewers. Within the group of chewers, 37 persons (16.4%) were addicted for betel quid chewing alone, while 189 persons (83.6%) addicted for the chewing of both tobacco and betel quid. Among the chewers, the habit is distributed in ~92% of rural people and ~8% of urban elite. The gender distribution shows that the habit is more prevalent in women (~81%) compared to men (19%). Based on chewing habits, the sample population was divided into three categories, namely tobacco and betel quid chewers (TBQC) betel quid chewers (BQC) and non-chewers (NC).

Table 1: Prevalence and distribution of chewing habit among the people of Chittoor district in Andhra Pradesh.

Chewing habit			Type of chewing			Rural-urban distribution of chewing habit			Gender distribution of chewing habit		
Chewers	Non-chewers	Total	BQ* chewers	TBQ*	Total	Rural	Urban	Total	Men	Women	Total
226	79	305	37	189	226	207	19	226	43	183	226
(74)	(26)	(100)	(16.4)	(83.6)	(100)	(91.6)	(8.4)	(100)	(19)	(81)	(100)

Figures in parentheses represent percentages.

*BQC: Betel Quid; TBQ: Tobacco & Betel Quid. Prevalence and distribution of health disorders

Prevalence and distribution of health disorders

The prevalence of nine common health ailments, namely knee-joint pains, diabetes, respiratory disorders, hypertension, heart problems, stomach problems, urinary disorders, dental disorders, mental disorders in the district were surveyed and presented in table 2. Of the 305 persons contacted, 183 (60%) reported that they were suffering from knee-joint pains, while 122 (40%) persons do not have any complaint about this disorder. The sufferers included ~92% rural people and ~80% women. Diabetes was prevalent in 21 persons (~7%), while 284 persons (~93%) reported no such complaints. The patients included 57% rural people and ~81% women. About 5% of the 305 persons reported respiratory problems, while ~95% of them were free from such ailments. The sufferers included ~88% of rural people and 75% women. About 18% of the population complained about the problems of hypertension, while ~82% of them did not. Further, this disorder was prevalent in 85% of rural people and 72% of women. Just ~3% of the total population sample complained about heart problems, while majority of them (~97%) did not have any such problems. The cardiac patients included ~89% rural people and the same proportion of women. Gastric problems were reportedly present in 18% and absent in ~82% of the district population. The sufferers included ~96% of rural masses and 83% women. Urinary problems were reported by a small proportion (~2%) of the sample population, while a vast majority of them (~98%) did not. Significantly, such disorders were very common among the rural folk (~83%) and men (~67%) compared to urban elite (~17%) and women (~33%). Dental and gum-related problems were seen in ~23% of the sample population of which the rural mass constitutes ~94% and the women (~79%). Neurological and mental problems were reported by a small proportion (<1%) of rural which was equally distributed in males and females (~1% each). Apart from the nine disorders cited, about 19% of the sample population has reported ailments such as eye problems, body pains, headache, weakness and obesity (Table 2).

Table 2: Prevalence and distribution of health problems among people of Chittoor district in Andhra Pradesh.

S. No.	Health problem	Prevalence			Pattern of distribution				
		Yes	No	Total	Gender		Rural-urban		Total
					Male	Female	Rural	Urban	
1	Knee-Joint pains	183 (60)	122 (40)	305	36 (19.6)	147 (80.4)	169 (92.4)	14 (7.6)	183
2	Diabetes	21 (6.8)	284 (93.2)	305	04 (19.1)	17 (80.9)	12 (57.2)	09 (42.8)	21
3	Respiratory disorders	16 (5.3)	289 (94.7)	305	04 (25)	12 (75)	14 (87.5)	02 (12.5)	16
4	Hypertension	54 (17.8)	251 (82.2)	305	15 (27.7)	39 (72.3)	46 (85.2)	08 (14.8)	54
5	Heart disorders	09 (3)	296 (97)	305	01 (11.1)	08 (88.9)	08 (88.9)	01 (11.1)	09
6	Stomach disorders	54 (17.8)	251 (82.2)	305	09 (16.6)	45 (83.4)	52 (96.3)	02 (3.7)	54
7	Urinary disorders	06 (2)	299 (98)	305	04 (66.7)	02 (33.3)	05 (83.4)	01 (16.6)	06

S. No.	Health problem	Prevalence			Pattern of distribution				
		Yes	No	Total	Gender		Rural-urban		Total
					Male	Female	Rural	Urban	
8	Dental disorders	71 (23.3)	234 (76.7)	305	15 (21.1)	56 (78.9)	67 (94.4)	04 (5.6)	71
9	Mental disorders	02 (0.7)	303 (99.3)	305	01 (50)	01 (50)	02 (100)	00	02
10	Others*	58 (19.1)	247 (80.9)	305	-	-	-	-	-

Figures in parentheses represent percentages.

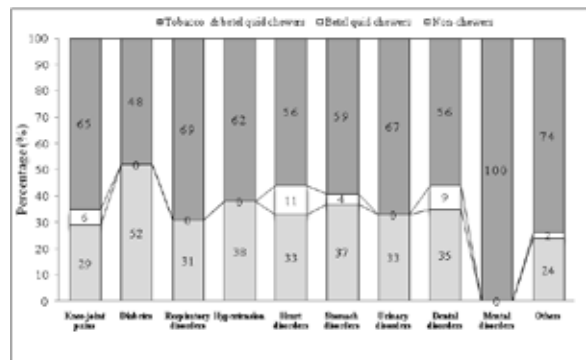
BQC: Betel Quid; TBQ: Tobacco & Betel Quid.

* Eye problems, body pains, headache, weakness and obesity

Chewing habits versus health problems

This part represents a correlative approach in which the prevalence of health ailments was linked to the chewing habits of the sample population. Accordingly, the spread of health disorders among tobacco and betel quid chewers (TBQC), betel quid chewers (BQC) and non-chewers (NC) was surveyed and presented in figure 1. The knee-joint pains were reported by 65% of TBQC, 6% of BQC and 29% of NC. Diabetes was reported by ~48% of TBQC, 0% of BQC and 52% of NC. Respiratory disorders were cited by ~69% of TBQC, 0% of BQC and 31% of NC. Hypertension and BP related problems were seen in ~62% of TBQC, 0% of BQC and 38% of NC, while heart problems were cited by ~56% of TBQC, just 11% of BQC and 33% of NC. Similarly, stomach disorders were seen in ~59% of TBQC, just 4% of BQC and 37% of NC, while urinary complications were reported by ~67% of TBQC, 0% of BQC and 33% of NC. The dental and gums-related problems were reported by ~56% of TBQC, ~9% of BQC and ~35% of NC. But surprisingly, mental problems were reported by TBQC, while two other groups (BQC and NC) have not reported such complications. Other health ailments like eye problems, body pains, headache, weakness and obesity were cited by ~74% of TBQC, ~2% of BQC and ~24% of NC (Fig.1).

Fig.1: Prevalence of health disorders among betel quid chewers, tobacco and betel quid chewers and non-chewers in the Chittoor district of A.P.



DISCUSSION

A large number of diseases are associated with food habits, life styles and environmental factors (Nelson and Heischouer,1999). Tobacco chewing and betel quid chewing have been cited as two important food habits that affects the global health condition (Gupta and Sen, 2001; Pauli,

2002). The present study shows that chewing habit is seen in 74% of the people in the Chittoor district of Andhra Pradesh. Based on chewing habit, the sample population is divided into tobacco and betel quid chewers (TBQC) and betel quid chewers (BQC) and those who do not chew are considered as non-chewers (NC). About 84% of the chewers belong to the first category (i.e., TBQC) and the remaining 16% of the population belong to the second category (i.e., BQC). About 92% of rural people are addicted to chewing habit, while a small section of the urban elite (~8%) has shown inclination towards it. The gender distribution of the habit indicates that more and more women (~81%) became addicted to chewing, while only a small section (19%) of them kept away from it. The current study confirms the earlier findings that the chewing habit is more widespread among women, compared to men and is closely associated with rural life (Hughes *et al.*, 2000). Thus, the distribution pattern of chewing habit in the sample population indicated that TBQC outnumber BQC in both rural and urban areas and in both the sexes. The belief that chewing suppresses hunger and thirst and gives relaxedness could have prompted people to addict to the habit (Boffetta *et al.*, 2008).

Common health problems versus chewing habits

The survey traced nine health problems as endemic to the sample population in the region. A vast majority of the people suffer from knee-joint pains (~60%), followed by dental disorders (~23%), hypertension and stomach or gastro-enteric disorders (~18% each), diabetes (~7%), respiratory disorders (~5%), heart problems (~3%), urinary disorders (~2%) and mental disorders (<1%). In addition, about 19% of people reported other health complications like eye problems, body pains, headache, weakness and obesity. The disorders are more widespread in rural areas (57 to 100%) compared to urban towns (~4 to 43%). Further, all ailments, except urinary problems, are more widely distributed among women (50 to 89%) compared to men (11 to 50%). Exceptionally, the kidney-related problems persist more in men (~67%) compared to women (~33%).

The study made a sincere attempt to correlate these disorders to the chewing habits of the people. As shown in the figure 1, all the nine disorders are widely distributed among TBQC (56 to 100%), followed by NC (24 to 52%) and BQC (zero to 11%). A review of literature reveals that tobacco (*Nicotiana tobaccum*: Solanaceae) is the prime causative agent of all human ills. Majority of chewers use it as an additional input in the betel quid. It contains a principle alkaloid called nicotine and three other minor alkaloids, namely germaesene, anabasine besides piperidine, polycyclic aromatic hydrocarbons, polonium, nitrosodiethenialamine, nitrosoproline, carboxylic acids, phenols and esters (Dickson, 1954). These components proved harmful to health, both in smoke and smokeless forms. It is well-known for its toxic and carcinogenic properties and has been implicated in oral cancer apart from those of the pharynx, gut and other visceral organs. It has been cited as an agent of cardio-vascular problems and mental depression leading to death (WHO, 2003; Pednekar and Gupta, 2007). The World Health Organization's estimates put the death toll of tobacco consumption at 100 million in the 20th century and it is expected to touch one billion mark in the 21st century (WHO, 2011). Notwithstanding its health hazards, people consume tobacco for its anti-helminthic, anti-ulcer, anti-septic, anti-indigestive, anti-diarrheal, anxiety relieving, wound-healing, mood-elevating and narcotic properties (Ershoff *et al.*, 1978; Kung and Iso, 1978; Singh *et al.*, 1989).

The present survey reveals the minimal presence of health problems among BQC (zero to 11% only) compared to those of TBQC and NC and hence the betel quid chewing appears to be good for health (Fig.1). Obviously, the medicinal value of betel quid and its components (betel leaf, areca nut and lime) deserved to be recalled. Betel leaf, the principle ingredient of betel quid comprises of proteins, water, fats, carbohydrates and a starch-digesting enzyme called diastase, vitamins (thiamine, niacin, riboflavin, carotene, ascorbic acid), minerals (iron, phosphorous, potassium, calcium, iodine, nitrogen) and a phenol called chavical has been believed to possess antiseptic and germicidal and cocaine-like properties (Kastura *et al.*, 2001; Warnakulasuriya *et al.*, 2002; Pauli, 2002). It gives pleasant odour in the mouth and often used as a household remedy for common ailments such as the urticaria, the derangement in three humours, namely *pitha*, *vatha* and *kabha* and works against bad breath, body pains, intestinal worms, conjunctivitis, constipation, swelling of gums, cuts and injuries (Warnakulasuriya *et al.*, 2002). Further it prevents cell degeneration and bleeding, facilitates urination, promotes lactation, modulates immunity, sweetens the breath, improves taste and voice, cleans abdomen and protects liver and cardio-vascular systems (Ashok, 2011). Because of its pharmacological, anti-bacterial, anti-cancer, anti-mutagenic and anti-fungal properties, the betel leaf is used to check coughs, dyspnea, cancer, indigestion nervous pains, arthritis, mastitis, diabetes, dental plaque and many more common ailments (Jeng *et al.*, 2002; Salleh *et al.*, 2002; Lei *et al.*, 2003; Sarkar *et al.*, 2008; Fatilah *et al.*, 2009). Interestingly, the betel leaf has not been shown to cause any health hazards, but the side effects are associated with the ingredients used in the betel quid (Kumar, 2010). Areca nut (also called betel nut or pinlang or pinang), the second ingredient of betel quid contains nine pyridine alkaloids such as the arecoline, arecoidine, arecaine, arecolidine, guvacine, isoguvacine, guvacoline and coniine which show antimicrobial, cholinergic and anti-helminthic properties (Lord *et al.*, 2002). Areca nut has been implicated in the stimulation of alertness, enhancement of stamina, relief from constipation, strengthening of gums and teeth, prevention of glaucoma, arrest of diarrhea, removal of gut worms and suppression of schizophrenia (Sullivan *et al.*, 2000). Lime, the third ingredient of betel quid, with its neuronal and muscular functions, facilitates digestion, induces spermatogenesis, strengthens bone and teeth, neutralizes areca ill-effects and cures inflammatory swellings and burns (Reddy *et al.*, 1980).

Thus, while the betel leaf and lime show all positive effects on the health condition, the areca nut has both positive and negative implications. It is likely that the betel leaf and lime neutralize the negative impact of areca nut and provide a congenial environment for the maintenance of good health condition. Notwithstanding the negative impacts of areca nut which manifests in the form of profuse perspiration, bronchial and tetanic spasms, asthma, cardio-vascular failure, contraction of pupils, thirst, abdominal pain, diarrhea, tetanic spasms, oral cancer, obesity, diabetes, chronic kidney disease, dental caries, gum recession, DNA damage, metabolic syndrome, palpitation and giddiness (Deng *et al.*, 2001; Boucher *et al.*, 2002; Chang *et al.*, 2006; Kang *et al.*, 2007), the balancing effects of betel leaf and lime vis-à-vis the positive effects of areca could have arrested the manifestation of common health disorders of skeletal, muscular, cardiac, dental, urinary and gastro-enteric problems. Essentially, the severe harmful effects of tobacco could have overrun the positive impact of the betel quid, resulting in the manifestation of many, if not all common

health ailments in the sample population. Thus, the survey highlights not only the health-suppressive nature of tobacco but also the health-supportive role of betel quid.

CONCLUSION

The study demonstrates interesting facts. Firstly, it removes the misconception that betel quid chewing is harmful to health and secondly, it strengthens the belief that tobacco chewing is much dangerous than predicted. Almost all common rural health problems are thus attributable to the addiction of tobacco chewing but not to the betel quid chewing per se. Thus the study, while discouraging the use of tobacco, encourages the use of betel quid at least once in a day for maintenance of normal health. Needless to say, the tobacco prohibition is the only remedy for protecting the public health. There is an urgent need to arrest tobacco consumption both in smoke and smokeless forms. What is required is a mass public health awareness programmes among all vulnerable sections of the society including rural masses, students, women, children and illiterates. The report concludes with a message that 'uses betel quid at least once in a day and avoids the use of tobacco even for one time in life in order to prevent the raise and spread of common health hazards.

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