

## RESEARCH ARTICLE

# Cross Sectional Survey on Association between Alcohol, Betel-Nut, Cigarette Consumption and Health Promoting Behavior of Industrial Workers in Ghaziabad

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### Abstract

**Background:** The work force in industries are at risk of developing unduly high rates of health and behaviour related problems including abuse of alcohol, betel nut and cigarette (alcohol, betel nut and cigarette consumption). This study describes the relationships between alcohol, betel nut and cigarette consumption and health promoting behaviour among industrial workers. **Materials and Methods:** A cross sectional survey was conducted on workers in various industries of Ghaziabad city with concerned authority permission. A sample size of 732 workers was calculated based on pilot study. Through Simple random sampling 732 workers in 20 to 50 years age group with informed consent were interviewed through structured, pretested, validated questionnaire in vernacular language by one calibrated investigator. Data on socio demography, alcohol, betel nut and cigarette consumption pattern and health behaviour were collected. The association between health promoting behaviour and alcohol, betel nut and cigarette consumption was analysed by Logistic regression and Chi-square test through SPSS 16 at  $p<0.05$  and 95%CI as significant. **Results:** Total prevalence of alcohol, betel nut and cigarette consumption in study population was 88%. The prevalence of individual alcohol, betel nut and cigarette consumption were 82%, 68% and 79% respectively. Combined alcohol, betel nut and cigarette prevalence in study population was 58%. Alcohol and cigarette users were significantly higher ( $p<0.001$ ) in 30 to 40 years age group with lower level of education having poor attitude towards health promoting behaviour, poor oral hygiene practices and rare indulgence in regular physical exercise. **Conclusions:** This study stimulate further research on exploring methods to prevent initiation of health risk behaviour and promote healthy behaviour with cessation help for the current alcohol, betel nut and cigarette users.

**Keywords:** Alcohol - betel-nut - cigarette - health promoting behaviour - oral cancer - industrial workers

*Asian Pac J Cancer Prev*, **16** (1), 139-144

### Introduction

To maintain good oral health, adherence to optimal oral health behaviour is required. Despite the importance of oral health, which is widely acknowledged, it seems to be a problem for industrial recruits to perform oral hygiene practices in an appropriate and efficient manner (Akrad et al., 2006).

The people higher up the socioeconomic hierarchy have lower levels of chronic diseases than those lower in the hierarchy, a phenomenon known as the social gradient in health, whereby those at the top of the social ladder are healthier than those immediately below them and they in turn are healthier than the next level on the gradient (Morita et al., 2007).

The work environment seriously influences the organism of exposed humans, including the oral cavity. The workers of the industry are highly exposed to harmful

elements in their work environment (Bachanek et al., 2001).

It has long been known that tobacco smoking or alcohol abuse plays a role in the aetiology of oral cancer and that the two agents may act synergistically (Anaise, 1978).

India is likely to face a heavy burden of medical and social problems due to increased alcohol, betel nut and cigarette consumption. General population studies conducted in different parts of the country suggest prevalence rates of use of alcoholic beverages ranging between 23% to 74% among males. Prevalence of tobacco chewing in India (15 years and above) ranging between 11.5-68.3% among males and for the females it was 1.9-64.0% (Reddy, 2004).

Prevalence of smoking tobacco in India (15 years and above) ranging between 23.9-61.8% among males and for the females it was 1.4-24.6%.

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It was estimated that at least 200 million people worldwide practiced betel chewing but the extent of habit varied markedly from one region to another. In India, prevalence ranged from 2.8% to 28.6% and significant differences between sexes were observed (Reddy, 2004).

#### *Issues of alcohol, betel nut and cigarette*

According to ICD-10, oral cancer in the south-western coastal region of Yunlin County is ranked as the 2<sup>nd</sup> most common cause of death from cancer in males, and its standardized mortality rate (34/100,000) is higher than that of the Taiwanese nation (14.9/100,000) and throughout the rest of the world (Tsai et al., 2012).

Tobacco use was a cause of significant morbidity and mortality, including cardiovascular disease, peripheral vascular disease, cerebro-vascular disease, cancer and chronic obstructive pulmonary disease among elderly population. Smoking was associated with higher risk of cognitive impairment and dementia, muscular degeneration, cataract and hearing changes (Mini et al., 2014). Over-consumption of alcohol harms health and social relationships, and, according to, excess alcohol consumption results in 2.5 million deaths every year (World Health Organization).

Chewing betel quid is significantly associated with adverse health effects, including oral and pharyngeal cancer, sub-mucosal fibrosis, gum disease, obesity, metabolic syndrome, hypertension and cardiovascular mortality (Lee et al., 2003; Reddy and Gupta, 2004). Betel quid chewing is a common habit in Southern Asian populations, e.g. Malaysia, India, Pakistan, Sri Lanka, Myanmar, Thailand and Taiwan, and its contribution to the development of oral sub-mucosal fibrosis and oral cancer confirmed (Lee et al., 2003). It also has a significant contribution (86.5%) to the risk of oral leukoplakia and oral sub-mucosal fibrosis. Health-related concerns are not the only motive for oral self-care. Social outcomes also play a potential role for specific health behaviour (Reddy and Gupta, 2004).

Despite numerous studies reporting that the mechanism of alcohol, betel nut and cigarette consumption habits are associated with oral cancer, those that focus on combining alcohol, betel nut and cigarette consumption habits with adopting health promoting behaviour in areas with a high prevalence of oral cancer are scarce. Therefore, a Cross sectional study was conducted on association between Alcohol, Betel-nut, Cigarette consumption and health promoting behavior of industrial workers in Ghaziabad."

#### *Need of the study*

The most common reasons cited for the study that there were several unaccounted factors like exposure of media, messages about tobacco/ betel quid or alcohol, price and cost of alcohol, betel nut and cigarette consumption, psychiatric disorders could have affected the resident's alcohol, betel nut and cigarette behavior.

## **Materials and Methods**

A Cross sectional survey was conducted on 732 industrial workers to determine the association between

Alcohol, Betel-nut, Cigarette consumption and health promoting behavior of industrial workers in Ghaziabad."

#### *Study setting*

The study area was the private industries in Ghaziabad District. It is a planned industrial city in the Indian state of Uttar Pradesh with a population of around 4,661,452 as per 2011 census.

#### *Study population*

Survey was conducted among industrial workers from different type of industries in Ghaziabad. There are several industries in the district with around 1 lakh workers working in them. Out of which Metal, Clothing industries were involved in the study. List of major industries with their names, address, contact numbers were obtained from Industrial development board of Ghaziabad.

A written protocol was prepared for the survey. The protocol contained information like objective and the purpose of the study, description and the type of information to be collected, sampling methods and Statistical methods to analyze the data.

A pilot study was carried out on 60 (10%) subjects in the month of March, 2013 before starting the main study to check feasibility of study, pretesting and validation of questionnaire in vernacular language (English and Hindi). The data of the pilot study were not included in the main study and the necessary modifications were made in the final proforma. Before starting the study, ethical clearance was obtained from the ethical committee of ITS- CDSR Muradnagar, Ghaziabad. Prior permission was also obtained from the authorities of industries selected for the study and to conduct the study among workers.

Prior scheduling was done before conducting the survey and the data was collected during the month of April-May 2013. On the day of survey, prior information was given to industry authorities to make the participants available for data collection.

**Proforma:** Before interview (face to face), a voluntary written consent was taken from the participants before their participation in the study in order to avoid any inconvenience and to ensure full cooperation. Participants were instructed to choose only one answer for each question asked. One calibrated interviewer collected the data by a proforma, comprising variables on Age, Gender, Education, industrial exposure, duration of Employment, duration of Work, Past Dental History, Oral Hygiene Practices, and risk habits and variables on health promoting behaviour.

Alcohol, betel nut and cigarette consumption habits were measured using questions: (A) 'do you drink alcohol?' Participants were classified as 'less consumption' if they had never drank alcohol or had not drank for one year, or 'regular consumption' if they were currently drinking'; (B) 'do you chew betel-nut?' Participants were classified as 'less consumption' if they had never chewed betel-nut or no longer chewed', or 'regular consumption' if they were currently chewing one quid or more per day'; (C) 'do you smoke cigarettes?' Participants were classified as 'less consumption' if they rarely or never smoked or 'regular consumption' if they were a current smoker one

cigarette or more per day'; (D) 'when did you begin to consume alcohol, betel nut chewing or smoke cigarettes?' if participants answered that they no longer partook of these 3 habits, they were asked question (E). 'How long is it since you quit drinking alcohol, betel nut chewing or smoking cigarettes?

Health-promoting behaviour was measured including physical activity, requiring participants to answer the questions: (A) 'Do you take regular exercise?' Participants were classified as 'not often' if their answer was never or sometimes, or 'often' if they usually exercised for >30 min per day, 3 times per week, or 150 minutes per week. (B) Vegetable and fruit habits: 'Do you have 3 portions of vegetables and 2 portions of fruit every day? The answer was classified as 'not often' if they answered never or sometimes, and as 'often' if they usually had at least 3 portions or one and half bowl-sized portions of vegetables, and at least 2 portions or one bowl-size of fruit >5 days per week. (C) Regular dental check-up behaviour: 'Do you generally go to the dental clinic for a check up every half-year?' the answer was classified as 'not regular' if the answer was never or more than one year before visiting a dentist, or 'regular' if they answered that they attended regularly or at least within half a year'. (D) Teeth brushing behaviour: 'do you think that you should brush your teeth after meals?' the answer was classified as 'incorrect' if they did not brush their teeth after meals and use dental floss at least once per day, or 'correct' if they brushed their teeth after meals and used dental floss at least once per day'. (E) Frequency of brushing teeth: 'how many times do you brush your teeth per day? Necessary modifications were also made at the time of preparing the questionnaire.

Before starting the survey, the investigator was trained and calibrated in the department of Public Health Dentistry I.T.S Dental college, Muradnagar and the intra-examiner reliability was calculated using Cohen's kappa statistics and the mean intra-examiner Kappa-value was 0.85 (SD 0.12, median 0.87).

#### *Sampling methodology*

The sample size was determined based on the results of the pilot study and the study participants were selected by Simple random sampling technique. A minimum of 732 workers from, Clothes, Metal, industries, of aged 20 and above consisting 608 males and 124 females were included in the study who gave the informed consent.

Inclusion criteria: *i).* Workers with minimum age of 20 years and above; *ii).* All the workers present in the industry on the scheduled days.

Exclusion criteria: *i).* Participants who is not willing to participate in the study; *ii).* Physically challenged workers were excluded from the study.

#### *Statistical analysis*

The data obtained was compiled systematically, transformed from a pre-coded proforma to a computer and a master table was prepared. Descriptive statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean $\pm$ SD and results on categorical measurements are presented in Numbers (%) and Inferential statistics were performed

using Chi Square test and Logistic Regression keeping p-value<0.05 at 95% confidence level. The statistical software namely SPSS 16.0 was used to analysis of the data and Microsoft excel have been used to generate graphs, tables, etc.

## Results

A total of 732 industrial workers participated in the study with a mean age of 31.59 $\pm$ 8.27. 83.10% (608) patients were males and 16.10% (124) were females (Figure 1). Some people were not interviewed because they were absent from home at the time or because they refused to participate in the study.

Among 732 participants majority 49.86% were in the age group of 21-30 years followed by 40.57% in the age group 31-40 years, 9.56% in the age group 41 and above. (Figure 2).

Among 732 participants the prevalence of Alcohol (82.0%), betel nut (27.2%) with tobacco 40.8% cigarette consumption (79.0%) because the types of betel material

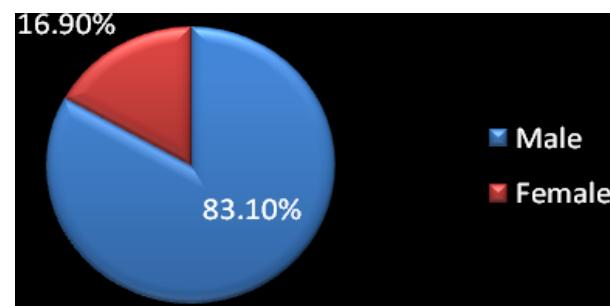


Figure 1. Gender Wise Distribution of Study Subjects

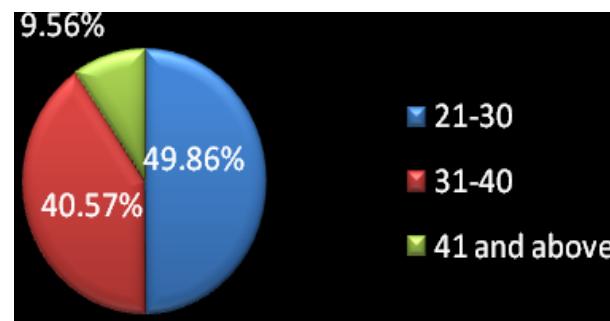


Figure 2. Age Wise Distribution of Study Subjects

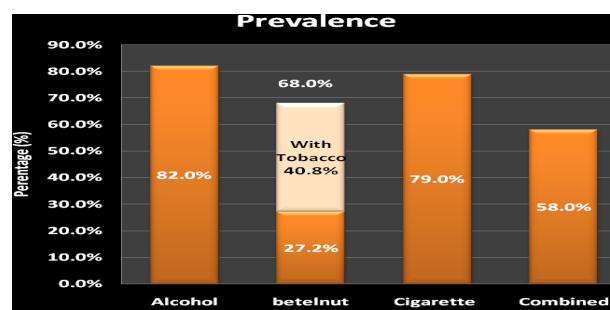
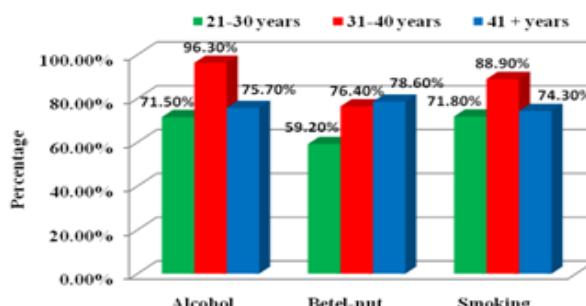
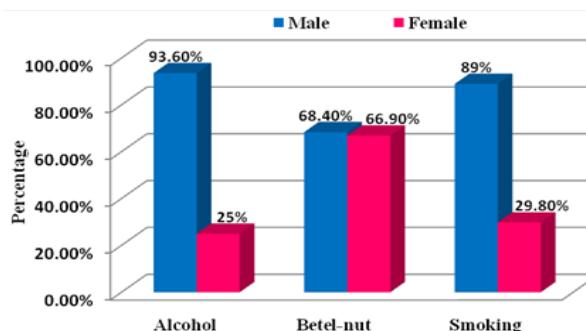


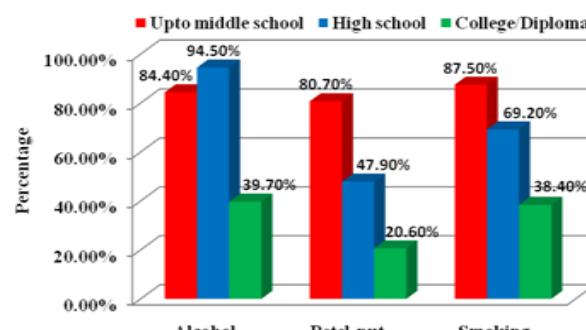
Figure 3. Prevalence of Alcohol, Betel Nut and Cigarette and Combined Alcohol, Betel Nut and Cigarette Consumption



**Figure 6. Prevalence of Alcohol, Betel Nut and Cigarette Consumption in Study Subjects According to the Age Groups**



**Figure 4. Prevalence of Alcohol, betel Nut and Cigarette Consumption in Study Subjects According to Gender**



**Figure 5. Prevalence of Alcohol, Betel Nut and Cigarette Consumption In Study Subjects According to Education**

chewed differed between the participants and the combined prevalence was 58.0%. (Figure 3).

The prevalence of Alcohol, smoking and betel nut chewing was higher among males (93.60%, 89% and 68.40%) than females (25%, 29.8% and 66.90%, respectively (Figure 4). The rate tended to be higher for men and to increase with age.

A total of 94.50% participants who were having high school education consume Alcohol whereas, betel nut consumers were 47.90% and cigarette consumers were 69.20% (Figure 5). Prevalence of all three lifestyle habits was significantly lower among workers who had graduated from college or university compared with workers who had a junior high school level (or below) education.

In Figure 6, According to age group, a total of 96.30% study participants were in the age group 31-40 years who consume alcohol than betel nut (76.40%) and cigarette consumers (88.90%).

**Table 1. The Logistic Regression for Association between Alcohol, Betel Nut and Cigarette Consumption and Health Promoting Behaviour of Industrial Workers**

Variables	$\beta$	Odds Ratio	95%CI	p value
Gender				
Male	3.9	15.81	12.92~19.63	<0.001
Female*				
Educational level				
Up to middle school	2.2	8.38	6.97~10.16	<0.001
High school	6.1	26.07	20.48~32.23	<0.001
College/Diploma*				
Age (years)				
21-30*				
31-40	2.6	10.44	8.95~12.55	<0.001
41 +	0.27	1.24	1.02~1.53	0.36
Physical activity				
Regular*				
Not Regular	0.96	2.75	1.81~3.32	<0.001
Vegetable and fruit Eating				
Good*				
Bad, Don't know	1.3	3.74	2.91~4.78	<0.001
Past Dental Care				
Yes*				
No	0.57	1.72	0.93~3.32	0.09
Tooth brush				
Yes*				
No	0.95	2.73	1.82~3.28	<0.001
How Often Clean Teeth				
<2 time daily	1.3	4.87	3.64~6.55	<0.001
>2 time daily*				

There was a significant difference between geographic location and prevalence of betel nut, cigarette smoking and alcohol consumption among males.

Alcohol, betel nut and cigarette consumption is associated with personal factors and health promoting behaviour:

There were few differences between the personal factors and health promoting behaviour in the alcohol, betel-nut chewing and cigarette smoking groups. Table 1 shows that subjects at study entry who consumed alcohol regularly were predominantly male ( $p<0.001$ ), with a high school education ( $p<0.001$ ), between 31-40 years of age ( $p<0.001$ ), not adopting physical activity ( $p<0.01$ ), not consuming vegetable and fruit ( $p<0.001$ ), not attending regular dental check-ups ( $p 0.09$ ) and brushed their teeth infrequently ( $p<0.001$ ) and frequency of cleaning teeth not more than 2 times in a day ( $p<0.001$ ). The estimated ORs were found to be lower up to middle school educated participants ( $OR=8.38$ ,  $95\%CI 0.1-0.5$ ) and in the age group of 41+ ( $OR=1.24$ ,  $95\%CI 0.1-0.5$ ) as compared to high schools and college/ diploma educated participants and age group 21-30 and 31 to 40 years. Educational level and occupation were found to be significant exogenous factors and were adjusted as covariates for the relationship between health promoting behaviour and smoking, alcohol drinking, and betel quid chewing. The adjusted ORs for factors such as alcohol drinking, cigarette smoking and betel quid chewing remained significantly elevated even after logistic regression analysis.

Subjects who reported low levels of health promoting

behaviour had a higher prevalence of all three lifestyle habits, and was only significant among males workers who consumed alcohol, betel nut and cigarette.

Prevalence of smoking was highest among skilled labour workers and prevalence of betel nut chewing was highest among unskilled/semi-skilled workers.

## Discussion

The present study was attempted to determine the association between Alcohol, Betel-nut and Cigarette consumption and health promoting behavior of industrial workers in Ghaziabad."

Regular users of betel nut and cigarettes are associated with less education and adopting a less health promoting lifestyle. Alcohol, betel nut and cigarette consumption was also significantly associated with males. Very few people first begin to use tobacco in adulthood, with most using tobacco for the first time before graduating from high school. The earlier young people begin using tobacco, the more likely it is that they will continue when they are adults, which in turn means that they are exposed to tobacco for a longer period of time. Nicotine addiction further ensures that many adolescent smokers will regularly use tobacco until adulthood (Oberoi et al., 2014).

The prevalence of alcohol, betel nut and cigarette consumption was identified in 82%, 68.0% (with tobacco it was 40.8%), and 79% of participants, respectively. In addition, when considering the gender difference, males that regularly consumed alcohol, betel nut and cigarette were 93.60%, 68.40% and 89.0%, respectively. These numbers were higher than the nation-wide percentages among both genders. Among males, the prevalence of current alcohol, betel nut and cigarette consumption behaviour was 93.60%, 68.40% and 89%, respectively which was not similar to the study done by Wen et al. (2005) showed the prevalence of alcohol, betel nut and cigarette consumption behaviour was 18.8%, 13.0% and 35.0% among males aged 18 years and above.

The age of starting to use alcohol, betel nut and cigarette consumption was very young 11-12 years old for drinking alcohol, 13 for betel nut chewing and 10 for smoking cigarettes. Moreover, many betel nut users become cigarette smokers and alcohol drinkers. To compare these habits with other countries, it was reported that in Malaysian adults 8.2% were betel quid chewers, a habit that was more prevalent among females (Ghani et al. 2011). Females >40 years old with Indian ethnicity and a history of smoking were likely to develop a quid chewing habit. Despite betel nut and cigarette consumption, the prevalence of alcohol consumption is similar to Germany and South Korea (Donath et al., 2011). It was found that higher alcohol consumption in rural than urban areas in Germany, and found that of the males, 90% are likely to drink excess alcohol in South Korea (Chung et al., 2012).

Participants who chewed betel-nut and consumed cigarettes tended to be male, less well educated, middle aged and an unhealthy life style (Figure 2, and 3). These findings are similar to the results of (Shieh et al., 2003) who described the prevalence of chewing betel-nut and cigarette smoking in the general population 18 or more

years of age in Chiayi city, a south-western coastal city of Taiwan. Based on this finding, the researchers have to develop culturally and linguistically competent health education materials for this group in the future.

With the passage of time, there is an ever increasing burden of both communicable and non-communicable diseases in developing countries. As tobacco is emerging as major threat for non-communicable diseases, it is important for public professionals to concentrate on new emerging health issues like tobacco control (Yadav et al., 2014).

Some potential limitations of this study should be considered before further discussion. One is that research subjects were recruited primarily from the factory workers, and as such generalizability of the results to the youths in the general population in India and other places in the world may be at issue. The present study was cross-sectional in design; thus, there was no scope for follow-up of the study subjects for any change in the pattern of these risk habits and clinical signs. More analytical studies, especially of longitudinal design, are required to establish the association of different socio-demographic variables with alcohol, betel nut and cigarette consumption and consistency of different patterns of consumers.

Another limitation was that the study was conducted on Industrial workers (Metal and clothes), and the findings may not be applicable to other type of industrial workers.

Comparing the data with nationwide statistics, participants exercised 48% and used dental floss 39% less often than the general population (Yadav et al., 2014). A alcohol, betel nut and cigarette consumers also think vegetable and fruit eating were significantly less OR-3.4 and took less exercise (14.5%) than those without these 2 habits (Table 1). Oral health and exercise are recognized as important health-related behaviour conducive to good mental and physical well-being (Mini et al., 2014; Bureau of Health Promotion). Several studies have indicated that it is not only the male gender that is associated with these 3 kinds of behaviour (Sebena et al., 2011; Chung et al., 2012) but that socioeconomic inequalities are important (Wen et al., 2005; Leinsalu et al., 2011; Martinez et al., 2011) with poor education, low economic status and living in rural areas being associated with alcohol, betel nut and cigarette use. (Donath et al., 2011; Leinsalu et al., 2011).

The findings by the study (Mukti RF et al. 2014) emphasize the need to develop health education programs that enhance health promoting behaviour among men and women who are in low socioeconomic groups.

Several studies have indicated that it is not only the male gender that is associated with these 3 kinds of behaviour (Sebena et al., 2011; Chung et al., 2012) but that socioeconomic inequalities are important with poor education, low economic status and living in rural areas being associated with alcohol, betel nut and cigarette use. Our findings indicate that 82% of alcohol 68% of betel nut, and 79% of cigarette users reported abstinence for >1 year which is not similar to the study done by Su-Er (2013), showed prevalence of alcohol, betel nut and cigarette consumption was 35%, 17%, and 26% and a study done by Wen et al. (2005) showed 53.2%, 32.7% and 50.2% participants consumes alcohol, betel nut and cigarette.

Therefore, it is possible to initiate health promoting programs to reduce the prevalence of alcohol, betel nut and cigarette consumption behaviours if the appropriate and cultivated culture-tailed strategies are used. Physical inactivity is a modifiable risk factor for several chronic conditions and a leading cause of premature mortality. An increasing proportion of adults worldwide do not engage in a level of physical activity sufficient to prevent or alleviate these adverse effects (Tsai et al., 2012).

Experts recommend brushing teeth often or at least twice a day, flossing teeth daily and regularly attending dental check-ups every 6 months (Tsai et al., 2012). Professional oral health resource and access to dental services are limited in rural areas. Therefore, community nurses should conduct health promoting programs related to the low cost, but effectiveness, of oral hygiene and physical activity through community-based health development, specifically for the social economic minority and males in rural areas. Although the educational program as intervention is helpful in directing behaviour, the magnitude of the improvement is not satisfactory. Additional efforts in enhancing the effectiveness of the programs are badly needed. Strategies of prevention or control of alcohol, betel nut and cigarette consumption should therefore include: *i)* Cessation of both chewing and smoking, *ii)* reduction of amounts of alcohol, betel nut and cigarette used, *iii)* removal of carcinogenic components from the products, *iv)* change to a safe substitute, *v)* persuade young people not to take up the habits by public education and law enforcement (some patients in our study were younger than 20 years of age), and *vi)* encourage the consumption of green vegetables and beta-carotene.

#### Recommendations

Training programmes of local health workers involving stakeholders regarding the abuse of alcohol, betel nut and cigarette consumption and their general, oral health and social consequences must be conducted at regular intervals.

Further research is required to understand the reasons why people consume alcohol, betel nut and cigarette, and explore ways to prevent initiation and enhance cessation of alcohol, betel nut and cigarette consumption habits in this population.

Habit of smoking and tobacco chewing in the workplaces remained the main areas to be emphasized for the successful implementation of intervention programmes which should include preventive strategies and screening programmes for different pattern of their use and for patients in need of Alcohol and tobacco dependence treatment.

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