

## Original Research

# Assessment of effect of gutkha on serum levels of vitamin B12 and folic acid

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### ABSTRACT

**Background:** Chewing smokeless tobacco has been a common addiction in Southeast Asia for many years. The present study assessed gutkha's effect on serum levels of vitamin B12 and folic acid. **Materials & Methods:** 60 subjects of both genders were divided into 3 groups of 20 each. Group I was smokers, group II was tobacco chewers and group III was control. In group I, the cases who smoked daily for  $\geq 6$  months; in group II, the cases who chewed tobacco or consumed gutkha daily for  $\geq 6$  months. VB12 and FA levels were estimated through the UV-spectrophotometry method. **Results:** Out of 60 subjects, males were 38 and females were 22. the mean vitamin B- 12 level in group I was 1855.3 pg/ml, in group II was 208.5 pg/ml, and in group III was 235.2 pg/ml The difference was significant ( $P < 0.05$ ). The mean folic acid in group I was 2.8 ng/ml, in group II was 2.2 ng/ml, and in group III was 16.4 ng/ml. The difference was significant ( $P < 0.05$ ). **Conclusion:** Compared to non-smokers, smokers had lower blood levels of folic acid, which may have a role in the onset of vascular and cardiovascular disorders. There is a statistically significant correlation between vitamin B12 deficiency and tobacco usage.

**Keywords:** smokeless tobacco, folic acid, vit B 12

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### INTRODUCTION

Chewing smokeless tobacco has been a common addiction in Southeast Asia for many years. Betel leaf chewing with areca and tobacco or without tobacco is frequently used in the South Asian region, significantly in China and Taiwan along with New Guinea and Thailand. Betel nut is being used by millions of people in the world. It is the even the commonest addictive product introduced all over the world.<sup>1,2</sup> Within the B-vitamin family, VB12 is a heat-sensitive, water-soluble vitamin. It is frequently found in nutrients linked to proteins as deoxyadenosylcobalamin, hydroxycobalamin, and methylcobalamin. FA, or folate, is a water-soluble, heat-sensitive vitamin that is also necessary.<sup>3</sup> It is a member of the class of vitamin compounds that include pteroylglutamic acid (PGA), which is used in many metabolic pathways as a cofactor in the enzymatic transfer of single carbon atoms.<sup>4</sup> Optic neuritis in smokers is related to a deficiency of the hydroxocobalamin form of vitamin B-12. In pipe smokers, due to the high amount of cyanide, a good amount of hydroxocobalamin gets converted into cyanocobalamin. Components of tobacco smoke

contain a high amount of cyanide which adversely affects vitamin- B12 metabolism. It is found that smokers have low levels of vitamin B12 in serum with increased excretion of B12 in urine. In addition to B-12, chronic smoking also affects folate levels in the human body. Serum folic acid concentrations are found to be lower in smokers as compared to non-smokers.<sup>5</sup> The present study assessed gutkha's effect on serum levels of vitamin B12 and folic acid.

### MATERIALS & METHODS

The present study consisted of 60 subjects of both genders. All gave their written consent to participate in the study. Data such as name, age, gender etc. was recorded. Subjects were divided into 3 groups of 20 each. Group I was smokers, group II was tobacco chewers and group III was control. In group I, the cases who smoked daily for  $\geq 6$  months; in group II, the cases who chewed tobacco or consumed gutkha daily for  $\geq 6$  months. VB12 and FA levels were estimated through the UV-spectrophotometry method. Data thus obtained were subjected to statistical analysis. P value  $< 0.05$  was considered significant.

**RESULTS**

**Table: I Distribution of patients**

Total- 60		
Gender	Male	Female
Number	38	22

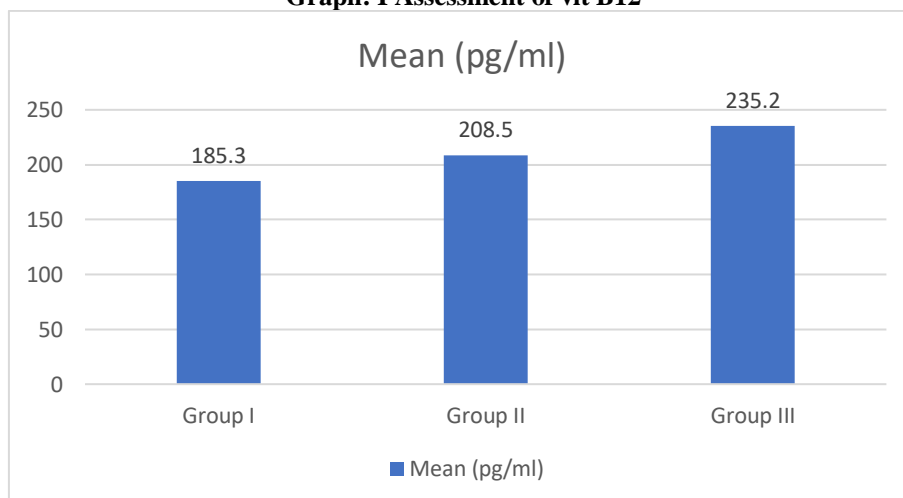
Table: I shows that out of 60 subjects, males were 38 and females were 22.

**Table: II Assessment of vit B12**

Groups	Mean (pg/ml)	P value
Group I	185.3	0.02
Group II	208.5	
Group III	235.2	

Table: II, graph I show that the mean vitamin B- 12 level in group I was 1855.3 pg/ml, in group II was 208.5 pg/ml, and in group III was 235.2 pg/ml The difference was significant (P< 0.05).

**Graph: I Assessment of vit B12**

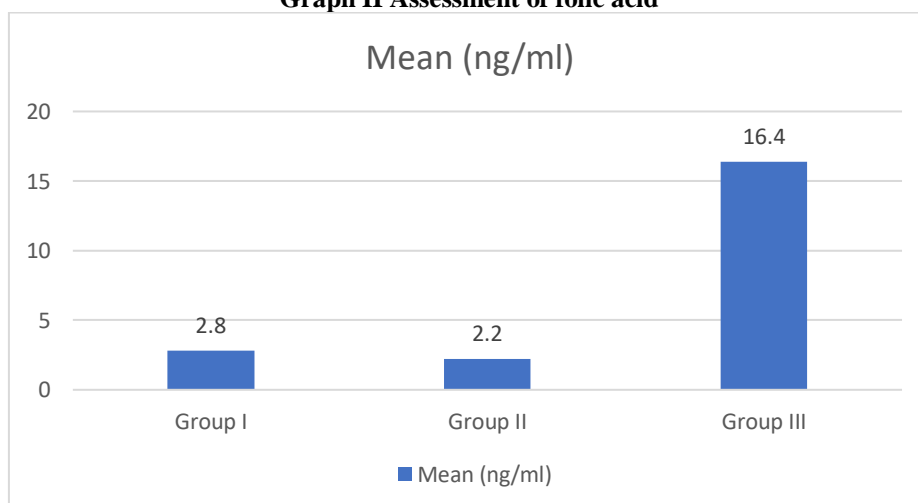


**Table: III Assessment of folic acid**

Groups	Mean(ng/ml)	P value
Group I	2.8	0.05
Group II	2.2	
Group III	16.4	

Table: III, graph I shows that the mean folic acid in group I was 2.8ng/ml, in group II was 2.2 ng/ml, and in group III was 16.4 ng/ml. The difference was significant (P< 0.05).

**Graph II Assessment of folic acid**



## DISCUSSION

An independent risk factor for vascular disease in smokers, homocysteine increase may be caused by abnormal serum concentrations of vitamin B12 and folic acid.<sup>6</sup> Vitamin supplements can help normalize the illnesses. It was discovered that the lungs' polymorphonuclear transit time was delayed right after smoking.<sup>7</sup> Exposure to cigarette smoke can cause folic acid shortage by chemical inactivation, which primarily affects the bronchial epithelium and makes it more vulnerable to neoplastic transformation by the carcinogenic hydrocarbons in tobacco smoke.<sup>8</sup> It has been demonstrated that a number of the hundreds of chemical components included in cigarette smoke, mainly organic nitrites, nitrous oxide, cyanates, and isocyanates, interact with the coenzymes of vitamin B12 and folic acid to convert them into molecules that are not biologically active.<sup>9</sup> The two main forms of vitamin B12 obtained from nutrition are deoxyadenosylcobalamin and hydroxycobalamin. In addition to being water-soluble and heat-sensitive, folic acid is closely related to vitamin B12 in its metabolism.<sup>10</sup> The present study assessed gutkha's effect on serum levels of vitamin B12 and folic acid. We found that out of 60 subjects, males were 38 and females were 22. Tungtrongchitr R et al<sup>11</sup> investigated the effects of tobacco smoking on serum vitamin B12, folic acid and haematological parameters in healthy smokers and non-smokers. One hundred and twenty-three male smokers from a military unit in Bangkok, who participated voluntarily in the study, were investigated. Sixty-six male non-smokers from the same unit were selected as controls. Fasting blood samples were collected for investigation of vitamin B12, folic acid and haematological variables. The serum folic acid concentration of smokers was lower than that of non-smokers, but was not statistically significantly different. Haemoglobin was lower in smokers than in non-smokers; 16.3% of smokers were anaemic compared with only 3.0% of non-smokers. Anaemia was not related to folate deficiency. The white blood cell count was found to be higher in smokers than in non-smokers. We found that the mean vitamin B-12 level in group I was 1855.3 pg/ml, in group II was 208.5 pg/ml, and in group III was 235.2 pg/ml. Vora et al<sup>12</sup> found that out of 120 patients 40 were smokers, 40 were tobacco chewers and 40 were nontobacco users in any forms (controls). Measurement of serum vitamin B12 level was done. The patients having vitamin B12 level >210pg/ml were considered normal. It was seen that in tobacco-consuming patients, vitamin B12 levels in serum were low. 69% of patients with vegetarian diet and 37% of patients with mixed diet had vitamin B12 deficiency. The odds ratio of 3.87 suggests that vitamin B12 deficiency was quite common in a vegetarian diet. We observed that the mean folic acid in group I was 2.8 ng/ml, in group II was 2.2 ng/ml, and in group III was 16.4 ng/ml. Warad et al<sup>13</sup> estimated and correlated serum vitamin B12 (VB12)

and folic acid (FA) levels among periodontally healthy subjects and chronic periodontitis (CP) subjects with habit of smoking and gutkha chewing. The study included 111 subjects ranging in age from 18 to 60 years. Participants were divided into four groups: 30 healthy subjects (Group I), 29 subjects with CP (Group II), 25 smokers with CP (Group III) and 27 gutkha chewers with CP (Group IV). Clinical parameters included pocket probing depth (PPD), clinical attachment level (CAL) & gingival index (GI) following which VB12 and FA levels were estimated through the UV-spectrophotometry method. Pairwise comparison by Mann-Whitney U-test showed an increase in the serum VB12 in Group IV when compared to Group I (p=0.01) and Group II (p=0.01). Although serum FA levels were found to be low in Group III (7.61 ug/ml) & Group IV (8.64 ug/ml), Group III was found to be statistically significant (P=0.046). The clinical parameters GI, PPD and CAL among the four groups of patients were also statistically significant (p < 0.05). The limitation of the study is the small sample size.

## CONCLUSION

Authors found that compared to non-smokers, smokers had lower blood levels of folic acid, which may have a role in the onset of vascular and cardiovascular disorders. There is a statistically significant correlation between vitamin B12 deficiency and tobacco usage.

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