



CODEN [USA]: IAJ PBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1443496>Available online at: <http://www.iajps.com>

Research Article

**SERUM VITAMIN B₃ LEVELS: A COMPARITIVE STUDY
BETWEEN SMOKERS AND NON-SMOKERS.****Dr. Sheeraz Ansari¹, Dr. Mumtaz Ali Qureshi², Dr. Maria Kazi³**¹MBBS, M. Phil (Biochemistry), Senior Lecturer, Department of biochemistry Isra University Hyderabad.²Ph. D biochemistry, Professor of biochemistry, Director Medical Research, Isra University Hyderabad.³MBBS, M. Phil, Ph. D (Biochemistry), Professor and Chair Person, Department of biochemistry, Isra University, Hyderabad.**Abstract:**

Smoking is a bad habit observed in every society all over the world with multiple consequences like from heart and lung diseases to malignancies disturbing the moral, social and economic status of individuals. Vitamin B₃ (niacin/nicotinamide), is water soluble in nature having crucial functions in living cells. The common sources are Fish, Meat, Kidney, Liver, Nuts, vegetables, tea and Coffee. Vitamin B₃ in its phosphorylated form (NADP⁺/NADPH) performs protection against reactive oxygen species induced injuries in multiple biosynthetic pathways. Our objective for this study was to evaluate and compare serum vitamin B₃ levels in smokers and non-smokers. This study was conducted at Isra university hospital Hyderabad from June 2016- December 2016. Smokers and non-smoker subjects were selected by probability sampling though inclusion and exclusion criteria after informed written consent following institutional ethical approval of the project. Sample size was 60 with 30 non-smokers subjects in group A as control group and 30 smokers in group B experimental group. Demographic data was sought on designed proforma. Blood was collected from subjects under aseptic measures and analyzed in Isra university lab for serum vitamin B₃ levels. Mean serum vitamin B₆ level, age and weight in two groups was compared on t-test using SPSS Version 22 along with frequency and percentage. Serum vitamin B₃ was noted as 0.350±0.12 and 1.54±0.32 in smokers and non-smokers respectively p-value 0.001. Mean age in group A (non-smokers) was 33.5 years and group B was (smokers) was 37.4 years p-value 0.59 while age range was 26-44 years. BMI was nonsignificant between the two groups 29.47+ 3.81 and 27.71+3.56Kg/m² p-value 0.67. There was a significant difference in serum vitamin B₃ levels between the smokers and non-smokers

Key Words: Vitamin B₃, Smokers, Non-smokers**Corresponding Author:****Dr. Sheeraz Ansari,**
MBBS, M. Phil (Biochemistry)
Senior Lecturer
Department of Biochemistry,
Isra University, Hyderabad.

QR code



Please cite this article in press Sheeraz Ansari et al., *Serum Vitamin B₃ Levels: A Comparative Study between Smokers and Non-Smokers.*, Indo Am. J. P. Sci, 2018; 05(09).

INTRODUCTION:

Vitamin B3 is one the water soluble vitamins also called as nicotinamide and niacin it gets incorporated into NAD (nicotinamide adenine dinucleotide) a hydride ion acceptor in the electron transport chain to form the reduced dinucleotide NADH. In its phosphorylated form (NADP+/NADPH) vitamin B3 performs protective functions in various biosynthetic pathways[1]. This vitamin is frequently found in Meat, Kidney, Liver, Fish, Legumes, Green vegetables, Coffee and Tea [2]. It also helps the body in the synthesis of sex hormones [3,4]. The deficiency of this important vitamin results in glossitis initially but later on gets more severe leading to pellagra with Dermatitis, Diarrhea and Dementia, famous 3 Ds[1]. Corn contains tryptophan deficient Zein protein so if taken as main diet it may result into the deficiency of this precious vitamin with is required at 17-21 mg/day for normal adults[5]. It is suggested in various studies that Chronic tobacco smoking may lower plasma micronutrients concentration either by competing for absorption or by increasing their breakdown[6,7]. It is assumed that tobacco smoking reduces its absorption or affects the incorporation of niacin into NAD+, NADH, NADP+, NADPH ,co-enzymes involved in the process of energy generation as well as DNA repair[8].

Tobacco, a leafy green plant needs warm climate for its growth having above 70 taxonomic categories with *Nicotianatabacum* most commercialized one while stronger one is the *Nicotianarustica* [9]. A tobacco product includes the Cigarette is being smoked as a common habit in Pakistan as well as other countries since longer periods possibly to relieve stress by some and as an enjoyment by the youth. Nicotine component of inhaled smoke reaches the brain quickly and owing to its stimulant properties, makes the smokers relaxed but it has high addictive potential which produces withdrawal effects. When used at higher dose effects become CNS depressant thus inhibit the signal transduction between nerve cells and the affected organs[10]. Tobacco contains many chemicals (toxic or carcinogenic) exceeding 400 that affect the human body systems as estimated by WHO 3.5million people are dying/year as a consequence diseases associated with tobacco smoking[11]. Prevalence of smoking in Pakistan was reported as 36% , 9% and 13% for males, females and adolescents[12-14]. Smoking habit still persists on top despite of FCTC (Framework Convention on Tobacco Control) by WHO agreed by 40 nations including Pakistan to reduce smoking by raising taxes on tobacco sale along with improving ventilation and banning

publicity of tobacco progressively. Tobacco puts the smokers on high risk for a variety of chronic diseases like cardiovascular (Ischemic heart diseases), pulmonary (COPD and asthma), cancers and infectious diseases like influenza A (H1N1) and tuberculosis[15,16]. The tobacco initiates the biosynthesis of different mediators, acute phase proteins such as hs-CRP, ferritin and cytokines leading to inflammation, insulin resistance and atherosclerosis[16,17]. The current research was focused to evaluate and compare the effects of tobacco smoking on serum vitamin B₃ as there was knowledge gap in searched literature with clues available for the deficiency of other vitamins.

METHODOLOGY:

Approval was taken from institutional ethical review committee after planning the research design. 60 volunteers 30 smokers and 30 non- smokers were selected through inclusion criteria: (Chronic smokers with ≥ 4 cig/day for ≥ 5 years with age, sex matched non- smokers with age range 20-50years males) and exclusion criteria: (inflammatory bowel disease ,Vegetarians, history of medication, alcohol- or substance abuse and other co-morbidities). Informed written consent was acquired from the participants and the demographic data was recorded on the predesigned proforma. Blood samples for lab tests were drawn according to aseptic protocols and put in jell tubes and sent to Isra University hospital research lab for serum vitamin B₃ levels. Vitamin B₃ was assessed according to the protocol Bioassay technology laboratory Shanghai china on Roche automated 9.2 chemistry analyser using instrumental Kit for enzyme-linked immunosorbent Assay (ELISA).

Statistical Analysis:

Data analysis was accomplished on SPSS Version 22 using student's t-test to compare mean serum vitamin B3 levels, age and BMI of two groups. Percentage and frequency was also calculated on the same software. Level of significance was placed at p-value < 0.05 .

RESULTS:

Mean age in non-smokers (group A) was found 33.5 ± 2.3 years while it was 37.4 ± 3.1 years in smokers (group B) that was not significant statistically (p-value 0.59). Age range in the study subjects was noted 26-44 years. There was no significant difference in BMI between the two groups that was 29.47 ± 3.81 for smokers and 27.71 ± 3.56 Kg/m² non-smokers (p-value 0.67). Serum levels for vitamin B₃ were 0.350 ± 0.12 in smokers group and 1.54 ± 0.32 in non-smokers group

that was significant statistically with p-value 0.001. (Table 1)

Table #1. Comparing study parameters b/w two groups (n=60)

S. No	Parameters	Non-Smokers Group A(n=30)	Smokers Group B(n=30)	P-Value
1	Age (Years)	33.5±2.3	37.4±3.1	0.59
2	BMI (Kg/m ²)	27.71±3.56	29.47± 3.81	0.67
3	Serum Vitamin B ₃ (mcg/ml)	1.54±0.32	0.350±0.12	0.001

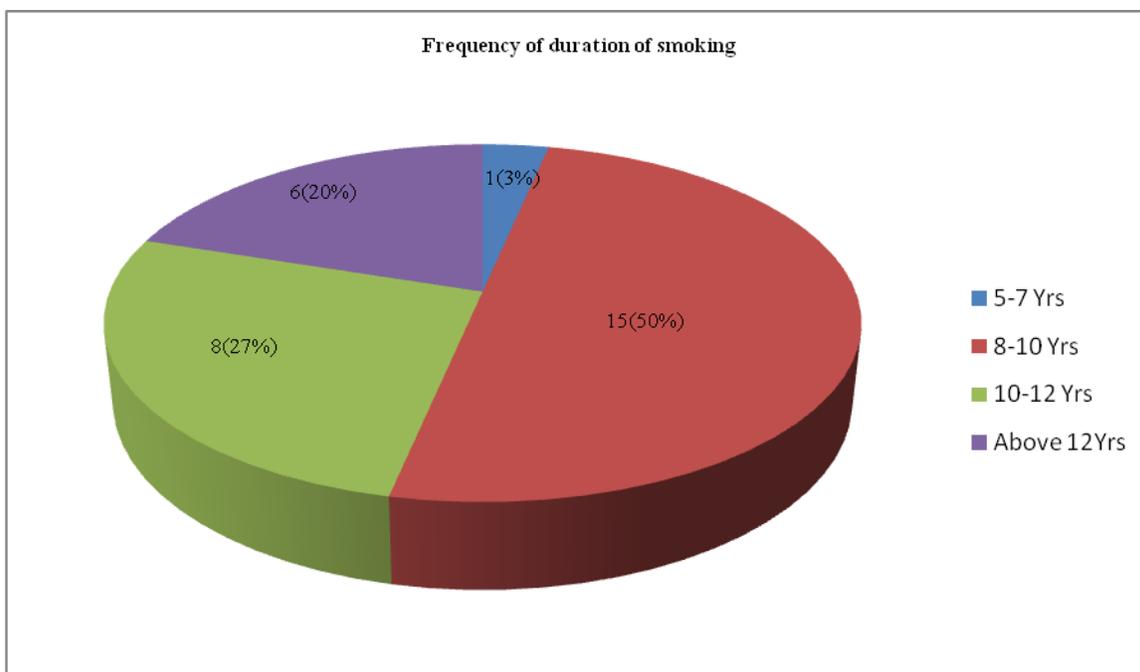


Figure #1. Frequency and percentage of duration of smoking

DISCUSSION:

We could not find any research publication the topic but some retrospective as well as prospective research work related to other vitamins and have shown similar effects of Chronic tobacco smoking on plasma concentrations of Vitamin D, Vitamin B6, and Vitamin C Vitamin B12 [18, 19]. In this study a significant difference is noted in the level of serum vitamin B3 in smoker and non-smoker subjects with P-value 0.001. Preston AM et al (1990) also reported smoking reduces serum level of vitamin C and β -carotene in plasma which is parallel to our findings [20]. Findings reported by Gabriel HE et al (2009) about significant reduction of Vitamin B9 and Ting Li et al (2003) about the Vitamin A reduction in smokers also supports our current study results of reduced B3 levels in smokers [21, 22]. Singh D (2016) in his research work concluded the smoking to reduce in Vitamin B12 levels significantly, that too

falls in consistent to our findings [23]. However Constantine et al (2008) [24] was not in accordance to the current results as he reported no effects of smoking on serum Vitamin B12 and serum iron levels. Our study was on a small sample size but it will open the gate for other researchers to work on larger populations and multiple parameters which we could not due to financial affordability. Cigarette smoking can be withdrawn as there is much advancement in treatment options like bupropion HCL (An antidepressant), NRT (nicotine replacement therapy) in various forms like gums, nasal spray, and transdermal patches etc [24]. Pakistan is far behind in this fight against the smoke with increased burden of IHD, Diabetes and oral cancers. Social awareness is much needed in the public only passing laws will do nothing till the implementation is not provided. It is still very commonly observed on stations, bus stops, insides the trains, buses and shops people do not

hesitate smoke. A big label in red words smoking is dangerous for health with a picture of oral cancer on the packet of cigarette does not prevent a person from purchasing the same. We need to work hard to save our generation from this bad habit by putting all collective strategies together. Brazil in 2012 forbidden menthol and almost all artificial additives in tobacco products a similar action was taken by Canadian government in their domestic market followed by the European Union who also revised directions for the tobacco products [11].

CONCLUSION:

Vitamin B3 levels were found significantly low in smokers as compared to non-smokers

REFERENCES:

1. Anthony A. Sauve (2007) NAD and Vitamin B3: From Metabolism to Therapies, *Journal of Pharmacology and Experimental Therapeutics*. 324(3), 883-893.
2. Penberthy WT, Kirkland JB. Niacin In: Erdman JW, MacDonald I, Zeisel SH, eds. *Present Knowledge in Nutrition*. 10th ed. Ames: International Life Sciences Institute; 2012: 293-306.
3. Ng CF; Lee CP; Ho AL; Lee VW (2011) Effect of niacin on erectile function in men suffering erectile dysfunction and dyslipidemia. *J Sex Med* .8(10):2883-93
4. Bissett DL, Oblong JE, Berge CA, et al (2005). Niacinamide: A B vitamin that improves aging facial skin appearance. *Dermatol Surg*. 31:860-865.
5. Jane Higdon, Victoria J. Drake, Elaine L. Jacobson, Barbara. Delage (2013) vitamins/niacin, *Handbook of Vitamins*. 5th ed. Boca Raton: CRC Press; 149-190.
6. Tijen Sengezer, Rabia Nazik Yuksel Tugba Babacan, Nesrin Dilbaz (2016). Evaluation of the relationship between serum vitamin D levels and Tobacco Use Disorder, *Anatolian Journal of Psychiatry*17(3):196-202
7. Pfeiffer CM, Sternberg MR, Schleicher RL, Rybak ME, (2013) .Dietary supplement use and smoking are important correlates of biomarkers of water-soluble vitamin status after adjusting for sociodemographic and lifestyle variables in a representative sample of U.S. adults, *J Nutr*. 143(6):957S-65S.
8. Gabriel HE, Crott JW, Ghandour H, et al. (2006) Chronic cigarette smoking is associated with diminished folate status, altered folate form distribution and increased genetic damage in the buccal mucosa of healthy adults .*AmJ Clin Nutr*;83:835-41.
9. Parties to the WHO Framework Convention on Tobacco Control, Tobacco - supply and distribution .Tobacco industry - legislation .Tobacco smoke pollution - prevention and control .Tobacco use cessation Treaties, WHO Framework Convention on Tobacco Control. Geneva, World Health Organization; 2014 (available at http://www.who.int/fctc/signatories_parties/en/index.html, 2014).
10. Shoshana Zevin, Neal L. Benowitz (1999) Drug Interactions with Tobacco Smoking *Clinical Pharmacokinetics*, 36(6):425-438.
11. Aliya Hisam, Mahmood Ur Rahman, Ehsan Kadir, Naila Azam and Sumaira Masood (2014) Proportion of exposure of passive smoking in teenage group and symptoms precipitated after exposure to second hand smoke, *Journal of the College of Physicians and Surgeons Pakistan* 24(6): 446-448.
12. Zaman M, Irfan U, Irshad E. (2002) Prevalence of cigarette smoking among Peshawar University students. *Pak J Chest Med*. 8:9-18.
13. Shaikh MA, Kamal A. (2004) Prevalence and pattern of smoking in university students--perspective from Islamabad, *JCPSP*. 14(3):194.
14. Jamil Ahmed, Tahir Taj, Shiraz Shaikh, Sajid Ali. (2012) Tobacco smoking in teenage students, *JCPSP*. 21 (11): 662-665
15. Rockville. (2015) Substance Abuse and Mental Health, National Survey on Drug Use and Health, U.S. Department of Health and Human Services, Center for Behavioral Health Statistics and Quality. Center for Behavioral Health Statistics and Quality.
16. Arshad Naseem, Shahzeb Satti, Muhammad Aslam Khan, Waseem Saeed. (2012) A clinical account of hospitalized 2009 pandemic influenza A (H1N1) cases, *JCPSP*. 21 (2): 97-102.
17. Palvasha Waheed, Abdul Khaliq Naveed and Fareeha Farooq (2009), Levels of inflammatory markers and their correlation with dyslipidemia in diabetics, *JCPSP*. 19 (4): 207-210.
18. Armani A, Becker RC. (2005). The biology, utilization and attenuation of C-reactive protein in cardiovascular disease: part II. *The American heart journal*. 149(6):977.
19. Oliver Zimmermann, Kefei Li, Myron Zaczekiewicz, Matthias Graf, Zhongmin Liu, and Jan Torzewski, "C-Reactive Protein in Human Atherogenesis: Facts and Fiction," *Mediators of Inflammation*, vol. 2014, Article ID 561428, 6 pages, 2014. <https://doi.org/10.1155/2014/561428>.
20. Tijen Sengezer, Rabia Nazik Yuksel Tugba Babacan, Nesrin Dilbaz. (2016) Evaluation of the relationship between serum vitamin D levels

- and Tobacco Use Disorder, *Anatolian Journal of Psychiatry* 17(3):196-202
21. Gabriel HE, Crott JW, Ghandour H, et al. (2009) Chronic cigarette smoking is associated with diminished folate status, altered folate form distribution, and increased genetic damage in the buccal mucosa of healthy adults. *AmJClinNutr*;83:835–41
 22. Ting Li, Agostino Molteni Predrag Latkovich William Castellani Richard C. Baybutt (2003) Vitamin A Depletion Induced by Cigarette Smoke Is Associated with the Development of Emphysema in Rats. *The Journal of Nutrition*,133(8):2629–2634.
 23. Singh D (2016) Effect of Cigarette Smoking on Serum Homocysteine and Vitamin B12 Level in Male Population of Udaipur. *Biochem Anal Biochem* 5: 282. doi:10.4172/2161-1009.1000282
 24. Foster HD. (2002) A healthier cigarette? *J Orthomol Med*, 17(3):170.