SERUM VITAMIN B₃ LEVELS: A COMPARITIVE STUDY BETWEEN SMOKERS AND NON-SMOKERS.

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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 ± 3.56 Kg/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

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INTRODUCTION:
Vitamin B3 is one of the water-soluble vitamins also called nicotinamide and niacin as it gets incorporated into NAD (nicotinamide adenine dinucleotide) as 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 by converting it to nicotinic acid, which later gets phosphorylated to nicotinamide and niacin by the body. Tryptophan is also converted to serotonin in the brain, which is a neurotransmitter. Nicotinic acid is further phosphorylated to niacin. Excess niacin is converted into nicotinamide mononucleotide (NAM) and finally into nicotinamide and nicotinic acid[5].

Serum levels for vitamin B3 were 0.350±0.12 in smokers group and 1.54±0.32 in non-smokers group (p-value 0.67). 

The deficiency of vitamin B3 results into the deficiency of this precious vitamin 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 current research was focused to evaluate and compare the effects of tobacco smoking on serum vitamin B3 as there was knowledge gape 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+3.56Kg/m²non-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)

<table>
<thead>
<tr>
<th>S. No</th>
<th>Parameters</th>
<th>Non-Smokers Group A(n=30)</th>
<th>Smokers Group B(n=30)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age (Years)</td>
<td>33.5±2.3</td>
<td>37.4±3.1</td>
<td>0.59</td>
</tr>
<tr>
<td>2</td>
<td>BMI (Kg/m²)</td>
<td>27.71±3.56</td>
<td>29.47±3.81</td>
<td>0.67</td>
</tr>
<tr>
<td>3</td>
<td>Serum Vitamin B₃ (mcg/ml)</td>
<td>1.54±0.32</td>
<td>0.350±0.12</td>
<td>0.001</td>
</tr>
</tbody>
</table>

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 ß-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 ciggrete 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

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
Niacinamide: A B vitamin that improves aging
facial skin appearance. Dermatol Surg. 31:860-
865.
5. Jane Higdon, Victoria J. Drake, Elaine L.
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
Psychiatry17(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, JNutr.
143(6):957S-65S.
Chronic cigarette smoking is associated with
diminished folate status, altered folate form
distribution and increased genetic damage in the
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
(availableathttp://www.who.int/fctc/signatories_
Interactions with Tobacco Smoking Clinical
11. Aliya Hisam, Mahmood Ur Rahman, Ehsan
Kadir, Naiya 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.
of cigarette smoking among Peshawar University
pattern of smoking in university students--
perspective from Islamabad, JCPSP. 14(3):194.
students, JCPSP. 21 (11): 662-665
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
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
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
Zaczkiewicz, 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
20. Tijen Sengezer, Rabia Nazik Yuksel Tugba
Babacan, Nesrin Dilbaz. (2016) Evaluation of
the relationship between serum vitamin D levels

