

Estimation Of Hct Levels in Tobacco Smokers, Non - Tobacco Smokers, Raw Tobacco Chewers and Its Effects -A Study

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Article History	Abstract
<p>Received: 16 June 2023 Revised: 05 Sept 2023 Accepted: 10 Oct 2023</p>	<p>Aim & Objective: The aim of the study was to to compare and correlate with HCT values levels in blood in all the groups i.e., smokers, Raw tobacco chewers, passive smokers, controls. Methodology: The Methodology followed for preparing this work is mostly the primary and secondary data. The primary data for the study are collected through OPD Department of TRR Medical College and hospital and Camp patients. We have taken Mission Hb [Haemoglobin Testing system] Meter Instrument was used to estimate Hb and HCT values in patient blood, with a Pricking Finger method free flow blood was collected in a graduated capillary tube and gently blood was transferred on the Hb strip and the reading was noticed and documented. Results: when we compare the study subjects there was a increase in HCT Levels in the smokers and raw tobacco chewers when compared with passive smokers and healthy controls. Conclusion: In this study HCT level of all study subjected.e., comparison of HCT % levels between different study subject groups has gradually increased from control vs passive smoker's vs raw tobacco chewer and higher in smokers showed significant P-Value have showed positive correlation as per annova test. As per our study done with per multiple comparison of hb% levels comparison between different study subject groups by post hoc test –bonferroni method analysis results were mixed and showed significant values.</p>
<p>CC License CC-BY-NC-SA 4.0</p>	<p>Keywords: Smokers, Raw tobacco chewers, Passive smoking, Pb (lead), Heamoglobin, HCT</p>

1. Introduction

The growing use of tobacco smoking and tobacco chewing is one of the greatest concerns around the world and especially south east Asian countries because of its serious effects on health. The consumption of tobacco products and the number of smokers, tobacco chewers have been gradually increased because of change in habits all over the world. use of tobacco products like cigarettes, raw tobacco chewing is one of the main causes of morbidity and mortality in world and among them smoke tobacco products, like cigarette contains more than 4000 identified chemical compounds which are very harmful, toxic for human health and cause various diseases. [1]

As per WHO in 20th century more than 100 million people [2] has died from tobacco smoking its products smoking causes inhalation of several hazardous elements which are Toxic contain many heavy metals such as cadmium, lead, chromium and nickel, manganese, mercury, arsenic, bismuth etc., which not only effects smokers, tobacco chewers but also through passive smoking.

Heavy metals generally have long biological half-life while inhaled through smoking. [3] These toxic elements especially lead intake for continuously leads to accumulation in bone and hard tissue structure like teeth as well as it effects the soft tissue structures of oral cavity and para-oral structures [4] causing pigmentation and results in disorder of mineral metabolism and some of which are powerful carcinogens in such toxic metals lead is considered to be harmful in any level [5].

lead plays a significant role in tobacco toxicity Lead can also enter human organs through food, drinking water and air. Lead present in tobacco smoke substantially leads to increased risk of cancer highly toxic metal capable of causing serious effects on brain, nervous system, rbc s, needle men and etal has described in his article that there is a decrease in IQ levels and behavioral problems. [6]

Lead is a redox inactive metal and can generate reactive oxygen species and reduce cell anti oxygen defenses and it also inhibits ferro-chelatase and impairs chain reaction that leads to the formation of heam and results in anemia. [7]

Lead is of particular is a major public health concern because it accumulates in the body particularly bone and teeth and it is present in several conventional dental materials which are used during treatment procedures etc., Few studied in their results showed that higher levels of lead may affect DMFT, caries and oral tissues and also It is understood the measurement HB AND HCT levels in blood is appropriate method to understand the pathology of its effects. [8]

So, it is very much important for an oral pathologist and basic dentist to avoid lead related products and give awareness to the patient about it and explain the toxicity of this material and its effects in human body including oral soft and hard tissue structures. further make aware ness that led and heavy metals are freely available they may enter in human body by air, water, and abundantly present in earth's crust.

In our study we have compared and correlated the association of HCT level in blood between study subjects of all groups. We also evaluated other parameters like pb levels also.

2. Materials and Methods

This prospective study was conducted in the Department of Dentistry; TRRIMS, Patancheru Study comprised a total of 140 patients out of which 35 were Smokers ,35 passive smokers ,35 raw tobacco chewers, 35 were healthy controls. Total 140 sample subjects.

Inclusion Criteria

- Low & mid income group
- Non-Tobacco exposed people taken as control
- Those who are frequently exposed to passive smoking example husband or gather in a place of work where smoking in common
- Middle age group
- gap or mensuration of 10-15 after female volunteer were taken.

Exclusion Criteria

- Diabetic patient
- H/O other systemic diseases
- Women during & recently mensuration women were excluded

All the participants of the study were explained of the nature of the study, and informed consent was obtained. Detailed case history was noted and 10 millilitres of capillary blood was collected by a needle prick method on a finger in a capillary tube from case group & controls under aseptic conditions using spirit and cotton his method and this method was non-invasive.

3. Results and Discussion

Table 1 Comparison of Hct Values Between Different Study Subject Groups.

HCT%	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	F Value	P Value
					Lower Bound	Upper Bound				
SMOKERS	35	39.51	3.49261	0.59036	38.3145	40.7140	31.00	47.00	15.438	0.000
RAW TOBACCO / GUTKHA CHEWING	35	38	3.79628	0.64169	36.6959	39.3041	28.00	48.00		
PASSIVE SMOKERS	35	35.89	5.38392	0.91005	34.0363	37.7352	21.00	49.00		
CONTROL	35	32.80	4.60051	0.77763	31.2197	34.3803	22.00	42.00		

TOTAL 140 36.55 5.01699 0.42401 35.7117 37.3883 21.00 49.00

Mean and standard deviation of HCT% in Smokers group is 39.51 ± 3.492 , Mean and standard deviation of HCT% in Raw Tobacco / Gutkha Chewing group is 38 ± 3.796 , Mean and standard deviation of HCT% in Passive Smokers group is 35.89 ± 5.384 , Mean and standard deviation of HCT% in Control group is 32.80 ± 4.60 . There is a highly statistical significance of HCT% is found between smokers, Raw Tobacco / Gutkha Chewing, Passive Smokers and Controls i.e., $P=0.000 < 0.001$ using One way ANOVA test.

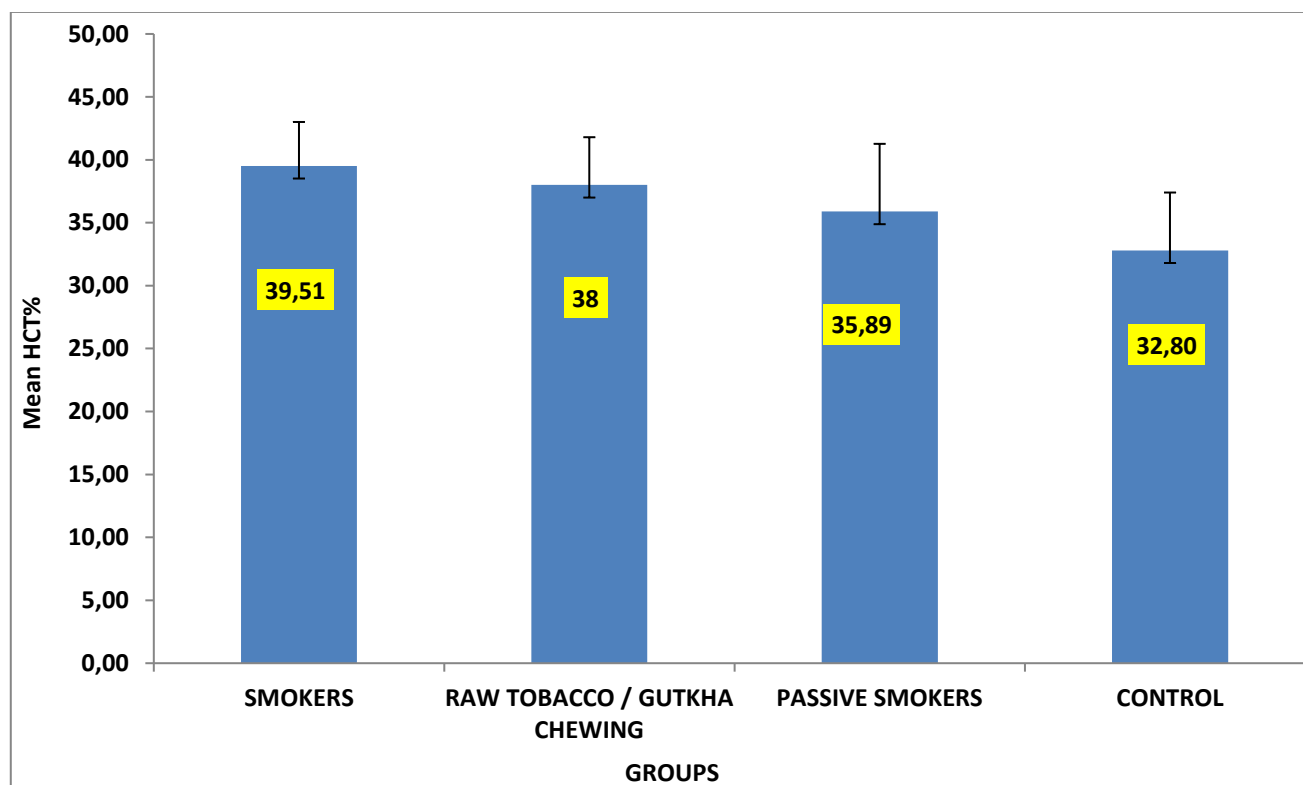


Figure 1: Bar diagram showing mean HCT% values of different study subject group

Table 2: Multiple Comparison Of HCT% Values between Different Study Subject Groups By Post Hoc Test –Bonferroni Method.

Multiple Comparisons						
Bonferroni: Dependent Variable: HCT%						
(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Smokers	Raw Tobacco / Gutkha Chewing	1.51429	1.04718	.903	-1.2894	4.3180
	Passive Smokers	3.62857*	1.04718	.004	.8248	6.4323
	Control	6.71429*	1.04718	.000	3.9106	9.5180
Raw Tobacco / Gutkha Chewing	Smokers	-1.51429	1.04718	.903	-4.3180	1.2894
	Passive Smokers	2.11429	1.04718	.273	-.6894	4.9180
	Control	5.20000*	1.04718	.000	2.3963	8.0037
Passive Smokers	Smokers	-3.62857*	1.04718	.004	-6.4323	-.8248
	Raw Tobacco / Gutkha Chewing	-2.11429	1.04718	.273	-4.9180	.6894
	Control	3.08571*	1.04718	.023	.2820	5.8894
Control	Smokers	-6.71429*	1.04718	.000	-9.5180	-3.9106
	Raw Tobacco / Gutkha Chewing	-5.20000*	1.04718	.000	-8.0037	-2.3963
	Passive Smokers	-3.08571*	1.04718	.023	-5.8894	-.2820

*. The mean difference is significant at the 0.05 level.

Multiple comparison test i.e., Bonferroni testis used for the comparison of HCT% between all the groups individually. It is found that there is no statistical significance of HCT% is found between smokers with Raw Tobacco /Gutkha Chewing (i.e., $P=0.903 > 0.05$). It is found that there is a statistical significance of HCT% is found between Smokers with Passive Smokers and Smokers with Control (i.e., $P=0.004 < 0.05$ and $P=0.000 < 0.001$). It is found that there is no statistical significance of HCT% is found between Raw Tobacco /Gutkha Chewing with Passive Smokers (i.e., $P=0.273 > 0.05$). and it is found that there is a statistical significance of HCT% is found between Raw Tobacco /Gutkha Chewing with Control (i.e., $P=0.000 < 0.001$). It is found that there is a statistical significance of HCT% is found between Passive Smokers with Control (i.e., $P=0.023 < 0.05$).

Cigarette smoking and tobacco chewing on across the global and major cause of concern which is preventable morbidity and motility [1]. lead is an essential that plays an important role in many of our physiological process of the body but however it is highly toxic poisonous metal that has known to trigger biological functions affecting almost every organ and system of the human body [9,10]. We tested with HCT values and noticed great correlation with HB and PB Levels which showed p value of 0.000 when compared with all subjects which was done with one-way annova test .and the results have showed statistically significant values as When we have correlated with other studies done by Ananda Lakshmi and etal HB and HCT [11]. HCT value increases in smokers when compared to non-smokers; and anal hegazy [12] stated that increase in smoking increases inflammation and immune function which in turn effects BLL with HB and HCT and in another study done by fatemeh etal [13], shown positive correlation.

Various authors has suggested in their studies about HCT levels and there correlation in one such study made by lakshmi and etal [14] in there study noticed a gradual increase of HCT levels in the smokers this kind of results we noticed in our research study and also concurrent with White head and etal study [15] , in there study they observed that HB and HCT values were elevated in smokers which was increased significantly those who were smoking more than 10 cigarettes per day.

Another done by Schwartz and Weiss- [16] there is increase in number of blood cell especially netrophils As per Anandha Lakshmi s [11] suggested from their results of their study the mean total WBC count of smokers was significantly higher ($p < 0.05$) than nonsmokers and WBC count increases with intensity of smoking as shown. This finding is consistent with zalokar JB et al [17]. As per Ingrid Elisia [18] in their finding found that smoking increases the size and haemoglobin level of rbc's is consistent with the literature. we strongly believe and coorelation between HB and HCT.

In our study Mean and standard deviation of HCT% in Smokers group is 39.51 ± 3.492 , Mean and standard deviation of HCT% in Raw Tobacco / Gutkha Chewing group is 38 ± 3.796 ,

Mean and standard deviation of HCT% in Passive Smokers group is 35.89 ± 5.384 , Mean and standard deviation of HCT% in Control group is 32.80 ± 4.60 . There is a highly statistical significance of HCT% is found between smokers, Raw Tobacco / Gutkha Chewing, Passive Smokers and Controls i.e., $P=0.000 < 0.001$ using One way ANOVA test.

Multiple comparison test i.e., Bonferroni test is used for the comparison of HCT% between all the groups individually. We have noticed there were positive results but and was found that there is a statistical significance of HCT% is found between Smokers with Passive Smokers and Smokers with Control (i.e., $P=0.004 < 0.05$ and $P=0.000 < 0.001$). and it is found that there is a statistical significance of HCT% is found between Raw Tobacco /Gutkha Chewing with Control (i.e., $P=0.000 < 0.001$).[19] It is found that there is a statistical significance of HCT% is found between Passive Smokers with Control (i.e., $P=0.023 < 0.05$) These results were closely coorelating the presence and effects of smoking ,raw tobacco chewing and the detection and presence of pb levels and there effects in the blood and other parts of human body

4. Conclusion

The mean HCT levels has gradually elevated when compared with controls, and passive smoking which was slightly higher. The mean HCT levels increased with disease progression for raw tobacco chewers slightly higher and smoker had higher values and more in males were noticed thus increase in the progression of disease which effects all parameters of oral health, caries index also. However, further longitudinal studies are to be carried out to confirm an association between Smoking, HCT, HB levels VS Pb levels in the blood it is clearly

evident that there was a positive co-relation where values were highly significant and we could establish connection between blood, smoking oral aspects also.

References

1. Muhammad Waqar Ashraf Levels of Heavy Metals in Popular Cigarette Brands and Exposure to These Metals via Smoking 2012; 2012: 729430. Published online 2012 Mar 12. <https://doi.org/10.1100/2012/729430> PMID: PMC3320036 PMID: 22489199
2. World Health Organization. The World health report 2002: reducing risks, promoting healthy life. Geneva: WHO; 2002.
3. Shishir Ram Shetty, Sura ali Ahmed Foud Al-bayati and Ridhima Aperito J Oral Health 2015, vol 1, issue 2, 109; Adnan Massadeh, Ahmed Gharibeh, Khaled Omari, Idrees Al-Momani, Ahmed Alomari, Hiatham Tumah & Wail Hayajneh Simultaneous Determination of Cd, Pb, Cu, Zn, and Se in Human Blood of Jordanian Smokers by ICP-OES Biological Trace Element Research volume 133, pages 1–11 (2010)
4. Fatemeh Ahmadi-Motamayel, Parisa Falsafi, Zahra Hayati, Farzad Rezaei and Jalal Poorolajal, Prevalence of Oral Mucosal Lesions in Male Smokers and Nonsmokers Chonnam Med J 2013; 49: 65-68
5. World Health Organization (WHO) <https://www.who.int/india/health-topics/tobacco> May 30, 2023.
6. Needle L, Gunnoe C, Levitson A, et al. Deficits in psychological and class room performance of children with elevated dentine lead levels. The New England Journal of Medicine. 1979; 300: 689–695 -63
7. Aleksandra Kasperczyk et al Biol Trace Elem Res (2012) 150: 49-55
8. LeadCare II | Meridian Bioscience (magellandx.com) Magellan BILLERICA, Mass Diagnostics Receives CFDA Clearance For LeadCare II In China Published: Aug 10, 2016., Aug. 9, 2016 /PRNewswire/ -- Magellan P Borella S Manni, A Giardino Cadmium, nickel, chromium and lead accumulate in human lymphocytes and interfere with PHA-induced proliferation PMID: 21362301 1990 Jun; 4(2): 87-95
9. Michael a. wall, md, Jean Johnson, dds, Peyton J. Corcoran, pxd, can Neal I. benowitz, md Cotinine in the Serum, Saliva, and Urine of Nonsmokers, Passive Smokers, and Active Smokers AJPH June 1988, Vol. 78, No. 6
10. Anandha Lakshmi S, Anandhi Lakshmanan, Ganesh Kumar P, and Saravanan A Effect of Intensity of Cigarette Smoking on Haematological and Lipid Parameters PMC4149063 PMID: 25177557 Published online 2014 Jul <https://doi.org/10.7860/JCDR/2014/9545.4612>
11. Amal A Hegazy, Manal M Zaher, Manal A Abd el-hafez, Amal A Morsy and Raya A Saleh Hegazy et al. Relation between anemia and blood levels of lead, copper, zinc and iron among children BMC Research Notes 2010, 3: 133 /1756-0500/3/133[374]-9
12. Fatemeh Ahmadi-Motamayel, Parisa Falsafi, Zahra Hayati, Farzad Rezaei and Jalal Poorolajal, Prevalence of Oral Mucosal Lesions in Male Smokers and Nonsmokers Chonnam Med J 2013; 49: 65-68
13. Lakshmi AS, Lakshmanan A, Kumar GP, Saravanan A. Effect of Intensity of Cigarette Smoking on Haematological and Lipid Parameters. Journal of Clinical and Diagnostic Research. 2014; 8(7): 11–3.
14. Ross D. Whitehead, MSc, Gozde Ozakinci, PhD, Ian D. Stephen, PhD, and David I. Perrett, PhD Whitehead et al. 2012 October; 102(10): e3–e4 PMID: PMC3490676 . <https://doi.org/10.2105/AJPH.2012.300942>
15. Joel Schwartz, Scott T. Weiss Cigarette smoking and peripheral blood leukocyte differentials Volume 4, Issue 3, May 1994, Pages 236-242
16. JB Zalokar, JL Richard, JR Claude. Leukocyte count, smoking, and myocardial infarction. N Engl J Med. 1981; 304(8): 465–68.
17. Ingrid Elisia, Vivian Lam, Brandon Cho, Mariah Hay, Michael Yu Li, Michelle Yeung, Luke Bu, William Jia, Nancy Norton, Stephen Lam, and Gerald Krystal The effect of smoking on chronic inflammation, immune function and blood cell composition Sci Rep. 2020; 10: 19480. Nov 10. PMID: PMC7655856 PMID: 33173057 <https://doi.org/10.1038/s41598-020-76556-7>.
18. Dr. M Naveen kumar, Dr Shallab Srivastav, Dr S Rama Devi, Estimation of Serum-Lead Levels in Smokers, Non - Tobacco Smokers, Raw Tobacco Chewers and Its Effects on Hemoglobin Levels-A Comparative Study; Vol.12, Iss.1, 2023; 1904-1909.