

CROSS SECTION STUDY

Study on the Effects of Nicotine on Platelet Function in Chronic Nicotine Gum Users

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ABSTRACT

Background: Chronic nicotine intake may modify the state of haematological parameters and further clarify the consequences of nicotine use on health, given the varied pharmacological properties of nicotine and additives and their widespread usage in many regions and nations. The health effects of smokeless nicotine use, regardless of form of use, have been thoroughly established.

Objective: The goal of this study was to see how nicotine affected platelet count and function hematologically.

Materials and Methods: The research was conducted at the department of pharmacology at a tertiary healthcare centre in Central India. A rigorous assessment was performed on 400 seemingly healthy people, 200 of whom were chronic nicotine gum users and the other 200 were non-users. Personal information, work department, history of smoking, chewing nicotine, history of exposure to nicotine smoke, history of any chronic disease such as diabetes mellitus, and medication history were all documented. Hematological tests were carried out. The platelet count was estimated using an automated blood analyzer.

Results: The following platelet metrics are higher in chronic nicotine gum users than in non-users-

1. Statistically significant platelet count
2. PCT is statistically insignificant.

Conclusion: In contrast to nonusers, nicotine usage in healthy people was associated with significant impacts on platelet indices, such as an increase in the mean MPV and PDW values.

Keywords: Nicotine, Platelets, Smoking.

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INTRODUCTION

Nicotine is primarily obtained from the dried and processed leaves of the *Nicotiana-tabacum* plant, which is widely planted and commercially developed in many countries. Smoking, chewing, snuffing, or dipping nicotine are the most common methods of consumption.¹ Smokeless nicotine products have a lengthy history in many locations and countries, including North America, northern Europe, India and other Asian countries, and parts of Africa. It can be taken orally or inhaled through the nose. Some users chew the dried leaves

as well. Chronic intake of Smokeless nicotine may influence the state of haematological parameters and further clarify the consequences of nicotine use on health, given the varied pharmacological actions of nicotine and additives and their widespread usage in many regions and nations.² The health effects of smokeless nicotine use, regardless of form of use, have been thoroughly established. Nicotine is absorbed through the tongue and travels to the brain in users of smokeless nicotine. Nicotine is taken into the bloodstream even after it has been removed from the lips. Furthermore, nicotine lingers

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in the bloodstream of nonsmokers for longer than it does of smokers.³ Cancer (especially oral, esophageal, and pancreatic malignancies), heart disease, gum disease, and oral lesions other than cancer are also dangers connected with smokeless nicotine use. Nicotine, the most significant phytochemical present in nicotine, is directly tied to the frequency and speed with which it is consumed, as well as the impact it has on the body.⁴ Nicotine, which is extremely addictive, is present in all nicotine products, including smokeless nicotine. The amount of nicotine per gramme of nicotine in the 40 most regularly used popular brands of moist snuff was found to range from 4.4 to 25 mg in a study conducted by the Centers for Disease Control and Prevention. According to other research, moist snuff contained between 4.7 and 24.3 mg of nicotine, dry snuff contained between 10.5 and 24.8 mg, and chewing nicotine contained between 3.4 and 39.7 mg of nicotine per gramme. Users of smokeless nicotine and smokers have nicotine levels in their blood that are similar.

MATERIALS AND METHODS

Sample Size

The study included 400 seemingly healthy people, 200 of whom were nicotine users and 200 of whom were not.

Source of Data

The study involves participants from a Central Indian tertiary healthcare center's Internal Medicine department. The current study included subjects aged 18 to 50 years old, of both sexes. The current investigation included age and gender matched healthy volunteers who did not use nicotine.

Nicotine should be consumed for at least a year by the participants. Subjects should appear to be in good health and not be using any medications. A complete history of current and previous illnesses, as well as the personal histories of all participants in the current study, were documented. Blood was obtained in EDTA Vacuum evacuated tubes under strict aseptic conditions. A blood sample was collected for a haemogram. A haematological examination was carried out. The platelet count, plateletcrit PCT, mean platelet volume, MPV, and platelet distribution width, PDW were all calculated. The information gathered was analysed and presented as Mean + SD. In this study, the students t test was utilized to compare the two groups. For data analysis, SPSS20.0 was utilized, and Microsoft Word and Excel were used to create graphs and tables. Level of significance: When evaluating the data, p0.05 was considered statistically significant.

OBSERVATION AND RESULTS

Table 1 shows both in the consumer and non-consumer subject differences in platelet parameters, the number of men is much larger.

Table 2 shows Nicotine users have different platelet characteristics. Consumers had greater platelet parameters than non-consumers. Platelet count (statistically significant), PCT (statistically insignificant), and PWD (not significant

statistically). In nicotine users, MPV is lower and statistically significant.

Table 3 shows all platelet metrics are higher in male consumers than female consumers, as seen in the table above, but the difference is statistically insignificant.

Table 4 shows Male and female non-consumers had no statistically significant differences in platelet properties.

Table 5 shows Males had a higher platelet count, and consumers have a lower MPV level than non-consumers.

Table 1: Gender wise distribution of subject

Gender	Non-consumers	Consumers
Males	154	162
Females	46	38

Table 2: Platelet parameters

Parameter	Nicotine Consumers	Non-consumers	p-value
Platelet Count (lakhs/cmm)	3.46 ± 1.52	2.40 ± 0.41	<0.001
PCT(%)	0.56 ± 0.48	0.52 ± 0.20	0.65
MPV(fL)	7.45 ± 2.16	9.29 ± 1.52	<0.001
PDW(%)	13.04 ± 6.26	2.28 ± 2.24	0.21

Table 3: Platelet parameters nicotine consumers

	Males	Females	p-value
Platelet count (L/cmm)	3.48	3.36	0.77
PCT	0.58	0.48	0.13
MPV	8.08	7.40	0.66
PDW	13.32	12.20	0.46

Table 4: Platelet count among non-nicotine consumers

	Male	Female	p-value
Platelet count	2.38	2.45	0.470
PCT	0.54	0.54	0.96
MPW	9.31	9.25	0.57
PDW	12.54	11.35	0.20

Table 5: Platelet parameters- non-consumers vs consumers males

	Non-consumer male	Consumer male	p-value
Platelet Count (lakhs/cmm)	2.38 ± 0.40	3.48 ± 1.19	<0.01
PCT (%)	0.54 ± 0.22	0.15 ± 0.52	0.50
MPV	9.32 ± 1.20	8.08 ± 2.14	<0.001
PDW	12.17 ± 6.30	13.32 ± 7.22	0.29

Table 6: Platelet parameters - non consumers vs consumers females

	Non-consumer female	Consumer female	p-value
Platelet Count (lakhs/cmm)	2.45 ± 0.44	3.36 ± 0.26	0.20
PCT (%)	0.54 ± 0.14	0.48 ± 0.12	0.10
MPV	9.25 ± 0.35	7.40 ± 2.36	<0.005
PDW	11.35 ± 1.30	12.20 ± 3.02	0.37

Table 6 shows Female consumers have much lower MPV than female non-consumers. Other parameters are not considerably different.

DISCUSSION

Nicotine is produced from the leaves of the *Nicotiana tabacum* plant, which is widely planted and commercially grown in many places throughout the world. Nicotine is also consumed in India in a variety of forms, including Pan (betel quid), dried leaves (Patti), paste (Qiwam, Zarda), and nicotine with lime (Khaini/Mawa). It is widely used throughout the world, notably in India and Central Asia. Nicotine intake has been found to be on the rise among high school kids, college students, and athletes.⁵ This is extremely popular in India, regardless of socioeconomic status. It is seen as particularly foreboding because to its ease of acquisition, low cost of acquisition, youth attraction, long shelf life, and absence of social shame. Despite the recognized health risks, nicotine chewing is not seen as particularly dangerous by users, and is seen as less of a social evil than smoking by the general population.⁶ Previous studies have shown that nicotine has long-term negative impacts on a variety of bodily parameters. Hematological parameters are important physiological indicators of organ and tissue damage and dysfunction. Chronic nicotine usage may impact the state of haematological parameters due to the numerous pharmacological properties of nicotine and additives, as well as their widespread use in many regions and nations.⁷ Define the health implications of nicotine usage in greater detail. The influence of nicotine on haematological parameters such as platelet counts, and platelet parameters was studied in this study. There were 200 participants in each group of non-users and users of nicotine. The difference in all indicators between consumers and non-consumers is statistically significant in this study. As a result, platelet count dropped significantly. This is in line with the findings of the current study, which show a considerable drop in platelet count. The effect of nicotine on platelets is also investigated in this study. The following were the outcomes: The following platelet metrics are higher in nicotine users than in non-users. Statistically significant platelet count. PCT is statistically insignificant. PDW - statistically insignificant. Nicotine users have lower MPV, which is statistically significant. PCT was found to be considerably lower in nicotine users compared to non-users ($p=0.017$). The absence of a bone marrow response to a peripheral demand for platelets causes a platelet anomaly with a low PCT value. Between nicotine users and non-users, there were no significant differences in platelets (PLT), mean platelet volume (MPV), or platelet distribution width (PDW). This contrasts with the current study, in which PCT is not significantly reduced. Previous studies have demonstrated

that prolonged nicotine use activates platelets and that quitting nicotine improves platelet function.^{8,9} This is in line with the findings of the current study, which show a substantial difference in all parameters between consumers and non-consumers.¹⁰

CONCLUSION

In nicotine users, platelet parameters were compared by gender. Male consumers have higher platelet parameters than female consumers, according to the findings. However, the disparity isn't statistically significant. Platelet properties were studied between male and female non-nicotine users. There was no statistically significant difference in platelet parameters between male and female non-consumers. Male non-nicotine users and male nicotine users had their platelet parameters examined. Platelet count is high in consumer men, and MPV is much lower in consumers, according to the findings. Female non-consumers and female consumers had their platelet parameters compared. Female customers had much lower MPV than male consumers, according to the findings. Other parameters are not considerably influenced.

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