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A COMPARATIVE STUDY OF RESTING HEART RATE IN SMOKERS AND NONSMOKERS

Motilal C. Tayade, Nandkumar .B.Kulkarni

Department of Physiology, Rural Medical College, Pravara Institute of Medical Sciences,
A.P. Loni, Ahmednager, Maharashtra, India

E-mail of Corresponding Author: drmc Tayade@gmail.com

ABSTRACT

Introduction: Smoking affects cardiovascular system by several mechanisms. Nicotine increases cardiac output by increasing both heart rate and myocardial contractility. The present study was planned to compare and assess resting heart rate in smokers as compared to non smokers.

Aim and objectives: Our aim was to assess and compare resting heart rate in smokers and nonsmokers. Our objectives were to study the effects of smoking on resting heart rate.

Material and methods: 200 male subjects in the age group 25 to 40 years comprising of 100 smokers and 100 nonsmokers as control group were considered for present study. Participant subjects were from staff members, residents and patients from routine OPD. Immediately after waking up and before subject get out of bed asked him to count his own Pulse rate by palpating radial artery for full one minute. (As per ACSM)

Observation and Result: Data was tabulated & analyzed. Standard error of difference between two means was taken. Z test was applied & by using the test P Value was found < 0.05 (significant)

Conclusion: Resting heart rate is a simple measurement with prognostic implications. High resting heart rate was noted in smokers as compared to nonsmokers.

Keywords: Resting heart rate, Smoking, ACSM criteria, Radial pulse.

Key messages: effect of smoking over resting heart rate, ACSM criteria for RHR

INTRODUCTION

Cigarette smoking is a major single cause of preventable cancer deaths in the world today.¹ Smoking related diseases are some of the biggest killers in the world today and are cited as one of the biggest causes of premature death in industrialized countries. The World Health Organization (WHO) estimates that tobacco caused 100 million deaths over the course of the 20th century.² Smoking affects cardiovascular system by several mechanisms. Nicotine increases cardiac output by increasing both heart rate and myocardial contractility.³ Autonomic alterations may contribute to the increased cardiovascular risk present in smokers.⁴ The pressor and tachycardial effects of Cigarette

smoking are associated with increase in plasma catecholamines.⁴

Resting heart rate is considered as one of ideal parameter for assessment of cardiovascular functions. The present study was planned to compare and assess resting heart rate in smokers as compared to non smokers.

Aim and Objectives

Our aim was to assess and compare resting heart rate in Smokers and Nonsmokers. Our objectives were to study the effects of smoking on resting heart rate.

RESEARCH METHODOLOGY

200 male subjects in the age group 25 to 40 Years comprising of 100 smokers and 100 nonsmokers as control group were considered for present study. Participant subjects were from staff members, residents and patients from routine OPD.

The informed written consent was obtained

Case Group was selected the Smokers with history of smoking for more than 5 years with no history of major illness like Hypertension, Diabetes Mellitus, Peripheral Neuropathy in past or present. While Control Group was selected subjects who have never smoked in life and not having any other addiction related to tobacco and with no history of major illness like Hypertension, Diabetes Mellitus, Peripheral Neuropathy in past and present. The both groups were selected after proper counseling & written consent. The study was approved by Institutional Ethical Committee, Pravara Institute of Medical Sciences, Loni from our university.

Immediately after waking up and before subject get out of bed asked him to count his own Pulse rate by palpating radial artery for full one minute. The necessary training was provided to them as per ACSM guidelines.⁵

Asked him to take readings only on those days when he wake up after good sound sleep with he do not have any form of stress & his bladder was not excessively distended during reading. Asked him to take such 5 readings and fill in the chart.

This method of counting resting heart rate was as per ACSM guidelines.

OBSERVATIONS

Table 1: Resting heart rate in smokers & nonsmokers in present study:

Resting heart rate (Beats /minute)	Nonsmokers	Smokers
Mean	70	76
S.D.	6.2	8.6

(S.D. = Standard Deviation)

Table 2: Resting Heart rate in Smokers with Smoking Index in present study:

Smoking Index*	Resting heart rate (Beats /minute) (Mean Value)
Light smokers (1-100)	71
Moderate smokers (101-200)	75
Heavy smokers (>200)	82

Smoking Index:⁶ It is criteria considered for present study to classify the smokers according to their severity. Here smoking index is calculated by multiplying numbers of cigarette smoked per day & duration of smoking in years. According to this index smokers were classified in three groups. (Table no.2)

RESULTS

In this present study we noted higher resting heart rate in smokers as compare to nonsmokers. (Table no.1) High resting heart rate was noted in subjects with higher smoking index. This clears there is direct relationship with resting heart rate & smoking severity. (Table no. 2)

Data was analyzed. Standard error of difference between two means was taken. Z test was applied & by using test P Value was found < 0.05 (significant)

DISCUSSION

There are different forms of smoking in India like Biddis, Cigarette, Hukkas, Cigar, Chillum etc. However in urban area filtered cigarette smoking is the major form of smoking while in rural India Biddis are the major form. Tobacco smoking in India kills 9,00,000 people a year, a figure that is expected to rise to one million by 2010.⁷ In present study we selected the subjects who smoke filtered cigarettes only.

Smoke contains several carcinogenic pyrolytic products that bind to DNA and cause many genetic mutations. There are over 19 known chemical carcinogens in cigarette smoke. Polynuclear aromatic hydrocarbons are tar components produced by pyrolysis in smoking.

Many of them are highly carcinogenic and mutagenic.⁸ Acrolein is a pyrolysis product that is abundant in cigarette smoke. It gives smoke an acrid smell and an irritating, lachromatory effect and is a major contributor to its carcinogenity. Nicotine is a highly addictive psychoactive chemical.⁹

Resting heart rate is an easy counting measurable parameter with high prognostic implications. Heart rate is measured by finding the pulse of body. Jean-Claude Tardif noted Resting heart rate is indeed a strong predictor of mortality in patients with coronary artery disease.¹⁰ Experimental data have demonstrated that a reduction in heart rate can delay the progression of atherosclerosis in animal models.¹¹ A study done by KA Perkins *et al.* regarding the acute effects of nicotine on resting metabolic rate (RMR), these results confirm that intake of nicotine, isolated from tobacco smoke, significantly increases RMR in humans.¹²

CONCLUSION

Smoking is by far the hardest on the heart, increasing persons resting heart rate. Resting heart rate is easy measurable parameter with prognostic implications.

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RECOMMENDATIONS

The government should make strict laws related to smoking & cigarette industries. Make awareness among society about hazards of smoking.

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Abbreviations:

WHO : World health organization

ACSM : American college of sports medicine

CAD : coronary artery disease

RHR : Resting heart rate