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## A comparative study on health related fitness between smoker and non-smoker of hostel boys

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### Abstract

Tobacco contains very poisonous chemical called nicotine, which does not seem to have an antidote. Carbon monoxide, ammonia, and pyridine are other harmful substances present in tobacco. These slow poisons create ill effects on health in course of time. As the smoke inhaled from a cigarette or bidi passes through nose pharynx and into the lungs, it leaves on the mucous membrane and walls of those organs tar-like substance that badly damages the health of the entire cardio-respiratory system. The aim of the study is to compare health related fitness between smoker and non-smoker of hostel boys. The study consists of 63 PG hostel boys (32 smokers and 31 non-smokers) of Kalyani University in India, ageing 20 to 24 years. The smokers smoked cigarettes at least 5 a day for 3 years. We used a questionnaire and physical fitness tests for data gathering. Twelve min run and walk test were used to measure cardiovascular endurance, grip dynamometer test used to measure muscular strength, one min sit up test used to measure muscular endurance, sit and reach test used to measure flexibility, B.M.I. and Durnin – Womersley (1974) skin fold measurement technique were used to measure body composition. Statistical analysis was done by using 't' – test. Results revealed that cardio-vascular endurance, muscular endurance, flexibility were significant at 0.05 and 0.01 levels between smoker and non-smoker hostel boys. Muscular Strength and Body Composition were not significant at 0.05 levels between smoker and non-smoker hostel boys. The non-smoker hostel boys are better in cardiovascular endurance, muscular endurance and flexibility than the smoker hostel boys. In muscular strength and body composition (B.M.I. and % of body fat), there was no significant difference between smoker and non-smoker.

**Keywords:** Tobacco, physical fitness, body composition, muscles

### 1. Introduction

Tobacco use leads most commonly to diseases affectively the heart and lungs, with smoking being a major risk factor for heart attacks, stroke, chronic obstructive pulmonary disease (COPD), emphysema and cancer (particularly lung cancer, cancer of the larynx and mouth, esophageal cancer and pancreatic cancer). Cigarette smoking increases the risk of Crohn's disease as well as the severity of the course of the disease. It is also the number one cause of bladder cancer. The smoke from tobacco elicits carcinogenic effects on the tissues of the body that are exposed to the smoke. Tobacco smoke is a complex mixture of over 5,000 identified chemicals, of which 98 are known to have specific toxicological properties. The most important chemicals causing cancer are those that produce DNA damage since such damage appears to be the primary underlying cause of cancer. Nicotine is the big enemy of the health. It is the most important constituent of tobacco and its content varies from 0.5% to 0.8%. Cigarette smokers inhale 60 mg of nicotine after smoking a pack of 20 cigarettes while non-smokers inhale about 7 mg. There are approximately 120 million smokers in India. According to the World Health Organization (WHO), India is home to 12% of the world's smokers. Approximately 900,000 people die every year in India due to smoking as of 2009. As of 2015, the number of men smoking tobacco in rose to 108 million, an increase of 36% between 1998 and 2015. According to a 2002 WHO estimate, 30% of adult males in India smoke. Among adult females, the figure is much lower at between 3-5%. According to the study, "A national Representative Case-Control study of smoking and Death in India", Tobacco will be responsible for 1 in 5 of all male deaths and 1 in 20 of all female deaths in country by 2010. This means approximately 1 million Indians would die annually from smoking by 2010. Fitness is one of the most important aspects in our daily life activity as well as sports performance.

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The need and importance of fitness was developed from the Greek & Roman period, the Dark Age, renaissance, revival of Olympic, World war etc. "Physical fitness refers to the organic capacity of the individual to perform the normal task of daily living without undue tiredness or fatigue having reserves of strength and energy available to meet satisfactorily any emergency demands suddenly placed upon him". New concepts of physical fitness are- 1. Health related fitness, 2. Performance related fitness. The components of health related fitness are – Cardiovascular Endurance, Muscular strength, Muscular Endurance, Flexibility, Body Composition.

**2. Methodology**

A cross-sectional study was conducted on 63 P.G. hostel boys (32 smokers and 31 non-smokers) of Kalyani University in

India, ageing 20 to 24 years. The smokers smoked cigarettes at least 5 a day for 3 years. We used a questionnaire and physical fitness tests for data gathering. At first personal data like age, height and weight were measured. Twelve min run and walk test were used to measure cardiovascular endurance, grip dynamometer test used to measure muscular strength, One min Sit up test used to measure muscular endurance, Sit and reach test used to measure flexibility, B.M.I. and Durnin-womersley (1974) skin fold measurement technique were used to measure body composition. All statistical calculation was done by standard statistical procedure. The Mean of different variables were compared by using 't' test. Statistical significance was tested at 0.05 and 0.01 levels.

**3. Results and Discussion**

**Table 1:** Mean and SD of Age, Height and weight of the subjects.

Subjects	No. of subjects	Age(Yr.)		Height(cm)		Weight(kg)	
		Mean	SD	Mean	SD	Mean	SD
Smoker	32	23	± 1	166	± 4.84	58.19	± 7.76
Non-Smoker	31	22.3	± 1.25	167.1	± 3.46	57.5	± 5.03

According to table No. 1 smoker group the Mean and SD of age, height and weight were 23, 166, 58.19 and 1, 4.84, 7.76

respectively non-smoker group Mean and SD were 22.3, 167.1, 57.5 and 1.25, 3.46, 5.03.

**Table 2:** Mean, SD, and 't' value of cardiovascular endurance of smoker and non-smoker boys.

C.V. Endurance		Mean	SD	SED	't' ratio		
	Smoker	2131.88	± 269.29			59.24	**3.31
	Non-smoker	2328.23	± 196.32				

\*Significant at 0.05 level from table value 2.00, \*\*Significant at 0.01 level from table value 2.65

It was observed from the table the mean score of cardiovascular endurance of smoker and non-smoker of hostel boys were 2131.88 ± 269.29 and 2328.23 ± 196.32 restively

and obtained 't' value was 3.31 which was statistically significant.

**Table 3:** Mean, SD, and 't' value of smoker and non-smoker boys right hand and left hand muscular strength.

Muscular Strength	Right Hand	Smoker	Mean	SD	SED	't' ratio
		Non-smoker	24.16	± 4.33		
	Left Hand	Smoker	22.6	± 4.26	1.49	0.64
		Non-smoker	22.45	± 5.2		
		21.5	± 4.7			

\*Significant at 0.05 level from table value 2.00

From the table-3 the mean score of Right hand strength of smoker and non-smoker of hostel boys were 24.16 ± 4.33 and 22.6 ± 4.26 respectively and obtained 't' value was 1.24 which was statistically not significant. The mean score of left

hand strength of smoker and non-smoker of hostel boys were 22.45 ± 5.20 and 21.5 ± 4.7 respectively and obtained 't' value was 0.64 which was statistically not significant.

**Table 4:** Mean, SD, and 't' value of muscular endurance of smoker and non-smoker hostel boys.

Muscular Endurance		Mean	SD	SED	't' ratio		
	Smoker	24.09	± 4.27			1.02	**3.71
	Non-Smoker	27.87	± 3.82				

\*Significant at 0.05 level from table value 2.00, \*\*Significant at 0.01 level from table value 2.65

From the table the mean score of muscular endurance of smoker and nonsmoker of hostel boys were 24.09 ± 4.27 and

27.87 ± 3.82 respectively and obtained 't' value was 3.71 which was statistically significant.

**Table 5:** Mean, SD, and 't' value of flexibility of smoker and non-smoker hostel boys

Flexibility		Mean	SD	SED	't' ratio
	Smoker	23.09	$\pm 5.66$	1.51	**2.92
	Non-Smoker	27.58	$\pm 6.32$		

\*Significant at 0.05 level from table value 2.00, \*\*Significant at 0.01 level from table value 2.65

From the table the mean score of Flexibility of smoker and non-smoker of hostel boys were 23.09  $\pm$  5.66 and 27.58  $\pm$  6.32 respectively and obtained 't' value was 2.97 which was statistically significant.

**Table 6:** Mean, SD, and 't' value of B.M.I and % of body fat of smoker and non-smoker hostel boys

Body Composition	B.M.I		Mean	SD	SED	't' ratio
		Smoker	21.01	$\pm 2.54$	0.54	0.72
	Non-smoker	20.62	$\pm 1.71$			
	% of body fat	Smoker	13.18	$\pm 3.46$	0.79	1.91
Non-smoker		11.67	$\pm 2.79$			

\*Significant at 0.05 level from table value 2.00

From the table the mean score of B.M.I. of smoker and non-smoker of hostel boys were 21.01  $\pm$  2.54 and 20.62  $\pm$  1.71 respectively and obtained 't' value was 0.75 which was statistically not significant. It was observed from the table the mean score of percentage of body fat of smoker and non-smoker of hostel boys were 13.18  $\pm$  3.06 and 11.67  $\pm$  2.79 respectively and obtained 't' value was 1.91 which was statistically not significant.

#### 4. Conclusion

The non-smoker hostel boys are better in cardiovascular endurance, muscular endurance and flexibility than the smoker hostel boys.

In muscular strength and body composition (B.M.I. and % of body fat), there was no significant difference between smoker and non-smoker.

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