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## A Comparative Study on Cardiovascular Efficiency of Adult Smoker and Non-Smoker

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### Abstract

**Introduction:** The efficiency of heart to eject greater amount of blood is known as cardiovascular efficiency. The functional capacity of the heart may be improved while the stroke volume and as a result cardiac output is enhanced. The cardiac output ensures the O<sub>2</sub> supply according to the demand in a certain intensity of the nature of work he performed. The greater demand during certain activity greater is the cardiac output according to his cardiovascular efficiency.

**Purpose:** To compare cardiovascular efficiency of smoker and non-smoker of adult age.

**Methods:** Thirty adult males (15 Smokers and 15 Non-Smokers), ages 21-25 years, volunteered to serve as subjects of the study. Cardio-vascular efficiency were the selected of the study. Independent 't' test was used to examine the significant difference. The level of confidence was set at .05.

**Findings:** The t-value of cardio-vascular efficiency [3.07 (<.05)], between smokers and non-smoker were found significant.

**Result:** Mean value indicates that in cardio-vascular efficiency Non-smokers are better than smokers.

**Keywords:** Reaction time, Audio, Visual, Defensive, Offensive.

### 1. Introduction

In the purpose of evaluation as the man become more civilized, he also become more scientific and as he becomes more scientific he developed methods for improvement of his performance. Organized sports though is pretty old the scientific approach to analyzed the performance of sports man are comparatively new. From 1950 onwards scientists have began a systemic research on the performance capacity with help of concept and technique from the various branches of established science.

The word "cardio" comes from heart and "vascular" means the vessels. It is system that helps in regulating the blood supply to and from the cell to the heart. It is a well-organized transport system of the body by which the blood being circulated with in a closed system under different pressure gradients, created by the pumping mechanism, where heart acts as the central pumping station. The cardiovascular system includes heart, arteries capillaries and veins.

The efficiency of heart to eject greater amount of blood is known as cardiovascular efficiency. The functional capacity of the heart may be improved while the stroke volume and as a result cardiac output is enhanced. The cardiac output ensures the O<sub>2</sub> supply according to the demand in a certain intensity of the nature of work he performed. The greater demand during certain activity greater is the cardiac output according to his cardiovascular efficiency. Although tobacco has dangerous effect on human health, it still highly consumed throughout the world (Benowitz et al., 1988) [3]. Smoking is one of the most common addictions of modern times. It has been implicated as an etiological agent for various chronic diseases, including a variety of infection, cancers, heart diseases and respiratory illnesses (Mehta et al., 2008; Zhong et al., 2008) [12, 14]. Moreover, cigarette smoking generates many toxic and carcinogenic compounds harmful to the health, such as nicotine, nitrogen oxides, carbon monoxide, hydrogen cyanide and free radicals (Hoffmann et al., 2001) [10].

There are more than 4000 chemicals found in cigarette smoke (Green CR, et. al 1996) [6], and a cigarette smoker is exposed to a number of harmful substances including nicotine, free radicals, carbon monoxide and other gaseous products (Gitte RN, 2011) [7]. It is widely

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known that smokers have higher risk for cardiovascular diseases, hypertension, inflammation, stroke, clotting disorder, and respiratory disease (Abel GA et. al, 2005) [1]. Moreover, cigarette smoking accelerates pathogenesis in different type of cancers such as lung, pancreas, breast, liver and kidney.

Lung function tests are a widely used tool to describe the effects of obstruction or restriction on lung function. It is a powerful diagnostic tool that plays a significant role in the diagnosis of early lung damage. It is also used to monitor the therapeutic efficacy of various treatment regimens and the course of the disease. The Spiro metric parameters have gained more popularity when it has been reported that Forced Vital Capacity (FVC), Forced Expiratory Volume in 1 s (FEV1), and FEV1/FVC Ratio are essential for the diagnosis of obstructive and restrictive respiratory illness [14]. Similarly, Measurement of Fractional Nitric Oxide (NO) in exhaled breath (FeNO) is a simple, safe, reliable and non-invasive tool in assessing the severity of pulmonary inflammation and asthma (Dweik, R.A.; Boggs, 2011) [4].

Cigarette smoking-related research and control efforts have generally been focused on traditional cigarettes, while little research exists on Shisha smoking and most of the literature fails to consider the physiological parameters including age, height, weight, gender, ethnicity and socio-economical matching between the groups. In order to address the emerging health risk, the present study aimed to determine the effects of Shisha smoking on lung function and Fractional Exhaled Nitric Oxide (FeNO) among young Saudi adults.

Medical and scientific knowledge leaves on doubt the harmful effect of smoking. Cigarette smoking is the measure eventual cause of illness disability and pre maturity death in country. Many university boys and girls are in a habit of smoking. They consider smoking as the smart, sophisticated, pleasurable and socially popular thing to do (Astrand, 1970) [2].

**Purpose of the Study**

Purpose of this study was to compare the Cardio-vascular efficiency between adult smokers and non-smokers.

**Methodology**

**Selection of Subject**

Total 30 subjects were selected for this study. 15 males’ smokers and 15 males non-smokers collected in south 24 parganas district, west Bengal, India, were taken as sample. Their age ranged between 21-25 years. They intake 5 to 8 cigarette or bidi per days.

**Selection of Variable and Their Criterion Measure**

For measuring cardiovascular efficiency of smokers and non-smokers, all the subjects were asked to perform Harvard step test, the tools used were bench 20 inches, stop watch and metronome.

**PEI**= Duration of exercise in seconds\*100/2\*Sum of three pulse counts of recovery

**Statistical Procedure**

The data analyzed and compared with the help of statistical procedure in which mean, standard deviation and ‘t’ test used to compare the data.

**Results**

**Table 1:** Mean and Standard deviation regarding age, height, weight of Smokers and Non-Smokers.

| Groups             | Smokers |        |        | Non-Smokers |        |        |
|--------------------|---------|--------|--------|-------------|--------|--------|
|                    | Age     | Height | Weight | Age         | Height | Weight |
| Mean               | 21.80   | 166.53 | 56.4   | 22.60       | 166.53 | 57.60  |
| Standard deviation | 1.08    | 2.77   | 2.17   | 1.12        | 6.25   | 4.80   |

**Table 2:** Mean and standard deviation of Cardiovascular of smokers and Non- smokers computed. Its result has been depicted in table 2.

| Variable                   | Groups      | Mean  | Standard deviation |
|----------------------------|-------------|-------|--------------------|
| Cardio-vascular efficiency | Smokers     | 75.57 | 2.17               |
|                            | Non-Smokers | 83.45 | 9.69               |

Table 2 depicts that the mean and standard deviation values of Cardio-vascular efficiency in smokers and non- smokers. There values were recorded as, Smokers75.57±2.17 and Non- Smokers 83.45±9.69 respectively.

**Table 3:** Comparative analysis of Cardio-vascular efficiency between smokers and non- smokers

| Groups       | Number | Mean  | SD   | SED  | ‘t’ Value |
|--------------|--------|-------|------|------|-----------|
| Smokers      | 15     | 75.57 | 2.17 | 2.56 | 3.07*     |
| Non- Smokers | 15     | 83.45 | 9.69 |      |           |

\* t’ 0.05 (28)=2.04 Not significant at 0.05 level

The analysis of table 3 shows that the mean and standard deviation value for Cardio-vascular efficiency for Smokers and Non-Smokers were recorded as 75.57 ±2.17 and 83.45 ±9.69 respectively. It indicates that Non-Smokers are significantly better than Smokers.

**Discussion**

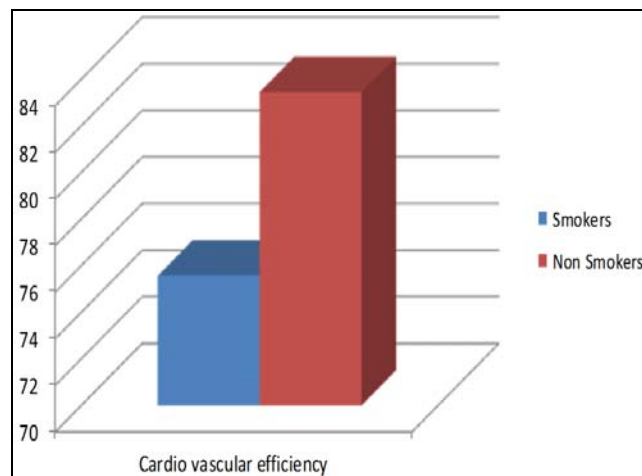
The cardiovascular system includes the heart and all of the blood vessels that carry blood to and from the organs. Blood vessels include arteries, veins, and capillaries, which are all connected and work in unison with the lungs to deliver oxygen to the brain, heart, and other vital organs.

Many teenagers and adults think that there are no effects of smoking on their bodies until they reach middle age. Smoking-caused lung cancer, other cancers, heart disease, and stroke typically do not occur until years after a person's first cigarette. However, there are many serious harms from smoking that occur much sooner. In fact, smoking has numerous immediate health effects on the brain and on the respiratory, cardiovascular, gastrointestinal, immune and metabolic systems. While these immediate effects do not all produce noticeable symptoms, most begin to damage the body with the first cigarette

There was no such difference in the mean physical parameters like age, height, weight, by calculating mean and standard deviation in smokers and non-smokers . Most of the smokers smoked only bidi followed by both cigarette and bidi mixed and only cigarettes. Most cigarette smokers usually smoked non-filter cigarettes since they are cheap and easily available in rural areas. Also, most smokers belonged to rural background and were of low socio-economic status. .

In the present study statistically highly significant association between smokers and non-smokers by applying t-test of significance of cardio vascular function. The association between smoking and impaired CVE was statistically highly significant. Burrows *et al.* reported that there is quantitative significant relationship between impaired ventilator function and duration and frequency of smoking.

#### Graphical representation of difference in mean scores of Cardio-vascular efficiency for Smokers and Non-Smokers



#### Conclusion:

Considering the above mentioned results following conclusion may be drawn

1. The cardiovascular efficiency of the non-smoker groups was better than that of the smoker group.
2. The poor PEI score of smoker group is probably due to their smoking habit.

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