

**Survey of VO2 Max Smoker and Non-Smoker Levels in High School Students****Yasir Valdi Cita Putra^{1✉}, Endro Puji Purwono², Anirotul Qoriah³**Department of Physical Education, Faculty of Sport Science, Universitas Negeri Semarang, Indonesia¹²³**Article History**Received 02 February 2018
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Abstract

Cigarette lovers in the country of Indonesia quite a lot. As commonly known, smoking can affect the respiratory system of the body and VO2 Max. The problem in the study is how the level of VO2 Max in the students of smokers and non-smokers in MA Negeri Pagerbarang Tegal regency. The purpose of the study was to determine the level of VO2 Max students smokers and non-smokers in MA Negeri Pagerbarang Tegal regency. The type and design of the study were surveys. The population of all male students of class X and XI MAN Pagerbarang, amounted to 91 students and consists of 8 classes. The sample was taken by Total Sampling technique. The level of VO2 Max is measured by Multistage Fitness Test. Results of the study with questionnaires, as many as 21 students are non-smokers, 21 students are moderate smokers and 43 are light smokers. Results of the study with the MFT instrument, average VO2 Max light smoker students were 42.97 ml / kg / min, moderate smokers at 38.71 ml / kg / min, and not smokers 49.33 ml / kg / min. Based on the results of research and discussion description, it can be concluded that there are indications of non-smoker students have a good level of ability VO2 Max good, light smoker s are moderate, and moderate smokers are moderate. Students should avoid or stop smoking, because smoking can have a negative impact, especially for the respiratory system and the level of VO2 Max.

How to Cite

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INTRODUCTION

Today, many people enjoy smoking in Indonesia. Whereas the government has tried to recommend the dangers of smoking through slogans, advertisements, public service messages, that the cigarette pack itself has a warning and the dangers of smoking, but in fact more and more individuals / people who smoke cigarettes are found. Smoking habits will result in shrinkage in health. The result is not only for smokers but for those who are inhaled by cigarette smoke. This statement is in accordance with Prasedjo et al, (2005: 25) opinion "Smokers have 400 mean chemicals when one cigarette is burned. The reason is that those who are not already addicted to cigarettes are kept away from cigarettes. Cigarette advertisements must contain "government warnings".

Although everyone knows the dangers caused by smoking, smoking has never been lost in people's lives and seems to be a behavior that can still be tolerated by society. This can be felt in everyday life in homes, offices, public transport and in peace. And even then we can see almost every time and find people who are smoking. Therefore, it is unfortunate if we now meet students (teenagers) who already have smoking habits.

Adolescence is a transition period of childhood into adulthood. This period lasts between the ages of 12-18 years or there are other experts such as Corbin (1980) who state that the period of adolescence ranges between 9 or 10 years to 21 or 22 years (Alfian TA, 2012). Lack of supervision of parents outside the home has a big contribution in the influence of students (teenagers) to do smoking. Hartadi in Juliardi (2006: 4) states "in adolescence, they tend to have curiosity, do not have mature considerations, are easily carried away by the current and always want to try and do not want to miss." This can be bad for students, for example often At this time, underage students are good at smoking. Sometimes they assume, smoking can eliminate the difficulty in learning, with smoking will arise a sense of self-confidence or a symbol of masculinity and also can relieve the feeling of pain. For students who are still in school uniforms, there is no hesitation in smoking in public or in the school environment. Although there is a ban on smoking in schools, students are still found to smoke even though they are secretly in a school cafeteria.

As is generally known smoking can affect the body's respiratory system. When smoking, the smoke that is smoked will go into the mouth, into the neck and into the lungs. Cigarette smoke con-

tains various kinds of toxins that are harmful to general health. The main substance that interferes is the entry of CO gas (Carbonmonoxyda) which can interfere with Hb (Hemoglobin), oxygen and acidic bonds. In normal circumstances, there is no cigarette smoke (CO), at the time of inspiration oxygen will enter the lungs and the alveoli is bound by Hb and forms HbO₂ (oxyhemoglobin). This Oxy Hb will be circulated throughout the body, including the muscles and used to move. The ability of Hb to bind oxygen is called aerobic ability or VO₂ maximum (aerobic capacity). The more O₂ can be tied, the higher VO₂ Max.

Thus it is clear that smoking habits on students will have an influence on someone's VO₂ Max level. This means that smoking habits in a person include a dominant element that affects the VO₂ Max level.

Based on the observations of researchers on August 29, 2016 in the MA Negeri Pagerbarang, Tegal Regency, it was found that some male students had smoking habits, the results were obtained during interviews with Physical Education teachers, Counseling Guidance teachers and students. The problem at the school is that there are students who consume cigarettes about 30% of the number of male students in the school. When smoking, students tend to smoke outside of school, but there have been cases of students who smoke at school and have been sanctioned by the school. According to the student smoker who was interviewed by the author, when he did heavy physical activity, he felt tired quickly and had short breaths. Based on the available literature, it is not clear the influence of smoking habits on someone's VO₂ Max level, so that researchers feel interested and want to examine more about VO₂ Max Level Survey of Smokers and Non-smokers in MA Negeri Pagerbarang Tegal Regency.

Based on the background, identification and limitation of the above problems, the problem in this study is: What is the VO₂ Max level of smokers and non-smokers in high school MA Negeri Pagerbarang, Tegal Regency.

This study aims to determine the VO₂ Max level of smokers and nonsmokers in high school MA Negeri Pagerbarang, Tegal Regency.

METHODS

This research is a survey research which is one of the research approaches which is generally used for extensive and many data collection. This research was carried out on large and small populations, but the data came from samples taken from the population. This study uses descriptive

analysis method with a quantitative approach. As stated by Nana Sudjana and Ibrahim (1989: 64) that descriptive research is a research that seeks to describe a phenomenon, event and event that occurs at the present time where the researcher tries to photograph the events and events that are the center of attention to be described as they are.

The population of all male students in class X and XI MAN Pagerbarang which amounted to 91 students and consisted of 8 classes. The research sample was taken with Total Sampling technique. VO2 Max levels are measured by the Multistage Fitness Test. The research procedure consists of the preparation stage, the implementation stage and the data analysis stage. Factors that influence the weather factor, equipment and assessor factors. Data analysis techniques using descriptive percentage.

RESULTS AND DISCUSSION

Descriptive Results The percentage of VO2 Max Norms Students Not Smoker. The 21 data obtained, there are norms of VO2 Max which are very bad 0%, Bad 0.00%, Moderate 19.05%, Good 52.38%, very good 19.05%, and very good at 9.52%. The presentation is as follows:

Table 1. Descriptive Results The percentage of VO2 Max Norms Students Not Smoker.

Category	Total	percentage
Very lacking	0	0,00%
less	0	0,00%
medium	4	19,05%
good	11	52,38%
Very good	4	19,05%
top	2	9,52%

Descriptive Results Percentage of Students Smokers Norma VO2 Max Light. The 43 data obtained VO2 Max are very bad norm 16.28%, 13.95% Poor, Average 25.58%, Good 27.91%, very good 9%, and very good at all by 7%. The presentation is as follows:

Table 2. Descriptive Results of Percentage of VO2 Max Norms for Light Smokers.

Category	Total	percentage
Very lacking	7	16,28%
less	6	13,95%
medium	11	25,58%
good	12	27,91%
Very good	4	9,30%
top	3	6,98%

Percentage Descriptive Results of VO2 Max Norms for Medium Smokers. From the 21 data obtained, there are norms of VO2 Max that are very bad 28.57%, Bad 9.52%, Moderate 42.86%, Good 9.52%, Very good 4.76%, and very good at 4.76% . The presentation is as follows:

Table 3. Percentage Descriptive Results of VO2 Max Norms for Medium Smokers.

Category	Total	percentage
Very lacking	6	28,57%
less	2	9,52%
medium	9	42,86%
good	2	9,52%
Very good	1	4,76%
top	1	4,76%

The results of this study are smoking habits indicated against VO2 Max levels of non-smokers with smokers, in MAN Pagerbarang male students in the 2016/2017 school year. A person who smokes his VO2 Max level is lower than a non-smoker this happens because the oxygen supply will decrease because hemoglobin will be more related to carbon monoxide than with oxygen so that when exercising a smoker will quickly gasp to meet optimal needs and fitness.

A smoker does not only have the chance to get lung cancer, which increases 10 times that of a non-smoker. This factor may affect research subjects, so smoking habits have a very negative effect on VO2 Max level.

Based on the VO2 Max measurement data, it shows that the average VO2 Max of smoker students is lower than that of non-smokers. The average VO2 Max of light smoker students was 42.97 ml / kg / min, moderate smokers were 38.71 ml / kg / min, and non-smokers were 49.33 ml / kg / min. A person who has VO2 Max more than 45.00 ml / kg / min indicates a good VO2 Max level. According to Guyton and Hall (2008) in Giri Wiarto (2013: 13) VO2 Max is the speed of oxygen consumption in maximum aerobic metabolism. According to Thoden in Suranto's module (2008: 118) VO2 Max is the maximum aerobic capture power describing the maximum amount of oxygen consumed per unit of time by a person during training or testing, with training that gets heavier until fatigue, the size is called VO2 Max.

VO2 Max is a level of body ability expressed in liters per minute or milliliter / minute / kg of body weight. Every cell in the human body needs oxygen to convert food to ATP (adenosine triphosphate) which is ready to be used for the work of each cell that consumes the least oxy-

gen is the muscle in a resting state. Muscle cells that contract require a lot of ATP. As a result the muscles used in training need more oxygen and produce CO₂.

Supported by the results of the percentage descriptive analysis that has been done, it can be concluded that there are indications that smokers have a lower VO₂ Max consumption rate than non-smokers. The difference shows one of the effects of cigarette consumption on someone's VO₂ Max level. The effects of smoking habits are very numerous and it relates to vital organs in the body such as the lungs, heart, kidneys, and others. According to the WHO, 35% of all deaths from heart disease and blood circulation are related to smoking (Bernard, Christian, 2002: 147). Smoking can also reduce performance. The continuous intake of nicotine can inhibit the nervous system and interfere with blood circulation and oxygen flow to the brain. This causes a marked decrease in achievement (Bernard, Christian, 2002: 148). The obstacles in this study are that the facilities owned by the school are incomplete, besides the implementation time is less balanced between one class and another. Therefore, the research is carried out in the morning all by taking the time of the subjects in addition to the physical education subject, according to the agreement. This research is a survey research, where the weaknesses in survey research are able to reach a large and wide population but cannot be used to explore cases or problems more deeply.

CONCLUSION

Based on VO₂ Max measurement data, non-smokers have an average VO₂ Max ability of 49.33% and are of good norm, and VO₂ Max measurement data of light smokers have an average VO₂ Max ability of 42.97% and moderate while VO₂ Max measurement data of smoker students indicated that VO₂ Max ability was 38.71% and moderate.

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