

## Description of SGPT Levels in Construction Workers Who Have an Active Smoking Habit

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### ABSTRACT

Physical activity is body movement that requires skeletal muscles and can cause energy expenditure. Physical activity is divided into three, namely light, moderate and heavy physical activity. Construction workers who carry out heavy physical activity for 7 to 8 hours every day can lose a lot of energy and fluids as well as important micronutrients, one of which is iron. Apart from carrying out heavy physical activities, construction workers also have an active smoking habit, which means they are considered active smokers if they smoke more than 20 cigarettes every day. Smoking is something that can cause health problems and smoking has become the biggest cause of death in the world. Cigarette raw materials such as tar, nicotine and carbon monoxide are the main toxicants that can trigger the formation of free radicals. The Research objective is to determine the description of SGPT levels in construction workers who have an active smoking habit. The methods of this research design is descriptive observational research where this research was carried out using the enzymatic kinetic method a total of 28 samples based on calculations using the Slovin formula. The results of the research is examining SGPT levels in construction workers from 28 samples showed an increase in active smokers 11-15 years, namely 3 samples and active smokers 16-20 years, namely 2 samples, there was an increase or were outside the normal value, which is where the normal value of SGPT levels in men -men, namely 42 U/L. The conclusion of this research is showed that 5 of the 28 samples had increased SGPT levels with levels of 63 U/L, 58 U/L, 52 U/L and 49 U/L in 2 samples.

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### INTRODUCTION

World Health Organization (WHO), physical activity is body movement produced by skeletal muscles and causes energy expenditure. Physical activity is divided into three groups, namely light, moderate and heavy (Tiara et al., 2016). Heavy physical activity, one of which is carried out by construction workers, works for 7 to 8 hours every day, so it can result in the loss of a lot of energy and fluids as well as important micronutrients, one of which is iron. Therefore, construction workers are vulnerable to iron deficiency (Laluyen et al., 2016).

Construction workers are a very important sector of the country's economic development. Construction workers are one of the jobs that can cause occupational diseases caused by several factors, namely dusty environmental conditions, inadequate living space, minimal availability of personal protective equipment and limited access to health facilities (Afano, F., 2020).

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During construction workers, blood flow and metabolic processes in the liver and kidneys decrease significantly. This decrease in blood flow will cause hypoxia in the liver and kidneys, after physical exercise is completed large amounts of oxidants are released. This will cause the number of oxidants to increase because this process can damage liver and kidney cells and activate white blood cells so that liver damage will become worse (Sinaga et al., 2019). Apart from carrying out heavy physical activity, construction workers are also known to have smoking habits, where smokers are divided into two groups, namely active smokers and passive smokers. Active smokers themselves are divided into three, namely light, moderate and heavy smokers, they are considered light smokers if they smoke 1-10 cigarettes every day, they are considered moderate smokers if they smoke 11-20 cigarettes every day, and they are said to be heavy smokers if they smoke more than 20 cigarettes. cigarettes every day. Meanwhile, passive smoking is someone who does not smoke but accidentally inhales cigarette smoke from people around them (Horax et al., 2017).

Active smoking habits carried out by construction workers can cause health problems. Where smoking is very dangerous for the body's organs, and smoking has become the biggest cause of death in the world. Cigarette raw materials such as tar, nicotine and carbon monoxide are the main toxicants that can trigger the formation of free radicals (Tanoeisan., 2016). Apart from cigarettes, continuous exposure to cigarette smoke can also cause various diseases such as heart disease, respiratory problems and liver cancer. Cigarette smoke contains chemicals which are then carried to the lungs, and the bloodstream will distribute them throughout the body. One of the enzymes in the liver is a chemical found in cigarettes that can cause cancer. Smoking can also cause lipid peroxidation which damages normal liver cell membranes. If liver cell damage occurs, SGPT in smokers will increase compared to non-smokers (Tanoeisan., 2016). Serum glutamate pyruvate transaminase is the main enzyme found in hepatocytes and is effective in diagnosing hepatocellular damage. If liver damage occurs, the GPT enzyme will leave the liver cells and enter the blood. Levels of this enzyme are also found in small amounts in the heart, kidneys and skeletal muscles (Kee J.L., 2014)

One of the liver function tests that can be carried out is Serum Glutamic Pyruvic Transaminase (SGPT). If liver cells are damaged, this enzyme will exit through the liver cells so that this will automatically cause an increase in levels in the blood serum. SGPT is an enzyme that functions as a catalyzer for various body functions. SGPT is considered more specific for assessing liver damage compared to SGOT (Tanoeisan., 2016). Research conducted by Wicak (2019) on SGPT levels in active smokers aged 17-25 years with a duration of smoking <10 years, concluded that active smokers in the moderate category had normal SGPT levels, while active smokers in the heavy category had increased SGPT levels (Wicaksana, 2019). The research results of Masita (2020) found a significant relationship between smoking habits and the level of SGPT enzyme activity which can cause serious damage to liver cell membranes (Masita., 2020).

One of the things that can increase SGPT levels is heavy physical activity which causes oxidative stress in the body. Based on a survey conducted on community construction workers in one of the working areas of the city of Mataram who carried out heavy physical activity and had an active smoking habit, they received complaints of respiratory problems, fatigue easily due to physical activity accompanied by smoking, and long working hours, namely 7 to 8 hours every day. Based on the explanation above, research needs to be carried out to determine and describe the description of SGPT levels in construction workers who have an active smoking habit.

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Based on the background of the problem, the problem formulation in this research is what is the description of SGPT levels in construction workers who have an active smoking habit?

### **MATERIALS/METHOD**

This research is descriptive observational research which only aims to describe the phenomena found, whether in the form of risk factors, or an effect or result. This research was carried out using the enzymatic kinetic method.

The sampling technique used in this research is side purposive, namely a sampling technique based on certain criteria or considerations that have been made by the researcher, based on previously known characteristics or characteristics of the population, including: 1) Worked as a construction worker for more than 5 years. 2) Active smokers who smoke more than 20 cigarettes every day regularly for 1 to 20 years.

Based on the results of the calculations that have been carried out, there are 28 samples used in this study. The data collection technique in this research begins with filling out a consent form, then continues with interviews and laboratory examinations. Interviews were conducted to find out name, age, gender, length of time working as a construction worker, and how long they had consumed cigarettes. Next, a laboratory examination is carried out, namely measuring SGPT levels.

### **RESULTS AND DISCUSSION**

Research has carried out an overview of the results of examination of SGPT levels in construction workers who have worked for more than 5 years and are known to have active smoking habits every day, divided into 4 groups, namely active smoking for 1-5 years, 6-10 years, 11-16 years and 16 -20 years.

Table 1. Results of examination of SGPT levels in construction workers who have active smoking habits for 1-5 years.

No.	Length of work (Years)	Length of smoking (Year)	SGPT Level (U/L)
1	>5	1-5	23
2	>5	1-5	18
3	>5	1-5	23
Average			21,3

Table 1. shows 3 samples out of 28 research samples of construction workers with more than 5 years of work and 1-5 years of smoking, SGPT levels in the normal value category, namely 18 U/L and 23 U/L with an average value of 21.3 U/L.

Table 2. Results of examination of SGPT levels in construction workers who have active smoking habits for 6-10 years.

No.	Length of work (Years)	Length of smoking (Year)	SGPT Level (U/L)
1	>5	6-10	21
2	>5	6-10	21
3	>5	6-10	24
4	>5	6-10	25
5	>5	6-10	36
6	>5	6-10	28
7	>5	6-10	28
Average			26

Data table 2. results from examination of SGPT levels in construction workers with more than 5 years of work and active smoking habits for 6-10 years. 8 samples from a total of 28 samples with the lowest SGPT levels, namely 21 U/L and the highest SGPT levels, namely 36 U/L with an average value of 26 U/L.

Table 3. Results of examination of SGPT levels in construction workers who have an active smoking habit for 11-15.

No.	Length of work (Years)	Length of smoking (Year)	SGPT Level (U/L)
1	>5	11-15	38
2	>5	11-15	28
3	>5	11-15	21
4	>5	11-15	36
5	>5	11-15	41
6	>5	11-15	36
7	>5	11-15	21
8	>5	11-15	58
9	>5	11-15	52
10	>5	11-15	63
11	>5	11-15	38
12	>5	11-15	25
Average			36,6

Table 3. shows the results of examinations on 12 samples from a total of 28 samples on construction workers who worked 7 to 8 hours per day for more than 5 years and were known to have smoked for 11-15 years with the highest SGPT levels, namely 63 U/L and SGPT levels. The lowest was 21 U/L, which was found in 3 samples in the category above normal values, namely 52 U/L, 58 U/L and 63 U/L with an average SGPT level value of 36.6 U/L.

Table 4. Results of examination of SGPT levels in construction workers who have active smoking habits for 16-20 years.

No.	Length of work (Years)	Length of smoking (Year)	SGPT Level (U/L)
1	>5	16-20	38
2	>5	16-20	49
3	>5	16-20	38
4	>5	16-20	41
5	>5	16-20	49
Average			43

In table 4.4, from 28 samples of workers with more than 5 years of work and 16-20 years of smoking, it shows that 2 samples had SGPT levels above the normal value, namely 49 U/L, with an average value of 43 U/L.

This study used 28 respondents, namely construction workers who had active smoking habits and had agreed to informed consent as a statement that the respondents were willing to follow the procedures in this study.

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Based on the research results in table 4.1 there are normal SGPT level results with an average value of 21.3 U/L, in table 4.2 normal SGPT levels with an average value of 26 U/L, in table 4.3 there are results of SGPT levels increasing with a value the average is 36.6 U/L, and in table 4.4 there are results that SGPT levels have increased with an average value of 43 U/L, where the normal value for SGPT levels in men is 42 U/L.

The increase in SGPT levels in table 4.3 was 3 samples with a smoking period of 11-15 years, namely 52 U/L, 58 U/L and 63 U/L, while in table 4.4 there were 2 samples with a smoking duration of 16-20 years, namely 49 U. /L. Things that can increase SGPT levels in construction workers can be due to several factors such as heavy physical activity while working, having been a construction worker for a long time, and being an active smoker for a long time. Heavy physical activity and long periods of work can influence SGPT levels to increase based on the type of work of construction workers, where the bricklayer section has very heavy work where the bricklayer section workers are tasked with, among other things, mixing cement, lifting cement, iron, wood, and so on. Meanwhile, construction workers are tasked with installing wood, cementing, casting, ceramics and so on. Construction workers can also suffer from fatigue due to the influence of working hours, namely 7 to 8 hours every day (Kumar, 2013).

Apart from physical activity while working, being an active smoker can also increase SGPT levels. In this study, the respondents selected were active smokers aged 1 to 20 years, which can be seen from the research results, the longer they have an active smoking habit, the more SGPT levels increase. Chronic exposure to cigarette smoke can cause chronic cell damage due to continuous exposure to cigarette chemical compounds, including Kupffer cells and various secreted cyclotone. Cigarette smoke also contains very high amounts of free radicals, it is estimated that in one puff there are 1014 free radicals molecules. Free radicals are highly reactive atoms that can trigger oxidative stress on liver cells (Kumar, 2013).

It can be seen from the research results of Masita (2020) that 40 samples obtained the lowest SGPT level of 30 U/L and the highest level of 106 U/L with an average value of 48.9 U/L. Pastophysiologicaly, the increase in SGPT levels is only 2 to 3 times the normal value, which means that the damage to the liver is still acute (Masita., 2020)

And in Tanoeisan's (2016) research, 48 samples of SGPT levels were normal with an average value of 23 U/L and above normal values with an average value of 28.68 U/L. It was concluded that those included in the light-moderate smoker category were within normal limits, while those included in the heavy smoker category experienced an increase. Therefore, it can be concluded that the longer you have an active smoking habit, the higher the risk of liver damage (Tanoeisan, 2016).

## **CONCLUSIONS**

From the results of the research that has been carried out, it can be concluded as follows: 1) The length of service for all construction workers is more than 5 years. 2) The duration of smoking is mostly between 11-15 years. 3) SGPT levels in smokers 1-5 years with an average of 21.3 U/L, SGPT levels in smokers 6-10 years with an average of 26 U/L, SGPT levels in smokers 11-15 years with an average 36.6 U/L, and SGPT levels in smokers 16-20 years with an average of 43 U/L.

## **REFERENCE**

- 
- Afano, F., Yuliatni, P. C. D., & Ani, L. S. (2020). Gambaran kesehatan kerja pekerja bangunan di Kota Denpasar periode Agustus-Oktober 2017. *Intisari Sains Medis*, 11(2), 906–912.
- Aji, A., Maulinda, L. Dan Amin, S., (2015). Isolasi nikotin dari putung rokok sebagai insektisida. *Jurnal Teknologi Kimia Unimal*, Volume 4,p.103.
- Aleya., & Khairun, N. B. (2014). Korelasi pemeriksaan laboratorium sgot/sgpt dengan kadar bilirubin pada pasien hepatitis c di ruang penyakit dalam rsud dr. H. Abdul moeloek provinsi *Jurnal Majority*, 4(9),135-139.
- Bawuna, N. hilda, Rottie, J., & Onibala, F. (2017). Hubungan antara tingkat stres dengan perilaku merokok pada mahasiswa fakultas teknik universitas sam ratulangi. *E-Journal Keperawatan*, 5.
- Candrawati, S. (2013). Pengaruh aktivitas fisik terhadap stres oksidatif. *Jurnal Mandala of Health*. Vol 6 (1). FK Universitas Jendral Sudirman, Purwokerto.
- Chang, S.A., (2012). *Smoking and type 2 diabetes mellitus*. diabetes metab. J. Vol. 36, 399–403.
- Conreg, D., Waleleng, B. J., & Stella, P. (2014). Hubungan konsumsi alkohol dengan gangguan fungsi hati pada subjek pria dewasa muda di kelurahan tateli dan teling atas manado. *Jurnal e-CliniC*, 2(2), 1-4.
- Hakim, L.,(2014). Etnobotani dan Manajemen Kebun Pekarangan Rumah : in *Ketahanan Pangan, Kesehatan dan Agrowisata*. Malang: (ID):Selaras.
- Horax Michael,Willyanto Santoso Leo, Gunadi Kartika.(2017). Media interaktif tentang bahaya merokok bagi pelajar. *Jurnal Infra*.5(1):15.
- Jiwantoro, Y. A., & Jannah, M. (2020). Pengaruh Ekstrak Pegagan (*Centella Asiatica* (L.) Terhadap Profil Darah dan Hepar Pada Tikus Putih yang Diinduksi Asap Rokok. *Jurnal Kesehatan Andalas*, 9(2), 230-234.
- Kee, J. L. (2014). *Pedoman pemeriksaan laboratorium & diagnostik*. 6 th edn. Edieted By R.P Kapoh. Jakarta : Buku Kedokteran EGC.
- Kumar V, Abbas A K, Fausto N., (2013) *Pathologic basis of disease*. 7 Edisi ke-7. Philadelphia: Elsevier; . hlm. 43 – 60
- Kowalak. (2011). *Buku Ajar Patofisiologi*. Jakarta: EGC.
- Laluyan Rebecca E.,YoulaA. Assa., Michaela E.Paruntu (2016). Gambaran kadar besi darah pada pekerja bangunan. *Jurnal e-Biomedik (eBm)*, 4(2).
- LeFever, K. J. (2017). *Pedoman pemeriksaan laboratorium & diagnostik*. EGC. Jakarta.
- Lingga L. (2012) *Bebas penyakit asam urat tanpa obat*. Jakarta: Agromedia Pustaka.
- Masita, (2020). *Hubungan kebiasaan merokok dengan tingkat aktivitas enzim sgpt & sgot pada masyarakat di wilayah sijunjung*. In masita (Ed.), *masita* (2020th ed., Vol. 21, Issue 1).
- Nurjanah, L. K. (2014). "Gangguan fungsi paru dan kadar cotinine pada urin karyawan yang terpapar asap rokok orang lain". *Jurnal Kesehatan Masyarakat*, 10(1), 43-52.
- Riswanto.(2009). *Pemeriksaan Hematologi Selayang Pandang*. Alfamedia Kanal Medika.
- Rosida, A. (2017). Pemeriksaan laboratorium penyakit hati. *Jurnal Kedokteran*, 4(2), 1-9.
- Samiadi, L. A. (2017) *Mengenal gangguan mineral dan tulang pada penyakit ginjal kronis*. Retrieved November 25, from Hello Sehat.
- Santhi, D. (2018). *Kimia Klinik Glory Diagnostics*. 16–18.
- Setiawan, A. (2011). *Faktor timbulnya cedera olahraga*. Media Ilmu Keolahragaan

- 
- Indonesia, 1(1), 94–98.
- Setiawan, H. (2013). Akumulasi dan distribusi logam berat pada vegetasi mangrove di perairan pesisir sulawesi selatan. Balai Penelitian Kehutanan Makassar. *Jurnal Ilmu Kehutanan*, 7(1), 12.
- Sinaga, A. F., Pangondian, H. P., Ramlan, S., Deni, R. M., Mandike, G., & Khairani, P. (2018). Efek hepatoprotektif minyak buah merah pada serum tikus dengan aktifitas fisik maksimal. *Jurnal Ilmiah Ilmu Keolahragaan*, 2(2), 115-125.
- Tanoesian, P. A., Yanti, M. M., & Stefana, H. M. K. (2016). Gambaran kadar serum glutamic pyruvic transaminase (sgpt) pada perokok aktif usia >40 tahun. *Jurnal Kedokteran*, 2(1), 1-5.
- Tiara, D., Tiho, M. dan Mewo, Y. M.,(2016). Gambaran Kadar Limfosit pada Pekerja Bangunan. *Jurnal e-Biomedik*, 4(2), pp. 2-7.
- Tsani, R. A., Setiani, O. dan Dewanti, N. A. Y. (2017). Hubungan riwayat pajanan pestisida dengan gangguan fungsi hati pada petani di desa sumberejo kecamatan ngablak kabupaten magelang. *Jurnal Kesehatan Masyarakat (e-Journal)*, 5(3).
- Wicaksana, L. K. (2019). Gambaran kadar sgpt (serum glutamic pyruvic transaminase) pada perokok aktif di usia 17-25 tahun dengan lama merokok <10 tahun. *Jurnal Kesehatan*, 3(1), 1-13.