Vitamin D Status among Indonesian Healthy Smokers: A Preliminary Findings

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Keywords: Vitamin D, healthy smokers, Indonesia.

Abstract: It is estimated that smoking habit has caused the death of six million people in different parts of the world each year. This figure is frequently connected with an expanded danger of death from constant non-transmittable illnesses. Low serum vitamin D levels are related to weakened lung function, expanded occurrence of infectious sicknesses and inflammation.In smokers an acceleration of pulmonary function decrease was observed.Chest radiography and spirometry tests were performed, which included samples of peripheral blood in a population sample of 25 healthy male smokers. Serum 25 (OHD) concentrations were measured by an electrochemical-luminescent (ECLIA) bond assay. The average level of vitamin D was found in 27.87 (SD = 7.08). There were no differences between body mass index (BMI) and 25(OHD) value ($p > 0.05$), and there were no differences between smoking types and 25(OHD)rates ($p > 0.05$). Vitamin D sufficiency is found primarily in healthy smokers, even if they are found in tropical regions such as Indonesia. It is still believed that vitamin D levels have a substantial clinical benefit in the deterioration of lung function.

1 INTRODUCTION

Vitamin D level is expanded by presentation to daylight. Vitamin D inadequacy might be ignored in Asian nations, maybe on the supposition that vitamin D deficiency is probably not going to happen in areas with ample daylight. A few examinations conveyed crosswise over various nations in South Asia including Southeast Asia uncovered broad pervasiveness of vitamin D inadequacy and deficiency. There are still many people living in tropical regions such as Indonesia, suffer from vitamin D deficiency due to many factors.On the other hand, vitamin D deficiency can reduce lung defence against disease.This point plans to know the commonness of vitamin D inadequacy in Indonesian populace.

Cigarettes have executed numerous individuals who suck it. Smoking propensities are evaluated to have caused the deaths of six million individuals in different parts of the world every year. This figure is likewise frequently connected with an expanded danger of death from chonic non-communicable sicknesses. WHO predicts that by 2025 around 45% of Indonesia's populace are smokers (WHO, 2015).Indonesia ranks fifth as the largest cigarette consumer country in the world, the third order as the country with the highest number of smokers in the world and the first in Southeast Asia (Susanto et al., 2011).

Cigarette smoke, particles and other toxic gases such as fumes from biomass fuels can lead to pulmonary inflammation, a modified normal response and progress to Chronic Obstructive Pulmonary Disease (COPD). This chronic inflammatory response can trigger the destruction of parenchymal tissue (the occurrence of emphysema) and interfere with the mechanism of natural repair and defense of the body (the occurrence of small airway fibrosis). This pathological change causes air trapping and progressive airflow limitations that cause symptoms of breathlessness and some other symptoms of COPD symptoms (Vestbo, 2014). Changes in tissue structure are closely related to the inflammatory response due to exposure to particle

Arbaningsih, S. and Lelo, A.
Vitamin D Status among Indonesian Healthy Smokers: A Preliminary Findings.
DOI: 10.5220/0008887902310235
In *Proceedings of the 7th International Conference on Multidisciplinary Research (ICMR 2018)* - , pages 231-235
ISBN: 978-989-758-437-4

dust or toxic gases, but the biggest important factor is the influence of cigarette smoke (Russel, 2002).

Smoking habits can modify vitamin D effect such as immuno-modulator and anti-inflammatory. Vitamin D deficiency is associated with respiratory disorders. Vitamin D can influence lung cell biology systems, such as the respiratory immune system (Lange et al., 2012; Hejazi et al., 2016).

In the lung study (2012), pulmonary function of FEV1 decreased 2-fold in smokers who have vitamin D deficiency compared to smokers without vitamin D deficiency. Vitamin D deficiency is often found in patients with COPD (with levels of 25-hydroxyvitamin D <20 ng / ml) associated with disease severity based on FEV1 pulmonary function evaluation (Janssen, 2010).

The main source of vitamin D is actually formed in the skin with the help of exposure to ultraviolet sun-B (UVB). Therefore, this study was conducted to assess vitamin D concentrate in smokers who did not have health problems in their lungs, who live in Medan, as part of Indonesia region, as a country that is exposed to sunlight throughout the year

2 METHODOLOGY

2.1 Research Design

The design of this research is an analytic research using cross sectional design. The study was done at General Hospital of Haji Medan. This research would be carried out after the approval of the Ethics Committee of University of North Sumatra. Serum vitamin D levels was performed in the clinical pathology laboratory of General Hospital of Haji Adam Malik Medan.

2.2 Sample

The samples in this study were 25 healthymales who have no abnormalitiesin the lungs, known by interpretation result of chest x-ray, spirometry examinationand physical diagnostic, aged 40-65 years, and smokers. The participants under the study are selected from hospital staffs (mostly indoor occupation), andthey are given written informed consent. Subjects were excluded if they had lung diseases, hypothyroidism, or if they have a history of treatment consumption which can influence calcium and vitamin D metabolism.

2.3 Instrument

The instruments that were used to collect the data in this research were chest x-ray examination, spirometry test and laboratory test. The spirometry was held by using a Minispir spirometer (MIR-Medical International Research, Italy) MIR Spirobank II spirometer. Serum of 25-hydroxyvitamin D (25OHD) concentration was processed by electro-chemiluminescence binding assay (ECLIA).

2.4 Data Collection and Analysis

To gather the information, spirometry was performed. Obstruction results from patient samples were defined according to the degree of airflow obstruction based on post-bronchodilator FEV1 as follows: mild (≥80% of expected value); moderate (80> FEV1≥50% expected); severe (50%> FEV1≥30% expected); very serious (<30% expected) (GOLD, 2017). Fringe blood tests were taken from an example of 25 men overviewed. In this manner, the information is in quantitative shape. The serum measurements for 25-hydroxyvitamin D was done by its techniques. Vitamin D was estimated with Elecsys (Roche) and the electrochemical immunoassay (ECLIA). The status of human vitamin D was evaluated by measuring the value of 25 (OH) D. Vitamin D deficiency is expressed when the concentration of 25 (OH) D <50 nmol / L or <20 ng / ml; while the concentration of vitamin D deficiency of 25 (OH) D is 51-74 nmol / L or 21-29 ng / ml. The normal rate of the vitamin D concentration of 25 (OH) D is> 30 ng / ml (Holick et al., 2008).

Statistical analyzes were performed with SPSS software for Windows. Persistent variables were displayed as mean ± standard deviation and 95 confidence intervals (95% CI) and all out variables, as rates. The Chi-square test was utilized to decide the relationship between absolute factors. Normality test was analyzed for each continuous variables.

3 RESULT

3.1 Demographic Characteristics

This study was followed by 25 healthy males subjects smoked. The characteristics of sample subjects are presented in more detail in table 1.

Table 1: Demographic characteristics.

Characteristics	N
Age, mean (SD), year	49,96 (4,66)
Body weight, rerata (SD), kg	76,74 (10,97)
Height, rerata (SD), cm	162,7 (7,25)
Body Mass Index, n (%)	
Normal	4 (16)
Overweight	21 (84)
Ethnicity, n (%)	
Java	10 (40)
Batak	11 (44)
Aceh	1 (4)
Banten	1 (4)
Palembang	1 (4)
Hindustan	1 (4)
Education, n (%)	
Did not finish primary school	0
Primary school	1 (4)
Junir high school	1 (4)
Senior high school	17 (68)
Diploma	1 (4)
Bachelor degree	4 (16)
Master degree	1 (4)
Smoking habit, n (%)	
Type of cigarette	
Keretek	13 (52)
Keretek with filter	7 (28)
Both	5 (20)
Smoker types, n (%)	
Light smoker	8 (32)
Moderate smoker	9 (36)
Heavy smoker	8 (32)

There were 4 subjects (16%) with normal body mass Index (BMI) and 21 subjects (84%) with over weight BMI. Found 13 subjects who smoked kretek (52%); subjects who smoke filter types are 7 people (28%); and 5 subjects who smoked both types (20%). The number of light smokers being found is 8 subjects (32%), moderate smokers are found 9 subjects (36%) and heavy smokers are found as many as 8subjects (32%).

The results of vitamin D was presented in table 2showing mean, standard deviation (SD), maximum minimum and 95% confidence interval (IK).

Table2:Results measurement of vitamin D.

Vitamin D	N
Mean	27,87
Median	27,44
SD	7,08
Minimum	17,19
Maximum	53,80
95% CI	24,95-30,79

The mean vitamin D was found at 27.87 ng/ml (SD= 7.08).The median was found at 27.44 ng/ml.The association of body mass index (BMI) with serum 25(OH)D level is shown in table 3.

Table 3: Differences of BMI and vitamin D.

Body Mass Index (BMI)	Vitamin D		Total (%)	P
	Normal (%)	Insufisiensi (%)		
Normal	3 (75)	1 (25)	4 (100)	1,00
Overweight	16 (76,2)	5 (23,8)	21 (100)	

The association of smoker types with serum 25(OH)D level is shown in table 4.

Table 4: Differences of smoker types and vitamin D.

Smoker types	Vitamin D		Total (%)	P
	Normal (%)	Insufisiensi (%)		
Light smoker	7 (87,5)	1 (12,5)	8 (100)	0,62
Moderate smoker	10 (71,4)	4 (2,6)	14 (100)	
Heavy smoker	2 (66,7)	1 (33,3)	3 (100)	

There wereno differences between body mass index (BMI) and vitamin D levels (p>0,05), and there were also no differences between types of smokers and vitamin D levels (p>0,05).

4 ANALYSIS

In this study we found insufficiency of vitamin D levels in healthy sample group who smoked with mean of 27.87 ng/ml(SD =7.08). This is similar to the results ofKassi et.al.'s (2015) research that smokers have a low serum 25 (OH) D concentration than non-smokers.This can be due to several factors. One of the components that can influence vitamin D concentration is BMI and long exposure to daylight.In the sample of healthy group,smokers found subjects with normal BMI4 people (16%) and overweight 21 people (84%).

The state of overweight will have a high danger of vitamin D insufficiency since vitamin D can be taken by fat cells (Dusso et al., 2005). Those having a BMI of ≥30 were related to bring down serum 25 (OH) D esteems when contrasted with non-obese people. Obesity does not influence the limit of the

skin to blend vitamin D; however, a considerable measure of subcutaneous fat changes its discharge in the course.Factors in the amount of BMI also affect the body's vitamin D levels.

In addition to the major factors of BMI, long-term exposure to sunlight also affects vitamin D levels(Lee et al. 2015). In healthy groups who are smokers, the sample subjects come from hospital staff, who are assumed to be more indoors at work. In this study, there wereno differences between body mass index (BMI) and vitamin D levels (p>0,05).

In this investigation there were no contrasts between kinds of smokers and vitamin D levels (p>0,05). The kinds of smokersswing out not to have the capacity to decide the high or low levels of vitamin D in the body

Insufficiency of vitamin D in smokers could be caused by changes in hepatic metabolism because smoking increases hepatic degradation of other steroids such as estrogen. Reduced serum parathyroid hormone in smokers is due to decreased secretion or increased hormone degradation. The decrease in serum concentrations of 1,25 (OH) 2D3 in smokers can also be related to the accumulation of cadmium in the kidneys. The reduced absorption of calcium is a consequence of decreasing serum 1,25 (OH) 2D3. Parathyroid hormone and vitamin D metabolites have a vital job in the control of calcium homeostasis and bone digestion (Brot et al. 1999).

Nimitphong reports (2013) the commonness of vitamin D deficiency> 70% in South Asia, and differs between 6-70% in Southeast Asia. This is in opposition to the suspicion that vitamin D lack does not happen in nations with adequate daylight as in Asia.This report has similarity with this research findings that the majority of healthy smokers in Indonesia have vitamin D insuficiency. Factors that can affect UVB exposure and vitamin D production in the skin include time, season, ozone and clouds.Vitamin D concentration is increased by exposure to sunlight.Urban residents who mostly spend their time indoors have vitamin D deficiency (Lee et al. 2015).

Brot et.Al. (1999) found smoking seems to debilitate the serum levels of 25(OH)D. Smokers haveeverything considered around 10% decrease of streaming levels of 25(OH)D.

5 CONCLUSION

Vitamin D sufficiency is found in healthy smokers, even though they are in tropical regions such as Indonesia. Vitamin D levels are still thought to have an important clinical role in impairment of lung function.

6 RECOMMENDATION

This preliminary study should be continued by using larger samples to find out various factors that may affect vitamin D levels. It is recommended that a smoker should have more ultraviolet exposure especially UVB to expand their vitamin D formation in the skin.

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