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Correlation of Fat Consumption and Lipid Profile for Telomere Length of *Minangkabau* Ethnicity Men, in West Sumatera, Indonesia

Yuniar Lestari, Delmi Sulastri, Desmawati

***Abstract*—Background: The aim of the study determine correlation of fat consumption and lipid profile for telomere length of *Minangkabau* ethnicity men, in West Sumatera, Indonesia. Methods: This cross sectional study was conducted subdistrict of Padang City from March 2016 to Augustus 2017. This study was performed on 130 Minangkabau ethnic men, aged 40-50 years worked as the district civil servant. The blood sample analysis using O'Callaghan and Fenech's technique to measure telomere length, and lipid profile analysis from blood venous. For fat consumption used food frequency questionnaire. The correlation was analyzed by using Pearson's correlation. A two-tailed *P*-value of <0.05 was considered statistically significant. Data were analyzed using the Stata version 14.2 (Stata Corporation). Results: There is no correlation between profile lipid (total cholesterol, LDL, HDL and triglycerides) with telomere length of Minangkabau ethnicity men (p>0.05). But there is correlation between fat consumption with telomere length of Minangkabau ethnicity men (p<0.05). Conclusion: The conclusion of this study confirmed there is correlation between fat consumption with telomere length of Minangkabau ethnicity men.**

Index Terms*—fat consumption, lipid profile, telomere length, *Minangkabau

I. Introduction

One important indicator of a nation population's health status is life expectancy. This is still relatively low in developing countries compared to developed countries. The average life expectancy worldwide has increased from 67 years in 2009 to 71 years in 2013 [1]. In Southeast Asia, which is composed of mainly developing countries the average life expectancy is 71 years in 2013. Indonesia is one of countries in Southeast Asia has life expectancy Indonesia reached 70.1 years, still falling short of the national target of 72 years. In the province of West Sumatra in Indonesia life expectancy is only 67.9 years [1-3].

One of the biomarkers can predicting life expectancy is telomere length. Telomeres are nucleoprotein complexes at the ends of eukaryotic chromosomes and DNA molecules [4]. Telomere shortening occurs due to the failure to synthesize the most part ends in a linear DNA molecule during ordinary DNA replication. Hence, telomeres gradually become shorter with age. Cell culture studies show life span is limited by telomere shortening, a natural process that begins with the onset of aging at the cellular level and occurs as diploid cells lose telomeres at cell division due to the failure of this process to synthesize the further most ends in a linear DNA molecule [4,5].

The lengths of human telomeres are normally reduced by approximately 24.8-27.7 base pairs per year [6]. Progressive telomere shortening is caused by aging, apoptosis, or oncogenic transformation of somatic cells. Shorter telomere length has been associated with an increased incidence of disease, organ malfunctions, poor recovery from illness and premature death [4,7].

Accumulating evidence indicates that factor can cause shortening telomere length is the atherogenic properties of fat consumption and elevated cholesterol and triglycerides confer repeated mechanical, hemodynamic, and/or immunological injury and, as such, may cause augmented cell turnover and increased production of Reactive Oxygen Species (ROS) in certain cells. The link between cholesterol and TL may be secondary to increased cell damage and turnover, which in turn amplifies cell ageing by bringing cells to their maximum replicative capacity—translating to shortened telomere length. This could also tie in with age-related innate immune pathway activation in adipose tissue and its link with subclinical chronic inflammation [8].

II. Materials and Methods

A. Study Design and Research Sample

This cross sectional study was conducted subdistrict of Padang City from March 2016 to Augustus 2017. This study was performed on 130 Minangkabau ethnic men, aged 40-50 years worked as the district civil servant. Minangkabau ethnic means if both the parents and the ancestors are Minangkabau people. The sample size was calculated using the formula for continuous data on population.

B. Operational Definitions

The variables of this study included independent variable is fat consumption, lipid profile and dependent variable is telomere length Minangkabau ethnic.

C. Data Collection Technique

This study was approved by the Ethical Committee of Medical Faculty, Universitas Andalas with registration number 051/KEP/FK/2016. Blood samples were drawn from all subject (5 mL) and stored into EDTA containing tubes for lab transfer. Blood samples were centrifuged at 1000 rpm for

Yuniar Lestari Department of Publich Health and Community Medicine, Faculty of Medicine Universitas Andalas, Padang City, Indonesia
Delmi Sulastri, Department of Nutrition, Faculty of Medicine Universitas Andalas, Padang City, Indonesia.
Desmawati, Department of Nutrition, Faculty of Medicine Universitas Andalas, Padang City, Indonesia.

10 min at 4EC and stored at -70EC for DNA extraction. Genomic DNA was extracted with Qiagen (QIAamp DNA Blood Mini Kit, Germany) and quantified by spectrophotometer (Hitachi 1800, Japan). Samples were run by Multiplex Real Time PCR BioradCFX 96 TM detection system with TM Software CFX manager. Telomere length was measured using O'Callaghan and Fenech15 technique and lipid profile analysis from blood venous. For fat consumption used food frequency questionnaire.

D. Data Analysis

The quantitative variables were recorded as Mean±SD, median and percentage. The correlation was analyzed by using Pearson's correlation. A two-tailed *P*-value of <0.05 was considered statistically significant. Data were analyzed using the Stata version 14.2 (Stata Corporation).

III. Results

Characteristics of respondents (Table 1).

Table 1: Characteristics of respondents

Characteristic	Mean ± SD
Age (years)	46.7 ± 3.9
Weight (Kg)	59.4 ± 12.2
Height (cm)	150.6 ± 6.2
Body mass index	26.1 ± 25.8
Systolic blood pressure (mmHg)	119.3 ± 15.8
Diastolic blood pressure (mmHg)	76.3 ± 11.1

Table 1 showed age of respondents 46.7 ± 3.9 years, weight 59.4 ± 12.2 kg, height 150.6 ± 6.2 cm, body mass index 26.1 ± 25.8 kg/m^2, systolic blood pressure 119.3 ± 15.8 mmHg and diastolic blood pressure 76.3 ± 11.1 mmHg.

Table 2: Mean of fat consumption, lipid profile, and telomere length of Minangkabau Ethnicity Men, in West Sumatera, Indonesia

Variables	Mean ± SD
Fat consumption (gr)	70.13 ± 41.88
Lipid profile	
Cholesterol total (mg/dl)	225.46 ± 44.55
Low density lipoprotein (LDL) (mg/dl)	134.56 ± 34.19
High density lipoprotein (HDL) (mg/dl)	44.05 ± 8.93
Triglycerides (mg/dl)	145.73 ± 81.38
Telomere length (bp)	533.89 ± 252.22

Table 2 showed fat consumption 70.13 ± 41.88 gr, cholesterol total 225.46 ± 44.55 mg/dl, low-density lipoprotein (LDL) 134.56 ± 34.19 mg/dl, high-density lipoprotein (HDL) 44.05 ± 8.93 mg/dl, triglycerides 145.73 ± 81.38 mg/dl and telomere length 533.89 ± 252.22 bp.

Correlation of fat consumption and lipid profile for telomere length of Minangkabau Ethnicity Men, in West Sumatera, Indonesia (Figure 1).

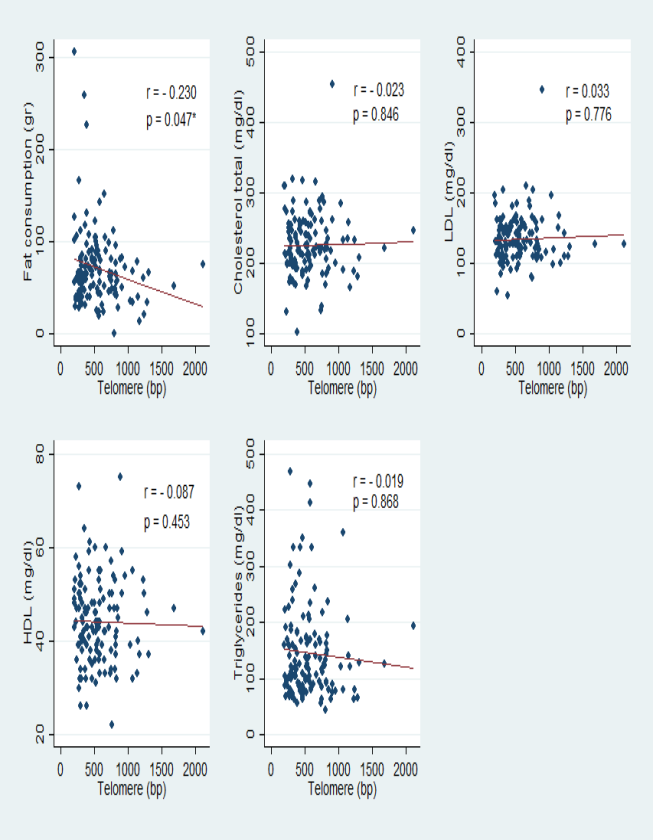

Figure 1: Correlation of fat consumption and lipid profile for telomere length of Minangkabau Ethnicity Men, in West Sumatera, Indonesia

Figure 1 showed there is no correlation between profile lipid (total cholesterol, LDL, HDL and triglycerides) with telomere length of Minangkabau ethnicity men (p>0.05). But there is correlation between fat consumption with telomere length of Minangkabau ethnicity men (p<0.05).

IV. DISCUSSION

The results showed there is no correlation between profile lipid (total cholesterol, LDL, HDL and triglycerides) with telomere length of Minangkabau ethnicity men (p>0.05). But there is correlation between fat consumption with telomere length of Minangkabau ethnicity men (p<0.05).

Minangkabau is the majority of the population living in West Sumatra and also in the Padang city. The characteristics of Minangkabau men in this study showed that the average Body Mass Index (BMI) was at the level of obesity. Meanwhile, on average, they have normal systolic and diastolic blood pressure.

Minangkabau people have a habit of consuming fat-containing foods. Most Minangkabau foods contain coconut milk and fried foods. Fat consumption reaches 10.6 - 21.7% of total energy. Theoretically the increase in total cholesterol and LDL is caused by an increase in saturated fat and cholesterol consumption. The saturated fat intake of Minangkabau ethnic community reached 18% which means that it exceeds the recommended number [9]. Minangkabau ethnic total cholesterol and LDL levels are higher than Sundanese, Javanese and Bugis ethnic [10]. In this study total cholesterol levels did not have correlation with telomere

length. In theory the state of hypercholesterolemia plays a role in the production of free radicals which then produce oxidative stress. Oxidative stress is often defined as an imbalance between reactive oxygen species (ROS) and antioxidant capacity in an organism. In this case, antioxidant enzymes such as superoxide dismutase (SOD) and glutathione peroxidase (GPx) play an important role in the first defense for detoxification of products resulting from oxidative stress. In addition, carbonyl proteins (PCs) and F2-isoprostanes are considered as severe oxidate stress biomarkers which are characterized by permanent damage to the structure and function of proteins and also an increase in free radicals induced by lipid peroxidation. There is a significant relationship that is inversely proportional between cholesterol and LDL levels with telomere length will be exacerbated by the nature of atherogenic cholesterol which increases Reactive Oxygen Species (ROS) production [11].

Telomere length which is one of the markers of cell aging, is influenced by various factors. Telomeres will shorten according to age. Telomere length will differ in gender, race, BMI, physical activity and illness.

In this study, the average BMI of respondents was in the condition of obesity. Obesity can increase inflammation because white adipose tissue is a major source of inflammatory cytokines. Inflammation promotes an increase in leucocyte cell turnover, which further increases telomere friction. Not surprisingly, obese adults have shorter telomeres than those with normal weight. Seventy people over a period of 10-12 years to find out the relationship between obese people with insulin resistance disorders, to find telomere friction. Telomere friction increases with weight gain. This shows that telomere loss is associated with obesity [12].

There were a few limitations in this study. First, researchers do not put attention to internal factors such as levels of enzyme that can improve telomere length and levels of endogenous antioxidants to reduce oxidative stress can effect shortening telomere length. Second, levels of telomerase enzyme and genetic variation.

V. CONCLUSION

This study confirmed there is correlation between fat consumption with telomere length of Minangkabau ethnicity men.

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Yuniar Lestari Department of Publich Health and Community Medicine, Faculty of Medicine Universitas Andalas, Padang City, Indonesia
Delmi Sulastri, Department of Nutrition, Faculty of Medicine Universitas Andalas, Padang City, Indonesia.
Desmawati, Department of Nutrition, Faculty of Medicine Universitas Andalas, Padang City, Indonesia.