ABSTRACTS AND PROCEEDINGS

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"Current Issues and Evidence Based Practice: Translating Research into Best Practice in Nursing and Health Sciences area"

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Supported By:
The Role Of Lifestyle In The Incidence Of Pre-Diabetes At The Kassi-Kassi Public Health Center

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ABSTRACT

Kadek Ayu Erika. The Role of Lifestyle in the Incidence of Pre-Diabetes at the Kassi-Kassi Public Health Center (supervised by Ilhamjaya Patellongi dan Rosdiana Natsir).

The aim of the study was to analyze the correlation between lifestyle and individual with obesity, obesity and pre-diabetes, and lifestyle with pre-diabetes.

The study was conducted at the Kassi-Kassi Public Health Center in Makassar from May to July 2009. The study was a case control study. The number of samples was 54 people selected by purposive sampling. The sampling were divided into 27 pre-diabetes individuals and 27 individuals with normal blood glucose. The data were collected through structured interview and questionnaire. The measurement of height, weight, waist circumference, blood pressure, and blood samples was done twice after fasting 12 hours for fasting blood glucose and oral glucose tolerance test. The data were analyzed by using univariate, bivariate with chi square, and independent t-test and Mann-Whitney test.

The result of the study indicate that there is a correlation between lifestyle and obesity in which $p = 0.018$, obesity and pre-diabetes in which $p = 0.003$. Lifestyle has a role in the incidence of pre-diabetes in which $p = 0.021$.

Key words: lifestyle, obesity, pre-diabetes
THE ROLE OF LIFESTYLE IN THE INSIDENCE OF PRE DIABETES AT THE KASSI-KASSI PUBLIC HEALTH CENTER

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ABSTRACT

Background: Impaired glucose tolerance (IGT) is defined as an early phase of Diabetic Type-2 process. IGT shows an occurrence of early phase of Diabetic and asymptomatic. The prevalence is increased in accordance to poor or unhealthy lifestyle such as over consuming of carbohydrate and lack of physical exercises.

Objective: The aim of the study was to analyze the correlation between lifestyle and individual with obesity, obesity and pre-diabetic, and lifestyle with pre-diabetic.

Methods: The study was conducted at the Kassi-Kassi Community Health Center in Makassar from May to July 2009. The study was a case control study. The number of samples was 54 people selected by purposive sampling. The samples were divided into 27 pre-diabetic individuals and 27 individuals with normal blood glucose. The data were collected through structured interview and questionnaire. The measurement of height, weight, waist circumference, blood pressure, and blood samples was done twice after fasting 12 hours for fasting blood glucose and oral glucose tolerance test. The data were analyzed by using univariate, bivariate with chi square, and independent t-test and Mann-Whitney test.

Result: The result of the study indicate that there is a correlation between lifestyle and obesity in which p = 0.018, obesity and pre-diabetic in which p = 0.003. Lifestyle has a role in the incident of pre-diabetic in which p = 0.021.

Conclusion: In conclusion, lifestyle has been proved affecting pre-diabetic event through obesity. This research shows a correlation between lifestyle and obesity, and also connection between obesity and pre-diabetic incident.

Keywords: lifestyle, obesity, pre-diabetes
**INTRODUCTION**

Changes in lifestyle (lifestyle) people now because of urbanization, westernization, modernization as a risk factor for diabetes (Tandra 2008, Arifin 1995). Diabetes is not felt by the patient at an early stage so it is not known earlier and was diagnosed after complications arise (Alberti 1996, ADA 1998). These complications will decrease the quality of life and productivity of a person who experienced it (Tjokroprawiro 2001).

Disturbed Glucose Tolerance (IGT) are pre-diabetic stage, which is a phase in the course of type-2 diabetes. Basic and clinical research has been published indicate that the phenotypic diabetes can be described as a state that resembles the "iceberg phenomenon" (Lawrence et al. 2004). This is evident in developing countries the diagnosis of DM was found only one patient out of 5 people who should have DM (Darmono 1996). The prevalence of diabetes is increased if there is an increasing environmental risk, such as the lifestyle of excessive carbohydrate consumption habits and less physical exercise, so that experienced excessive weight gain, sedentary life (life relaxed), smoking and alcohol. And the risk of diabetes will increase if age over 40 years. (Irawan 2004, Tandra 2008). Obesity and physical inactivity was found as a major risk factor for type 2 diabetes, and 80 to 90% of diabetics are those who are overweight or obese. In people who have a genetic predisposition, the possibility/probability of getting type 2 diabetes would be very high if combined with lifestyle factors (Lindstrom 2006).

Type 2 diabetes that usually develops slowly and gradually to be identified. When genetic factors support the individual or someone gets insulin resistance relate to environmental factors such as obesity and inactivity, they may be exposed to post-prandial Hyperglycemia or commonly referred to as impaired glucose tolerance (IGT/IGT). The prevalence of DM in the world has increased so that it can be considered as a plague epidemic, which in 2000 predicted a world population of 150 million people suffer from diabetes in 2020 and is estimated to 300 million people. Which greatly increased the prevalence rate is estimated in developing countries such as China, India, including Indonesia (Adam 1998). The prevalence of diabetes worldwide was 7.5%, while prevalence in Southeast Asia show a figure of 13.2% with an estimated prevalence of patients who are in IGT status was approximately 17.1% -
25.8% or about 93 million people (Lawrence et al. 2004).

Recent clinical study reported that changes in lifestyle and/or approach to pharmacotherapy in individuals with IGT can reduce the risk of incident diabetes (Lawrence et al. 2004). Intervention lifestyle changes such as low-calorie foods, low fat and aerobic exercise to lose weight and improve insulin sensitivity and reduce the risk of diabetes (Warnken et al. 2005, Mercola 2005). This study aims to analyze the relationship of individual lifestyle and obesity; analyze the relationship between obesity and the incidence of pre-diabetes, and analyze the role of lifestyle on the incidence of pre-diabetes.

METHODS

Subjects were individually pre-diabetes mellitus and normal blood sugar levels are selected by purposive sampling method of selecting samples that meet the inclusion criteria with a sample of 54 people.

The sample is divided into 27 individual pre-diabetes and 27 individuals with normal blood sugar. Completion of questionnaire by direct interview, conducted by a team that had previously been trained about personal biographical data, lifestyle. Previous questionnaires had been tested for validity and reliability. All the selected samples were measured by trained teams of 5 persons including measurement of weight, height, blood pressure, waist circumference. Measurement of body weight using digital scales and measuring microtoise height, BMI with the formula weight/(TB) 2, TDS and TDD using the mercury sphygmomanometer, with a tape measure waist circumference.

For blood sampling laboratory tests performed by officers subject Prodia laboratory. Previously, individuals were told to fast for 12 hours from 20:00 to 08:00 hours local time. First taken 6 cc for checking fasting blood sugar (GDP) in the next two 3cc for blood sugar 2 hours after drinking the sugar water (glucose) 75 grams dissolved in a glass of water (250cc).

Statistical analysis using SPSS for Windows version 14.0, with significance level (significance) which used p <0.05.

RESULTS

Research subjects numbered 54 people comprising 27 individual pre-diabetes and 27 individuals with normal blood sugar. A mean age of respondents in pre-diabetes group was 45 years (SD = 30-65). Of the 39 respondents with BMI in obese category, 29
(74.4%) of respondents have a lifestyle with a category quite well and there were 10 (25.6%) of respondents have a lifestyle with excellent category. And of the 15 respondents with normal BMI, there were 6 (40%) of respondents have a pretty good lifestyle by category and there are 9 (60%) of respondents have a lifestyle with excellent category (Table 1). Based on this, there is significant correlation between the Lifestyle with Body Mass Index (BMI) with the significant value of 0.018 and OR = 4.35 which means that respondents with the lifestyle is good enough to have the possibility of 4.35 times for obese compared with respondents who have a lifestyle very good.

Table 1. Correlation between lifestyle and obesity

<table>
<thead>
<tr>
<th>Lifestyle</th>
<th>Pre-diabetic</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body Mass Index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(BMI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obesity</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>p</td>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Less</td>
<td>1</td>
<td>3.7</td>
</tr>
<tr>
<td>Enough</td>
<td>20</td>
<td>74.1</td>
</tr>
<tr>
<td>Very Good</td>
<td>5</td>
<td>18.5</td>
</tr>
<tr>
<td>Perfect</td>
<td>1</td>
<td>3.7</td>
</tr>
</tbody>
</table>

Table 2. Cross-tabulation on the role of lifestyle in pre-diabetic incidence.

<table>
<thead>
<tr>
<th>Lifestyle</th>
<th>Pre-diabetic</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Mass Index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(BMI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obesity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-obesity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: primary data, 2009

In the group of pre-diabetes is a lifestyle with the highest frequency category that is good enough 20 (74.1%) and in the highest frequency of normal blood sugar is pretty good lifestyle by categories namely 14 (51.9%). While based on the parameters of BMI with the incidence of pre-diabetes are at the highest frequency of pre-diabetes are obese BMI category of 15 (55.6%) and in normal blood sugar group frequency is the most obese BMI category of 12 (44.4%) (Table 2).

Of the 25 respondents with pre-diabetes, 20 (80%) of respondents have a pretty good
lifestyle by category and there were 5 (20%) of respondents have a lifestyle with very good categories. And of the 27 respondents with normal blood sugar, there were 14 (51.9%) of respondents have a pretty good lifestyle by category and there were 13 (48.1%) of respondents have a lifestyle with excellent category (Table 3).

Table 3. Correlation between lifestyle and obesity with pre-diabetic incidence

<table>
<thead>
<tr>
<th>Lifestyle</th>
<th>Pre-diabetic</th>
<th>Normal</th>
<th>p</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Enough</td>
<td>2</td>
<td>80</td>
<td>1</td>
<td>51.</td>
</tr>
<tr>
<td>Very</td>
<td>0</td>
<td>20</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Good</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>48.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>10</td>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>

| BMI         | Pre-diabetic | Normal | p 
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 27)</td>
<td>(n=27)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td></td>
</tr>
<tr>
<td>Obesity</td>
<td>49.78 ± 12.98</td>
<td>42.7 ± 12.59</td>
<td>0.021</td>
</tr>
<tr>
<td>Normal</td>
<td>25.91 ± 3.23</td>
<td>23.89 ± 3.55</td>
<td>0.033</td>
</tr>
</tbody>
</table>

Source: primary data, 2009

Based on this, there is significant correlation between the incidence of lifestyle with pre-diabetes with significant value of 0.033 and OR = 3.714, which means the respondent with the lifestyle is good enough to have 3.71 times likely to have pre-diabetes as compared with respondents who have a very good lifestyle. Meanwhile, out of 27 respondents with pre-diabetes, 22 (81.5%) of respondents have a BMI with obesity and there is a category 5 (18.5%) of respondents have a normal BMI category. And of the 27 respondents with normal blood sugar, there were 17 (63%) of respondents have a BMI with obesity category and there were 10 (37%) of respondents have a normal BMI category.

Table 4. The role of lifestyle on the incidence of pre-diabetes

The mean of lifestyle in pre-diabetic group was 49.78 ± 12.98 and the average lifestyle in the normal blood sugar group was 42.7 ± 12.59. While the mean BMI in pre-diabetic group was 25.91 ± 3.23 and the mean BMI in the normal blood sugar group was 23.89 ±
3.55 (Table 4). Based on this, found significant value \( p = 0.021 \) and \( p = 0.033 \) on the parameters of lifestyle and body mass index (BMI), which means that there are differences in lifestyle and body mass index (BMI) was significant between groups of pre-diabetes with normal blood sugar group.

**DISCUSSION**

Statistical analysis showed that there was a significant correlation between lifestyle and obesity, with a significance value of \( p = 0.018 \). There are 29 individuals (74.4%) pre-diabetes with lifestyle quite well but there were obesity, researchers assume this is related to lifestyle modernization or Westernization. They are less aware of the impact of poor lifestyle habits including factor "eat" (diet) who still loves to eat fried coto and coupled with a lack of physical activity as much as 8 people (29.6%) did not work on pre-diabetic individuals. This will lead to obesity, and travel along the same pre-diabetes occurs without symptoms. This is in line with the results of research that there are some experiments that have shown the effects of lifestyle westernization/modernization of the increase in obesity and type 2 diabetes. A group of residents/community in Arizona has a 5-fold prevalence of type 2 diabetes than those who live in mountainous areas of Mexico (Lindstrom 2006).

Lifestyle or life style is the behavior and habits in one's life, which can affect one's health level (Nieman 1993). Lifestyle bad, one of them is a lack of physical activity, "overeating" excessive diet "that will eventually lead to obesity. This is consistent with the result that the researchers obtain a mean BMI \( 25.91 \pm SB \pm 3.23 \) which indicates that the average individual has undergone obesity, and as many as 15 people (55.6%) occurred in group pre-diabetes. The result of the data showed that individuals with lifestyle pretty well have the possibility of 4.35 times for obese compared with respondents who have a very good lifestyle.

Research by Vyhnanova (2009) showed that after undergoing the process of weight loss through diet and physical activity involvement showed changes in glucose and lipid metabolism, diabetic patients are obese. In addition, age also influences the occurrence of pre-diabetes that begins with obesity, according to research, researchers in an average age of individuals who have pre-diabetes is the age of 45 years. This fits the theory that the process of pre-diabetes screening begins at age 30 years and more are at risk with a
family history of heart disease, stroke or diabetes. Age 45 years is also a risk factor for pre-diabetes occurs as well as diabetes (Arora 2007).

Based on the results of bivariate analysis that the lifestyle associated with obesity, researchers assume that not only one of the factors like physical activity or diet alone that play a role in the incidence of pre-diabetes through obesity is still there. However the other lifestyle factors such as smoking, alcohol, lack of rest, impaired psychological, eating snacks, drinking coffee may affect lifestyle. If these factors are not balanced among the causes that trigger the occurrence of bad lifestyle that will be at risk of becoming obese pre-diabetic individuals. This is supported by previous studies, the average American sweetened with high fructose syrup and high consumption of soft drinks can cause an artificial fructose intake in high amounts, which can lead to disruption of fat and glucose metabolism. Fructose can increase the risk of DM, also indirectly via increased body weight (Lindstrom 2006). This is in line with the results of research Bray (2009) that if the consumption of fructose sweetener found in soft drinks is increasing, while their milk consumption reduced, it will cause obesity.

Statistical test results also show that there is a link obesity with the incidence of pre-diabetes. Obesity in pre-diabetic group were 22 persons (81.5%) with average BMI indicator 25.91. This proves that obesity occurs because of an unhealthy lifestyle performed on the individual and can cause individuals to become pre-diabetic. Results showed individuals with lifestyle enough to have the possibility of 4.35 times for obese compared with individuals who have a very good lifestyle.

BMI was associated with the occurrence of pre-diabetes is supported by previous research. Type 2 diabetes mellitus have the highest prevalence among populations with high rates of obesity. In a study conducted by a group of nurses, the risk for women diagnosed with diabetes during follow-up of 14 years was 5-fold in BMI 24.0-24.9 kg/m2, 40-fold in BMI 31.0-32.9 kg/m2 and 93-fold in BMI above 35 kg/m2 compared with the group below 22.0 kg/m2 BMI. The amount of waist circumference was found more have a close relationship with insulin resistance and cardiovascular risk factors compared with BMI. In epidemiologic prospective study has been conducted by several researchers, waist circumference is one independent predictor
of the risk of type 2 diabetes mellitus (Lindström 2006).

Researchers assume that the result of sedentary lifestyle that is relaxed lifestyle lead to central obesity according to the researchers that the results obtained are not normal waist circumference > 90 cm in as many as 16 people (59.3%) in pre-diabetic individuals. Jaana Lindström (2006) states that the factors predisposing to the occurrence of abdominal fat accumulation is influenced by genetic factors, but lifestyle factors are also very influential. Smoking was found to increase the accumulation of fat, as well as high alcohol consumption and low consumption of fiber.

Statistical analysis showed that there is a relationship role of lifestyle on the incidence of pre-diabetes, with p = 0.021. In pre-diabetes group there are 20 individual lifestyle enough, because their lifestyle is less healthy, which is still lack of exercise, is still eating at midnight, like snacks, fried foods, coffee, smoking. This is in line with the results of the study by Breslow (UCLA, USA), on the famous study of 6000 people at the beach area of San Francisco, found a very dramatic difference to the average death rate among those who follow the seven healthy habits (no smoking, consumption alcohol a little, eat breakfast every day, do not eat a snack, 7-8 hours of sleep per night, exercise/exercise routine, and maintaining ideal body weight) and those who do not. People who follow all the seven healthy habits have on average a lower death rate than people with no more than three healthy habits. Dr. Breslow has estimated that people who follow all the seven habits of healthy living with an average of 9 years longer than did not (Nieman 1993).

In a study conducted by O'dea, he tried to change the lifestyle group of Australian aborigines to hunt lifestyle and as a result, hyperglycemia can be prevented and reduced. Therefore, based on various studies above, it can be assumed that lifestyle changes can prevent the development of DM (Lindstrom 2006). Research conducted by Paul et al (2007) of a sample of over 25 years to get evidence that there is influence of lifestyle in reducing new cases of Diabetes Mellitus, in those who have a good lifestyle, the incidence of the DM less appeal in a distinguished group who have a bad lifestyle.

In accordance with the theory that the condition of obesity are intimately associated with insulin resistance. In obese adipocytes will experience dysfunction, inflammation, or known as "sick fat cells". These adipocytes are cells that actively
remove various components such as leptin, adiponectin, free fatty acid (FFA), various cytokines and other lipoproteins, TNF?, IL-6, CRP (C reactive protein) as a marker of inflammation in the liver and stimulates the occurrence of resistance insulin. ALB concentrations increased in the circulation caused by increased lipolysis process. The process is strongly influenced by the presence of the enzyme Hormone Sensitive Lipase (HSL) in adipose cells. Currently it is known that ALB is a pathogenic factor for the development of type 2 diabetes. Increased FFA can cause insulin resistance in skeletal muscle, liver and endothelial cells (Boden 2004). ALB is decreased and the state of insulin resistance will improve the process of lipolysis. Increased FFA in the long term is one of the causes of insulin resistance. It is proved that with the decrease in FFA levels can increase insulin sensitivity in obese subjects with diabetes (Boden 2004, Evans et al. 2004, Khaterine et al. 2004).

Various studies have shown the strong influence of physical activity levels with the incidence of Diabetes Mellitus. Cardiovascular fitness level is one predictor of excess mortality due to diabetes type 2 (Bell 2002). Physical exercise may increase tissue sensitivity to insulin. Based on cohort studies, found that those who perform regular physical exercise have a lower risk of about 35% get type 2 diabetes disease compared their low activity level (Bazzano 2004). Based on retrospective studies (case control) done Kriska (1993) against an entire community of Indians, found that those who are affected by diabetes, having traced proved to have low levels of physical activity. Clinical trial of diet and exercise can reduce adverse events in people with type 2 diabetes with Impaired Glucose Tolerance (IGT) (Lawrence et al. 2004).

Thus, lifestyle contribute to the occurrence of pre-diabetes, so that every individual should make healthy living habits such as not smoking, no alcohol consumption, breakfast every day, do not eat snacks, reduce the consumption of soft drinks and fruit drinks, consumption of vitamin D, milk consumption or calcium, enough (7-8 hours of sleep per day), training/exercise routine, and maintaining an ideal weight so as to prevent the occurrence of pre-diabetes or diabetes mellitus which can increase life expectancy and quality of life. Routine activity can provide the following benefits: lower blood glucose levels, lower basal insulin levels, improve insulin sensitivity, lower HbA1c, increasing energy use, increase strength and body flexibility.
CONCLUSION

Lifestyle is shown to play a role on the incidence of pre-diabetes through obesity. This study shows that there is a relationship with obesity and lifestyle. There is also a relationship of obesity with the incidence of pre-diabetes.

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LEMBAR VALIDASI KARYA ILMIAH

A. IDENTITAS (diketik oleh pengusul)

A.1. Identitas pengusul (diisi oleh pengusul karya ilmiah)
Nama Lengkap (tanpa gelar) : Kadek Ayu Erika
Prodi, Jurusan, Fakultas : Program Studi Ilmu Keperawatan
Usulan menjadi Asisten Ahli/Lektor/LK/KG (*) dalam bidang : Fakultas Kedokteran Unhas.

A.2. Identitas karya ilmiah (diisi oleh pengusul karya ilmiah)
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Judul artikel jurnal/buku/laporan penelitian / Karya Ilmiah (*) : -
Judul (untuk karya bab dalam buku atau prosiding) : The Role Of Lifestyle in the Incidence Of Pre Diabetes at the Kass-
Nama para penulis (tersusun lengkap) : Kadek Ayu Erika
Nama dan ISSN Jurnal, Vol., No.,Halaman : Halaman : 21
Bulan dan Tahun terbit : -
ISBN buku/prosiding, penerbit dan tahun terbitan : 30 April 2011
Ket : (*) lingkari yang sesuai

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B.1.1 Buku/Prosiding: ISBN
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B.1.2 Jurnal:
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  ISSN
  - valid
  - tidak valid, alasan:

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  - Internasional (*)
  - valid
  - tidak valid, alasan:
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K1: Jurnal internasional bereputasi SJR:

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Sesuai sampul/daftar isi : ☑ ya ☐ tidak, fakta
Sesuai kompetensi : ☑ sesuai ☐ tidak sesuai, fakta
Sesuai kontribusi : ☑ ya ☐ tidak, fakta

B.2.3 Pelanggaran Etika : ☑ tidak ☐ ada

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☐ Publikasi ganda, fakta
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Prof. dr. Veni Hadju, M.Sc., Ph.D

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2. Prof. Dr. drg. Edy Machmud, Sp. Prost

3. Dr. Firdaus Hamid, Ph.D