Correlation Between Life Style and Dyslipidemia with Impaired Fasting Blood Sugar in State Junior High School and State Senior High School Having Central Obesity

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ABSTRACT

The aim of the research was to determine correlation between life style (physical activities, consumption, behaviour, smoking status and stress level) and dyslipidemia and impaired fasting blood sugar in State Junior High School and State senior High School who have central obesity in Makassar. The research was an observational study with cross sectional approach consisting of 150 teachers. The data consisted of abdominal circumference, dyslipidemia, fasting blood sugar and stress level. Correlation between life style and dyslipidemia and impaired fasting blood sugar was analyzed using chi square analysis. The results of the research indicate that there is a correlation between behaviour (0.014) and its domain, which is knowledge (0.007), attitude (0.005), practise (0.014) and impaired fasting food blood sugar. There is a significant correlation between triglyceride (0.003) and impaired fasting blood sugar, but there is no correlation between physical activities (0.305), total cholesterol (0.064), HDL (0.710), LDL (0.122), consumption pattern (carbohydrate (0.367), fat (0.508), vegetables (0.835) abd fruits (0.601), smoking status (0.366), stress level (0.159) and impaired fasting blood sugar

CCS Concepts

• **Social and professional topics → User characteristics**

Keywords

fasting blood sugar; dyslipidemia; cental obesity

1. INTRODUCTION

Diabetes mellitus (DM) is a metabolic disease characterized by elevated blood sugar levels due to impairment of insulin secretion, insulin work or both. In general, the disease is divided into two types, namely type 1 with pancreatic beta cell damage due to autoimmune, genetic or idiopathic and type 2 factors that generally arise from insulin resistance associated with lifestyle changes. According to IDF estimates in 2012, more than 371 million people worldwide experience DM, 4.8 million people die from this metabolic disease and 471 billion US dollars spent on his treatment [1].

The disease has become one of the global public health problems and according to the International Diabetes Federation (IDF) 5th update of 2012, the number of sufferers is increasing among others in Europe there are 56.3 million (8.5%) of the total adult population with diabetes [2]. At a global rate the prevalence of diabetes mellitus is 8% in 2011 and is expected to increase to 10% by 2030 [3].

Diabetes mellitus not only stops here but it has been found that about 10-20% of people with type 2 diabetes mellitus will develop into cardiovascular complications [4]. This is why health promotion needs to be done about healthy lifestyle and early diagnosis as the key to a health problem strategy.

Diagnosis Prediabetes is established when fasting blood glucose 100-125 mg / dL and or 2 hours post-glucose load 140-199 mg / dL [5]. While the diagnosis of Diabetes mellitus is when blood sugar level ≥126 mg / dL [2]. In this study when a person has a fasting blood glucose level of ≥100 mg / dL then inserted into fasting blood glucose is impaired so that prediabetes and diabetes mellitus are inserted into impaired fasting blood glucose.

In Indonesia Prediabetes is estimated to be at risk of type 2 diabetes with a high risk of 3 to 10 times and is estimated to increase to 70% during life [6] and diabetes mellitus was ranked second cause of death of 14.7% . The main cause of death in type 2 DM is coronanry heart disease (CHD) (± 80%) [6]. this is because the process of formation of atherosclerotic lesions in patients with DM progresses faster.

Many things can play a role in the incidence of CHD, one of which is dyslipidemia. Dyslipidemia is a lipid metabolic disorder characterized by increased or decreased lipid fraction in plasma. The major lipid fraction disorder is the increase in total cholesterol, low density lipoprotein (LDL), triglycerides and low density lipoprotein (HDL). Increased lipid levels cause constriction of blood vessels or atherosclerosis. The prevalence of dilipidema in patients with DM 2 times higher than non-diabetic

ICHSM 2018, June 8–10, 2018, Tsukuba, Japan

ACM ISBN 978-1-4503-6435-5/18/06...$15.00
DOI: https://doi.org/10.1145/3242789.3242811

population. In the western country, there are 20-30% of the population has diabetic dyslipidemia. DM patients were found twice as likely to have hypertriglyceridemia and decreased HDL cholesterol [7]. It was found that in 20% of male DM patients and 25% of female DM patients had very low HDL cholesterol levels [8].The Canada Diabetes Association states that type 2 diabetes and pre-diabetes can occur unnoticed so there needs to be awareness of the risk factor and the need for control of one's blood sugar [9].

Until now there has been no effective and efficient treatment because of its multiple cause. Prevention efforts are one of the most effective and efficient ways to reduce the occurrence of impaired fasting blood glucose. New prevention efforts can be done if we know what risk factors that can cause fasting blood glucose is disrupted. Therefore, knowledge of the risk factor causes it is necessary to formulate effective ways of prevention. In addition, the role model, people who play a role in providing good prevention examples, can improve the effectiveness of fasting blood glucose prevention methods for vulnerable groups such as adolescents and children. e.

Therefore, the authors are interested in conducting research on lifestyle relationships and dyslipidemia with fasting blood glucose are disrupted in teachers of SMPN and SMAN who are obese in central Makassar.

2. METHODOLOGY

2.1. Research Type

This research is an observational research with cross sectional approach. This approach was used to evaluate the dynamics of correlation, between risk factors and effects, by approaching observation or collecting data at a time .

2.2. Location and Time of Study

Location of research conducted at State Junior High School (SMPN) and State Senior High School (SMAN) in Biringkanayya Sub-district, Manggala Sub-district and Tamalanrea Sub-district of Makassar City with total of 12 schools with the highest number of teachers in three sub-districts and in klini k Parahitha as a place to check blood sugar. The study period starts from July to November 2016.

2.3. Materials and Tools

Materials and tools used in measuring fasting blood sugar in Parahitha clinic are 6 cc injection spoits, alcohol swab, plaster, name label, blood container tube, blanket tube, micro pipette, tip, reagent, 2 cc blood serum, aquades, centrifuge and test tube. Blood sampling using microhemtocrit tube by piercing on venous area after holding 2 cc blood then put in clean tube which then blood is incubated for 30 minutes at room temperature. After that the blood is inserted into a centrifuge tube. Blood in a centrifuge tube for 15-20 minutes at 3,000 rpm speed will get serum results

blood. Materials and tools used in measuring the lipid profile at Parahitha clinic are 6 cc spoit injection, alcohol swab, plaster, name label, blood container tube, blanket tube, micro pipette, tip, photometer, Cobas C311, reagent, blood serum 2 cc , aquades, centrifuges, and test tubes. The measurement method used is total cholesterol examination is CHOD-POD (cholesterol oxidase) while for HDL and LDL examination using Homogeneous Enzymatic Colorimetric method and triglyceride test with Homogeneous Colorimetric method. Blood sampling using microhemtocrit tube by piercing on venous area after holding 2 cc blood then put in clean tube which then blood is incubated for 30 minutes at room temperature. After that the blood is inserted into a centrifuge tube. Blood in a centrifuge tube for 15-20 minutes at a rate of 3,000 rpm will then obtained serum blood results.

2.4. Population and Sample

Population is the whole object of research or object under study [10]. Population in this research is all teacher of civil servant of State Junior High School (SMPN) and State Senior High School (SMAN) that exist in Makassar City. Number of sample computed is 351 then do the technique of sampling by way of purposive sampling is sampling based on certain considerations that have been made by researchers who have known before.

2.5. Data Collection

Primary data is data obtained directly by researchers of respondents who were selected as a sample at the time of the research by conducting interviews directly to the respondents by using questionnaires. The pattern of consumption through food frequency semi quantitative data frequency of consumption of carbohydrates, fats, vegetables and fruit subjects in the period of days, weeks and months in a day was collected as well. Other questionnaire that were used were Smoking status, Stress level using DASS questionnaire and International Physical Activity Questionnaire.

2.6. Data Analysis

Data analysis was done using computerized program that is SPSS version 15 with significance value $p < 0.05$. bivariate analysis was done using chisquare test by looking at the relation of variables independent (physical activity, dyslipidemia, consumption patterns, smoking, behavior, and stress) with dependent fasting blood glucose level dependent variables. Multivariate analysis was conducted to see the effect of all independent variables on dependent variable of fasting blood glucose level disrupted by using logistic regression test

3. Result and Discussion

3.1. Bivariate Analysis

3.1.1 Physical Activity, Smoking Status and stress level with Sugar Blood Fasting Interfered

Table 1 shows that the percentage of teachers experiencing fasting glucose is disrupted higher at low physical activity of 24.5% compared to the high physical activity of 17.5%. The chisquare test showed no significant relationship between physical activity and impaired fasting blood glucose level ($p = 0.305$). Smoking status was higher among smokers / former smokers by 36.4% compared with never smokers at 18.7%. The chisquare test showed no significant relationship between smoking status and impaired fasting blood glucose level ($p = 0.366$). And at the stress level the percentage of teachers who experienced fasting blood gestation was higher by 23.4% than the normal category. The chisquare test showed no significant relationship between stress levels and impaired fasting blood glucose level ($p = 0.159$).

3.1.2 Pattern of Consumption with Blood Sugar Subjects Interfered

Table 2 shows that the percentage of teachers who experienced fasting glucose was significantly impaired in teachers with a carbohydrate consumption pattern of 21.3% versus 18% occasionally. Chisquare test showed no significant relationship between carbohydrate consumption pattern with impaired fasting blood glucose level ($p = 0.618$). In the pattern of higher fat consumption fat consumption patterns are often 23.1% compared

to the pattern of rare fat consumption of 16.7%. The chisquare test showed no significant relationship between fat consumption pattern and impaired fasting blood glucose level (p = 0.327). In the pattern of vegetable consumption is higher in teachers with a rare vegetable consumption pattern of 30% compared to vegetable consumption patterns are often 19.3%. Chisquare test showed no significant relationship between vegetable consumption pattern and impaired fasting blood glucose level (p = 0,419). In fruit consumption pattern higher consumption pattern of rare fruit was 22,8% compared to rare fruit consumption pattern 18,3%. Chisquare test showed no significant relationship between fruit consumption pattern with impaired fasting blood glucose level (p = 0,501).

Table 1. Relationship of physical activity, smoking status and stress level with Fasting Blood Sugar

No	Variable	FASTING BLOOD GLUCOSE LEVEL		p
		Interrupted	Normal	
1	Physical Activity			
	Low	13(24.5%)	40(75.5%)	0.305
	High	17(17.5%)	80(82.5%)	
2	Smoking Status			
	Smoker/Ex-Smoker	4(36.4%)	7(63.6%)	0.366
	Non-Smoker	26(18.7%)	113(81.3%)	
3	Stress Level			
	Stress	22(23.4%)	72(76.6%)	0.159
	Normal	8(14.3%)	48(85.7%)	
	Total	30(20%)	120(80%)	

Table 2 Relationship of Consumption Pattern Carbohydrates, fats, fruits and vegetables with Fasting Blood Sugar

No	Variable	fasting blood glucose level		p
		Interrupted	Normal	
1	Carbohydrate consumption patterns			
	Frequent	19(21.3%)	70(78.7%)	0.618
	Once awhile	11(18%)	50(82%)	
2	Fat Consumption patterns			
	Frequent	18(23.1%)	60(76.9%)	0.327
	Rarely	12(18.7%)	60(83.3%)	
3	Vegetable consumption patterns			
	Frequent	3(30%)	7(76.6%)	0.419
	Rarely	27(19.3%)	113(85.7%)	
4	Fruit consumption patterns			
	Frequent	17(18.3%)	76(81.7%)	0.501
	Rarely	13(22.8%)	44(77.2%)	
	Total	30(20%)	120(80%)	

3.1.3 Balanced Nutrition Behavior and Blood Fasting Blood Interfered

Table 3 shows that the percentage of teachers experiencing fasting glucose is more disrupted in teachers with less knowledge of 32.7% compared to good knowledge of 13.9%. The chisquare test showed a significant relationship between knowledge with impaired fasting blood glucose level (p = 0.007). On the attitude of more to the teacher with a negative attitude of 31.1% compared to a positive attitude 12.4%. The chisquare test showed a significant relationship between attitudes with impaired fasting blood glucose level (p = 0.005). In practice more for teachers with bad practices 30.4% than good practice 13.8%. Chisquare test showed a significant relationship between practice with impaired fasting blood glucose level (p = 0.014) and on more behavior in teachers with ineffective behavior of 30.4% compared to effective behavior of 13.8%. Chisquare test showed a significant relationship between fruit consumption pattern and impaired fasting blood glucose level (p = 0.014).

Table 3 Relationship Knowledge, Attitude and Practice with Fasting Blood Sugar

No	Variable	fasting blood glucose level		p
		Interrupted	Normal	
1	Knowledge			
	Less	16(32.7%)	33(67.3%)	0.007
	Good	14(13.9%)	87(86.1%)	
2	Attitude			
	Negative	19(31.1%)	42(68.9%)	0.005
	Positive	11(12.4%)	78(87.6%)	
3	Practice			
	Not Good	17(30.4%)	39(69.6%)	0.014
	Good	13(13.8%)	81(86.2%)	
4	Behavior			
	Not Effective	17(30.4%)	39(69.6%)	0.014
	Effective	13(13.8%)	81(86.2%)	
	Total	30(20%)	120(80%)	

3.1.4 Dyslipidemia and Blood Sugar Interfered

Table 4 shows that the percentage of teachers with interfered glucose disorder is higher in the high category total cholesterol by 23.3% compared to the normal category of 8.8%. The chisquare test showed no significant association between total cholesterol and impaired fasting blood glucose LEVEL (p = 0.064). At higher triglyceride levels at high levels 32.2% compared to low levels of 12.1%. The chisquare test showed a significant relationship between triglycerides and impaired fasting blood glucose level (p = 0.003). HDL levels were higher in normal HDL 20.7% compared with low HDL levels of 17.9%. Chisquare test showed no significant relationship between HDL with impaired fasting blood glucose level (p = 0.710). At higher LDL levels higher levels of LDL 21.3% compared to normal levels no teachers who experienced fasting glucose were interfered. Chisquare test showed no significant relationship between LDL with impaired fasting blood glucose level (p = 0.122). And in dyslipidemia the percentage of higher teachers had impaired fasting blood glucose by 23% while those without dyslipidemia did not have fasting glucose interfered. Fisher's exact test showed a significant

relationship between dyslipidemia and impaired fasting blood glucose level (p = 0.048).

Table 4 Relationship of Dyslipidemia with Blood Sugar Fasting Interfered

No	Lipid Profile	fasting blood glucose level		p
		Interrupted	Normal	
1	Total Cholesterol			
	High	27(23.3%)	89(76.7%)	0.064
	Normal	3(8.8%)	31(91.2%)	
2	Triglycerides			
	High	19(32.2%)	40(47.2%)	0.003
	Normal	11(12.1%)	80(87.9%)	
3	HDL			
	Low	7(17.9%)	32(82.1%)	0.710
	Normal	23(20.7%)	88(79.3%)	
4	LDL			
	High	30(21.3%)	111(78.7%)	0.122
	Normal	0(0%)	9(86.2%)	
5	Dyslipidemia			
	Yes	29(23%)	97(77%)	0.048
	No	1(4.2%)	23(95.8%)	
	Total	30(20%)	120(80%)	

3.2. Multivariate Analysis

Based on Table 5, results shows that after all independent variables are incorporated into the model by using logistic regression test with backward conditional method that is by entering all the variables into the model, then one by one independent variable is removed from the model based on the criteria of significance then entered into the method enter . (B1) = -1,496, attitudes (B2) = -1,449, practice (B3) = -1,324, behavior of balanced nutrition (B4) = = 1.146, the value of the coefficient of logistic regression for independent variables 1.791, and triglycerides (B5) = 0.970. By observing the value of p <0.05 so that the behavior of balanced nutrition (p = 0.050) with the domain of knowledge (p = 0.021), attitude (p = 0.012) and practice (p = 0.028) affect the fasting blood sugar is disrupted as well as triglycerides have the effect on fasting blood sugar is disturbed by the value of p = 0.036. While total cholesterolol, HDL, LDL, physical activity, smoking status, stress level, carbohydrate consumption pattern, fat consumption pattern, fruit consumption pattern, vegetable consumption pattern and dyslipidemia have no effect on fasting blood glucose.

3.3. Overall Discussion

Based on physical activity showed that respondents who experienced fasting blood glucose level were most affected by respondents who had low physical activity of 24.5%. With a value of p = 0.305 indicates that physical activity has no relationship with fasting blood glucose level disrupted. This may be due to the small number of samples with fasting blood glucose level and when asking for non-specific physical activity.

Low physical activity accompanied by frequent eating of fatty foods will increase the fat in the body resulting in weight gain and when it happens continuously it will occur obesity. Obesity and the occurrence of impaired fasting glucose are interrelated.

Based on smoking status indicates that smoking status is not related to the incidence of impaired fasting blood glucose as evidenced by the value of p = 0.366. Different research on results conducted by Suparin [11] that there are differences in blood glucose levels of smokers and non-smokers with a value of p = 0.002 tobacco.

The results of this study in line with research conducted Arifin, [12] showed no significant relationship between stress with blood glucose level of patients with type 2 diabetes mellitus at the general hospital of West Nusa Tenggara with p = 0,052.

Based on the pattern of carbohydrate consumption showed that respondents who experienced fasting blood glucose level was the most disturbed in the respondents with carbohydrate consumption pattern is often 21.3% compared with sometimes 18% with p = 0.618. This suggests that statistically carbohydrate consumption patterns have no relationship with impaired fasting blood glucose level.

Table 5. Lifestyle Relationships (Physical activity, smoking status, stress level, carbohydrate consumption patterns, fats, fruits, vegetables and behavior) and Dyslipidemia (Total Cholesterol, Triglycerides, HDL, LDL) with fast blood glucose LEVEL Interfered

No	Variable	B	S.E	Wald	Df	Sig	Exp(B)	95.0% CI For Exp (B)	
								Lower	Upper
1	Knowledge	-1.496	.647	5.350	1	0.21	.224	0.63	.796
2	Atitude	-1.449	.575	6.343	1	0.12	.235	0.76	.725
3	Practise	-1.324	.603	4.818	1	.028	.266	0.82	.868
4	Nutrition	1.791	.912	3.856	1	0.50	5.994	1.003	35.804
5	TG Status	0.970	.463	4.396	1	.036	2.638	1.605	6.533
	Constant	1.991	1.222	2.655	1	.103	7.321		

Another study showed different results by Ngaisyah, [13] that carbohydrate intake was significantly associated with fasting blood glucose with p = 0.035. This is because the amount of carbohydrates consumed from the main meal and distraction affects blood glucose levels and insulin secretion.

Based on the pattern of fruit consumption shows that the respondents who experienced fasting blood glucose level was the highest percentage of respondents with the consumption pattern of rare categories of 22.8% with the value of p = 0.501. This suggests that the statistical pattern of fruit consumption has no relationship with impaired fasting blood glucose level. The same study conducted by Ngaisyah,[13] in East Kalimantan with chi square test showed that fruit consumption had no significant relationship in controlling blood sugar level on respondents (p> 0,05).

Based on nutritional knowledge shows that respondents who have nutritional knowledge less experienced fasting blood glucose level

is the highest disrupted as much as 32.7% compared to those with good knowledge of 13.9%. The value p = 0.007 indicates that a person's knowledge affects the occurrence of uninterrupted fasting blood glucose level events.

4. CONCLUSION

Based on the analysis done, it can be concluded that there is a correlation between behaviour (0.014) and its domain, which is knowledge (0.007), attitude (0.005), practise (0.014) and impaired fasting food blood sugar. There is a significant correlation between triglyceride (0.003) and impaired fasting blood sugar, but there is no correlation between physical activities (0.305), total cholesterol (0.064), HDL (0.710), LDL (0.122), consumption pattern (carbohydrate (0.367), fat (0.508), vegetables (0.835) abd fruits (0.601), smoking status (0.366), stress level (0.159) and impaired fasting blood sugar.

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