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The Effect of Fat Consumption Intake, Obesity, and Cholesterol Level On Fertility Of Women

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ABSTRACT

Excess fat intake can lead to accumulation of body fat, obesity, high cholesterol levels cause disruption of female menstrual cycle hormone production. The purpose of study was to determine the effect of excess fat intake, obesity, high cholesterol levels on menstrual cycle and to determine the difference before and after the intervention of a low diet in saturated fat nutrition.

The type of research is Analytical Observational study, design Cross Sectional, Logistic Regression Test and T-test of paired sample. Implementation January-June 2021. The population is 480 women of childbearing age (WCA). The instuments are questionnaire and observation. Random sampling technique 218 WCA. The form of nutritional diet intervention is low in saturated fat at least 4-5 days a week for 3 months.

Results: Significant fat intake 0.000<0.05. , Obesity 0.001<0.05. Cholesterol level value of 0.001 <0.00 has an effect on menstrual cycle and there is a difference before and after the intervention of diet nutrition low in saturated fat obesity 0.000 <0.05, cholesterol sig 0.000 <0.05, menstrual cycle 0.000 <0.05.

Conclusion: Excess fat intake, obesity, high cholesterol levels affect menstrual cycle and there are differences before and after the intervention of a diet low in saturated fat nutrition.

Keywords: Fat Intake; Obesity; Cholesterol Levels; Menstrual Cycle

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INTRODUCTION

Excess of fat intake causes ccumulation of body fat and at risk of obesity, high cholesterol (LDL) and high triglycerides in blood. Fat serves as a source of energy to help the process of absorption of nutrients in body. However, excess of saturated fat is harmful to health and reproductive system disorders[1].

Excess of fat, obesity and high cholesterol affect hypothalamus and follicles producing hormone estrogen, triggering menstrual cycle irregularities [2]. Lipoprotein metabolism disorders and increased triglyceride levels are at risk for hypercholesterolemia, liptin hormone abnormalities, metabolic disorders, menstrual hormone production disorders, fertility disorders, polycystic syndrome, infertility and degenerative diseases. [314]. Every woman will normally experience menstrual cycle as a sign of female fertility [5].

The prevalence of obesity aged > 18 years in Indonesia continues to increase from 10.5% in 2007 to 21.8% in 2018. Patients with high cholesterol also experienced increase from 52.3% in 2016 from 8225 people to 2967 people (36.1%). High cholesterol levels are total cholesterol 190 mg/dL or more[6].

Cholesterol functions in synthesis of substances in cell membrane, affect steroid hormones, menstrual cycle and female fertility [7]. Consumption of healthy eating, balanced nutrition and healthy lifestyle is an effort to treat obesity and high cholesterol [8].

A preliminary study in 2020 showed that 110 women of childbearing age (WUS) experienced irregular menstrual cycles, there were 68 WUS (62%) obesity and 48 WUS (44%).

Efforts to reduce fat accumulation, obesity and high cholesterol levels can be done by consuming balanced and healthy foods on regular basis by reducing consumption of harmful saturated fats and increasing consumption of fortitude from vegetables and fruits.

Based on the background, it is necessary to conduct research on the effect of excess fat intake, obesity and high cholesterol levels on WUS fertility and fat-based nutritional diet intervention..

METHOD

This type of research uses Observational Analytical Cross Sectional study design, data analysis is by Logistic Regression Test statistics. The research was carried out for the period of January 2020 to June 2021. The population was 480 women of childbearing age (WUS) using random sampling technique of 218 WUS. Data on excess fat intake was obtained from direct questionnaire consisting of 8 items, and menstrual cycle data of 5 items. Then the WUS who experienced irregular menstrual cycles were divided into two groups (intervention and control). Statistics Test difference of T test paired samples was employed. Data on obesity, cholesterol levels were obtained from examination. The form of nutritional diet intervention is low in saturated fat by increasing the consumption of *fiber* (vegetables and fruit) at least 4 days/week for 3 months.

RESULTS

Table 1. Frequency distribution of fat intake, obesity, cholesterol levels and menstrual cycle

Variabel	category	n	(%)
Fat Intake	Enough	119	54.6
	Excessive	99	45.4
Obesiity	BMI Normal	101	46.3
	BMI Not Normal	117	53.7
Colesterol	Normal	122	56
	Not Normal	96	44
Menstrual Cycle	Regular Menstrual Cycle	124	56.9
	Irregular Menstrual Cycle	94	43.1

Based on table 1. It shows that from 218 WUS, excess fat intake was 45.4%, obesity was 53.7%, high cholesterol levels were 44% and irregular menstrual cycles were 43.1%.

Table 2. Effect of excess fat intake, obesity, high cholesterol levels

	B	S.E.	Wald	df	Sig.	Exp(B)
	Fat Intake	-1.462	.316	1.472	1	.000	.232
	Obesity	1.076	.317	1.548	1	.001	2.934
	Cholesterol Level	1.043	.311	1.256	1	.001	2.837
	Constant	-1.364	.793	.960	1	.085	.256

Analysis of table 2. Excess fat intake with sig 0.000 <0.05 means it has effects, Exp (B) is at risk of 0.232 times, obesity is 0.001 <0.05 means it has effects. Exp (B) is 2,934 times at risk, cholesterol level is 0.001 <0.05 means it has effects. Exp (B) 2.837 at risk of increasing menstrual cycle irregularity.

Table 3. Differences Before and After Dietary Intervention Saturated Fat Nutrition

Variable	Pair 1	Mean	df	Sig. (2-tailed)
Obesity	BMI before diet BMI after diet	1.362	46	.000
Colesterol	Cholesterol before diet Cholesterol after diet	65.957	46	.000
Menstrual Cycle	Menstrual cycle before diet Menstrual cycle after diet	-24.255	46	.000

Table 3 Shows that there is a difference before and after the nutritional diet, namely obesity sig (2-tailed) 0.000 <0.05. Cholesterol sig (2-tailed) value 0.000 <0.05 Menstrual cycle sig (2-tailed) value 0.000 <0.05.

DISCUSSION

Excess of fat intake

Analysis of excess fat intake has a risk of 232 times affecting occurrence of irregularities in WUS menstrual cycle. logistic regression test of significance of 0.000 <0.05, which means that it is very influential in providing nutritional diet low in saturated fat by increasing fiber consumption for regularity of the WUS menstrual cycle. According to other researchers, saturated fat intake has a 3.6 times risk of influencing metabolic syndrome which disrupts women's menstrual cycles[9]. However, other opinions differ, high-fat diet has nothing to do with menstrual cycle [10]**.** In this study, 45.4% of WUS had a habit of consuming excess saturated fat including chicken meat, chicken eggs, offal, duck, mujahir fish, beef, fried foods, oil crackers, milk and coconut milk.

Fat is a source of energy that helps the process of absorption of other nutrients such as vitamins [11]. Excessive saturated fat intake is harmful to health causing various diseases, fat accumulation, obesity, and high cholesterol levels in blood [12]. Triglyceride levels in blood function for follicular growth and high androgen levels in ovaries trigger anovulatory cycles, metabolic disorders, menstrual hormone production disorders, fertility disorders, polycystic syndrome, and infertility.[2]**.** Saturated fat in body during childbearing age (20-40 years) is 20 mg/day. Excess fat intake increases triglycerides and LDL (low Density Lipoprotein) in blood causing disruption of hormone production in reproductive organs and female reproductive system. A nutritional diet low in saturated fat by increasing the consumption of fiber at least 28 g/day from fruits and vegetables can reduce body weight and blood cholesterol levels in women of childbearing age normally.[11].

Obesity

The analysis shows that the risk is 2,934 times affecting the menstrual cycle and the significance is 0.001 <0.05. Then the higher the body mass index (BMI) the higher the irregularity of menstrual cycle. According to other researchers, obesity is associated with irregular menstrual cycles that cause infertility [2]. Supported by other opinions, diet, genetics and lifestyle affect obesity, intake of high-fat foods in the long term without balanced activity increases obesity [13].

The nutritional status of this study was measured by comparing body weight and body length, namely Body Mass Index (BMI) or Body Mass Index = BW (kg)/TB2 (meters) with the following WUS assessment criteria: Thin <17kg/m2, Normal 18-25kg /m2, Overweight 23-27 kg/m2, obesity > 27 kg/m2[14]. Other researchers argue that obesity and overweight in fertile women are found in infertile women with irregular menstrual cycles [6].

The results of WUS intervention on diet with low in saturated fat nutrition were significant 0.000 < 0.05, meaning that there was a difference before and after nutritional diet of low in saturated fat by increasing fiber intake. Average obesity experienced decrease in BMI from 27.35 to 25.99. According to other studies, menstrual cycle disorders were 1.89 times greater in obese women. Reinforced by other opinion that body mass index affects the menstrual cycle. Obesity affects the production of the hormones

estrogen and progesterone regulates a woman's menstrual cycle [14]. Obesity/overweight in fertile women is found in infertile women with irregular menstrual cycles [6].

Nutritional diets with eating patterns to balance energy intake must be as needed, control of emotional patterns of appetite are also regulated and controlled in the amount of food, as well as rest/sleep patterns to increase energy intake as an alternative to losing weight and obesity.

Cholesterol Level

Analysis of total cholesterol levels is at risk of 2.837 times, the higher the cholesterol level, the higher the irregularity of woman's menstrual cycle and the effect is 0.001 <0.05. As supported by other researchers that high cholesterol levels increase LDL cholesterol in blood and saturated fatty acids in serum, insulin and plasma [11].

The WUS intervention in irregular menstrual cycle group obtained significance value of 0.000 <0.05, which means that there is a difference before and after diet of low in saturated fat. According to other studies that high cholesterol is the result of a diet that consumes excessive saturated fat. Fiber plays a very important role which contains gelatin which functions to bind cholesterol and bile acids that are excreted through the feces [11]. In contrast to other opinions that have not intervened in fat intake in three groups, the results did not affect person's cholesterol levels [15].

Dietary fiber plays an important role in helping reduce LDL cholesterol/bad fats and increase HDL cholesterol/unbad fats. Excess LDL cholesterol forms clots in blood causing fat metabolism disorders so that it reduces hormone estrogen production and interferes female fertility, hypercholesterolemia can cause hormone buildup in ovarian follicles, so polycystic ovary syndrome (PCOS) can occur.

Menstrual Cycle

The results showed that 94 (43.1%) of 218 WUS experienced irregular menstrual cycles. Furthermore, 94 WUS who experienced irregular menstrual cycles were divided into two groups (intervention and control). The intervention group was low in saturated fat nutrition diet for 3 weeks. The results of the T test paired samples show significance value of 0.000<0.05, indicating that there is a difference between menstrual cycles before and after diet of low in saturated fat. The average before the nutritional diet was 41.70 to 65.96 after the nutritional diet of low in saturated fat, meaning that there was an increase in regularity of menstrual cycle. According to other opinions, excess of body fat is related to menstrual cycle [14].

Menstrual cycle is one of the signs of female fertility, which is characterized by having a menstrual cycle between 21-35 days for 3 consecutive months on a regular basis [5]. Factors that affect menstrual cycle include age, nutritional status, psychology and lifestyle. The menstrual cycle is associated with more nutritional status or less nutritional status causing impaired function of hypothalamus in pituitary to produce FSH (follicle stimulating hormone) and LH (follicle hormone), the more body fat, the more estrogen is formed causing impaired ovarian function and women's menstrual cycle. [10].

The eating habits of WUS in this study include: chicken meat, chicken offal, fried foods, fatty beef, coconut milk, oil-fried crackers, and fried fish, which contain excess of saturated fat which can cause

fat accumulation that triggers obesity and high cholesterol. The nutritional diet of this study includes nutritional diet of low in saturated fat, reducing carbohydrates by increasing fiber consumption, which is beneficial in lowering cholesterol levels in blood and reducing weight in obesity so as to stabilize reproduction of menstrual cycle hormones. According to other opinions, the consumption of saturated fat is associated with increasing cholesterol levels in blood [11].

CONCLUSIONS

The conclusion of this study is that excess of fat intake, obesity, high cholesterol levels affect the occurrence of menstrual cycle. The higher the intake of fat consumed, the higher the occurrence of obesity, high cholesterol levels and the more disturbed menstrual cycle. In the intervention of diet of low in saturated fat, there were differences before and after the intervention, there was a decrease in obesity, cholesterol levels and an increase in regularity of menstrual cycle.

REFERENCES

1. Hidayati DR, Yuliati Y, Pratiwi KR. Hubungan asupan lemak dengan kadar trigliserida dan indeks massa tubuh sivitas akademika uny. *J Prodi Biol*. 2017;6(1):25-33.
2. Susilawati D. Hubungan Obesitas Dan Siklus Menstruasi Dengan Kejadian Infertilitas Pada Pasangan Usia Subur Di Klinik Dr.Hj. Putri Sri Lasmini SPOG (K) Periode Januari-Juli Tahun 2017. *J Kesehat Mercusuar*. 2019;2(1):8. doi:10.36984/jkm.v2i1.20
3. Smulyanskaya N. Factors of fertility ageing rate. *Popul Econ*. 2020;4(1):60-74. doi:10.3897/popecon.4.e53039
4. Panth N, Gavarkovs A, Tamez M, Mattei J. The Influence of Diet on Fertility and the Implications for Public Health Nutrition in the United States. *Front Public Heal*. 2018;6(July):1-7. doi:10.3389/fpubh.2018.00211
5. Ryadinency R. Faktor Yang Berhubungan Dengan Kejadian Infertilitas Pada Wanita Usia Subur Di Rsu Sawerigading Palopo. Published online 2018. doi:10.31227/osf.io/bvqtk
6. Reproduksi O, Wanita P, Masalah D, et al. Paparan Rokok, Status Gizi, Beban Kerja Dan Infeksi Organ Reproduksi Pada Wanita Dengan Masalah Fertilitas Rsi Sultan Agung Semarang. *J Kesehat Masy*. 2018;6(5):202-208.
7. Sèdes L, Thirouard L, Maqdasy S, et al. Cholesterol: A gatekeeper of male fertility? *Front Endocrinol (Lausanne)*. 2018;9(JUL):1-13. doi:10.3389/fendo.2018.00369
8. No V, Pemenuhan H, Dan N, et al. Jurnal Ilmu Kebidanan dan Kesehatan (Journal of Midwifery Science and Health) Diterbitkan oleh Jurnal Ilmu Kebidanan dan Kesehatan. 2017;10(1).
9. Yoeantafara A, Martini S. Pengaruh Pola Makan Terhadap Kadar Kolesterol The Influence of Diet to Total Cholesterol Levels. *J Mkmi*. 2017;13(4):304-309.
10. Prathita YA, Syahredi S, Lipoeto NI. Hubungan Status Gizi dengan Siklus Menstruasi pada

Mahasiswi Fakultas Kedokteran Universitas Andalas. *J Kesehat Andalas*. 2017;6(1):104. doi:10.25077/jka.v6i1.653

11. Yuliantini E, Sari AP, Nur E. Hubungan asupan energi, lemak dan serat « Yuliantini E; dkk). *Nutr Food Res*. 2015;38(2):139-147.
12. Sri U. Hubungan antara Usia dan Jenis Kelamin dengan Kadar Kolesterol Penderita Obesitas RSUD Abdul Moeloek Provinsi Lampung. *J Kesehat*. 2015;6(1):43-48.
13. Praditasari JA, Sumarmik S. Asupan Lemak, Aktivitas Fisik Dan Kegemukan Pada Remaja Putri Di Smp Bina Insani Surabaya. *Media Gizi Indones*. 2018;13(2):117. doi:10.20473/mgi.v13i2.117-122
14. Zaki Yatun Usna El Alasi1, Irfan Hamdani., dr. SA. The Relationship of Body Mass Index on The Menstrual Cycle Against Students in. 2017;1(1):40-48.
15. Abdul Rehman HM. Relation of Cholesterol Level to Dietary Fat Intake in Patients of Ischemic Heart Disease. *Cardiovasc Pharmacol Open Access*. 2015;04(02):2-7. doi:10.4172/2329-6607.1000141