

ANALYSIS OF DIABETICS' LIFESTYLE ON DIABETIC NEPHROPATHY CASES AT MUHAMMADIYAH HOSPITAL OF LAMONGAN

Virgianti Nur Faridah, Suratmi, Siti Sholihah

Lecturer, Health Science Faculty, Muhammadiyah University of Lamongan,
INDONESIA.

virgianti_nf@yahoo.com

ABSTRACT

Diabetic nephropathy is a complication of diabetes mellitus which affects diabetics' quality of life. It is associated with chronic conditions and frequently found in fatal conditions. One of the underlying factors is diabetics' healthy lifestyle.

This study applied analytic surveys with case control approach. The study samples were diabetics who treated at Muhammadiyah Hospital of Lamongan during June-July 2017 of 46 respondents. They were divided into two groups, 23 patients with diabetic nephropathy and 23 patients without diabetic nephropathy. The data were collected through closed questionnaires and analyzed using Fisher's exact test with a significance level of 0.05. It was obtained χ^2 count = 37.80 and $p = 0.000$ in which $p < 0.05$ then H_0 was rejected, which meant that there was a relationship between diabetics' lifestyle and the diabetic nephropathy cases.

Nurse plays a very important role in terms of providing health education for the diabetics in order to have a healthy lifestyle to prevent the occurrence of diabetic nephropathy. Lifestyle includes healthy diet, physical activity, weight loss efforts, adequate rest, coping mechanisms, supervision of drugs, regular control, and avoiding smoking and alcohol consumption.

Keywords: Diabetics' Lifestyle, Diabetic Nephropathy

1. INTRODUCTION

Diabetics is a term for people with diabetes mellitus. The data from International Diabetes Federation shows that diabetics have reached 366 million people with mortality reaching 4.6 million people (IDF, 2011). Indonesia ranks the 4th biggest population of diabetics in the world amounted to 14 million people. In Indonesia, diabetes cases reach 6% per year, as the 6th mortality etiology for the age range of 20–79 years (Tempo, 2013). According to several studies, only 41% of the DM population knew their condition, 39% received treatment and 0.7% received proper DM treatment.

Generally, diabetics in Indonesia receive treatment after experiencing complications. If they are not treated properly, they will experience dangerous multi-organ complications. Compared to non-diabetics, diabetics are at risk of 25 times blindness, 7 times chronic renal failure, 5 times diabetic ulcers, and 2 times coronary heart disease.

Diabetic nephropathy is one of the complications of DM, also called as Diabetes Mellitus Diabetic Nephropathy (DMND). Recent data shows that DMND occurs in one third of diabetics and becomes the single most prominent cause of late stage kidney disease in the United States and Europe. Patients undergoing Dialysis were amounted to 25% due to DMND (PERNEFRI, 2013). In Asia, according to prevalence study, 60% of diabetic hypertension patients experienced Diabetic Nephropathy. In Indonesia, based on the data from PT ASKES in 2010, the number of patients with kidney failure was 17.507 patients and

increased to 23.261 patients in 2011. Based on the preliminary survey obtained from the Medical Record unit of Muhammadiyah Hospital of Lamongan, there were 403 diabetics, including Hemodialysis room from December 2014 to February 2015 who had complications from diabetic nephropathy amounted to 97 people (24.06%). From these data, the prevalence of diabetic nephropathy is quite high and harmful.

The most influencing factors of diabetic nephropathy are hyperglycemia and hypertension. Diabetes becomes diabetic nephropathy due to poor glycemic control causing filtration disorder, in which this results glomerular kidney leak. This is characterized by persistent microalbuminuria causing acute kidney failure to terminal renal failure. Diabetic nephropathy varies between 10-25 years depending on several supporting factors including the increase of chronic arterial blood gas (ABG) level, obesity, smoking, and genetics. Blood glucose level increases as a result of high carbohydrate diet, which exceeds the absorption of the kidneys resulting in impaired kidney function. Besides, obesity and lack of activity will cause an increase in insulin resistance resulting in chronic hyperglycemia which aggravates the work of the kidneys. Smoking habit results in narrowing arteries so that vascularization of the vascular throughout the body is disturbed, including being manipulated (Price & Lorraine, 2005).

Therefore, based on the above description, lifestyle is a dominant trigger factor which needs to be analyzed related to the increase of diabetic nephropathy cases. In particular, the authors are interested in researching diabetics' lifestyle on diabetic nephropathy cases at Muhammadiyah Hospital of Lamongan.

2. RESEARCH METHOD

The research design used in this study was analytic survey design. The approach used in this study was case control (Hidayat, 2010). The population in this study were all patients with Diabetes Mellitus at Muhammadiyah Hospital of Lamongan during May-July 2017 amounted to 46 people through accidental sampling (Notoatmodjo, 2012). The data were collected through a questionnaire sheet to measure the variables of diabetics' lifestyle and diabetic nephropathy cases. The test used was Chi Square test (Nursalam, 2014).

3. RESEARCH RESULT

Table 1. Diabetics' Characteristics

Variable	Frequency n	%	Variable	Frequency n	%
Gender			Occupation		
Male	22	47.8	Housewife	6	13
Female	24	52.2	Farmer/Fisherman	9	19.6
Age			Private	19	41.3
40-49	9	19.6	Civil servant/Military	12	26.1
50-59	21	45.7	Period of Experiencing DM		
60-69	13	28.3	< 5 years	2	4.3
>70	3	6.5	6-10 years	26	56.5
Education			11-15 years	14	30.4
College	10	21.7	< 16 years	4	8.7
Senior High School	16	34.8	Co-morbidities		
Junior High School	9	19.6	Yes	37	80.4
Primary School	11	23.9	No	9	19.6
			Total	46	100

Based on Table 1 above, it shows that from 46 Diabetes Mellitus patients, 24 of them were female (45.7%), 21 patients aged between 50 and 59 years (63.3%), 16 patients graduated from high school (34.8 %), 19 patients worked in private sector (41.3%), 26 patients experienced diabetes for 6-10 years (56.5%) and 37 patients had co-morbidities (80.4%).

Table 2. Specific Data

Lifestyle	Healthy		Unhealthy		Total	
	Total	%	Total	%	Total	%
DN Cases						
Diabetes Mellitus Diabetic Nephropathy	2	4.30%	21	45.70%	23	100%
Diabetes Mellitus	23	100%	0	0	23	100%
Total	25	54.35%	21	45.65%	46	100%

Based on Table 2 above, it shows that 23 (50%) of the DM respondents had a healthy lifestyle and 21 (45.70%) of the DMDN respondents had unhealthy lifestyle. In accordance with the results of the Fisher Exact Test of statistical test, it was found that $X^2 = 37.80$ with $p = 0.000$, in which $p < 0.05$ then H_0 was rejected. This meant that there was a relationship between diabetics' lifestyle and diabetic nephropathy cases at Muhammadiyah Hospital of Lamongan.

4. DISCUSSION

4.1 Diabetics' Lifestyle

Based on the data in Table 2, it shows that 25 (54.30%) diabetics had healthy life style while 21 (45.70%) diabetics had an unhealthy life style.

Diabetics' lifestyle includes healthy diet, physical activity, weight loss efforts, adequate rest, coping mechanisms, supervision of drugs, routine control, and avoiding smoking and alcoholic drink (Erwin, 2013). On the other hand, 37 (80.4%) diabetics who had unhealthy life styles experienced co-morbidities. This, of course, might reduce diabetics' quality of life.

A healthy diet for diabetics may stabilize blood sugar level. One of the clinical features of diabetes mellitus is polyphagia (increased hunger) which likely causing the difficulty in regulating a healthy diet. Everyone, including a diabetic, needs to consume a variety of foods to fulfil the need of various body substances including energy, builder, and regulator. In fact, the need of energy depends on age, physical activity, and disease state and treatment. Consuming sufficient fiber provides many benefits such as delaying hunger that it can help control appetite which indirectly affects the weight loss process, regular defecation, and reducing blood fat levels. High fiber foods commonly have low calories (Sutanto, 2010).

Nutritional balance should ideally be followed by the balance of consuming adequate water. The average of individual needs for water are 2 liters/day, which adjusted accordingly. For diabetics who experience heart and renal problems, it is necessary to adjust the balance of intake and output of fluid.

It is recommended that diabetics' activity include rhythmic exercise such as gymnastics, walking, swimming for 30-60 minutes/day with a frequency of 3-5 times/week. Lack of activity increases insulin resistance (Handayani, 2012). According to nutritionists, it is recommended to exercise after consuming food, to which later it burns carbohydrates consumed.

For diabetics, arranging a diet means consuming food according to caloric needed in order to achieve and maintain an ideal body weight (Sutanto, 2010).

A study suggests that diabetes has a deficit of leptin hormone as a result of lack of a gene producing leptin or not functioning properly. Without leptin gene, the body fails to respond to signs of satiety which causes fat and insulin insensitivity (Corwin, 2009).

Enough rest for more than 8 hours helps metabolism of sufficient insulin production (Susilo, 2012).

Diabetics who have unhealthy coping mechanisms will easily experience stress. Stress triggers unhealthy behaviors such as drinking alcohol, inadequate diets, and not doing exercise which cause uncontrolled blood sugar level. High blood sugar level will worsen diabetics' condition and increase complications. The impact of stress on diabetics might be a serious matter. The first reaction of a stress response is activation of the sympathetic nervous system followed by sympathetic-adrenal-medular secretion. When it is settled, the hypothalamic-pituitary system will be activated. Hypothalamic will secrete corticotropin releasing factor which stimulate the pituitary anterior to produce ACTH. ACTH produces cortisol which causes an increase in blood sugar level. An increase in secretion of cortisol (stress hormone) has an impact on the effects of gluconeogenesis, namely the process of forming blood sugar from ingredients other than carbohydrates. (American diabetes Association, 2011).

Diabetics who experience drug abuse of analgesic/anti-pain can experience ischemia papillae, especially if there is also an infection as a result of necrose papillae. The release of papilla often results in haematuria and pyuria. UTI (urinary tract infection) more common occurs to diabetics with contributing factors in the form of incomplete urination due to autonomic neuropathy (O'Calaghan, 2009).

Diabetics need routine vital sign evaluation in the form of blood pressure, blood sugar and other laboratorium tests, if needed. Also, management of hyperglycemia and hypertension is carried out to reduce the risk of kidney disorders (Francinita, 2013).

Other periodic checks needed are HbA1C (Glycosylation Hemoglobin/glucose bound to hemoglobin) with a normal value of less than 6%, ideally 3 months. HbA1C is mainly used as a test for blood glucose levels averaging the previous 90 days, which is the average life span of erythrocytes containing hemoglobin in most patients (Sutanto 2010).

Hyperglycemia results in damage to peripheral nerves (neuropathy) and blood vessels (angiopathy) and the nephron (nephropathy). The habit of smoking and drinking alcohol worsens blood vessel and nerve circulation (Francinita, 2013).

4.2 Diabetic Nephropathy Cases

Based on data from Table 2, it shows that 23 (50%) diabetics were Diabetic Nephropathy (DMND) patients while the other 23 (50%) diabetics are Diabetes Mellitus (DM) patients. Moreover, there were 11 (47.83%) Diabetic Nephropathy (DMND) patients with the highest diabetes duration for 6-10 years.

The chronic process of diabetics has a major influence on the incidence of diabetic nephropathy. In diabetes, the first changes perceived in the kidneys are enlarged kidney size and hyperfiltration. Filtrated glucose will be reabsorbed by the tubules and simultaneously carries sodium. This happens along with the effect of insulin (exogenous in IDDM and endogenous in NIDDM) which stimulates tubular reabsorption of sodium causing extracellular volume to increase and subsequently hyperfiltration occurs. In diabetes, efferent

arterioles are more sensitive to the effects of angiotensin II than afferent arterioles, and perhaps this can explain why in uncontrolled diabetes the intraglomerular pressure rises and there is glomerular hyperfiltration (Price & Lorraine, 2005).

Diabetic nephropathy consists of 5 phases. Bad kidney condition endangers hemodialysis if kidney function is less than 5% and serum creatinine is more than 8 mg/dl to survive and maintain the quality of life (Robbin, 2007)

4.3 The Effect of Diabetics' Lifestyle on Diabetic Nephropathy Cases at Muhammadiyah Hospital of Lamongan.

Based on the results of Fisher's "Exact Test", there was a significant effect with a significance level of $p = 0.00$ where ($p = 0.005$) then H_0 was rejected. This meant that there was a relationship between diabetics' lifestyle and diabetic nephropathy at Muhammadiyah Hospital of Lamongan in 2017.

Based on Table 1, it shows that the distribution of most diabetes mellitus patients aged between 50 and 59 years amounted to 21 people (45.7%). At the age of 50-59 years the possibility of activity begins to decline while the regeneration process increases.

The influential factor of diabetics' lifestyle is healthy diet to stabilize blood sugar level. It is recommended that diabetics do activities with rhythmic exercise such as gymnastics, walk for 30-60 minutes/day with a frequency of 3-5 times per week. Lack of activity increases insulin resistance (Handayani, 2012).

Some studies estimated that more than 20% of children in the United States are obese so that more adolescents and pre-adolescents experience insulin resistance (Corwin, 2009). As many as 80% of obese who experience bariatric surgery (gastric bypass) show dramatic recovery of diabetes within a few days or weeks. This could be happened due to a significant improvement in insulin sensitivity which may be mediated by intestinal hormones. For example GLP-1 (Glucagon-Like Peptide-I) is a hormone released from the small intestine in response to rapid and gastric food movements which increases insulin release and sensitivity (Corwin, 2009).

Drug consumption in diabetes certainly needs more attention and supervision because not all drugs are safe for diabetics. For example, anti-inflammatory (kalmetason, metilprednisolon and others) may affect blood sugar level for diabetics.

The existence of several DM clubs is important for the diabetics in which they can dig more information about the prevention and treatment of diabetes mellitus, increase positive activity, control GDA and blood pressure periodically, increase friendship, improve adaptive coping mechanisms, and improve their quality of life.

5. CONCLUSIONS AND SUGGESTIONS

Diabetics need to apply a healthy lifestyle in the form of healthy diet, physical activity, weight loss efforts, adequate rest, good coping mechanisms and avoid stress, drugs consumption with supervision, regular control, avoiding smoking and alcoholic beverages to avoid complications. Further research can be carried out to see which lifestyle factors have the most influence on the incidence of Diabetes Mellitus Diabetic Nephropathy and its relation to the period of experiencing Diabetes Mellitus.

REFERENCES

- [1] American Diabetes Association. (2011). *Diabetes type 2*. Retrieved from <http://www.diabetes.com>.
- [2] Corwin, E. J. (2009). *Patofisiologi*. Jakarta: EGC.
- [3] Erwin, E. (2013). *Menerapkan Gaya Hidup 5 S dan 4 J*. Jakarta: Majalah Rumah Sakit Mitra Keluarga.
- [4] Francinita, M. M. (2013). *Diabetes bukan akhir dari segalanya*. Jakarta: Majalah Rumah Sakit Mitra Keluarga.
- [5] Handayani. (2012). *Life style modification and intervention of early pharmacology in the prevention of type 2 diabetes mellitus disease*. Dinas Kesehatan Provinsi NTB: Media Gizi Masyarakat Indonesia.
- [6] Hidayat, A., & Alimul, A. (2010). *Metode penelitian kesehatan; paradigma kuantitatif* Cetakan ke – 1. Surabaya: Health Books.
- [7] Nursalam. (2014). *Metodologi penelitian ilmu keperawatan*. Jakarta: Salemba.
- [8] O' Calaghan, C. (2009). *At a glance SISTEM GINJAL*. Jakarta: Erlangga.
- [9] Perkeni, P. (2011). *Pengelolaan Diabetes Mellitus*. Retrieved from <http://www.perkeni.com>.
- [10] Price, S. A., & Lorraine, M. W. (2005). *Patofisiologi*. Jakarta: EGC.