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Relationship of therapeutic outcome with quality of life on type 2 diabetes mellitus patients in Abdul Azis Singkawang hospital

D A Perwitasari[1], S Urbayatun[2], I N Faridah[1], N Masyithah[1]

[1]Faculty of Pharmacy, Universitas Ahmad Dahlan, Yogyakarta, Indonesia

[2]Faculty of Psychology, Universitas Ahmad Dahlan, Yogyakarta, Indonesia

E-mail: diahperwitasari2003@yahoo.com

Abstract: Diabetes is one of the diseases that required long treatment. Therapeutic outcome is one of the important factors that affect the quality of life. The purpose of this research is to know the effect of therapeutic result on quality of life in Abdul Azis Singkawang hospital. This study used Cross-sectional design. The inclusion criteria for this study was patients with type 2 diabetes mellitus (T2DM) outpatients over 18 years with ICD code X E.11. This study used the EQ-5D to measure patient's quality of life. We recruited 86 T2DM patients who met the inclusion criteria and were dominated by female respondents around 57%. The average value of quality of life EQ-5D was the index value 0.75±0.22 and visual analog scale 74.02±11.80. The result of the analysis showed that there was significant relationship between income and quality of life (p=0.001) and there was significant correlation between 2-hour PG and quality of life (p=0.037). The conclusion of this study was the therapeutic outcome affect the quality of life in 2-h PG, where the higher 2-h PG showed the low quality of life.

Keywords: Quality of life, EQ-5D, therapeutic outcome

1. Introduction

Diabetes mellitus (DM) is one of the most common endocrine diseases that become a health problem in the worldwide. American Diabetes Association states that DM was a group of metabolic diseases with characteristics of hyperglycemia due to insulin secretion abnormalities, insulin action and both [1]. Type 2 Diabetes mellitus was one of the most common types found in more than 90-95% [2]. Indonesia is estimated in 2030 will have a DM of 21.3 million people [3].

Quality of life is the individual's perception in relationtship to the purpose of life, hope and attention. DM is a chronic diseases that required therapy continuously so can affect the quality of life patient's and can lead to tendency DM patients had been complications [4]. Quality of life described various scopes such as a physical health, psychological conditions, degree of independence, social relationships, personal beliefs and aspects related to situations felt, according to their individual developmental environment [5].

The most common method that used to measure was the EQ-5D questionnaire (European quality of life-5 dimensions). The EQ-5D questionnaire consisted of 5 dimensions of mobility, self-care, regular activity, pain/discomfort, and anxiety/depression, plus a global question to assess the general

health condition called VAS (visual analog scale) [6]. The desired of therapeutic outcome was to change the lifestyle/diet (weight control and physical activity) and using drugs antidiabetic or insulin [7]. If not handled properly, complications due to diabetes can occur was microvascular complication (retinopathy, nephropathy and neuropathy, mainly on sensory nerves such as gangren, autonomic nerves such as sexual dysfunction and gastroparesis), macrovascular complications (CHD, cerebrovascular diseases, PAD) and others complications (psychosocial problems, dental diseases) [7]. The purpose of this study is to determine the effect of therapeutic outcome to the quality of life.

2. Materials and Methods

This study used cross-sectional design and prospective data retrieval in diabetic patients at Abdul Azis Singkawang hospital.

2.1 Tools and materials

The data was collected used the EQ-5D (European quality of life-5 dimensions) questionnaire. Patient characteristics include age, sex, education, income, occupation, length of treatment, long suffering, family history of DM, social status, comorbidities and therapies used were collected. Treatment outcomes include levels of BG, FBG and 2-h PG measured using the Easy Touch tool, and HbA1c measurements using DCA Vantage Analyze instruments. Inclusion criteria include type 2 diabetes mellitus patients, aged >18 years, had complications, and outpatients, while the exclusion criteria include patient refusal, illiterate patients and type 1 diabetes mellitus.

2.2 The way of research

The target population in this study were all patients with T2DM (ICD X E.11) which were outpatients and treated at Abdul Azis Singkawang hospital from January to March 2017. This study used primary data from EQ-5D questionnaire.

2.3 Statistical analysis

In this study the statistical analysis used univariate analysis which describe the characteristic of each variable, bivariate analysis knew the relationship between two variables, multivariate analysis knew the relationship of some variables. The reliability test in this research used Cronbach's method alpha coefficient and validity test in this research used content validity, Pearson correlation. Content validity was fulfilled if correlation coefficient correlation above 0.30 [8].

The EQ-5D questionnaire consisted of 5 questions and 1 global question to assess the state of public health called VAS (visual analog scale). The 3 level EQ-5D assessment started from 11111 to 33333 and the index value ranges from 0-1. A value of 0 indicated that health was worse than death, whereas if value 1 indicated good quality of life [9].

3. Results and discussion

3.1 Demographic characteristics

Characteristics of the patient include sex, age, status, education, occupation, income, diseases duration, type of treatment and comorbidities. The distribution of T2DM patients by characteristics can be seen in Table 1.

Based on Table 1, it can be seen that most of T2DM patients were female (57%). This was in line with previous research results where T2DM patients with female sex were higher when compared with men [14]. The mean age of T2DM patients was 58.16±7.76 years, this was because the aging process was caused decrease ability of β-pancreatic cells in producing insulin [10]. The highest percentage of education level was higher education (64%). The average distribution of income was 2.5±8.75 million, meaning the average income of patients was above the minimum sallary rate of Singkawang (2.2 million). Around 90.7% of patients received oral therapy with treatment duration of 6.70±4.90 years, and diseases duration from 7.31±5.38 years. Most patients in this research had 57% macrovascular diseases complications of heart, gangrene, hypertension and stroke.

Table 1. Patients characteristic

Characteristic (n=86)	X±SD	
Age (years)	58.16±7.769	
Treatment duration (years)	6.70±4.90	
Diseases duration (years)	7.31±5.38	
HbA1c (%)	9.50±2.62	
FBG (mg/dl)	158.69±70.49	
BG (mg/dl)	244.74±95.19	
2-h PG (mg/dl)	244.99±89.63	
Characteristic (n= 86)	Amount	Percentage (%)
Gender		
a. Male	37	(43%)
b. Female	49	(57%)
Education		
a. Low	31	(36%)
b. High	55	(64%)
Occupation		
a. Jobless	33	(38.4%)
b. Occupied	53	(61.6%)
Income		
a. <2.2 million	30	(34.9%)
b. >2.2 million	56	(65.1%)
Marietal status		
a. Married	76	(87.4%)
b. Single	10	(11.6%)
Family history		
a. Yes	53	(61.6%)
b. No	33	(38.4%)
Type of treatment		
a. Insulin	8	(9.30%)
b. Oral hypoglycaemic	78	(90.7%)
Comorbidities		
a. Microvascular (kidney, eye)	12	(14.0%)
b. Macrovascular (heart, gangrene, hypertension, stroke)	49	(57.0%)
c. Macrovascular & Microvascular	25	(29.1%)

Note. FBG = Fasting blood glucose; BG = Blood glucose; 2-h PG = 2 hours prandial glucose; HbA1c = Hemoglobin A1c.

3.2. Associations between sociodemographic and quality of life

The results of univariate analysis which showed the mean value of quality of life level in patients with type 2 diabetes mellitus can be seen in Table 2.

Table 2. Patient quality of life rate

Dimention of EQ-5D	Mean	SD
Index	0.7591	0.22969
VAS	74.0233	11.80426

Note. VAS = visual analog scale; Index = the state of health patient's

The result of univariate test analysis showed that the quality of life in patients with T2DM in Abdul Azis hospital was good, it can be seen from the index valued close to 1, while the VAS also showed a good quality of life.

The relationship between characteristic and quality of life can be seen in Table 3. Based on bivariate result there was no significant relationship (p<0.05) between sex with quality of life, meaning that gender does not affect the quality of life. There was no significant difference (p<0.05) between jobless and occupied of quality of life. There was no significant difference (p<0.05) between have family history and no family history. There was no significant difference (p<0.05) between type of treatment of insulin and oral hypoglycaemic, meaning that theraphy did not have relationship with quality of life. Some studies explained that patients with T2DM who consumed insulin induced diseases burden and reduced satisfaction with treatment of patients used orally treatments [11].

Table 3. The relationship between characteristic and quality of life

Characteristics	n	Index		VAS	
		Mean ± SD	*p*	Mean ± SD	*p*
Gender					
Male	37	0.77±0.17	1.000	75.6 ± 12.00	0.297
Female	49	0.74±0.26		72.7 ± 11.60	
Education					
Low education	31	0.71 ± 0.25	0.138	69.83 ± 9.80	0.005*
Higher education	55	0.78 ± 0.21		76.39 ± 12.27	
Occupation					
Jobless	33	0.73 ± 0.25	0.577	74.70 ± 13.41	0.431
Occupied	53	0.77 ± 0.21		73.70 ± 10.81	
Income					
<2.2 million	30	0.68 ± 0.25	0.015*	69.17 ± 11.22	0.005*
>2.2 million	56	0.76 ± 0.21		76.62 ± 11.36	
Family history					
Yes	53	0.79 ± 0.19	0.110	74.16 ± 10.36	0.871
No	33	0.70 ± 0.26		73.78 ± 13.97	
Marietal status					
Married	76	0.76 ± 0.22	0.665	73.69 ± 11.81	0.631
Single	10	0.73 ± 0.30		76.50 ± 12.03	
Type of treatment					
Insulin	8	0.69 ± 0.35	0.765	65.62 ± 16.78	0.097
Oral hypoglycaemic	78	0.76 ± 0.21		74.88 ± 10.96	
Comorbidites					
Microvascular	12	0.79 ± 0.12	0.536	72.58 ± 6.94	0.062
Microvascular	49	0.76 ± 0.24		76.42 ± 12.07	
Micro+ Macrovascular	25	0.73 ± 0.24		70.00 ± 12.24	

Note. VAS = visual analog scale; * p<0.05

Quality of life was strongly influeced by the severity of complications of T2DM diseases [11], but in patients in RSUD Abdul Azis found no significant difference between comorbidities and quality of life. There was significant difference (p<0.05) between low education and high education. Patients who are highly educated are better qualified than those with low education [15]. This can be interpreted as a positive effect of education for that matter T2DM management.

There was significant difference (p<0.05) between <2.2 million and >2.2 million, that low quality of life was associated with the low socio economics of T2DM patients [16].

3.3. Associations between sociodemographic and therapeutic outcome

From Table 4, the level of education (p=0.000) influence one of the outcomes of T2DM patient therapy was FBG, this was because patients with higher education level of knowledge and understanding was greater, so they better understand how to controlled blood glucose well. There was significant (p<0.05) between income and therapeutic outcome, this showed that income has an influence on FBG (p=0.002). There was significant (p<0.05) between family history and therapeutic outcome. Family history have an effect on the patient's 2-h PG (p=0.047).

Other factors that can cause the increase of blood glucosa levels include hormones, genetic disorders and eating patterns [17]. There was significant difference between type of treatment and HbA1c indicated with p value 0.048 and the significant difference between type of treatment and BG with p< 0.001. This suggests that the type of treatment received by an outpatient T2DM patient does not affect the value of blood glucose. Marietal status divided into 2 was single and married which can be seen that it has relationship with outcome of therapy in patient T2DM. There was significant differences between 2-h PG (p=0.019) and FBG (p=0.031) in T2DM patients with marietal status. This suggests that marietal status conditions was related to the outcome of therapy, but it was also found that diabetes mellitus patients are chronic diseases that required significant behavioral changes, supported by high family attention, and low family conflicts can be a high level of adherence [12].

Table 4. Mann Whitney test results analysis between characteristics with therapeutic outcome

Characteristic	HbA1c		FBG		BG		2-h PG	
	X ± SD	p	X ± SD	p	X ± SD	p	X ± SD	p
Education (n)								
a. Low education (31)	9.91±2.66	0.280	194.45± 77.9	0.000*	258.39±108.2	0.416	266.9±95.40	0.150
b. High education (55)	9.34±2.68		138.53±57.4		237.05±87.11		232.64±84.60	
Income (n)								
a. <2.2 million (30)	10.21±2.74	0.089	189.13±78.20	0.002*	257.43±115.15	0.584	267.93±89.87	0.077
b. >2.2 million (56)	9.19±2.59		142.38±60.64		237.95±82.93		232.70±87.84	
Family history (n)								
a. Yes (53)	9.87±2.53	0.117	165.28±76.89	0.520	253.47±93.87	0.297	258.21±89.60	0.047*
b. No (33)	9.02±2.85		148.09±58.33		230.73±97.05		223.76±86.83	
Marietal status (n)								
a. Married (53)	9.76±2.72	0.053	164.46±72.27	0.031*	249.50±95.42	0.153	252.26±89.89	0.019*
b. Single (33)	7.94±1.57		114.80±31.21		208.60±89.76		189.70±68.53	
Type of treatment (n)								
a. Insulin (53)	11.25±2.29	0.048*	249.88±85.73	0.001*	276.00 ±110.54	0.308	310.50±122.12	0.067
b. Oral hypoglycaemic (33)	9.37±2.66		149.33±62.16		241.54±93.70		238.27±83.79	

Note. HbA1c = Hemoglobin A1c; FBG = fasting blood glucose; BG = blood glucose; 2-h PG = 2 hours prandial glucose; *p<0.05

3.4 The relationship between therapeutic outcome,characteristic and quality of life

The result of multivariate relationships between quality of life, characteristic and therapeutic outcome are showed in Table 5.

Table 5. Results of regression linear therapeutic outcome and characteristics of quality of life

Variable dependent	Variable independent	Coeffisient of determination (r^2)	Corellation (r)	p
Indeks	Income	0.051	0.225	0.037
VAS	Income	0.087	0.253	0.001
	2-h PG	0.139	-0.265	

Note. VAS = visual analog scale; 2-h PG = 2 hours prandial glucose

Based on Table 5, income significantly influence quality of life was index of 5.1%, income and 2-h PG significantly give effect to quality of life was VAS of 8.7%. The results of linear regression

analysis showed that there was relationship between the outcome of therapy with T2DM patient quality of life. The result of negative correlation on income was index and VAS (r=0.225; r=0.253) means that the higher the income, the higher quality of life. The socio-economic status associated with DM affects a person to perform his self-care management [18] so that quality of life was also affected. VAS was influenced by the 2-h PG indicated by the negative correlation (r=-0.265) value means higher 2-h PG, quality of life scores was lower. Blood glucose level was one of the factors that affect the quality of life [19]. The results was aligned in previous studies that the better the control of blood glucose then the quality of life of T2DM patients the better [20]. Besides the control of blood glucose was very important to be done to assess the quality of life of T2DM patients because most affect the patient's functional, psychological and social health [13], with the increasing rate of lifestyle diseases such as diabetes mellitus in many developing countries, healthcare policy makers should develop policy to educated diabetes patients to have a good glycemic control.

Limitations of this study are the limited number of respondents who match the inclusion criteria and the need of time to explained the intent or content of the questionnaire.

4. Conclusion

We found that 2-h PG and income could affect quality of life. The result of negative correlation analysis showed that higher 2-h PG showed lower VAS value, while the higher the patient's T2DM income, so the higher quality of life.

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