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Association between Individual Characteristics and Health Related Quality of Life (HRQoL) in Patient With Type 2 Diabetes Mellitus.

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ABSTRACT

Type 2 diabetes mellitus is a chronic disease which can not be healed totally. Diabetic complications significantly affect the Health Related Quality of Life (HRQoL) of patients. The objective of this study was to investigate the relationship of individual characteristics including age, sex, occupation, diabetic complications and duration of diabetes with HRQoL in patient with type 2 diabetes mellitus. A prospective study were carried out in Dr. M. Djamil Hospital Padang- Indonesia, from Februari - April 2015. The inclusion criteria : patients who were diagnosed with type 2 diabetes mellitus, receiving oral hypoglycemic and/or insulin therapy, being 40 years old or older, and willingness to give informed consent. HRQoL of patients assessed by guided interview using the SF-36 questionnaire. The questionnaire had eight domains health profile i.e. physical functioning (PF), role physical (RP), body pain (BP), general health (GH), social functioning (SF), role emotional (RE), vitality (VT) and mental health (MH). Non-parametric Mann-Whitney and Kruskal-Wallis tests were used to investigate the relationship of individual characteristics with HRQoL. A total of 140 patients with type 2 diabetes mellitus participated in this research. Overall patients with type 2 diabetes mellitus have a good HRQoL scores. There are significant difference ($p < 0,05$) between gender, occupation and diabetic complications with HRQoL in type 2 diabetes mellitus patients. However, there are not significant difference ($p > 0,05$) between age and duration of diabetes with HRQoL in type 2 diabetes patients. Gender, occupation and the presence of diabetic complications affect the poor HRQoL of patients with type 2 diabetes mellitus.

Keywords: HRQoL, type 2 diabetes mellitus, SF-36, individual characteristics

INTRODUCTION

Diabetes mellitus is a chronic disorder which will limit patient's routine activities in terms of physical, social and psychological status. People with diabetes often feel challenged by their disease and its day – to day diabetes management demands. Patients must deal with their diabetes every day, making countless decisions in an often fail effort to approximate the non-diabetic metabolic state [1]. Patients with type 2 diabetes mellitus must conform with pattern and type of food, daily habits and long-term disease treatment costs. A decrease in productivity due to illness and complications also become a burden for the patient because of the limitations of physical and social function [2,3].

The World Health Organization (WHO) has established two main objectives in caring for diabetic patients: first, maintain the health and quality of life of individuals with diabetes through effective patient care and education and second, treat and prevent complications of the disease which should decrease morbidity and mortality as well as reduce the treatment cost [4].

Health-related quality of life (HRQoL) is an important criteria in the assessment of the therapeutic results in chronic diseases treatment such as type 2 diabetes mellitus [5]. HRQoL is considered a patient-assessed or patient centered outcome that relates to the individual's health perceptions, wellbeing, and functioning [6]. Individual perceptions about the impact and satisfaction on health status become important as a final evaluation of the treatment, because therapeutic intervention such as drug potentially increase or decrease HRQOL [7]. Psychological problem and lower quality of life can interfere patient's metabolism control that can aggravate the condition of diabetes [8].

HRQOL is influenced by many factors such as individual characteristics, physiological factors, psychosocial factors, functional status, general health perception and quality of life in general [9]. Several studies have demonstrated the various individual characteristics factors associated with HRQOL including age, sex/gender, education level, socioeconomic status, duration of diabetes and complications [9,10,11,12]. Patients with controlled blood sugar levels have a better quality of life than patients with poorly controlled blood sugar levels. In another study, level of education and low socioeconomic status is associated with decreased patient's quality of life. Long suffering diabetes also affects the patient's confidence to doing the treatment, which would increase the risk of complications, thus providing a decreasing effect on the quality of life that associated significantly with morbidity and mortality, it can affect the life expectancy of patients with type 2 diabetes mellitus [10,11].

Health related Quality of life (HRQOL) questionnaire (SF-36) with its 36 questions measures physical, mental, social, emotional and general health status along with the vitality and body pain [13]. This is an effective and standard tool to understand individual's mental, emotional, social, physical and general health status [14]. Health care providers should strive to achieve an increase in HRQOL as a result of therapy, including RSUP Dr. M. Djamil Hospital Padang- Indonesia as a regional hospital in Sumatera Island.

METHODOLOGY

The prospective study was carried out in DR. M. Djamil Hospital Padang-Indonesia from Februari - April 2015. Inclusion criteria for the study were patients who diagnosed with type 2 diabetes mellitus, receiving oral hypoglycemic and/or insulin therapy, being 40 years old or older, and willingness to give informed consent. The medical outcomes study Short Form (SF-36) questionnaire was used as an instrument for the assessment of HRQOL. The Indonesian version of the SF-36 used in this study was translated and validated. SF-36 Questionnaire consisting of 36 questions comprising 8 domains, as follows : Physical Functioning (PF), Role Physical (RP), Body Pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), Role Emotional (RE), and Mental Health (MH). Eight health domains are divided into two components which are the physical component (PCS) and mental component (MCS). The total of the entire domain (8 domains) are summed and averaged to obtain the value of overall quality of life. The SF-36 scores range from 0 to 100 with higher scores indicating better functioning, well-being, and state of health [13]. Researcher assisted patients while answering the questionnaire.

Statistical analyses

All variables such as age, sex/gender, occupation, diabetic complications and duration of diabetes and 36 questions of SF-36 were entered in Statistical Package for Social Sciences (SPSS) software. Independent variables (age, sex, occupation, complications and duration of diabetes) were presented as percentages. Dependent variable (quality of Life) was presented as Mean \pm SD. Normality was tested with the *Kolmogorov-Smirnov* test. Relationship assessment between the quality of life and individual characteristics (age, sex, occupation, complications) was used Nonparametric Mann-Whitney tests, while the relationship between the quality of life and duration of diabetes were used Non parametric Kruskal-Wallis tests. Relationship was considered statistically significant when *p*-values \leq 0.05 were reached.

RESULTS

A total of 140 patients had participated in this study. Demographic characteristics all of the patients are shown in table 1. Twenty eight patients (20%) had poor quality of life (HRQoL score $<$ 50,00) and 112 patients (80%) had good quality of life (HRQoL score $>$ 50,00) (Table 1). The average value of HRQoL in type 2 diabetes mellitus patients was 60.22 ± 13.21 .

This study found Role Emotional (RE) domain had a higher score which were 85.00 ± 34.70 . The score for others domains were Mental Health (MH) ($80,14 \pm 7,61$), Physical Functioning (PF) ($68,68 \pm 18,62$), Social Functioning (SF) ($61,70 \pm 20,68$), Vitality (VT) ($55,18 \pm 11,48$), Body Pain (BP) ($42,30 \pm 27,56$), General Health (GH) ($54,64 \pm 16,50$) and Role Physical (RP) ($34,11 \pm 40,70$).

Physical components (PCS) showed average of HRQoL scores was less than 50.00. Analysis each domain in Physical Component (PCS) found that Physical Functioning (PF) domain had good quality of life score ($> 50,00$), whereas Role Physical (RP), Body Pain (BP), General Health (GH) domain had poor quality of life score ($< 50,00$) (figure 1). Mental component (MCS) also showed average of HRQoL was more than 50.00 with all domains in this components had good quality of life score ($> 50,00$) (figure 2).

Females have lower HRQoL than males. Physical Functioning (PF) and Vitality (VT) domains are significantly correlated between HRQoL and sex/gender ($p < 0,05$) (table 2, table 3). There was no significant difference in the quality of life of patients with diabetes compared to age, both from a Physical Component (PCS) and Mental Component (MCS) as well as on the total value of HRQoL (table 2, table 4). Occupation was associated with quality of life (table 5). Patients who have a job have a better quality of life, which statistically important difference in the domain of Physical Functioning (PF) and Role Physical (RP) ($p < 0,05$) (table 2). There were significant association between quality of life and complication, which significant difference was seen in the whole domain of Physical Component (PCS) and the Mental Component (MCS) in energy / vitality (VT) domain (table 2, table 6). There were no significant association between quality of life and duration of diabetes in all domain HRQoL ($p > 0,05$) (table 2, table 7).

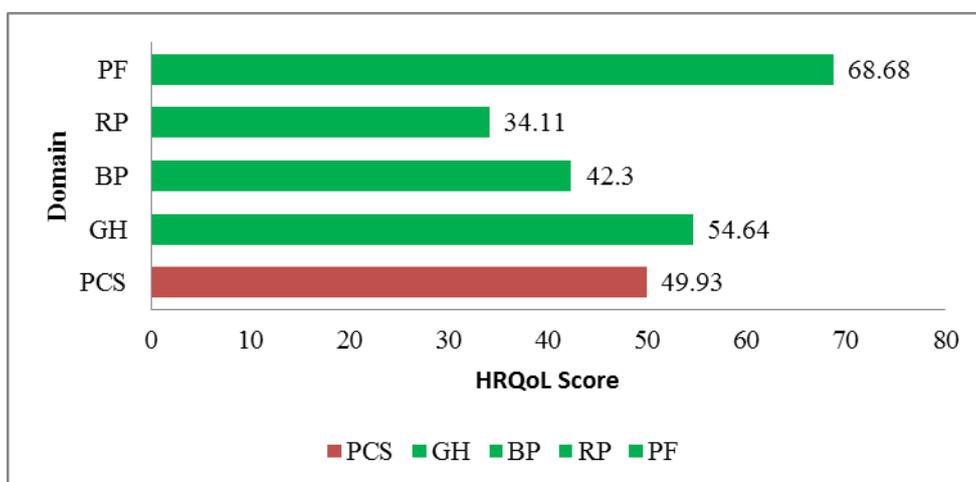


Figure 1: HRQoL score in Physical Component (PCS)

Table 1: Characteristics of the sample (N=140) of type 2 diabetic patient

Demographics	n (total)	% (percentage)
Sex/gender		
Male	59	42,1
Female	81	57,9
Age		
40-59 years	69	49,3
≥ 60 years	71	50,7
Occupation		
Working	37	26,4
No-working	103	73,6
Complication		
With complication	125	89,3
Without complication	15	10,7
Duration of diabetes		
< 5 years	44	31,4
5-10 years	62	44,3
> 10 years	34	24,3
Overall HRQoL		
Good HRQoL	112	80
Poor HRQoL	28	20

Table 2: Average scores in eight SF-36 domains of type 2 diabetic patients

	PF	RP	BP	GH	PCS	SF	RE	VT	MH	MCS	Total
Sex/gender											
Male	80,36	73,89	74,73	75,98	77,08	75,35	72,03	80,35	70,43	77,00	78,70
Female	63,32	68,03	67,42	66,51	65,71	66,97	69,38	63,33	70,55	65,77	64,52
p-value	0,014	0,357	0,290	0,169	0,102	0,219	0,560	0,012	0,985	0,105	0,041
Age											
40-59 years	78,36	75,88	72,59	68,83	75,25	66,56	70,22	73,96	67,05	69,94	72,53
≥60 years	62,86	65,27	68,47	72,13	65,89	74,33	70,77	67,14	73,85	71,04	68,53
p-value	0,023	0,091	0,546	0,628	0,172	0,248	0,901	0,311	0,283	0,872	0,560
Occupation											
Working	94,32	85,68	77,97	76,85	87,85	70,97	71,35	79,36	71,09	73,86	85,41
No-working	61,94	65,05	67,82	68,22	64,27	70,33	70,19	67,32	70,29	69,29	65,15
p-value	0,000	0,004	0,189	0,263	0,002	0,933	0,820	0,114	0,910	0,556	0,009
Complication											
Yes	67,44	69,90	65,24	67,81	65,54	69,52	70,22	67,89	71,04	68,24	66,21
Non	96,00	100,5	114,3	92,90	111,8	78,70	72,83	92,23	65,97	89,37	106,2
p-value	0,010	0,001	0,000	0,023	0,000	0,399	0,719	0,025	0,620	0,057	0,000
Duration of Diabetes											
< 5 years	73,70	72,91	74,39	80,64	75,02	74,32	66,25	73,84	65,83	71,74	71,89
5-10 years	75,19	74,34	72,81	66,74	74,42	70,33	69,27	69,89	71,06	69,65	73,77
> 10 years	57,79	60,38	61,25	64,24	57,50	65,87	78,24	67,29	75,51	70,44	62,74
p-value	0,106	0,186	0,301	0,126	0,099	0,649	0,126	0,761	0,520	0,966	0,427

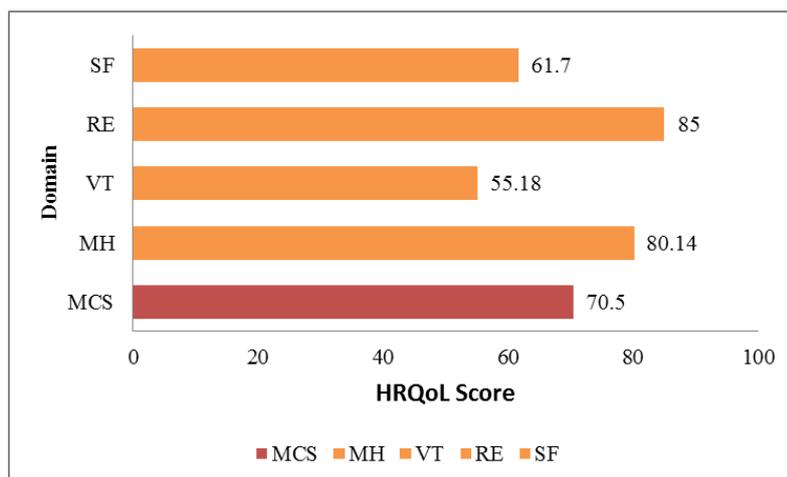


Figure 2: HRQoL score in Mental Component (MCS)

Table 3: Mann-Whitney analysis between sex/gender variable and HRQoL

Test Statistics ^a											
	PF	RP	BP	GH	PCS	SF	RE	VT	MH	MCS	Total average
Mann-Whitney U	1808,000	2189,500	2140,000	2066,000	2001,500	2103,500	2299,000	1808,500	2385,500	2006,000	1905,500
Wilcoxon W	5129,000	5510,500	5461,000	5387,000	5322,500	5424,500	5620,000	5129,500	4155,500	5327,000	5226,500
Z	-2,467	-,921	-,1058	-,1375	-,1638	-,1229	-,583	-,2,500	-,018	-,1,619	-,2,043
Asymp. Sig. (2-tailed)	,014	,357	,290	,169	,102	,219	,560	,012	,985	,105	,041

a. Grouping Variable: sex/gender

Table 4: Mann-Whitney analysis between age variable and HRQoL

Test Statistics ^a											
	PF	RP	BP	GH	PCS	SF	RE	VT	MH	MCS	Total average
Mann-Whitney U	1907,000	2078,000	2305,500	2334,000	2122,000	2177,500	2430,000	2211,000	2211,500	2411,000	2309,500
Wilcoxon W	4463,000	4634,000	4861,500	4749,000	4678,000	4592,500	4845,000	4767,000	4626,500	4826,000	4865,500
Z	-2,273	-,1689	-,603	-,485	-,1,365	-,1,155	-,124	-,1,014	-,1,074	-,161	-,584
Asymp. Sig. (2-tailed)	,023	,091	,546	,628	,172	,248	,901	,311	,283	,872	,560

a. Grouping Variable: age

DISCUSSION

This research found that quality of life diabetic type 2 patient in M. Djamil Hospital were in good condition. Mental Component (MCS) had higher average HRQoL score compare to Physical components (PCS). It was due to majority of respondents had accepted and adjusted theirself to these disease. Family supports for patients with diabetes mellitus greatly assist in improving confidence, quality of life and ability to perform self-care. This finding was supported by Awadalla *et al* and Issa & Baiyewu [15,16].

Male have a better quality of life compared to female, with statistically significant difference in the domain of Physical Functioning (PF) and Vitality (VT). This finding was supported by Papadopoulos *et al* and Spasić, *et al* [17,18]. Females are more likely to experience a decrease in physical functioning and vitality/energy than male patients after getting type 2 diabetes mellitus.

Table 5: Mann-Whitney analysis between occupation variable and HRQoL

Test Statistics ^a											
	PF	RP	BP	GH	PCS	SF	RE	VT	MH	MCS	Total average
Mann-Whitney U	1024,000	1344,000	1629,000	1670,500	1263,500	1888,000	1874,000	1577,500	1883,500	1781,000	1354,000
Wilcoxon W	6380,000	6700,000	6985,000	7026,500	6619,500	7244,000	7230,000	6933,500	7239,500	7137,000	6710,000
Z	-4,187	-2,894	-1,313	-1,119	-3,034	-,084	-,227	-1,581	-,113	-,589	-2,606
Asymp. Sig. (2-tailed)	,000	,004	,189	,263	,002	,933	,820	,114	,910	,556	,009

a. Grouping Variable: occupation

Table 6: Mann-Whitney analysis between complication variable and HRQoL

Test Statistics ^a											
	PF	RP	BP	GH	PCS	SF	RE	VT	MH	MCS	Total average
Mann-Whitney U	555,000	487,000	280,500	601,500	318,000	814,500	902,500	611,500	869,500	654,500	401,500
Wilcoxon W	8430,000	8362,000	8155,500	8476,500	8193,000	8689,500	8777,500	8486,500	989,500	8529,500	8276,500
Z	-2,590	-3,311	-4,449	-2,280	-4,174	-,844	-,360	-2,240	-,496	-1,907	-3,611
Asymp. Sig. (2-tailed)	,010	,001	,000	,023	,000	,399	,719	,025	,620	,057	,000

a. Grouping Variable: complication

Table 7: Kruskal-Wallis analysis between duration of diabetes variable and HRQoL

Test Statistics ^{a,b}											
	PF	RP	BP	GH	PCS	SF	RE	VT	MH	MCS	Total average
Chi-Square	4,487	3,363	2,398	4,151	4,620	,866	4,144	,546	1,306	,068	1,702
Df	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	,106	,186	,301	,126	,099	,649	,126	,761	,520	,966	,427

a. Kruskal Wallis Test

b. Grouping Variable: duration of diabetes

The ability to solve problems, poor living control, and declining physical function in female will affect the diminution spirit (vitality/energy) in terms of patient HRQoL assessment. Better social life and physical activity might contribute to higher satisfaction levels in men. Studies have shown that male were more confident of their ability to control diabetes and reported a higher quality of life and were less likely to get depression or anxiety compared to female [17,18].

There was no significant difference in the quality of life of patients with diabetes compared to age. This characteristic is a weak predictor to determine health-related quality of life in patients with diabetes, this finding was supported by Chaveeponjkamjorn *et al* and Lau, *et al*. Increasing age will make patient more mature in the ability to accept conditions of pain and better psychological adaptation [19,20].

Patient with job had higher HRQoL score than patient without occupation. They can do more physical activity than those who do not work. Patients who did not work have decreased physical function and limitations of activity. This finding was supported by Kusek *et al*, reported that physical activity (working) can improve insulin sensitivity and have a direct effect on reducing blood glucose levels and may indirectly improve the quality of life of patients [21].

HRQoL in patients with type 2 diabetes mellitus was significantly associated with complication in all HRQoL domains, were included physical component (PCS) and mental component (MCS). Type 2 Diabetes mellitus may increase the risk of patient inability to experience physical, psychological and social caused by complications experienced. Physical complaints that accompany type 2 diabetes mellitus, especially hypertension, neuropathy, such as tingling, pain, burning sensation in the feet, numbness in the hands and feet most often perceived by the patient. Various complaints were perceived and complications experienced by patients resulted in limitations, especially in terms of physical, psychological, social impaired function and of course these changes will have a negative impact on HRQoL of patients with type 2 diabetes mellitus. Patients with type 2 diabetes mellitus with complications have decline in their physical function, limitations in activities due to physical problems, often feel pain in the body, the decline in general health, impaired social functioning, limitations do an activity because of emotional problems, vitality decreases and disturbance of mental health [1,5,8].

Duration of diabetes was not associated with quality of life. This finding was supported by Chaveeponjkamjorn *et al* [19]. The treatment of diabetes is dependent upon the management in setting and adjusting, environmental influences and family support. It will help to improve the quality of life of patients although they had suffered this disease more than 10 years [19,22].

CONCLUSION

HRQoL in patient with type 2 diabetes mellitus was significantly associated with sex, occupation and complication of diabetes ($p < 0,05$). There were no significantly association between HRQoL with age and duration of diabetes ($p > 0,05$).

SUGGESTION

HRQoL assessment needs to be conducted periodically to determine the condition of the patient

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