PATIENT CHARACTERISTICS FACTORS ON THE QUALITY OF LIFE TYPE 2 DIABETES MELLITUS PATIENTS WITH INSULIN-BASED THERAPY

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ABSTRACT

Type 2 diabetes mellitus is a chronic disease that can not be cured completely, will affect Health Related Quality Of Life (HRQOL). The purpose of this study was to determine the QOL of type 2 DM patients based on patient’s characteristic factors (age, gender, educational status) at Endocrinology Clinic Dr. Sardjito Hospital Yogyakarta. This study is a cross sectional study with descriptive method. Data are taken concurrently by interview and from medical records of patients who visited the Endocrinology Clinic Dr. Sardjito Hospital between July 2012 until March 2013. The inclusion criteria of patients include patients who visit during the study, no constraint in the language and not having a nervous breakdown, and willing to participate the study. The quality of life was measured by Diabetes Quality of Life Clinical Trial Questionnaire (DQLCTQ). There are several statistical analysis used in this study. Mann Whitney for QOL analysis based on gender, educational status. Kruskall Wallis for QOL analysis based on patient’s age. The results of 137 patients known that gender (p value= 0.000) and education status (p value = 0.000) was significantly influence the average value of quality of life. Whereas, the patient’s age (p value = 0.530) was not significantly affect the average value of quality of life.

Key words: patients characteristics factors, quality of life, type 2 diabetes mellitus.
Introduction

Diabetes mellitus (DM) is a metabolic disorder which associated with the metabolism abnormalities of carbohydrates, fats and proteins (Triplitt et al., 2008). According a caused factors, type 1 diabetes mellitus is caused by the destruction of beta pancreatic cells and autoimmune idiopathic, while type 2 diabetes mellitus is caused by insulin resistance from lifestyle factors and diet (Perkeni, 2011).

Diabetes mellitus type 2 can cause a significant problems to the quality of life (QoL) through the increasing risk of various acute and chronic complications. Several studies have reported that Health Related Quality Of Life (HRQOL) of DM patients was lower than without DM (Andayani et al., 2010).

In this case, the quality of life should be an important concern for health professionals because it can be a reference to the successfull of intervention or therapy (Coons, 2005). Furthermore, the decrease of patient’s HRQOL will affect patient care, which mainly affect the control and management of diabetes (Singh and Bradley, 2006).

Based on the background above, it is very necessary to do research about evaluating the HRQOL related factor of insulin-based therapy on type 2 DM patients at Endocrinology clinic Dr. Sardjito Hospital Yogyakarta. This study was conducted in Dr. Sardjito Hospital Yogyakarta, because the prevalence of diabetes mellitus in outpatient is estimated as first rank at those hospital. In addition, Dr. Sardjito Hospital is a referral hospital in Yogyakarta and surrounding areas. The endocrinology clinic as a special clinic for outpatient diabetic. Thus, evaluating the factors that affect quality of life, can improve the HRQOL of type 2 DM patients. The purpose of this study was to determine the QoL on type 2 DM patients with insulin-based therapy based on patient’s characteristic factors at Endocrinology Clinic Dr. Sardjito Hospital Yogyakarta.

Materials and Methods

Research Method

The type 2 DM patients were obtained from endocrinology clinic of Dr. Sardjito Yogyakarta who meet the inclusion and exclusion criteria. The number of patients in this study was 137 people.

Research Instrument
The research instrument used was the Diabetes Quality of Life Clinical Trial Questionnaire (DQLCTQ). Diabetes Quality of Life Clinical Trial Questionnaire (DQLCTQ) adapted from the journal publication of research conducted by Shen et al. (1999) which has been validated by Hartati (2003) in Dr. Sardjito Hospital Yogyakarta.

The course of Study

The study begins by completing the permission from the endocrinology clinic and medical record department of Dr. Sardjito Hospital Yogyakarta. Before that, the researchers must attach a ethical clearance which obtained from the Institutional Review Board (IRB) of the Faculty of Medicine, University of Gadjah Mada. The next step doing recruitment of type 2 DM patients who meet the inclusion and exclusion criteria. If the patient is willing to participate, the investigator may ask the patient to sign an informed consent.

The next phase is the researcher asked about personal information details, duration of illness, and others previously mentioned points that have been prepared. Recently, the researchers gave questionnaires to type 2 DM patients who obtain insulin-based therapy, alone or in combination with agent hypoglicemic oral at the endocrinology clinic of Dr. Sardjito Hospital Yogyakarta.

The next stage is to tracked the patient data at the medical records about patient characteristics. The final stage analyzed the resulted data.

Analysis of Research Findings

1. The questionnaire scoring of data is divided into two, namely the encoding stages and the calculating score. The coding and calculation of scores for each domain are as follows.

Score calculation formula:

\[
\frac{\text{Number of scores}}{\text{Number of items}} = \text{average}
\]

\[
\frac{100 \times (\text{average} - 1)}{\text{Highest scores}} = \text{domain value}
\]

2. The descriptive analysis of variance distribution using the Kolmogorov Smirnov to determine whether the data are normally distributed or not.

3. The comparative statistics are used to determine whether the independent variables have a statistically significant effect on the dependent variable. The analysis depends on the variance distribution of the test results. In this study, all of
the data were not normally distributed, so the Mann-Whitney analysis is used for 2 categories variable (gender, educational status) and Kruskal-Wallis is used for more than 2 categories variable (age).

Results and Discussion
This study was conducted on type 2 DM patients with insulin based therapy at the endocrinology clinic Dr Sardjito Hospital Yogyakarta since July 2012 - April 2013. The total number of respondents in this study were 137 people. Sampling was conducted by using non-probability sampling technique with purposive sampling approached that is based on sampling considerations and in accordance with the inclusion and exclusion criteria.

1. Descriptive Analysis
In this study, the percentage of all respondents experiencing biggest impairment was the age of 60-69 years and ≥ 70 years. This could be due to a degrading the patient’s ability and decreasing the patient’s survival caused by type 2 diabetes mellitus.

The biggest percentage of type 2 DM patients is male (55.5%) than female respondents (44.5%). The research of Morewitz and Goldstein (2007) showed that the prevalence of diabetes is more happen in men than women commonly.

The percentage of respondents with educational stage at least high school and those with less than a high-school education (62.8%), and only 37.2% of respondents were educated above high school. This grouping was based on research Maty et al. (2009) which described that the incidence of diabetes in the respondents group with education stage less than or equal to 12 years was higher than the respondents group with education longer than 12 years.

2. Patient Characteristics Factors on the Quality of Life
a. Age
Age is one of the factors that affects the quality of life (Rubin and Peyrot, 1999). Age will affect the risk, incidence and impair a glucose tolerance of type 2 diabetes mellitus. The aging process that takes place after the age of 30 years will lead the anatomical, physiological, and biochemical changes. Age on quality of life of all domains can be seen in Table 1.
Table 1. Age on the patient’s quality of life

<table>
<thead>
<tr>
<th>Domain</th>
<th>&lt; 50</th>
<th>50-59</th>
<th>60-69</th>
<th>≥ 70</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>93.27 ± 21.44 (a,b)</td>
<td>74.24 ± 19.76 (c)</td>
<td>67.23 ± 24.57 (d)</td>
<td>54.08 ± 24.27 (e)</td>
<td>0.023 (a)</td>
</tr>
<tr>
<td>Energy</td>
<td>72.55 ± 20.02</td>
<td>64.63 ± 20.65</td>
<td>80.29 ± 20.32</td>
<td>57.67 ± 12.85</td>
<td>0.075</td>
</tr>
<tr>
<td>Health distress</td>
<td>58.45 ± 19.45</td>
<td>62.33 ± 13.85</td>
<td>71.16 ± 12.53</td>
<td>80.83 ± 13.61</td>
<td>0.158</td>
</tr>
<tr>
<td>Mental health</td>
<td>52.41 ± 12.96</td>
<td>63.03 ± 14.33</td>
<td>78.02 ± 16.13</td>
<td>71.20 ± 15.23</td>
<td>0.134</td>
</tr>
<tr>
<td>Personal satisfaction</td>
<td>67.00 ± 9.31</td>
<td>66.60 ± 8.21</td>
<td>81.07 ± 10.95</td>
<td>55.23 ± 11.25</td>
<td>0.044 (a)</td>
</tr>
<tr>
<td>Treatment satisfaction</td>
<td>70.55 ± 12.37</td>
<td>70.01 ± 20.05</td>
<td>67.26 ± 17.90</td>
<td>69.42 ± 12.39</td>
<td>0.986</td>
</tr>
<tr>
<td>Treatment effect</td>
<td>92.91 ± 10.11 (b)</td>
<td>71.15 ± 12.44 (c)</td>
<td>69.83 ± 13.27</td>
<td>53.72 ± 14.43 (b,c)</td>
<td>0.032 (a)</td>
</tr>
<tr>
<td>Symptoms frequency</td>
<td>64.95 ± 18.75</td>
<td>72.12 ± 15.11</td>
<td>68.92 ± 18.68</td>
<td>65.40 ± 17.89</td>
<td>0.880</td>
</tr>
<tr>
<td>QOL</td>
<td>67.09 ± 7.95</td>
<td>67.62 ± 9.01</td>
<td>75.46 ± 10.41</td>
<td>62.10 ± 10.18</td>
<td>0.530</td>
</tr>
</tbody>
</table>

Note: \(a\) = Kruskal-Wallis, \(b,c,d\) = Mann-Whitney

Table 1 shows that the average value of QoL at respondents with age ≥ 70 years is less than other age ranges. While the highest average value of the QoL is at respondents with age range 60-69 years. Redekop and Koopmanschap (2002) concluded that patients with more than 70 years of age have the lowest QoL score than the others, while the highest QoL score possessed by patients with age less than 50 years. The age differences are significantly influence the physical, personal satisfaction and treatment effects domain.

The highest value of QoL domains of physical function, treatment satisfaction and the treatment effect possessed by age category < 50 years, while its lowest value owned by ≥ 70 year.

Peterson et al. (2004) found that the age differences greatly affect the physical function of patients with type 2 diabetes. Likewise, Chia (2007) also stated that the elderly DM patients have lower physical function scores.

Patients with the age group < 50 years also have a lower score of health pressure and mental health than any other age. It means that younger respondents have a higher anxiety levels related to their initial diseases. In contrast to research conducted by Redekop and Koopmanschap (2002) stated that a younger age have a more positive attitude in view of their life than elderly patients. Similarly with Wexler et al. (2006) concluded that a increasing age was also associated with a decreasing in the QoL.
patients with type 2 diabetes. According to Funnel (2008) and Boye et al. (2007) which suggests that age is a significant predictor of the QoL patients with type 2 diabetes mellitus.

Based on the analysis in Table 1, it can be done further a multivariate non parametric methods for Mann-Whitney statistics (p value ≤ 0.05) for the physical function, personal satisfaction, and treatment effect domain on the age groups respectively. It is known that the age differences in patients < 50 years and 60-69 years are significantly affect the physical domain (p value = 0.045). The age differences in patients < 50 years, 50-59 years and ≥ 70 years were significantly different the physical function (p value = 0.012) and treatment effect domain (p value = 0.008). Besides that, the age differences in patients 60-69 year and ≥ 70 years were statistically influence the domain of personal satisfaction (p value = 0.009).

b. Gender

The average value of the QoL in male respondents is higher than the average value of the QoL women respondents with a significant difference statistically. The results of the Mann-Whitney statistical test between gender characteristics of patients with all of the QoL domains can be seen in Table 2.

**Table 2. Gender on the patient’s quality of life**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Male</th>
<th>Female</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>75.20 ± 21.91</td>
<td>61.28 ± 23.88</td>
<td>0.039*</td>
</tr>
<tr>
<td>Energy</td>
<td>77.30 ± 19.03</td>
<td>58.66 ± 18.50</td>
<td>0.006*</td>
</tr>
<tr>
<td>Health distress</td>
<td>76.57 ± 12.64</td>
<td>59.57 ± 15.08</td>
<td>0.011*</td>
</tr>
<tr>
<td>Mental health</td>
<td>77.08 ± 15.10</td>
<td>58.93 ± 14.52</td>
<td>0.007*</td>
</tr>
<tr>
<td>Personal satisfaction</td>
<td>78.67 ± 9.86</td>
<td>56.95 ± 10.49</td>
<td>0.001*</td>
</tr>
<tr>
<td>Treatment satisfaction</td>
<td>75.17 ± 14.83</td>
<td>61.31 ± 19.25</td>
<td>0.041*</td>
</tr>
<tr>
<td>Treatment effect</td>
<td>71.28 ± 14.48</td>
<td>66.16 ± 11.76</td>
<td>0.453</td>
</tr>
<tr>
<td>Symptoms frequency</td>
<td>75.75 ± 15.61</td>
<td>60.59 ± 18.23</td>
<td>0.026*</td>
</tr>
<tr>
<td>QoL</td>
<td>81.00 ± 8.90</td>
<td>54.05 ± 9.59</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

Note: * = Mann-Whitney

Table 2 explains that the average value of QoL in male respondents (81.00 ± 8.90) is higher than female respondents (54.05 ± 9.59).
average value of the QoL in male respondents (81.00 ± 8.90) is higher than female respondents (54.05 ± 9.59). The gender differences are significantly influence the domain of physical function, energy, health distress, mental health, personal satisfaction, treatment satisfaction, symptoms frequency, and quality of life values.

The analysis also found that women have lower score of health pressure and mental health than male respondents. According to Unden (2008) stated that the QoL value for women at age 50-60 years have lower score of QoL and mental health than men at the same age. Redekop and Koopmanschap (2002) concluded that female patients have higher levels of anxiety than male patients. Similarly with the research conducted by Shobana et al. (2003) showed that there are significantly differences in the psychological health of men and women. The depression and anxiety levels in women is also higher than men. Grant et al. (2009) also suggested that there are differences in men and women challenges associated with the type 2 diabetes mellitus experiences. Men are more able to adapt the challenges of his illness problems. The difference of these challenges can also be one of the factors on QoL differences.

c. Educational Level

One of the factors that affect the QoL patients with type 2 diabetes mellitus is education status. According to Chyun et al. (2006), one of the demographic factors that associated with the poor of QoL patients with type 2 diabetes is education. Research performed by Hartati (2003) in Dr. Sardjito Hospital suggests that differences in education levels are statistically significant affect on the physical function, energy, mental health, symptoms frequency domain and the QoL values of patients. Likewise, this study discovered that differences in educational level also statistically significant affect the energy domain, mental health, personal satisfaction, treatment satisfaction, treatment effect, the frequency of symptoms and QoL values.

Research Papadopolous et al. (2007) suggested that patients with
less than six long years of education have lower QoL values. Research Issa & Baiyewu (2006) also concluded that the lower of education levels, the lower of QoL values in patients. In line with the research Gautam et al. (2009), who said that the lower QoL associated with lower levels of education possessed by patients with type 2 diabetes mellitus. The educational status on the DM type 2 patient's QoL and all its domain can be seen in Table 3.

Table 3. Educational level on the patient's quality of life

<table>
<thead>
<tr>
<th>Domain</th>
<th>≤ High School</th>
<th>&gt; High School</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>65.80 ± 24.76</td>
<td>74.39 ± 19.43</td>
<td>0.216</td>
</tr>
<tr>
<td>Energy</td>
<td>59.88 ± 19.15</td>
<td>84.37 ± 17.50</td>
<td>0.000*</td>
</tr>
<tr>
<td>Health distress</td>
<td>66.46 ± 14.14</td>
<td>73.28 ± 13.80</td>
<td>0.323</td>
</tr>
<tr>
<td>Mental health</td>
<td>60.81 ± 13.98</td>
<td>82.81 ± 15.96</td>
<td>0.002*</td>
</tr>
<tr>
<td>Personal satisfaction</td>
<td>61.28 ± 10.64</td>
<td>82.01 ± 9.07</td>
<td>0.003*</td>
</tr>
<tr>
<td>Treatment satisfaction</td>
<td>63.45 ± 17.91</td>
<td>78.35 ± 15.35</td>
<td>0.033*</td>
</tr>
<tr>
<td>Treatment effect</td>
<td>61.88 ± 13.59</td>
<td>81.00 ± 11.80</td>
<td>0.006*</td>
</tr>
<tr>
<td>Symptoms frequency</td>
<td>60.81 ± 16.58</td>
<td>82.81 ± 16.43</td>
<td>0.002*</td>
</tr>
<tr>
<td>QoL</td>
<td>57.81 ± 9.63</td>
<td>87.86 ± 8.11</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

Note: *= Mann-Whitney

Table 3 shows that respondents with educational status is below or equal to the high school has a lower average value of quality of life than above high school. The educational level differences are statistically influence the energy, mental health, personal satisfaction, treatment satisfaction, treatment effect, the frequency of symptoms domain and QoL values.

Factors that influence the educational status very closely with the physical function and energy domain. Group of respondents who have highest score on energy domain is a group of patients with high educational status above. It is related to patient's ability to express their symptoms. Patients with higher educational status will have a better ability to express the disease symptoms and signs, so that a given therapy may be more appropriate. This is supported by Quand (2007) that good mental health will relate to the move ability and higher education levels. Similarly with Notoatmojo (2005) stated that the level of education is
an indicator that someone has taken formal education in a particular field, but it is not an indicator that a person has mastered several fields of science. Someone with better education, more mature in dealing with the changing process, so that more receptive to outside influences positive, objective and open to a variety of information including health information.

References


Chia, L.R., 2007. The characteristics that associate with health related quality of life in patients with type-2 diabetes. *Dissertation*, Graduate Faculty of School of Nursing University of Pittsburgh, Pittsburgh.


