Quality of life and glycemic profile of type 2 diabetes mellitus patients of Indonesian: a descriptive study

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Abstract. The prevalence of diabetes type 2 is increasing globally. Quality of life (QOL) in diabetic patients is the primary goal of care. Today, there is an increasing awareness suggesting that patient’s QOL and treatment satisfaction were improved after good glycemic control. This study aimed to demonstrate the quality of life and the glycemic profiles of type 2 Diabetes Mellitus patients. This study was a descriptive study of cross-sectional design. A sample of 115 out-patients attending eight public health centers in Binjai City, Indonesia. Patient’s quality of life was assessed in four domains of role limitation due to physical health, psychological, social and environment in a four Likert point. Two glycemic profiles which are blood sugar level and glycated hemoglobin (HbA1c) were measured by Spectrophotometer Colorimeter + Full Automatic method and affinity Doronad + Modified HPLC technique, respectively. In the results, we confirmed that almost 80.0% of diabetes mellitus type 2 patients are in good QOL (score 81-100) in three QOL dimensions: Physical health, Social relationship and Environment health but not in Psychological health dimension. The blood sugar level and HbA1c level are beyond the normal value, 267.5±103.2mg/dLand9.9±2.3%, respectively. The better controlled glycemic index, the better patient’s QOL.

1. Introduction
The incidence of type 2 diabetes is increasing globally. According to the International Diabetes Federation, type 2 accounts for 90% of all diabetes cases. Globally the number of diabetic patients is expected to increase from 285 million to 439 million by the year 2030.[1] It has projected that type 2 Diabetes Mellitus (DM) represents the fourth leading cause of death.World Health Organization (WHO) predicts that in Indonesia the number of DM patients will increase to be 21.257.000 patients by the year 2030. Indonesia will be the second highest prevalent country in Southeast Asia.[2]

Today, attention towards patient’s QOL is increasing rather than patient’s longevity. Thus, quality of life of diabetic patients should be maintained because it can aggravate metabolic disorders.[3] There is an increasing awareness suggesting that patient’s QOL and treatment satisfaction were
improved following good glycemic control. The blood sugar level of type 2 DM patient needs to be controlled to achieve a better quality of life. According to De Grauw et al. and Walling, the strict control of blood sugar level in diabetic patients can result in a reduction of one-fourth of microvascular complications.

Glycated hemoglobin (HbA1c) is another glycemic parameter that routinely used as diagnostic tool for assessing long-term glycemic control, hence the primary function is as an indicator of the mean blood sugar level and can predict the risk for development of diabetes complications. Several studies have proved that diabetes mellitus type 2 patients with regular treatment and glycemic control have the better quality of life.

This study aimed to demonstrate the quality of life and the glycemic profiles of type 2 diabetes mellitus patients.

2. Method
The study took place in Binjai City. It is the second biggest city in North Sumatera Province. The study was a cross-sectional design. The primary data were from outpatients of diabetes clinic in eight Primary Health Centers (PHC) located in Binjai City. The PHCs are the referral for diabetic clinics that provide free medical care program including medicine. This background was the reason we chose them as the study site. The study population was all outpatients who attended the clinic days. A sample calculation was conducted using consecutive-sampling to meet the number of 115 diabetic type 2 patients.

2.1. Data Collection
The quality of life was assessed based on WHOQOL-BREF questionnaires consists of 26 items. Two items are related to the overall QOL and general health, and the remaining 24 items are related to four domains of physical health (seven items), psychological health (six items), social relationship (three items) and environmental health (eight items). Each items scored on a four-point Likert scale ranging from one (strongly agree) to five (strongly disagree) with the highest scores representing better QOL. For interpretation of the final scores, we used the following criteria: score 0-40 means poor QOL, score 41-60 means sufficient QOL, score 61-80 = good QOL and score 81-100 = very good QOL. The HbA1c level was assessed by affinity Doronad + Modified HPLC technique (Premier Hb9210), and Blood Sugar Level (BSL) was evaluated by Spectrophotometer Colorimeter + Full Automatic method (Pentra 400). Three laboratory personnel performed the tests. Before drawing the blood sample, the patients were briefed in regard the importance of study and registered by the nursing officer. Written informed consent was obtained from all subjects to ensure voluntary participation in the study. Ethical approval was from the local institutional ethics committee of Universitas Sumatera Utara. Data analysis was carried out using the Statistical Package for Social Sciences (SPSS) program, and the results were as descriptive information (i.e., frequency, percentage, mean and standard deviation).

3. Results and Discussions

3.1. Sociodemography and Disease-specific characteristics of Diabetes Mellitus Type 2 patients

| Table 1. Sociodemography characteristics of the subjects (n=115). |
|---------------------------------------------------------------|
| Variable           | n   | %     |
| Age group (years)  |      |       |
| 21-40              | 10   | 8.7   |
| 41-60              | 61   | 53.1  |
| >60                | 44   | 38.2  |
| Gender             |      |       |
| Male               | 30   | 26.1  |
| Female             | 85   | 73.9  |
Level of education
Illiterate 7 6.1
Primary 22 19.1
Secondary 28 24.3
High school 37 32.2
Graduate school 26 22.6

Occupation
Haphazard workers 58 50.4
Laborers 4 3.5
Farmers 5 4.3
Private employee 9 7.8
Civil servant 20 17.4
Others 19 16.5

Marital Status
Married 89 77.4
Single/Divorced 6 2.6

Monthly Income
Below Regional Income Rate 41 35.7
Within Regional Income Rate 54 46.9
Above Regional Income Rate 20 17.4

| Variables | n | Percentage (%) |
|-----------|---|----------------|
| Duration of diabetes (years) |   |                |
| <5        | 18 | 15.7           |
| 5-10      | 89 | 77.4           |
| >10       | 8  | 6.9            |
| Diabetic foot |   |                |
| No        | 110| 93.0           |
| Yes       | 5  | 7.0            |
| Diabetes treatment |   |                |
| Oral therapy | 110| 93.0       |
| Insulin therapy | 5  | 7.0         |
| Retinopathy |   |                |
| No        | 88 | 76.5           |
| Yes       | 27 | 23.5           |

Table 2. Disease-specific characteristics of the subjects (n=115).

Table 1 and 2 show the social demographics and disease-specific characteristics of study population. As presented in Table 1, a total of 115 subjects with diabetes type 2 participated in the study. The majority were aged over 46 years old (89.6%), female (73.9%) and married (77.4%). Among 115 subjects, about half worked as a haphazard worker (50.4%) and had high and graduate school as education background (54.8%). And in Table 2, a majority (77.4%) of subjects had been suffering from diabetes for 5-10 years, not having a diabetic foot (93.0%) neither retinopathy (76.5%), and only five subjects (7.0%) had insulin therapy.

3.2. The QOL Grade of Diabetes Mellitus Type 2 patients

Table 3. The QOL grade of diabetes mellitus type two patients (n=115).

| Domains of QOL           | Very Good |            | Good |            | Sufficient |            | Poor |            |
|--------------------------|-----------|------------|------|------------|------------|------------|------|------------|
|                          | n         | %          | n    | %          | n          | %          | n    | %          |
| Physical health          | 2         | 1.7        | 80   | 69.6       | 24         | 20.9       | 9    | 7.8        |
| Psychological health     | 1         | 0.9        | 8    | 7.0        | 16         | 13.9       | 90   | 78.2       |
| Social relationship      | 2         | 1.7        | 78   | 67.8       | 25         | 21.7       | 10   | 8.7        |
According to Table 3, most of diabetic type 2 subjects (69.6-67.8%) have a good quality of life in three domains of QOL but not in the psychological health domain which is around 78.0% of subjects had a reduced quality of life (score 0-40) in this domain.

3.3. Glycemic control of Diabetes Mellitus Type 2 patients

| Blood Sugar Level (mg/dL) | Mean  | SD    | Range   |
|---------------------------|-------|-------|---------|
| HbA1c (%)                 | 9.9   | 2.3   | 4.9 – 15.5 |

Table 4 showed that the value of blood sugar level and HbA1c of the subjects are not in normal value.

3.4. Discussion

This study aimed to demonstrate the Quality of Life and the glycemic profile among patients with Diabetes Mellitus type 2 patients. Our study found that women are more susceptible to Diabetes Mellitus type 2 than men. It is because of their high susceptibility to different diseases and has multiple roles in daily activity such as-as spouse, housewife and probable employee in the society.[11] Regarding age, more than half of the subjects (53.1%) are 40-60 years old, and 38.2% are over 61 years old. These findings are slightly different with Saudi Arabian diabetes mellitus patients in which only 21.5% diabetes patients are 40-61 years old.

Most of the patients (>75%) in this study have suffered from diabetes mellitus type 2 and have been in medical care and glycemic control for more than five years. However, they still had high level of blood glucose level (267.5 mg/dL) and HbA1c (9.9%). The study in Oman found that diabetes type 2 patients with less than five years had the HbA1c level beyond normal value (around 8.0%). Normally, the longer the patients get diabetic medical care, the glycemic profile will be closer to normal range. Among four QOL domains, the only poor QOL is in psychological health. Al-Shehri found that duration of diabetes, as well as the type of treatment, were not significant factors as regard patient’s QOL.[7] Several studies found that there is a correlation between a high level of blood glucose level with poor psychological health. Our study found the mean level of blood glucose level is 267.5 mg/dL (range 95.0 – 600.0 mg/dL). It could be caused by the strict control of blood glucose level and the uncontrolled blood glucose levels. Both of these conditions have side effects.

According to De Grauw et al. [5] and Walling [6], the strict control of blood glucose levels in diabetic patients can result in a reduction of one-fourth of microvascular complications. The more uncontrolled of blood glucose levels, the more complicated treatment regimen. As a result, there is an elevated risk of hypoglycemia incidence that will affect the physical function and cause a fatal loss of consciousness and brain damage.[12]

Several studies revealed that high blood glucose level and psychological health domain were correlated significantly.[13-15] Type of treatment and degree of control were also related with QOL. Most of this study subjects (93.0%) used oral treatment. In fact, oral hypoglycemic treatment was related with relatively better QOL compared with those who were on insulin treatment or those with combined oral hypoglycemic and insulin.

4. Conclusions

It can be concluded that Indonesian adult diabetic patients are still not favorable. Female gender, types, and duration of treatments associated with glycemic profiles. It is recommended that the diabetic medical care at PHC level needs to be improved based on WHO standard to prevent low physical function and fatal disease.
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