

## Illness Perceptions and Quality of Life in Patients with Diabetes Mellitus Type 2

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### Abstract

One of the treatment objectives in patients with type 2 diabetes mellitus (T2DM) is improving their quality of life (QoL). Illness perceptions are major determinant of QoL. This study was aimed to evaluate the QoL of T2DM patients with complications, and to examine the correlation between patients' illness perceptions and QoL. We conducted a cross-sectional study in a private hospital in Yogyakarta, Indonesia from July to September 2015. We recruited adult patients with a diagnosis of T2DM with complications (ICD E.11) that has been diagnosed for at least 3 months. Illness perceptions were assessed with the Brief Illness Perception Questionnaire (BIPQ), and diabetes type 2 specific QoL with the Diabetes Quality of Life for Clinical Trial Questionnaire (DQLCTQ). Data was analyzed using Pearson correlation test. We recruited 51 T2DM patients. Female patients were dominant and most of the subjects experienced T2DM more than 5 years. The BIPQ scores indicated that patients had positive perceptions about T2DM and the treatment in all domains, except for coherence. Scores on the DQLCTQ showed that T2DM patients' QoL is good, except for the self satisfaction and treatment effect. Statistically significant positive correlations were observed between BIPQ dimensions of personal control, treatment control and coherence and QoL domains ( $p < 0.01$ ). Moreover, the strong negative correlation were observed between consequences, concern and emotional response and QoL domains ( $p < 0.01$ ). However, 92% correlations are weak. Illness perceptions are correlated with T2DM patients' QoL. Interventions aimed to get more adaptive illness perceptions may impact positively on QoL.

**Keywords:** BIPQ, DQLCTQ, illness perceptions, Indonesia, QoL, T2DM

## Persepsi terhadap Penyakit dan Kualitas Hidup Pasien Diabetes Melitus Tipe 2

### Abstrak

Salah satu tujuan terapi DM tipe 2 adalah memperbaiki kualitas hidup pasien. Persepsi terhadap penyakit merupakan penentu utama dari kualitas hidup. Tujuan penelitian ini adalah untuk mengevaluasi kualitas hidup pasien pada pasien DM tipe 2 dengan komplikasi serta mengetahui hubungan antara persepsi pasien dan kualitas hidup. Rancangan penelitian ini adalah potong lintang yang dilakukan di rumah sakit swasta di Yogyakarta. Subyek yang berpartisipasi dalam penelitian ini adalah pasien DM tipe 2 dewasa dengan komplikasi yang terdiagnosa minimal 3 bulan sebelum penelitian ini dimulai (ICD E11). Kualitas hidup diukur dengan *Diabetes Quality of Life for Clinical Trial Questionnaire* (DQLCTQ) dan persepsi pasien diukur dengan *Brief Illness Perception Questionnaire* (BIPQ). Sejumlah 51 pasien DM tipe 2 dengan komplikasi turut berpartisipasi dalam penelitian ini dari bulan Juli sampai September 2015. Mayoritas subjek adalah wanita dan sebagian besar pasien mengalami DM tipe 2 lebih dari 5 tahun. Skor domain BIPQ memperlihatkan bahwa pasien DM tipe 2 mempunyai persepsi yang positif terhadap penyakit dan pengobatannya pada semua domain kecuali koherensi. Skor domain DQLCTQ memperlihatkan bahwa pasien mempunyai kualitas hidup yang baik, kecuali domain kepuasan pribadi dan efek terapi (berturut-turut 55,6 dan 44,3). Korelasi kuat yang positif terlihat pada domain persepsi kontrol diri, kontrol terapi dan koherensi dengan semua domain kualitas hidup ( $p < 0,01$ ). Korelasi kuat yang negatif terlihat pada domain konsekuensi, kekhawatiran dan respon emosi dengan kualitas hidup ( $p < 0,01$ ). Sejumlah 92% korelasi BIPQ dan DQLCTQ adalah lemah. Persepsi pasien dan komplikasi dapat memengaruhi kualitas hidup pasien DM tipe 2. Intervensi yang bersifat memperbaiki persepsi pasien akan berdampak positif terhadap kualitas hidup.

**Kata kunci:** BIPQ, DM tipe 2, DQLCTQ, Indonesia, kualitas hidup, persepsi

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## Introduction

The prevalence of diabetes mellitus (DM) in Indonesia is 6.2% in 2015, and it is predicted to affect 21.3 million people in 2030 when the population in Indonesia will be 345 million people.<sup>1,2</sup> DM is one of the chronic diseases which has a major impact on the quality of life (QoL) of persons afflicted.<sup>3</sup> QoL is conceptualized as individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.<sup>4</sup> Several determinants may affect QoL, such as age, sex, type of medication, complications, illness perceptions, coping and social support.<sup>3,5</sup> A previous study in Indonesia in one private hospital found that the different types of treatment may affect patients' adherence and QoL. In another study, patient adherence to the medication prescribed was associated with QoL.<sup>6,7</sup>

Diabetes may lead to complications, like micro and macrovascular complications. Macrovascular complications are due to the damage of large blood vessels, such as myocardial infarction, stroke and peripheral arterial disease. Microvascular complications are due to the damage of small blood vessels, such as retinopathy, neuropathy and nephropathy.<sup>8,9</sup> A previous study showed that peripheral sensory neuropathy, coronary artery disease and peripheral vascular disease are associated with lower score of some QoL domains.<sup>10</sup> A study conducted in South Korea, showed that patients with hypertension and diabetes had lower scores on EQ-5D, a measure of functional status, than patients with hypertension only and diabetes only. The differences in EQ-5D scores among the complicated and non-complicated patients were significant ( $p < 0.05$ ).<sup>11</sup>

The Common Sense Model (CSM) is a multi level framework which depicts the

process of self-regulation of health and disease. The CSM views the patients in the socio-cultural context who according to their beliefs of disease and treatment may adjust their life to get better treatment outcome.<sup>12,13</sup> Some of the patients' characteristics may influence their illness perceptions, such as age and education. Moreover, patients' illness perceptions could associate with glycemic control. Psychological interventions aimed at changing patients' illness perceptions may lead to a better therapeutic outcome.<sup>13</sup>

A study made the similar conclusion that DM had negative influence or may deteriorate patients' QoL. Association between patients' perception and QoL in people with diabetes mellitus in Indonesia has not been explored yet. Our previous study found that the type of treatment may influence patients' adherence and QoL.<sup>7</sup> Thus, we need to understand the association between perceptions and Indonesian diabetes mellitus type 2 (T2DM) patients' QoL. The different level of perceptions which could be caused by the different quality of health provider, especially in educating the chronic diseases' patients during the treatment, may influence patients' QoL. This study was conducted in the hospital because we need to recruit T2DM patients who were treated according to the particular guidelines and particular service of health provider. This study was aimed to evaluate illness perceptions (IPs) in patients with T2DM and to understand the associations between IPs and QoL.

## Methods

We conducted a cross-sectional study in a private hospital in Yogyakarta, Indonesia. The consideration of using private hospital in our study due to the results of our previous study that patients in private hospital need more aspect to be considered to increase pharmaceutical care.<sup>7</sup> We recruited adult

outpatients with diagnosis of T2DM with complications who visited internist polyclinic from July 2015 until September 2015. We chose this period due to the study permission from the hospital. Complications were defined as macrovascular and microvascular according to the ICD E.<sup>11</sup> The diagnosis of T2DM patients was found in the medical record. Subjects were recruited if they have been diagnosed more than three months ago. We decided not to recruit newly diagnosed patients to avoid the coping process of the patients as new T2DM patients with the perspectives of treatment and lifestyle which could influence the QoL.<sup>14</sup> We excluded pregnant women and lactating women in order to minimize other metabolism factors which can affect the patients' quality of life. Moreover, pregnant women may experience distressful period which could decrease the QoL.<sup>15</sup>

The patients' IPs and QoL were measured by Brief Illness Perception Questionnaire (BIPQ) and Diabetes Quality of Life for Clinical Trial Questionnaire (DQLCTQ), respectively. Patients filled in the questionnaires after the informed consent

procedure. The BIPQ is available in *Bahasa Indonesia*. This questionnaire also widely used in the psychological area to understand patients' behaviour in particular chronic disease, such as heart attack, cancer, diabetes and rheumatoid arthritis [www.uib.no/ipq]. The BIPQ assesses eight dimensions, *i.e.*, consequences, timeline, personal control, treatment control, identity, concern, coherence and emotional response. The higher score of BIPQ domains, the more negative perception of patients (question number 1, 2, 5, 6, 8). On the other dimensions (*i.e.*, personal control, treatment control and coherence) the higher the score, the more positive the perceptions of the patients are (number 3, 4, and 7).<sup>16</sup> The DQLCTQ is a disease specific instrument of DM quality of life and includes 8 domains: physical function (6 questions), energy (2 questions), health distress (6 questions), mental health (2 questions), satisfaction (15 questions), treatment satisfaction (3 questions), treatment effect (9 questions), and frequency of symptoms (7 questions). This questionnaire is widely used in Indonesia, even in the clinical trial study to observe QoL as the outcome or in the observational study.<sup>17</sup> Demographic data of the patients were collected from the questionnaire.

Correlation between IPs and QoL were calculated using Pearson correlation test due to the normality distribution of data, however, Spearman correlation test was performed for non-parametric data. Our study results were compared to other previous study results to enrich the discussion. This study has been approved by Ethics Committee of Universitas Ahmad Dahlan, No. 011504039.

## Results

We recruited 51 T2DM patients with complications. Table 1 presents patient characteristics; most of the patients were female. The mean age of patients was 49

**Table 1 Sociodemographic of Subjects**

Characteristic	n (%)
<b>Gender</b>	
Male	23 (45.1)
Female	28 (54.9)
<b>Education</b>	
Up to senior high school	36 (70.6)
More than senior high school	15 (29.4)
<b>Occupation</b>	
Jobless	22 (28.4)
Occupied	29 (21.6)
<b>Age (age <math>\pm</math> mean)</b>	49 $\pm$ 20.7
<b>Duration of T2DM (years)</b>	6.5 $\pm$ 5.9
<b>Complications</b>	
Hyperlipidemia	3 (5.9)
Hypertension	40 (78.4)
Heart attack	4 (7.8)
Neuropathy	8 (15.7)
Nephropathy	1 (2)
Stroke	2 (3.9)

**Table 2 B-IPQ Scores of T2DM Patients**

Dimensions	T2DM with Complications (n=51)
Consequences	6.27 ± 2.25
Timeline	5.33 ± 2.91
Personal control	8.90 ± 1.78
Treatment control	8.88 ± 1.33
Identity	4.96 ± 2.00
Concern	4.90 ± 2.54
Coherence	7.86 ± 1.75
Emotional response	5.96 ± 2.57

years (SD=20.7 years) and the mean of T2DM duration was 6.5 years (SD=5.9 years). Most of the patients had hypertension (78.4%) as the complication. Table 2 presents the BIPQ in our study. The positive perceptions are shown in all domains of BIPQ, except for coherence (7.86±1.75). In general, there are no influence of demographic factors to QoL domains, except for the patients' sex and treatment satisfaction, geriatric patients and health problems, high blood pressure and symptoms frequency-health problem, working status and physical function (data were not shown).

Table 3 presents the DQLCTQ domains' differences between T2DM patients with and without complication.<sup>7</sup> The significant differences are shown in all domains except for physical function and mental health ( $p<0.01$ ). In general, the scores of quality of life domains in the 'without complication' group are higher than the scores in the 'with complication' group, except for physical

function and mental health. We analyzed the QoL domain differences among the types of complications. However, there were no significant differences among the types of complications (data were not shown).

Table 4 presents the associations between patients' illness perceptions and their quality of life. Some domains of BIPQ are significantly associated with quality of life domains, such as consequence, concern, coherence and emotional response. The strong correlations are seen on consequences-physical function, emotional response-health problem, concern-energy, concern-mental health. However the weak correlations are seen on most domains of BIPQ and DQLCTQ.

Some of the BIPQ domains have positive correlation with the QoL domains like personal control, treatment control and coherence with frequency of symptoms, satisfaction, vitality/energy, mental health and treatment effect. Negative correlations were found in identity and concern with physical function,

**Table 3 QoL Domains Scores [DQLCTQ] in Patients Without and With Complications**

Domains	Without Complication (Mean ± SD) <sup>7</sup> , n=88	With Complication (Mean ± SD), n=51	p-value
Physical function	76.5 ± 25.47	68.5 ± 25.12	0.204
Health problem	95.0 ± 7.38	85.1 ± 10.05	<0.01*
Self satisfaction	82.3 ± 8.75	55.6 ± 8.19	<0.01*
Energy	80.8 ± 18.53	62.0 ± 14.09	<0.01*
Mental health	76.9 ± 9.17	77.0 ± 10.82	0.968
Treatment effect	65.9 ± 18.42	43.4 ± 9.23	<0.01*
Frequency of symptoms	81.3 ± 13.46	72.5 ± 14.41	<0.01*
Treatment satisfaction	94.0 ± 11.03	79.9 ± 9.18	<0.01*

\*= significant

treatment flexibility, frequency of symptoms, vitality, health distress, mental health and satisfaction.

## Discussion

Our study found some of BIPQ domains have positive beliefs, such as personal control, treatment control and coherence. The negative perceptions were seen on the domains of consequence, timeline, identity, concern and emotional response.

Regarding to the score of QoL domains in our study, complication affected the patients' QoL. This finding is also in accordance with the previous studies which showed that the

end-stage complications gave high burden to the QoL.<sup>18,19</sup> Hypertension itself did not influence to all QoL domain, even though the T2DM patients with complications had worse QoL than T2DM patients without complications. However, we found that T2DM patients with high blood pressure experienced worsening of symptoms frequency and health problem. These results are similar to previous study in American among the American Indian.<sup>20</sup> Other study also presented that the mild complications in DM patients may result the significant impact to the patients QoL. This study suggested giving early treatment and diagnosis to the patients.<sup>10</sup> One of the DM treatment goals is to prevent the

**Table 4 Correlations (Pearson) Between B-IPQ and DQLCTQ**

Brief Illness Perception Questionnaire		Diabetes Quality of Life Clinical Trial Questionnaire							
		PF	HP	S	E	MH	TE	FS	TS
<b>Dimensions</b>	<b>Mean±SD</b>	68.49 25.12	85.08 10.45	55.59 8.19	62.04 14.09	77.02 10.88	43.37 9.24	72.51 15.41	79.92 9.18
Consequences	6.27±2.25	<b>-0.55***</b>	-0.28*	-0.17	-0.38**	-0.07	-0.20	-0.38**	-0.16
Timeline	5.33±2.91	0.26	0.13	0.16	0.27	0.05	0.15	0.07	0.06
Personal control	8.90±1.78	0.04	0.10	0.19	0.23	0.16	0.07	0.29*	0.19
Treatment control	8.88±1.34	-0.07	0.03	0.30*	0.15	0.27	0.21	0.11	0.11
Identity	4.96±2.00	-0.35*	-0.16	-0.26	-0.13	-0.17	0.38**	-0.31*	-0.09
Concern	4.90±2.55	-0.15	-0.42**	-0.48***	<b>-0.61***</b>	<b>-0.54***</b>	-0.15	-0.42**	0.09
Coherence	7.86±1.75	0.01	0.18	<b>0.51***</b>	0.37**	0.35*	0.42**	0.36**	0.09
Emotional response	5.96±2.58	-0.24	<b>-0.61***</b>	-0.28*	-0.55***	-0.32*	-0.09	-0.37**	-0.16

Note: Correlation coefficients are displayed (Pearson's *r* for normally distributed data and Spearman's *Rho* for non-normally distributed data); \* $p \leq 0.05$ ; \*\* $p \leq 0.01$ ; \*\*\* $p \leq 0.001$ ; bold: strong correlation; negative number mean: negative slope.

Abbreviations: PF: Physical Function, HP: Health Problems, S: Satisfaction, E: Energy, MH: Mental Health, TE: Treatment Effect, FS: Frequency of Symptoms, TS: Treatment Satisfaction.



complications, however previous study found that the treatment policies which purposed to reduce the complication risk cannot improve patients' quality of life.<sup>8</sup>

Our study findings are in line with the previous study that the negative perception was associated with lower score of quality of life.<sup>18</sup> Consequence domain had negative correlations with physical function, vitality/energy, health distress and frequency of symptoms. Patients felt that the disease significantly influence their physical function, energy health distress and also associated with the increase of disease symptoms. Previous studies also reported that belief in serious consequences were negatively associated with health distress<sup>21,22</sup> and emotional function.<sup>23,24</sup> Timeline was positively weak correlated with all domains of QoL. Contradictively, the previous study found that length of disease scores are associated with poor emotional health<sup>23,24</sup> and health distress.<sup>21,25</sup> Furthermore, perceptions of shorter duration was related to greater diabetes self-management.<sup>21,26</sup>

Our findings show that perceptions of personal control are positively related to a frequency of symptoms. This finding is in line with the previous study which reported that higher personal control beliefs associated with better metabolic control.<sup>27</sup> Moreover, lower personal control scores are associated with poor emotional health in diabetes<sup>23,24</sup> and greater diabetes-related distress.<sup>21</sup> Patients who perceived that they had the ability to control their diabetes, reported that they had more physical activities.<sup>28-30</sup> Treatment control is the extent to which the patients believe that the treatment may control their illness.<sup>27,31,32</sup> Our finding showed that more positive perceptions of treatment control is related to a better role limitation due to emotional problems and satisfaction. Furthermore, greater treatment effectiveness were associated with greater diabetes self-management<sup>26</sup> and deterioration of diabetes-related distress.<sup>21</sup>

Identity is the particular label the patients used to describe what symptoms their perceive as part of the illness.<sup>32</sup> Our finding indicated that more physical complaints due to patients with T2DM with complications is related to a lower physical function, role limitation due to physical health treatment, treatment flexibility and frequency of symptoms. However, previous study concluded that identity negatively correlated with physical component summary and mental component summary in SF-12 performance.<sup>33</sup> In addition, high identity scores are associated with lack of emotional distress<sup>24</sup> and greater diabetes-related distress.<sup>22</sup> Concern is the emotional representation of the level of worry of the illness generates.<sup>31,32,34</sup> Our study found similar result to previous studies, it was suggested that more concerns about patients with T2DM with complications are related to a poorer emotional function/mental health.<sup>19,24</sup> This could be caused by more symptoms experienced and more medication that should be consumed by the patients. Coherence is the overall comprehension of illness factor.<sup>31,32,34</sup> Previous study reported that there was a positive relationship between illness coherence and quality of life.<sup>35</sup> In addition, Paddison *et al.* (2010) also concluded that low illness coherence scores are associated with greater diabetes-related distress.<sup>22</sup> Emotional response is assessment of the emotional responses generated by the illness.<sup>32</sup> As previous reports, we also found that high emotional response scores are related to health distress<sup>21</sup> and emotional function (mental health).<sup>24</sup>

Strong correlations among consequences-physical function, emotional response-health problem, concern-energy, concern-mental health show that over the CSM context of T2DM patients, some psychiatric parameters may influence the treatment outcome. The perceptions about consequences, emotional response and concern about the disease,

which they think will be getting worse, may change the physical function, vitality and mental health. Some clinical characteristics, such as high blood pressure also had a role in influencing patients' QoL. Previous studies in the context of the CSM showed that patients' perceptions affect patients' illness distress which is related to emotional outcomes. Patients' perception about diabetes symptoms and treatment were associated with greater diabetes distress in a study in New Zealand patients (n=615), where distress was assessed with Problems Areas in Diabetes (PAID).<sup>22</sup> A systematic review and meta analysis which included nine cross-sectional and four randomized control trial studies regarding illness perceptions in people with diabetes showed that illness perceptions had a small but significant association with glycaemic control; however, the direction of the associations remained unclear.<sup>36</sup> DM patients' life may change because of the consequences of the chronic disease. They experience symptoms related to hypoglycemia or hyperglycemia, the change of lifestyle including diet, exercises, sleeping pattern and daily activities. They also have to adhere to the routine physician and laboratory evaluation.<sup>37</sup> These situation may change patients' perception about their life and furthermore may impact the QoL.<sup>38</sup> Previous study suggested that a positive self-perception played an important role in self management, especially in increasing the patients' compliance to treatment.<sup>39</sup>

The limitation of our study is regarding the outpatients of T2DM with complications who was recruited. The wide gap of number among of listed complications, it is not possible to controls the displayed results. Because of the cross-sectional design, conclusions about causality cannot be drawn in this study. However, the findings in present study confirmed that presence of complications have a significant negative impact on QoL

among the patients with T2DM. These results also cannot be generalized into Indonesian T2DM patients, due to differences of culture in every island and service quality of each health providers. This finding should be considered in the design of intervention and monitoring programmes for patients with T2DM with complications, in order to planning and implementation of "patient oriented" that involve assisting with the needs and improving the QOL of individuals.

## Conclusion

According to present finding, we suggest patients' perceptions may affect patients' QoL. Some of perceptions domains, such as consequences, emotional health and concern are correlated to physical functions of T2DM patients. The high blood pressure could worsen T2DM patients QoL.

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## Conflict of Interest

The authors have no conflict of interest.

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