Relationship between Diabetes Self-Care Management and Quality of Life of People with Type 2 Diabetes

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Abstract

Optimal quality of life in diabetes requires a specific set of self-care management behaviours. The purpose of this research was to study the relationship between diabetes self-care management and quality of life in patients with diabetes type II. 168 diabetes were recruited from extended out-patient department 1 at Phrae Hospital during January to June 2016. All participants completed three parts of questionnaires including: 1) demographic data and diabetes-specific characteristics; 2) the Diabetes Self-care Management Questionnaire (DSMQ); and 3) the Diabetes-39 (D-39), the modified instrument determining Quality Of Life (QOL) of diabetes patients. Pearson's Correlation coefficient analysis was conducted to determine the correlation between the DSMQ and QOL of diabetes patients. Results revealed that: 1) for diabetes self-management, overall score of the DSMQ indicated medium level (4.50±0.25). The best subscore was managing "health care use" (5.28±0.37), while the lowest self-management subscore was "dietary control" (3.92±0.35). 2) For QOL, overall score of the D-39 indicated good level (6.58±0.41), which meant that the participants were not affected by diabetes and its treatments. The highest subscore was "sexual functioning" (6.87±0.51), while the lowest subscore was "energy and mobility" (6.47±0.56); and 3) the DSMQ was positively correlated to QOL of diabetes patients significantly at low level ($r = 0.28$, $p < 0.001$). Conclusion and recommendations: Health care providers should promote diabetes self-management and self-care programs enhancing dietary control. Ultimate purposes covered effectiveness of diabetes self-care management and reduce and/or prevent diabetes-related complications.

Keywords: Diabetes Self-care management, the DSMQ, Quality of life, the D-39, Diabetes type II

Introduction

Diabetes is a chronic disease affecting more than 415 million people world-wide in 2015 and it is estimated to rise by 55 percent or more, up to 642 million, with four out of five diabetic patients living in Southeast Asia. (International Diabetes Federation: IDF, 2015). In Thailand, according to the Health Statistics reported for period incidence of 2012-2014, 674,826; 698,720; and 670,664 patients (Crude incidence rates, CR per 100,000 residents were 1,050.05; 1,080.25; and 1,032.50 patients) respectively were hospitalised at outpatient clinics in Thailand government hospitals. Within this number, mortality rate was as high as 4,705; 5,480; and 6,114 (Specific Death Rate, SDR = 0.70, 0.78, and 0.91) respectively (Office of Policy and Strategy, Office of the Permanent Secretary of Ministry of Public Health, 2015).

In Phrae, it is reported that there was the highest incidence rate of diabetes with 37,267.01 amongst eight provinces in the upper north of Thailand, namely: Chiang Mai, Rumphun, Rumpang, Mae Hong Son, Chiang Rai, Pa-Yao, Phrae and Naan; while the lowest incidence rate was Chieng Mai (13,164.69). In 2012-2014, there were 1,166 patients, 1,351 and 1,669 diabetic patients respectively visiting outpatient clinics in Phrae Branch 1, Phrae Hospital (outpatient clinics in Phrae Branch 1, Phrae Hospital, 2016).

Diabetes contributes to the global burden of complications to vital organs such as coronary artery, eyes, kidney, peripheral nerves and feet (Diabetes Association of Thailand under the patronage of Her Royal Highness Princess Maha Chakri Sirindhorn. 2014: 33). These complications affected diabetes patients who were mostly sedentary, having unhealthy dietary practice, did not follow up the doctor's appointment, and did not take medication as prescribed by doctors (Co, et. al., 2015). In order to monitor blood sugar level and prevent complication, patients need to change their lifestyle, respect the effective medication and therapies recommended by specialists. Patients experienced barriers, such as a lack of diabetes information and lack of motivation (Mbuagbaw, Aronson , Walker, et. al., 2017). Tailoring these recommendations and adjusted them to their lifestyles. Some diabetic experienced mental and even poor quality of life (Seppala, Saxen, Kautiainen, Jarvenpaa, 2013: 225) as they felt irritated, stressed, burnout, anxious and depressed (Co. et. al., 2015: 378; Khader, Al-Khawadeh & Ajlouni, 2010: 84). Therefore, it is said that the necessary interventions for an optimal care for diabetes patients requires discipline and a set of self-management skills (Mbuagbaw, Aronson & Walker, et. al., 2017). The use of quality-of-life assessment in diabetes care affects the quality of life (Testa, 2000:29).

Self-manageability of diabetes that they actually implement in their everyday life could result in a good health-related quality of life. With the highest incidence rate and no related study of self-management and quality of life of type 2 diabetic patients living in Phrae, it was a need to examine how well participants in Phrae could self-manage, how their quality of life was, and what was the association between self-management and quality of life of such patients. Results from this study can be applied to implement a comprehensive intervention of diabetes self-management, their confidence in their diabetes management skills. This would show how prepare they are to implement behavioural changes. The optimal goal is the quality of life of type 2 diabetic patients.

Purposes

1. To study self-management behaviors and quality of life of type 2 diabetic patients.
2. To study the relationship between self-management behavior and quality of life of type 2 diabetic patients.

Hypothesis of research

Self-management behaviors correlated with quality of life in type 2 diabetic patients.

Research Frameworks

Two conceptual frameworks were applied to this study: 1) The Diabetes Self-care Management Questionnaire (DSMQ) originated by Andreas Schmitt (Schmitt et al 2013); and 2) The modified Quality of life (QOL) (Diabetes-39: D-39) of diabetes originated by Gregory Boyer (Boyer, et. al., 1997) and modified to fit the Thai context by Konika Songraksa and Sa-nguan Lerkiatbundit (2009).

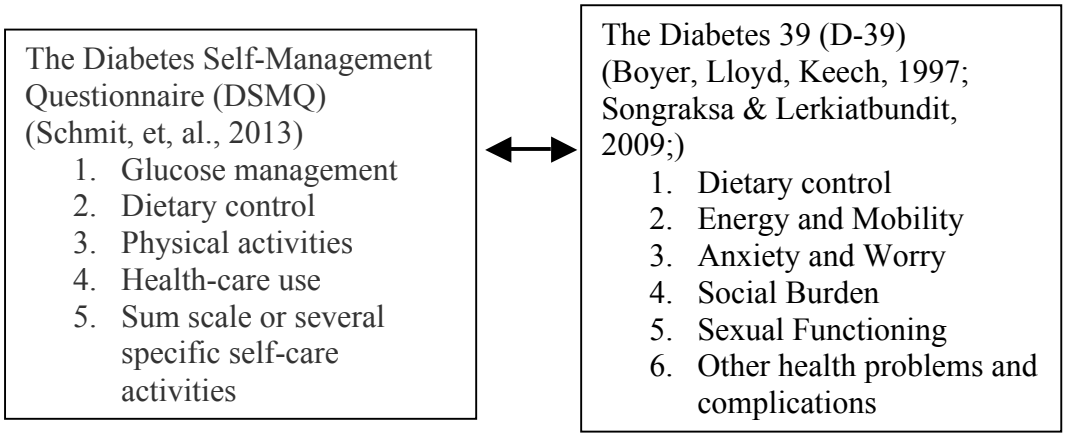

Figure 1: Conceptual framework

In this study, Diabetes Self-Management referred to a multi-dimensional construct comprising the individual's practice in order to assess self-care activities which can predict glycemic control. The DSMQ (Schmit, et. al., 2013) is a diabetes-specific self-care activity associated with glycaemic control. It covers five different aspects of diabetes self-management which are the patient's perceptive of their behaviour.

In this study, quality of life referred to the individual's subjective perception of physical, emotional and social well-being. The D-39 applied to this study was designed to determine the quality of life of participants diagnosed with diabetes type I and II. It also can be used on all diabetes patients regardless of demographic variables (Aguiar CCT, Vieira APGF, Carvalho AF, Montengro-Junior RM, 2008).

Methodology/Data Collection Procedure

A cross-section convenience sampling of 168 out-patients with type II diabetes who had been visiting out-patient department 1 at Phrae Hospital during January to June 2016 were recruited.

Sample size

G-power 3.0.10 (Faul, Erdfelder, Lang, & Buchner, 2007; Faul, Erdfelder, Buchner, & Lang, 2009) with t-test Correlation: Pierson product moment correlation coefficient (Cohen, 1988; Cohen, 1992) was used to calculate the sample size. The effect size index was 0.30 ($f^2 = 0.30$). The significance was at 0.05 ($\alpha = 0.05$). Power of test was 0.95 ($\beta = 0.95$). Initially, sample size was calculated at 134. Then, 25% of sample was added to prevent error of data collection. Therefore, the actual sample size was 168.

Inclusion criteria

Study participation was limited to adult patients who has the following inclusion criteria:

1. Participants with a clinical diagnosis of type 2 diabetes who had been visiting out-patient department 1 at Phrae Hospital during January to June 2016.
2. 18 years old or more
3. Presenting in good conscious and sufficient Thai language skill and written informed consent in Thai.
4. Providing informed consent to participate to this study.
5.

Excluded criteria

Diabetes patients who has the following criteria were excluded from the study.

1. Terminal illness, late complication status and/or experienced DM shocks during questioned such as hypoglycemia, hyperglycemia and semi-coma.
2. Unable to share their experienced for the whole period of collecting data.

Instruments

Eligible out-patients for study were approached and informed about the possibility to participate. Patients who consented were assessed using questionnaires containing three parts: 1) Personal data of demographic and diabetes-specific characteristics were gained from the electronic patient records and fasting blood sugar (FBS) was analysed in the out-patient laboratory; 2) the DSMQ; and 3) the D-39.

Part I: Personal data of demographic and diabetes-specific characteristics.

Demographic data: sex, age, marital status, religion, occupation, educational level, and monthly income; and Diabetes-specific characteristics: BMI, diabetes duration, current FBS, and other illness.

Part II: The Diabetes Self-management Questionnaire (DSMQ) (Schmit, et. al., 2013) describes self-care activities related to the patient's diabetes in terms of how they took care of themselves over the last eight weeks. It consisted of five domains as follow:

1) Glucose management (GM) (5 items: 1+, 4+, 6+, 10-, 12-)
2) Dietary control (DC) (4 items: 2+, 5-, 9-, 13-)
3) Physical activities (PA) (3 items: 8+, 11-, 15-)
4) Health care use (HU) (3 items: 3+, 7-, 14+)
5) Sum scale or several specific self-care activities (SS) (1 items: 16-)

Seven items are formulated positively (no. 1, 2, 3. 4, 6, 8, 14) and nine inversely (no. 5, 7, 9, 10, 11, 12, 13, 15, 16). The rating scale was designed as a four-point Likert scale with the response options "applies to me very much" as three points as follows (Schmit, et. al., 2013):

Applies to me very much	= 3
Applies to me to a considerable degree	= 2
Applies to me to some degree	= 1
Does not apply to me	= 0

Schmitt, et. al. (2013: 138) descripted how to score the DMSQ that "the scores range from 0 to 10 (raw score/theoretical maximum score *10; for example, for the subscale "Glucose management" a raw score of 12 leads to a transformed score of 12/15 * 10 = 8). A transformed score of ten thus represented the highest self-rating of the assessed behavior. If "not required as a part of my treatment" has been marked in an item, it was not used, and the scale score computation was adapted accordingly (by reducing the theoretical maximum score by three points). However, in case of more than half of the items of a scale missing, a scale score should not be computed".

The cut-point of a transformed score was divided into three levels: well, medium and poor diabetes self-management as follows:

Average	Indicating
0.00 – 3.33	Poor diabetes self-management
3.34 – 6.66	Medium diabetes self-management
6.67 – 10.00	Well diabetes self-management

Part III: The D-39 applied to this study was a modification of the D-39 (Boyer & Lloyd & Keech, 1997: Songraksa. & Lerkiatbundit, 2009) in which Konika Songraksa and Sa-nguan Lerkiatbundit (2009) added two more items of "overall quality of life, and severity of DM" to fit to the Thai culture. The questionnaire was granted permission to reuse the D-39 from both Boyer and Songraksa. The D-39 is a self-report describing how much was the quality of life of the patient affected by diabetes and its treatments over the last four weeks. It consists of six subscales as follows:

1) Diabetes Control (DC) (12 items: 1, 4, 5, 14, 15, 17, 18, 24, 27, 28, 31, 39)
2) Energy and Mobility (EM) (15 items: 3, 7, 9, 10, 11, 12, 13, 16, 25, 29, 32, 33, 34, 35, 36)
3) Anxiety and Worry (AW) (4 items: 2, 6, 8, 22)
4) Social Burden (SB) (5 items: 19, 20, 26, 37, 38)
5) Sexual Functioning (SF) (3 items: 21, 23, 30)
6) Overall QOL and severity of DM (2 items)

The possible responses are 0-7 point scale, and range from "Not affected at all" (=1) to "Extremely affected" (=7). As score "1" indicates quality of life of the patient was not affected by diabetes and its treatments, therefore, it meant the patient had "a good quality of life". For preventing confusion, after collecting data, scales were converted to the indication of good quality of life = 7 and poor quality of life = 1; while there was no score for Overall QOL and severity of DM.

The cut-point of D-39 score was calculated by summing the responses and then applying a linear transformation to a 0–1 scale as indicated as follows:

Average	Indicating
0.91 – 1.00	Extremely affected
0.71 – 0.90	Rather affected
0.51 – 0.70	Medium affected
0.31 - 0.50	Affected at some point
0.00 - 0.30	Not affected at all

Test of content validity

1. After the DSMQ was granted to be reused, it was translated into Thai using a standardised forward and backward translation procedure (Bradley, 1994). Three independent bilingual translators and diabetes specials performed the forward-translation until the back-translated and original questionnaires were matched. Then, the Thai version was finalised.

2. The D-39 was granted to be reused, which the Thai version of D-39 was translated into Thai language already with good content validity (0.94) Konika Songraksa and Sa-nguan Lerkiatbundit (2009).

Re-test of reliability

After 30 diabetes patients first completed the questionnaires, they were retested for reliability by Cronbach's Alpha Coefficient. Reliability of the DSMQ and the D-39 were 0.40 and 0.97 respectively. Then, questionnaires were developed by researcher team and were retested on five diabetes patients. Cronbach's Alpha Coefficient of reliability of the DSMQ and the D-39 were = 0.65 and 0.91 respectively after being answered by 168 participants.

Ethic

Data collection was approved by the Ethics Committee of the Phrae Hospital that File number was 3/2016, given on 22nd January 2016. Written informed consent was obtained before participation.

Analysis

Demographic data and diabetes-specific characteristics; for example sex, age, marital status, religion, occupation, study level, monthly income, BMI, diabetes duration, current FBS, other illness were analysis in mean and percentage.

The DSMQ and the D-39 were analysed in mean and standard deviation.
The relationship between the DSMQ and the D-39 were analysed by Pearson product moment correlation coefficient.

Results

Table 1 describes demographic data of the participants. 168 participants answered 77 items of questionnaires. The mean age was 65.35 ± 10.45 years, more than half of the participants were female (61.31%). The majority were married (n = 124, 73.80%), Buddhists (n = 166, 98.80%) and graduated from primary school (n = 123, 73.20%). Forty-eight of them were unemployed (28.90%) and earned only 1,000 – 10,000 baht monthly.

Table 1: Demographic data

Demographic data	Frequency (f)	Percentage (%)
Gender		
Male	65	38.70
Female	130	61.30
Age in years		
< 35	2	1.20
35 - 60	85	50.60
> 60	81	48.20
Marital status		
Single	7	4.20
Married	124	73.80
Divorced/widow/separated	37	22.00
Religion		
Buddhist	166	98.80
Christian	2	1.20
Occupation		
Employee	48	28.60
Agriculture	26	15.50
Business	28	16.70
Civil service officer	18	10.70
Unemployed	48	28.60
Educational level		
No schooling	3	1.80
Primary school	123	73.20
Secondary school	20	11.90
Associate degree/ Under-graduate/ Graduate/ Post-graduated	22	13.10
Monthly income		
< 1,000 baht	56	33.10
1,000 – 10,000 baht	80	47.30
> 10,000 baht	32	19.00

Diabetes-specific characteristics of the participants are reported in Table 2. For Body mass index (BMI), 104 patients (60.90%) were rated at overweight (mean 25.02 ± 3.99). They were diagnosed with diabetes for 5-10 years (n = 75, 44.60%; mean 33.32 ± 5.08) with FBS of higher than 130 mg./dl. (n = 88, 52.40%; mean 142.46 ± 43.80). Besides, diabetes, patients were also diagnosed with high blood pressure (n = 112, 66.70%), dyslipidemia (n = 101, 66.70%).

Table 2: Diabetes-specific characteristics

Diabetes-specific characteristics	Frequency (f)	Percentage (%)
BMI in kg/m^2		
< 18.50	3	1.80
18.50 – 23.49	61	36.30
23.50 – 30.00	102	60.70
> 30.01	2	1.20
Min-max = 15.81 – 38.46	Mean 25.02, SD 3.99	
FBS in mg./dl/		
70 – 110	80	47.60
> 110	88	52.40
Min-max = 65.00 – 291.00	Mean 60.35, SD 43.86	
Diabetes duration in years		
< 5	57	33.90
5 -10	75	44.60
> 10	36	21.46
Min-max = 1 – 22	Mean 42.44, SD 5.08	
Other diseases		
High blood pressure (HT)	112	66.70
Do not diagnosed with HT	56	33.30
Dyslipidemia	101	60.10
Do not diagnosed with Dyslipidemia	67	39.90
Kidney failure	12	7.10
Do not diagnosed with kidney failure	156	92.90

Table 3 illustrated that overall diabetes self-management of the participants were in medium level (4.50±0.25). The best self-management was "health care use" (5.28±0.37), followed by "sum scale or several specific self-care activities" (4.64±0.46). The poorest self-management was dietary control (3.92±0.35).

Table 3: Diabetes self-management

Diabetes self-management	Average ($\bar{x}$)	Standard deviation (SD)	Indicating
1. Glucose management (GM)	4.40	0.37	Medium
2. Dietary control (DC)	3.92	0.35	Medium
3. Physical activities (PA)	4.28	0.65	Medium
4. Health care use (HU)	5.28	0.37	Medium
5. Sum scale (SS)	4.64	0.46	Medium

Table 4 reported a good quality of life of the participants (6.59±0.41) which meant that diabetes and its treatments over the last four weeks did not affect the patients that much. The overall QOL and severity of diabetes showed the lowest score (6.34±0.90).

Table 4

Quality of Life (D-39)	Average ($\bar{x}$)	Standard deviation (SD)	Indicating
1. Diabetes Control (DC)	6.65	0.44	Well
2. Energy and Mobility (EM)	6.47	0.56	Well
3. Anxiety and Worry (AW)	6.63	0.45	Well
4. Social Burden (SB)	6.52	0.49	Well
5. Sexual Functioning (SF)	6.87	0.51	Well
Overall score for D-39	**6.58**	**0.41**	**Well**
6. Overall QOL	5.51	0.96	Well
Severity of DM	1.34	1.02	Well

The final table-5 indicated that diabetes self-management was correlated positively with quality of life of the participants ($r = 0.28$, $p < 0.001$). Its positive correlation value was significantly at 0.05.

Table 5: Correlation between diabetes self-management and quality of life

Variations	$\bar{x}$	r	p
Self-care management	2.32		
Quality of life	6.58	0.28	0.001*

*$p < 0.05$

Conclusions

This study revealed that the self-management behaviour of participants was good. This result did not quite agree with the study of Sawangpon (2015), Leardwiriyanun (2015) and Raaijmaker, etl al., (2014) stated that the self-management behaviour of participants was at medium level. The subscale that participant could manage the best was "health care use" (2.64±0.37) which meant the patients mostly followed the doctor's appointment. This may be because most Thais respect the older, higher educational level and wealthier people. The subscale of self-management that they could hardly manage was "dietary control" (1.96±0.35). This is associated with their high blood sugar (FBS>110 mg./dl.) (52.40%) and overweight (60.70%).

Reasons participants could hardly control their dietary pattern as recommended by health providers may be explained as follows. For Thais, food is a central part of social occasions and celebration. This is due to the nature of Thais who typically are friendly and sociable. It may also be because of the way in which food is ordered and eaten in Thailand. Thais share and enjoy side dishes together. When having meals, Thais do not combine various food on their plates. They rather have a spoon of food at the time. By this way, it is hardly measured the amount of food an individual has. Moreover, varies and delicious foods in Thailand are available almost everywhere along the roadside and almost all the time. Finally, sticky or glutinous rice, a higher calorie of rice, is preferable in the North and Northeast of Thailand as the staple food, rather than non-glutinous rice. This may make it harder to have appropriate dietary pattern for diabetes patients living in these areas.

The overall score of quality of life of the participants indicated good level reflecting that they were not affected by diabetes and its treatments. The highest subscore was

"sexual functioning" (6.58±0.37). It is well-known that diabetes can affect nerve function and blood flow particularly genitals, however, the result of this study was reverse. This may be explained that Thais are typically shy to discuss or reveal about this issue. Further, just more than half of participants (52.40%) had high level of FBS. Almost half of them were older than 60 years old (48%). 44.60% were sick with diabetes for between 5 to 10 years, while those who have been sick for more than 10 years was 21.46%. In sum, the study results did not show individually how severe patients were affected in terms of sexual functioning.

The lowest score of quality of life of participants was energy and mobility (6.47±0.56). This also could be explained that diabetes patients mostly develop peripheral neuropathy, vascular disease, muscle atrophy, balance and gait problems, postural instability and falls.

This finding of relationship between self-management and quality of life met the hypothesis of the study. That self-management behaviors were associated positively with quality of life ($r = 0.28$, $p < 0.001$). While minimizing glycemic goals of diabetes patients is focused on the treatment plan, health providers should also take care of patients as holistic, as a whole human. Once being diagnosed as diabetes-a chronic illness, patients are facing physical, emotional and social challenges to enhance safety and quality of life. Addressing the issues associated with diabetes self-management can significantly improve the quality of life. Thus, for individuals with poor diabetes self-management in particular, prepare and help them to have discipline and self-management skills individually are necessary.

Summary and suggestions

Health care providers should promote diabetes self-management and self-care programs enhancing dietary control. Ultimate purposes covered effectiveness of diabetes self-care management and reduce and/or prevent diabetes-related complications.

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