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Original Article

Factors predicting quality of life in older people with diabetes in Thailand

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Abstract

The study aimed to investigate factors affecting the quality of life of older persons with diabetes. Data were collected on 345 persons from 5 regional hospitals in Thailand. The instruments measured characteristic, quality of life, resilience and self-care behavior. Participants exhibited low-level physical and mental health quality of life ($\bar{x}$=45.78, 47.60; SD=8.963, 8.93). Resilience and self-care behavior showed a moderate level ($\bar{x}$=121.89, 38.2; SD=21.084, 7.363). Stepwise regression indicated that resilience, self-care behavior, age, education and gender were predictive of physical health quality of life. Mental health quality of life was found to be predicted by resilience, self-care behavior and marital status. We determined that resilience, personal characteristics, self-care behavior and demographic factors were predictive of quality of life among older diabetics. Health care professionals need to be aware of individual differences among older diabetics towards promoting better quality of life.

Keywords: diabetes, resilience, self-care behavior, quality of life

1. Introduction

The incidence of diabetes is increasing in many countries, including Thailand. In 2012, the National Statistical Office of Thailand reported that 15% of people aged 60 years and above had diabetes (National Statistical Office, 2015). Diabetes control presents a challenge and demands the pursuit of self-care regimens; it has an impact on physical and mental stress (Yi-Frazier *et al.,* 2008). Diabetes can cause complications such as retinopathy, blindness, chronic kidney disease, peripheral neuropathy, diabetic wounds, coronary artery disease, and stroke (American Diabetes Association, 2010). Delaying the onset of these complications demands strict adherence to care regimens. However, many people with diabetes are unable to change their lifestyle, which has a negative effect on their daily living and quality of life. Health-related quality of life (HRQoL) is often used to assess the physical, psychological, sociological, and spiritual status of various types of illnesses. The quality of life of people with diabetes has been examined in previous studies; however, differences in background and culture were found to result in different outcomes. It is therefore necessary to determine the factors that affect the quality of life of people with diabetes in different societies.

The World Health Organization (1996) describes quality of life as individuals' perception of their lives asso-

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ciated with personal beliefs, expectations, life goals, social values, and cultural context. These factors influence physical and mental health. Grady *et al.* (2005) defined quality of life as satisfaction with health, physical functioning and mental state, and social interaction and socioeconomic conditions. As a health-care concept, quality of life is determined in terms of health-related quality of life. Particularly in chronic illnesses, it is defined as a subjective, personal evaluation of the satisfaction of physical, psychological, and spiritual well-being (Wilson and Cleary, 1995). Though there are many models of health-related quality of life, one feature common to them is that they include physical, psychological, social, and spiritual factors (Bakas *et al.,* 2012). The 36-item *Short Form Health Survey* (SF-36) has been broadly used in many countries to determine health-related quality of life. Versions in different languages have demonstrated high reliability. The Thai version has been shown to achieve the same standard level as the original (Vathesatogkit *et al*., 2012). Even though some specific scales measure the HRQoL for diabetes their reliability has been confirmed with reference to the high standard of the SF-36. It has been claimed that the SF-36 is a reliable predictor of quality of life of people with diabetes and in various populations (Rajan *et al*., 2013). Thus, in the present study, we decided to employ the SF-36 to measure quality of life.

People suffering from diabetes often experience a lower quality of life associated with poor glycemic control; this often causes other complications, which may prove fatal. The quality of life of people with diabetes can be measured using factors associated with health including personal and external conditions (Polonsky, 2000). Resilience exerts an important influence on glycemic control and quality of life (Yi-Frazier *et al.,* 2008; Steinhardt *et al*., 2009).

Resilience is an individual characteristic that eases the negative effects of stress and promotes the ability to adapt to different situations. It restores balance in people's lives (Wagnild and Young, 1993). A resilient person is able to cope with adversity such as accidents, disaster, or economic crisis (Wagnild, 2010). Resilience also protects against the risks of long-term illness (Rogerson and Emes, 2008). There is no doubt that weaker resilience results in impaired health.

Nygren *et al.* (2005) and Lavretsky and Irwin (2007) briefly describe resilience as a buffer that protects people from adversity. Resilience can therefore lead to physical and mental wellness. Other authors have also confirmed the positive effect of resilience on health (Masten and Obradovic, 2006). Individuals with higher resilience have greater motivation for adaptation (Wagnild and Young, 1993; Atkinson *et al.*, 2009). Together with increased self-care, promoting resilience can have an effect on controlling illnesses, preventing complications with chronic illnesses, and improving overall quality of life (Lavretsky and Irwin, 2007).

Self-care behavior is a conscious decision to cope with health problems toward achieving better health. Self-care behavior has been examined as a means of promoting positive influences on health and the quality of life in diabetics (Davis *et al.,* 2007). Studies have ascertained that self-care behavior reduces chronic health complications. The effect of regular practice of indicated self-care behavior ultimately leads to better quality of life. (Whittlemore *et al.,* 2005).

The present study used the *Self-Care Inventory-Revised* (SCI-R) developed by Weinger *et al.* (2005) from the questionnaire by LaGreca *et al*. (1988). The questions were selected specifically for people with type 2 diabetes. Some studies have demonstrated the relevance of resilience, coping, self-care, and quality of life; however, they have produced varying results. For example, one study examining the role of resilience in psychological adjustment and physical health in patients with diabetes found that low resilience was associated with less self-care behavior. Low resilience has also been found to be related to maladaptive coping in diabetes (Yi-Frazier *et al*., 2008). In Taiwan, the quality of life in middle-aged and elderly diabetics could be predicted by their self-care behavior, economic status, and frequency of hospitalization (Huang and Hung, 2007).

The aim of this study was to determine the factors that affect the quality of life of older people with diabetes. The research questions were as follows, 1) What are the scores for resilience, self-care behavior, and quality of life of older diabetics?, and 2) Can resilience and self-care behavior predict the quality of life of older diabetics?

2. Materials and Methods

2.1 Participants

This cross-sectional study was conducted with older diabetics in Thailand. Multi-stage sampling was conducted to select participants. To obtain an appropriate and heterogeneous sample, we selected the regional hospital in each part of the country. A total of 25 regional hospitals from four regions were listed: five from the north, six from the northeast, nine from the center, and five from the south. We adopted simple random sampling without replacement. We finally selected five hospitals with a total of 1,349 diabetics undergoing monthly treatment. We used the method of Yamane (1973) to achieve statistical power of 95%. The calculation showed that it was necessary to include 309 participants. To increase the reliability, we increased the sample size to 350. We invited older diabetics who were receiving follow-up treatment to participate in the study. The inclusion criteria were diagnosis of type 2 diabetes, age 60 years or above, taking oral medication or insulin injection, ability to communicate in Thai, absence of hearing or speaking limitations, and willingness to participate freely in the study. The researchers contacted the participants while they were waiting to see their physicians. The researchers explained the purpose and procedures of the study and answered any questions related to voluntary agreement. Written informed consent was obtained from all participants.

2.2 Data collection

This study was conducted at the outpatient diabetes clinics of five regional hospitals from December 2013 to March 2014. Literate participants answered the questionnaires by themselves, whereas those with limitations in reading or checking the answers were assisted by the researchers. The questionnaire took roughly 45 minutes to complete; participation was voluntary and anonymous.

2.3 Measurement

The questionnaire comprised the following validated measures, ten demographic questions, a quality-of-life scale, a resilience scale, and a self-care behavior scale. They are explained in detail below.

Quality of life: The short form of the HRQoL scale (SF-36 v2) is a 36-item questionnaire reflecting two domains: physical and mental quality of life. Possible scores range from 0 to 100 with a cutoff point of 50. Higher scores indicate higher quality of life. We used the SF-36 v2 (Ware and Sherbourne, 1992) translated into Thai. The instrument consists of eight categories: 1) physical functions (ten items); 2) role limitations due to physical problems (four items); 3) bodily pain (two items); 4) general health perceptions (five items); 5) social functioning (two items); 6) vitality (four items); 7) role limitations due to emotional problems (three items); 8) general mental health (five items); and one overall estimation of wellness.

Resilience: The resilience scale (RS) consisted of 25 items. Participants were asked to rate their own degree of resilience from 1 to 7 (1, least resilient; 7, most resilient). Possible scores range from 25 to 175. Higher scores reflect higher resilience; scores under 121 indicate low resilience, 121-146 moderate resilience, and 147-175 high resilience (Wagnild and Young, 1993). The present study utilized a Thai version of the scale, which was used in a previous study comparing resilience between Swedish and Thai women and men aged 60 years and above.

Self-care behavior: The SCI-R is a revised scale developed from the self-care behavior scale of LaGreca *et al*. (1988). We translated the SCI-R into Thai, and it was then back-translated by bilingual professionals. We modified the scale to measure self-care with type 2 diabetes by deleting three items that were specific for type 1 diabetes. The scale comprises 12 positive statements with scores ranging from 1 (lowest) to 5 (highest). Possible scores range from 0 to 60. Higher scores indicate better self-care behavior: 1-20 denotes inadequate self-care behavior; 21-40 moderate self-care behavior; and 41-60 good self-care behavior.

2.4 Reliability

We used Cronbach's alpha coefficient to test the reliability of the resilience scores (0.926), the self-care behavior scores (0.736), and a composite of the eight categories of HRQoL scores (0.877). The reliability for each category of quality of life was as follows: physical function 0.935; limitation of physical role 0.962; bodily pain 0.881; general health 0.787; and vitality 0.696. The cutoff point we used was a Cronbach's alpha score above 0.70. All three areas were generally above that point and were therefore all reliable.

2.5 Ethical approval

The Institutional Review Board of Chulalongkorn University and the outpatient diabetes clinics of the five regional hospitals in Thailand approved this study (COA No. 145/2555 September 30, 2013).

2.6 Data analysis

We analyzed the data using SPSS version 17.0 for Windows (SPSS Inc., Chicago, IL). Demographic data were presented with descriptive statistics: frequency; percentage; mean score; and standard deviation (SD). We conducted multiple regression analysis using a forward stepwise method to identify significant factors for quality of life. An alpha value of less than 0.05 was considered significant.

3. Results

We distributed 350 questionnaires for completion. Five cases involved missing data and were excluded. Thus, the data from 345 participants (98.6%) were analyzed. Table 1 shows the demographics of the subjects. Most participants were women (59.13%), young-old (average age 69, SD=6.871), married (63.19%) Buddhist (86.96%), and had completed only primary school education (57.39%); 17.97% were illiterate. The majority of participants had had diabetes for over 1 year (92.47%). Most of them stated that they had suffered complications (62.32%). The most frequent complication was hypertension (57.68%; Table 1).

The results show a low-moderate resilience score (121.89, SD=21.084), a moderate self-care behavior score (38.12, SD=7.363), and a low level of mental and physical quality-of-life scores (47.60, SD=8.938; 45.78, SD=8.963, respectively). Five variables of age, resilience, self-care behavior, education, and gender were found to be correlated with quality of life (r=0.428); they accounted for 18.3% of the findings for physical quality of life ($R^2 = 0.183$, $p<0.05$; Table 2). Table 3 indicates that resilience, self-care behavior, and marital status are significant predictors for mental quality of life when applying a stepwise regression model (r = -0.328, $R^2=0.107$; $p<0.05$).

4. Discussion

The majority of participants were young-old who are likely to maintain many activities. They tend to perceived diabetes as affecting their lives more than older subjects do (Lounsbury *et al.,* 2014). Chronic diabetes lowers quality of

Table 1. Demographics (n=345).

Characteristics	Number	Percentage
Gender		
Female	204	59.13
Male	141	40.87
Age (mean = 69; SD = 6.871)		
60-69	199	57.68
70-79	116	33.62
≥ 80	30	8.70
Religion		
Buddhism	300	86.96
Muslim	40	11.59
Christian	4	1.16
Not indicated	1	0.29
Marital status		
Single	18	5.22
Married	218	63.19
Separated or divorced	17	4.93
Widowed	92	26.67
Education		
Illiterate	62	17.97
Primary	198	57.39
Secondary	16	4.64
High school	24	6.96
Bachelor's degree	37	10.72
Postgraduate	8	2.32
Duration of illness		
< 1 year	26	7.54
1-5 year	156	45.22
6-10 year	87	25.22
> 10 year	76	22.03
Complications		
Yes	215	62.32
No	130	37.68

SD = Standard Deviation

life (Väätäinen *et al*., 2014), which accounts for the low mean scores for both mental and physical quality of life observed in the current study, which are in accord with findings from studies of people with chronic illness among U.S. community-dwelling adults (Strine *et al.*, 2008). Findings from one French study of people with type 2 diabetes showed that although young diabetics had lower quality of life, older diabetics did not considered diabetes to be a great problem (Bourdel-Marchasson *et al*., 2013). Conversely, higher quality-of-life scores have been identified in Taiwanese diabetics aged below 60 years (Huang and Hung, 2007). Furthermore, the poor quality of life observed in older outpatient diabetics is probably influenced by many complications as well as by the long duration of their disease (Jelsness-Jørgensen *et al.,* 2011).

We found the mean score for resilience to be at a moderate level (121.89). This is in contrast to one study of low-income older adults living in public housing and high-income community residents; the mean resilience scores for the two groups were found to be in the range 141-149 (Wagnild, 2003). A mean resilience score of 143.1±24.0, demonstrating strong resilience, has been reported for battered women living in shelters in Western countries (Humphreys, 2003). A comparative study of healthy Swedish and Thai people aged 60 and over found mean resilience scores of 146 and 144, respectively (Choowattanapakorn *et al.,* 2010). The mean resilience score of older Thai diabetics in the present study is lower than that previously reported. This finding may be related to the fact that most participants had suffered diabetes for more than 1 year and considered themselves to have complications. Those factors may have reduced their level of resilience.

We found self-care behavior to be at a moderate level, with a mean score of 38.12 (SD=7.363). This is similar to the moderate practice of self-care in Hispanic older diabetics born in both Mexico and the United States (Mier *et al.,* 2012). As with self-care among diabetics, African-Americans with heart failure also evidenced inadequate self-care behavior. The authors of that study indicated that the subjects may not have properly understood explanations regarding heart failure and self-care adherence (O'Connell *et al.,* 2011). In contrast to the findings of the present study, one investigation of diabetic Taiwanese reported a medium-high level of self-care behavior as well as quality of life (Huang and Hung, 2007). The diabetic participants in Taiwan were younger than the Thais in the current study (mean age, 57.72 and 69, respectively). The majority of Thais participants (62.31%) reported having disease complications, whereas 42.7% of the Taiwanese subjects had no complications. This may indicate that older age and complications among the Thai diabetics were associated with inadequate self-care.

The five variables of age, resilience, self-care behavior, education, and gender were found to be correlated with quality of life (r=0.428) and accounted for 18.3% of the findings for physical quality of life (R^2=0.183, $p<0.05$). Resilience, self-care behavior, and marital status were found to be significant predictors of mental quality of life when applying a stepwise regression model (r = -0.328, R^2 = 0.107; $p<0.05$).

Positive and negative aspects of personality have been found to affect quality of life (Borrott and Bush, 2008). Resilience is an individual characteristic and considered part of the personality; it may also be linked to quality of life. Borrott and Bush (2008) found that resilience is a remarkable predictor of physical quality of life (b=0.287). The results of the present study are in accordance with those of an investigation conducted among 175 people in Taiwan aged 18-88 years, who were suffering from stress as a result of injuries (Wu, 2011). Similar studies have identified a relationship between resilience and mental and physical quality of life (Wagnild, 2003). Further investigations among older residents in rural and urban areas may confirm that high resilience in the two groups is directly correlated to mental and physical quality of life.

Table 2. Analysis of variables influencing physical health quality of life for older people with diabetes, and an equation predicting physical health quality of life (n=345)

Predicting variable	b	SE_b	Beta	t	p-value
Age	4.947	0.900	0.273	5.496*	.000
Resilience	0.122	0.022	0.287	5.526*	.000
Self-care behavior	-0.154	0.064	-0.127	-2.424*	.016
Education	-2.236	0.900	-0.124	-2.484*	.013
Gender	-1.832	0.903	-0.101	-2.028*	.043
Constant score	36.284	3.122			
$R = 0.428$ $R^2 = 0.183$ $R^2_{adj} = 0.171$ $F = 15.183^*$ p-value = .000					

*p = .05; b = standardized regression; SE_b = standard error of b; t = t-statistic; p-value = significance for the variables with all other independent variables entered in the model; R = multicorrelation coefficient; R^2 = multiple regression correlation coefficient; R^2_{adj} = adjusted R^2 value.

Raw score regression equation:

$$Y_{\text{physical health quality of life}} = 36.284 + 4.947_{\text{age}} + 0.122_{\text{resilience}} - 0.154_{\text{self-care behavior}} - 2.23_{\text{education Ò}} - 1.832_{\text{age}}$$

Standard score regression equation:

$$Z_{\text{physical health quality of life}} = 0.273_{\text{age}} + 0.287_{\text{resilience}} - 0.127_{\text{self-care behavior}} - 0.124_{\text{education}} - 0.101_{\text{age}}$$

Table 3. Analysis of variables that influence mental health quality of life among older people with diabetes and an equation for mental health quality of life (Stepwise) (n=345).

Predicting variables	B	SE_b	Beta	t	p-value
Resilience	0.128	0.023	0.301	5.596*	.000
Self-care behavior	-0.229	0.065	-0.188	-3.503*	.001
Marital status	2.039	0.949	0.110	2.148*	.032
Constant	39.449	3.166			
$R = 0.328$ $R^2 = 0.107$ $R^2_{adj} = 0.099$ $F = 13.663^*$ p-value = .000					

*p = .05; b = standardized regression; SE_b = standard error of b; t = t-statistic; p-value = significance for the variables with all other independent variables entered in the model; R = multicorrelation coefficient; R^2 = multiple regression correlation coefficient; R^2_{adj} = adjusted R^2 value

Raw score regression equation:

$$Y_{\text{mental health quality of life}} = 39.449 + 0.128_{\text{resilience}} - 0.229_{\text{self-care behavior}} + 2.039_{\text{marital status}}$$

Standard score regression equation:

$$Z_{\text{mental health quality of life}} = 0.301_{\text{resilience}} - 0.188_{\text{self-care behavior}} + 0.110_{\text{marital status}}$$

Differences in age affect quality of life in people suffering from chronic illnesses. Younger people with cancer and those with chronic heart failure have reported better quality of life than older individuals (Li *et al.,* 2012). Discussions about such findings reflect the belief that younger people are more likely to enjoy better health than the elderly. With regards to the aging process and their chronic illnesses, elderly persons' declining health is another important factor that affects their quality of life. Using multiple regression analysis, the presented study found age to be a predictor of quality of life ($b=0.273$, $p<0.05$).

According to the health-promotion concepts of Bandura (2004), self-care behavior is an important factor that influences quality of life. The results of the present study

confirmed Bandura's concept, whereby self-care behaviors can predict levels of both mental and physical quality of life (b=-0.188,-0.127). A study by Huang and Hung (2007) found that promoting good self-care behavior for diabetics resulted in better quality of life; conversely, negative behavior has been observed to cause a worsening of the quality of life in people with chronic heart failure (O'Connell *et al.,* 2011).

In terms of education, most participants in the present study were educated only up to primary school level. That group showed better self-care and had a higher quality-of-life score than the second-largest group: those who were illiterate. Similar findings regarding the effect of education were obtained by Huang and Hung (2007) among Taiwanese diabetics. A further demonstration of more highly educated people with diabetes tending to have better self-care and a higher quality of life can be found in Alguwaihes and Shan's study (2009). Conversely, lower educated African-American patients with heart failure displayed lower quality of life (O'Connell *et al.,* 2011).

Marital status appears to be less associated with psychological and spiritual conditions, which implies less of an association with quality of life (Vahia *et al.*, 2011). It was found to be the poorest predictor of mental quality of life (b = 0.110). In contrast, diabetics without a spouse showed lower quality-of-life results than those living with a spouse (Jelsness-Jorgensen *et al.,* 2011). Other studies have found marital status to bear no relationship to the quality of life (Huang and Hung, 2007). This may be explained by the fact that marital status does not necessarily correspond to family support, and diabetics may receive support outside the family.

The trend with many modern societies is toward treating people equally in most circumstances. People are increasingly brought up to assume fewer differences between the sexes. Gender had the lowest potential for predicting physical quality of life (b=-0.101). Women had higher quality-of-life scores than men. This result was similar to results from cancer patients at hospice care units (Kutner *et al.,* 2003). Lessan-Pezeshki and Rostami (2009) observed that men had higher quality-of-life scores than women; another study found no relationship between gender and quality of life (Bruscia *et al.,* 2008). Our conclusion is that gender is not a strong factor in influencing the quality of life.

4.1 Limitations

The cross-sectional design of this study permitted data collection at a specific time point, whereas quality of life is dynamic. In addition, this design did not allow causality to be determined. A longitudinal study is required to confirm our findings and serve as a basis for interventions to promote the quality of life of older people with diabetes.

5. Conclusions

This study found that resilience is a personal characteristic that can remarkably influence both mental and physical quality of life. We also determined that self-care behavior affects quality of life as a whole. The personal characteristics of age, gender, education, and marital status had limited effects on quality of life. Our findings regarding such personal characteristics are similar to those of many previous studies, which demonstrated that they exerted either a limited effect or no effect on quality of life. It is therefore reasonable to conclude that other factors and processes affect quality of life. Further studies are required to identify such potentially important factors.

The recognition that resilience and self-care behavior affect quality of life underlines the importance of resilience in an individual. The practices that lead to the promotion of better mental and physical health in diabetics may also benefit people with other chronic illnesses.

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