

การศึกษาความสัมพันธ์ระหว่างความยุ่งยากจากการเป็นเบาหวานและการจัดการตนเอง ของผู้เป็นเบาหวานชนิดที่ 2 ชาวภูฏาน

Exploring the Association between Diabetes Distress and Diabetes Self-management Among Bhutanese People with Type 2 Diabetes Mellitus

นิพนธ์ฉบับ

Original Article

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วารสารไทยเภสัชศาสตร์และวิทยาการสุขภาพ 2564;16(4):317-323.

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาความยุ่งยากจากการเป็นเบาหวาน และการจัดการตนเอง และศึกษาความสัมพันธ์ระหว่างความยุ่งยากจากการเป็นเบาหวานและการจัดการตนเอง ของผู้เป็นเบาหวานชนิดที่ 2 ชาวภูฏาน **วิธีการศึกษา:** เป็นการศึกษาเชิงพรรณนาเพื่อหาความสัมพันธ์ในชาวภูฏานที่เป็นเบาหวานชนิดที่ 2 จำนวน 105 คน ที่มารับการรักษา ณ คลินิกเบาหวาน โรงพยาบาล จิกมี ดอร์จี วังชุก ประเทศภูฏาน คัดเลือกตัวอย่างด้วยวิธีการสุ่มอย่างง่าย เครื่องมือวิจัยประกอบด้วย แบบสอบถามความยุ่งยากจากการเป็นเบาหวาน และแบบสอบถามการจัดการตนเองสำหรับผู้เป็นเบาหวาน วิเคราะห์ข้อมูลด้วยสถิติเชิงพรรณนาและการวิเคราะห์สัมประสิทธิ์สหสัมพันธ์ของเพียร์สัน **ผลการศึกษา:** กลุ่มตัวอย่างมีค่าเฉลี่ยคะแนนการจัดการตนเองเท่ากับ 7.6 ($SD = 1.03$) โดยร้อยละ 90.5 ของกลุ่มตัวอย่างมีคะแนนเฉลี่ยการจัดการตนเองอยู่ในเกณฑ์ดี และร้อยละ 9.5 มีคะแนนเฉลี่ยต่ำกว่าเกณฑ์ ($M \leq 6$) กลุ่มตัวอย่างทุกคนมีคะแนนเฉลี่ยความยุ่งยากจากการเป็นเบาหวานต่ำ ($M = 1.4, SD = 0.23$) ความยุ่งยากจากการเป็นเบาหวานมีความสัมพันธ์ทางลบกับการจัดการตนเองโดยรวมอย่างมีนัยสำคัญทางสถิติ ($r = -0.300, P\text{-value} = 0.002$) และความยุ่งยากจากการเป็นเบาหวานมีความสัมพันธ์ทางลบอย่างมีนัยสำคัญทางสถิติกับการจัดการตนเองรายด้าน ได้แก่ การควบคุมระดับน้ำตาลในเลือด ($r = -0.244, P\text{-value} = .016$) และการควบคุมอาหาร ($r = -0.193, P\text{-value} = 0.048$) แต่ไม่มีความสัมพันธ์ทางสถิติกับการจัดการตนเองด้านการมีกิจกรรมทางกายและการใช้การบริการทางสุขภาพ **สรุป:** ควรมีการประเมินและหาวิธีการจัดการความยุ่งยากจากการเป็นเบาหวานอย่างสม่ำเสมอ เพื่อส่งเสริมให้ชาวภูฏานที่เป็นเบาหวานชนิดที่ 2 จัดการตนเองได้ดีในการควบคุมระดับน้ำตาลในเลือด เพื่อลดความเสี่ยงภาวะแทรกซ้อนจากเบาหวาน

คำสำคัญ: การจัดการตนเอง, ความยุ่งยากจากการเป็นเบาหวาน, การควบคุมระดับน้ำตาลในเลือด, เบาหวานชนิดที่ 2, ชาวภูฏาน

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Abstract

Objective: To explore diabetes distress and diabetes self-management and its association among the Bhutanese people with type 2 diabetes mellitus (T2DM). **Methodology:** In this descriptive correlational study, 105 participants with T2DM who came to diabetes clinic of Jigme Dorji Wangchuck National Referral Hospital (JDWNRH) were recruited by a simple random sampling method. Research instruments included the Diabetes Self-Management Questionnaires (DSMQ) and the Diabetes Distress Scale (DDS). Descriptive statistics and Pearson's correlation were used to analyze the data. **Results:** Participants had mean DSM score of 7.76 ($SD = 1.03$), 90.5% of participants reported high scores of the DSM, however, 9.5% of them had scores ≤ 6 which indicated sub-optimal self-management. The results also revealed that 100% of the participant had no to little diabetes distress with the mean diabetes distress score of 1.40 ($SD = 0.23$). Results from Pearson's correlation analysis showed that diabetes distress had significant negative association with overall DSM ($r = -0.300, P\text{-value} = 0.002$), and the DSM subscales; glucose management ($r = -0.244, P\text{-value} = 0.016$) and dietary control ($r = -0.193, P\text{-value} = 0.048$). However, there were no significant correlations between DD and physical activity subscale and healthcare use subscale of the DSM. **Conclusion:** Regular assessment and management of diabetes distress among people with T2DM is necessary for DSM improvement with the aim to promote good glycemic control and reduce the risk of diabetes complications.

Keywords: diabetes self-management, diabetes distress, glucose management, type 2 diabetes mellitus, Bhutanese

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Introduction

People living with diabetes mellitus (DM) is on the rise around the world. The International Diabetes Federation (IDF) (2019) estimates an increase in the number of people living with DM by 74% in South East Asia region in 2045 as compared to 2019. The prevalence rate of DM in Bhutan is estimated at 10.3% of the total population, where 1 in every

12 adult is affected.¹ DM is a chronic condition that requires individuals to manage and control the condition throughout their lives. Uncontrolled DM increases the risk for microvascular and macrovascular complications thus leading to increase mortality.² The treatment of T2DM focuses mainly on controlling blood glucose level and preventing any

complications related to high blood glucose which could be accomplished by extensive diabetes self-management (DSM).³ DSM involves changing behaviors and altering lifestyles such as adhering to diabetes medication regimen, healthy diet, and regular physical activity.⁴ DSM requires intensive and long-term commitment from the people living with DM. Proper adherence to glucose-lowering medication helps in reducing HbA1C effectively, with 1.14% reduction in HbA1c seen in adherent-to-medication group opposed to only 0.75% reduction seen in non-adherence to medication group.⁵ Medical nutrition therapy focusing on healthy diet comprising of low carbohydrates and low fat was seen to reduce HbA1C level by 0.3 to 2% among people with T2DM.⁶ Similarly, exercise among people with T2DM was found to reduce HbA1C by an average of 0.66%.³ Interestingly, 61.8% of people with T2DM in Bhutan were found to have low to medium adherence to diabetic medications.⁷ Healthy eating behavior and adherence to physical activity among Bhutanese diabetics were at moderate level.⁸ In addition, 46% to 72% of Bhutanese people with T2DM were found to have uncontrolled DM^{7,8,9}, suggesting sub-optimal DSM in the country.

Apart from increased physical and financial burden, people living with DM also face psychological burden, caused by constant need to adhere to long-term treatment regimen to manage their chronic condition and control the occurrence of complications.³ They face challenges to do several activities such as adhering to complex medication and dietary regimen, daily physical activities and periodic visits to doctor's clinic, repetitively over their lifetime, which are complicated and demanding. Psychological burden can cause emotional distress and negatively impact the ability of people to carry out diabetes care activities, thus impacting overall health care.^{3,10} This emotional distress is termed as '*diabetes distress*,' which is manifested as various ranges of negative psychological responses such as worry, conflict, frustration and discouragement.¹¹ A systemic review showed 36% prevalence of diabetic distress among people with T2DM¹², but there are no data about diabetes distress among the Bhutan people with T2DM until now. Diabetes distress, which is a form of stress can increase glucose level through physiological mechanism, thus leading to difficulty controlling blood sugar level in diabetic people presenting with diabetes distress.¹³

The individual and family self-management theory (IFSMT)¹⁴ suggests that self-management behaviors can have impact on the ability of people with chronic illness to effectively

control their emotions. Diabetes distress significantly impacts medication adherence and results in poorer dietary and exercise behaviors.³ A study in Singapore found that there are significant and negative association between diabetes distress and DSM among people with T2DM.¹⁵ Similar association was seen among people with diabetes in another study in the US.¹⁶ People with T2DM has identified diabetes distress as one of the barriers to effective self-management.¹⁷ Furthermore, diabetes distress is found to reduce the self-efficacy to carry out diabetes self-management activities and lower perception of control diabetes among people living with DM.^{3,18} A similar study in Malaysia found that diabetes distress lowered diabetes self-efficacy, thus resulting in the poor self-care among the participants.¹¹

Currently, information examining the relationship between diabetes self-management and diabetes distress among the Bhutanese people with T2DM is lacking. The findings from studies conducted in other countries might not be applicable to the Bhutanese population because of the different traditions, cultures and health care system in the country. The objectives of the study were to examine diabetes distress and DSM and explore the relationship between them among the people living with T2DM in Bhutan. We hypothesized that there would be a significant association between diabetic distress and DSM among Bhutanese people with T2DM. The results of the study could be used as an evidence to show the importance of addressing the issues of diabetes related to distress when focusing on promoting of self-management skills of the Bhutanese patients with T2DM.

Methods

A descriptive correlational design was used to conduct the study. This study was approved by the Institutional Review Board (IRB) of Burapha University, Thailand (IRB number G-Hs 005/2563) and the Research Ethical board of Ministry of Health (REBH), Bhutan (REBH/Approval/2020/001). The sample size was calculated using G* power with small effect size of 0.25, alpha of 0.05 and power of .80, with assuming a 10% of nonresponse rate. A total of 107 participants were recruited from people with T2DM who visited the diabetes clinic at Jigme Dorji Wangchuk National Referral Hospital (JDWNRH) over the period of one month. Participants who met the inclusion criteria which included being adult aged 18 to 60 years old, having no severe physical and mental

disability, being able to read and write simple English, and living with T2DM for at least 6 months were recruited into the study using a simple random sampling method. However, there were 2 incomplete responses, therefore, 105 participants were used in the analysis.

Research instruments

Participants were requested to complete three self-reported questionnaires (in English) in a private room. Research instruments were as follows. Demographic characteristics and health status of the participants were collected using the questionnaire developed by the researcher. Such data could be either reported by the patients themselves or collected from the health book of the participants.

The **diabetes distress** was assessed using the diabetes distress scale (DDS) which was developed by Polonsky and colleagues.¹⁹ This 17-items scale can be divided into four subscales namely emotional burden subscale (5 items), physical burden (4 items), regimen related diabetes distress (5 items), and interpersonal distress (3 items). Each item is scored on a 6-point Likert type scale and it can be scored both as means of individual subscales or mean of all subscale combined. A score of 2 or less indicates no or little distress, 2 to 2.9 indicates moderate diabetes distress, and 3 or more indicates high distress.²⁰ The internal consistency reliability was acceptable with a Cronbach's alpha coefficient of 0.68 for this study.

Diabetes self-management was measured using the Diabetes self-management questionnaire (DSMQ) developed by Schmitt and colleagues.²¹ It is made up of 16 items, which can be divided into four subscales, specifically glucose management subscale (5 items), dietary control subscale (4 item), physical activity subscale (3 items) and health care use subscale (3 items). One item (item 16) is included only in the 'sum score' and does not fall into any subcategory. Each item is scored on a 4-point Likert scale and the final score is converted to be between 0 to 10, which is achieved by dividing the actual score by theoretical full score and then multiplying it by 10. The final score can be given as either a total score of all the subscales combined or of individual subscales. Higher score shows optimal diabetes self-management.²¹ A total score of less than 6 is used as a cut-off point to indicate suboptimal diabetes self-management.¹⁰ In this study, internal

consistency reliability was found to be acceptable with a Cronbach's alpha coefficient of 0.66.

Data analysis

Descriptive statistics was used to analyze the demographic characteristics and health status data of the participants. In correlation analysis, assumptions of Pearson's correlation (normality, linearity and homoscedasticity) were tested and met during preliminary data analysis. Thereafter, the association between diabetes distress and diabetes self-management and its subscales was analyzed by performing Pearson's correlation test. Statistical significance was set at a type I error of 5%. The Minitab17 software was used to perform all the statistical tests for this study.

Results

Of the 105 participants, 55.2% of the participants were female (Table 1). The mean age of the participants was 49.6 years (SD = 8.06), with 84.8 % (n = 89) of them aged between 40 to 60 years old. More than half of the participants (64.8%) had education level of primary or lower. Most of them (92.4%) were married and lived with family. 91.3% of the participants declared they had adequate family income for their daily use.

The diabetes distress score of all participants (100%) were less than 2, with a mean score of 1.40 (SD = 0.23), which indicated that all the participants had no to little diabetes distress (Table 2). Considering the diabetes distress subscale, the emotional burden diabetes distress had the highest mean score of 1.81 (SD = 0.49), followed by regimen related diabetes distress with mean score of 1.36 (SD = 0.31). Physician related diabetes distress and interpersonal diabetes distress had an equal mean score of 1.16 (SD = 0.25 and 0.31 respectively).

The mean score of diabetes self-management (DSM) among the participants was 7.76 (SD = 1.03), which indicated that the participants had optimal level of DSM (> 6) (Table 3). The results showed that 90.48% of the participants had optimal level of DSM, while only 9.52% of them had suboptimal DSM. DSM consisted of four subscales and the mean of glucose management subscale, dietary control subscale, physical activity subscale and health care use subscale were 7.59 (SD = 1.52), 7.61 (SD = 1.45), 7.02 (SD = 2.18) and 8.73 (SD = 1.60), respectively.

Table 1 Demographic characteristics and health status of participants (N = 105).

Characteristics	n (%)
Gender	
Male	47 (44.8)
Female	58 (55.2)
Age (years)	
18 - 40	16 (15.2)
41 - 60	89 (84.8)
Mean = 49.6, SD = 8.06	
Education level	
Less than Primary school	22 (21.0)
Primary school	46 (43.8)
Secondary/High school	27 (25.7)
Bachelor's degree and higher	10 (9.5)
Marital status	
Married	97 (92.4)
Single	2 (1.9)
Divorced	1 (0.9)
Widowed	5 (4.8)
Family income (n = 103)	
Adequate	94 (91.3)
Inadequate	9 (8.7)
Income/month (n=102) (1 Nu = 0.014 USD)	
< Nu 5000	11 (10.8)
Nu 5000 – 30000	68(66.7)
> Nu 30000	23 (22.5)
Diagnosis duration (years)	
< 1	9 (8.6)
1 – 5	58 (55.2)
> 5	38 (36.2)
Mean = 6.22, SD = 6.2	
Body mass index (kg/m²)	
Normal (18.5 - 24.9)	26 (24.8)
Overweight (25 - 29.9)	54 (51.4)
Obese (> 30)	25 (23.8)
Mean = 27.9, SD = 4.6	
Diabetic related complications	
None	83(79.1)
1 complication	19 (18.1)
> 1 complication	3 (2.8)
Comorbidities	
None	34 (32.4)
1 comorbidity	64 (60.9)
>1comorbidities	7 (6.7)
HbA1c (%)	
Controlled (≤ 7)	65 (61.9)
Uncontrolled (> 7)	38 (36.2)
Mean = 7.21, SD = 2.16	

Table 2 Level of diabetes distress (N = 105).

Diabetes distress	n (%)	Possible score	Actual score	Mean	SD
Level of diabetes distress					
No or little distress	105 (100)	1 - 6	1 - 2	1.40	0.23
Diabetes distress					
Emotional Burden (EB)		1 - 6	1 - 3	1.81	0.49
Physician related (PR)		1 - 6	1 - 2	1.16	0.25
Regimen related distress (RD)		1 - 6	1 - 2	1.34	0.31
Interpersonal distress (ID)		1 - 6	1 - 2	1.16	0.31

Table 3 Level of diabetes self-management (DSM) (N = 105).

Diabetes self-management	n (%)	Possible score	Actual score	Mean	SD
Level of DSM					
Suboptimal (≤ 6)	10(9.52)	0 - 10	5.4 – 6.0	5.80	0.23
Optimal (> 6)	95(90.48)	0 - 10	6.2 – 9.7	7.96	0.85
DSM score					
Overall		0 – 10	5.4 – 9.8	7.76	1.03
Subscales					
Glucose management		0 – 10	3.3 – 10	7.59	1.52
Dietary control		0 – 10	1.7 – 10	7.61	1.45
Physical activity		0 – 10	1.1 – 10	7.02	2.18
Health care use		0 - 10	3.3 – 10	8.73	1.60

Results from Pearson's correlation test revealed that there was a significant, moderate, negative correlation between total diabetes self-management (DSM) and total diabetes distress ($r = -0.30$, P -value = 0.002) (Table 4). It was also found that total diabetes distress has significant and negative low correlation with the glucose management and dietary control subscales of DSM ($r = -0.24$, P -value = 0.016 and $r = -0.19$, P -value = 0.048), respectively. However, diabetes distress had no significant association with physical activity or health care use subscales of DSM.

Table 4 Correlation (r)* between diabetes self-management and diabetes distress (N = 105).

Variables	Diabetes distress	P -value
Diabetes self-management	-0.30	0.002
Glucose management subscale	-0.24	0.016
Dietary control subscale	-0.19	0.048
Physical activity subscale	0.03	0.766
Healthcare use subscale	-0.15	0.138

* Pearson's product moment correlation coefficients.

Discussions and Conclusion

All participants of this study (100%) were found to have no to little diabetes distress with a mean score of 1.4 (SD = 0.23), which is different from previous studies conducted in other countries where diabetes distress were higher.^{10,15,22,23} Further analysis of the diabetes distress subscales revealed that the mean score of emotional burden subscales was comparatively higher ($M = 1.81$, $SD = 0.49$) than the mean scores of other subscales including physical distress, regimen distress, and interpersonal distress, which is similar to results from studies in India.^{22,24}

Many individual and environmental factors could explain the absence of diabetes distress among all the participants of this study. Studies have shown that people with multiple comorbidities^{23,25} and development of diabetes-related complications present themselves with higher diabetes distress.^{23,25} However, in this study, less proportion of participants presented themselves with complex and multiple comorbidities (6.7%) and diabetes related complications (20.9%) compared to participants in two previous studies (21% & 45.3%, and 63.3% & 50%, respectively)^{23,25}, thus experiencing no or little distress. The free health services provided in Bhutan and the claims of participants having adequate income might have contributed to participants having no distress. Results from a study showed that low income people have higher emotional burden, regimen distress and interpersonal distress.²² In this study, only 22.5% of the participants had family income less than Nu 5000 (1 Nu = 0.014 USD) in a month which can be considered low income category (Poverty line in Bhutan set at a cut-off at Nu 2195.95 per person per month²⁶), compared to 61.5% of participants falling under the low-income category in study in Iran.²² Additionally, a study in Bangladesh showed that monthly income could significantly predict diabetes distress.²⁷ Social support was found to have a buffering effect and help reduce overall diabetes distress.²⁸ Studies showed that social support from family and friends have significant correlation with diabetes distress.^{29,30} Majority of the participants in this study were married and living with family. Traditionally, Bhutanese people live in joint family, where family members help and support each other. Bhutanese people are religious (dominantly Buddhist), where people believe in the social values of "Tha damtshig" which means "a commitment to be loyal, love and help other people" which is unique in Bhutanese society.³¹ This traditional and religious way of life, contributing to increased level of social support might result in no or low diabetes distress experienced by participants in this study. A study showed that 61.9% (n = 65) have good control over their glucose level, which might also influence in lowering diabetes distress.³²

Results from the study showed that majority of the participants (90.48%) has DSM score of > 6, which indicated an optimal level of DSM.¹⁰ Further analysis of the DSM subscale revealed that the participants reported the highest score in healthcare use subscale (M = 8.73, SD = 1.60), followed by the dietary control (M = 7.61, SD = 1.45), glucose

management (M = 7.59, SD = 1.52), and the lowest score in physical activity subscale (M = 7.02, SD = 2.18).

It is suggested by the IFSMT¹⁴ that many factors such as individual and family characteristics, complexity of the health conditions or the environment around a person have an influence on how people manage their health conditions. The mean age of 49.6 (SD = 8.06) years of the participants of the study showed that participants were middle aged people. These individuals were physically healthy and mentally sound to carry out self-care activities effectively and consistently, thus resulting in optimal DSM level in comparison to older adults who are physically and cognitively challenged to carry activities required as part of diabetes self-care management.^{33,34} The expense incurred for maintaining effective diabetes self-management such as cost of medications and buying healthy food hampers DSM activities.³⁵ However, the majority of the participants (91.3%) in this study claimed that they earn adequate monthly income. Additionally, Bhutanese people enjoy universal health coverage paid by the royal government of Bhutan. The financial burden faced by the participants is minimal, thus they could carry out DSM activity effectively as needed. In accordance with the IFSMT¹⁴, people tend to give low priority to DSM when they face more number and more severe comorbidities³⁶ and poor DSM is seen in people who develop diabetes complications.³⁷ However, in this study, only small portion of the participants (2.8%) had developed more than two diabetes related complications and only 6.7% of them reported having more than two comorbidities, which has resulted in people exhibiting better DSM levels. Finally, it was found that people who have spouse helping them manage T2DM were found to have better DSM behaviors than those who are single, widowed or divorced³⁸, as seen with the participants in this study.

As suggested by the IFSMT of Ryan and Sawin¹⁴, the results from Pearson's correlation test show that there was significant negative, moderate correlation between total DSM and total diabetes distress. A similar relationship was revealed between diabetes distress and DSM in a study conducted in Singapore.^{15,16} Diabetes distress is found to be negatively associated with DSM, because it lowers self-efficacy of the person and lowers the perception of control over the disease^{3,18} and low self-efficacy is associated with poorer DSM.³⁹

The results further showed that diabetes distress was negatively correlated with glucose management and dietary control subscales of DSM, whereas there was no association between diabetes distress and physical activity and healthcare use subscale of DSM. People with high diabetes distress were found to have low adherence to medications compared to people with lower distress⁴⁰, thus possibly impacting glucose management. More distressed participants were found to have less adherence to dietary and exercise regimen.⁴¹ The absence of association between diabetes distress and healthcare use subscale can possibly be explained by the easy accessibility and free health-care system of Bhutan, where people with T2DM do not feel burdened when they need to access healthcare services.

In this study, participants had no to little diabetes distress owing to many factors such as good social support, few number of comorbidities and diabetes-related complications, lower financial burden, good physical and mental health, which has in turn led to participants exhibiting comparatively higher DSM, with 90.48% of the participants demonstrating optimal level of DSM.

The study finding showed that majority participants had optimal level of DSM, where participants score highest in health care use and lowest in physical activity. It was also found that the participants had no to little diabetes related distress. However, it was seen that they had higher emotional burden compared to other types of diabetes distress. It also revealed a significant association between diabetes distress and DSM and its subscales. The findings support the need for psychological assessment for diabetes distress and its determinants among the Bhutanese people living with T2DM. It provides evidence for the health care providers to include routine evaluation for diabetes distress and help the people in management of diabetes distress, which can result in the enhancing diabetes management, improve blood glucose control and delay the occurrence of complications. The study also suggests the need for nurses and diabetic educators to create programs which can encourage people of T2DM to exercise more and adhere to healthier diet to maintain optimal body weight and body mass index. There is also a need to reinforce the people about adhering diabetes self-management activities including strict adherence to diabetic medications because 36.2% of the participants had uncontrolled diabetes.

A similar study should be carried out in hospital in different regions of Bhutan, including wider range of population to help increase generalization of study results. Instruments adapted to fit the general Bhutanese population for future study might help improve the quality of the study.

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