Short Communication

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The Characteristics of Pruritus in Thai Type2 Diabetic Patients and its Impact on their Dermatology Life Quality Index

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Abbreviations: T2DM: Type 2 Diabetes Mellitus; DLQI: Dermatology Life Quality Index; NRS: Numeric Rating Scale

ABSTRACT

Background: Dermatological manifestations in diabetes mellitus include those due to disease itself, as well as complications and their respective treatments. Pruritus often presents with cutaneous manifestations, causing psychological distress and leading to scratching. Data showing an association between pruritus and health-related quality of life in Thai type-2 DM (T2DM) patients are still lacking. Our study concerns itself with effects of type-2 DM in an urban area, and ways to improve the physical and psychological quality of life of patients.

Objectives: The purpose of the present study was to evaluate the dermatologic quality of life among Thai T2DM patients with pruritus, and the association between plasma glucose level and degree of itching.

Materials and Methods: The study included Thai T2DM patients with pruritus, aged 18 years or above, and who attended the outpatient DM Clinic at Vajira Hospital. Their previous plasma glucose, HbA1C level and personal histories were recorded. They were also asked to complete the questionnaire regarding Dermatologic Life Quality Index and Itching Numeric Sating Scale.

Results: 300 T2DM patients with pruritus were enrolled in this study. The average plasma glucose level was 160 mg/ dL, and HbA1C level was 7.9%. We found no specific area of pruritus and most of the people have pruritus in more than one area. Most of our subjects have a mild to moderate degree of pruritus. Our study found that serum HbA1C levels above 6.5%, and previous topical steroid and topical moisturizer no usage were significantly associated with pruritus. We found that dry skin and sweating were statistically aggravating factors after multivariate analysis. There is a strong association between education, marital status and DLQI score.

Conclusion: Our study found that the control of HbA1C level, and no usage of topical steroids and moisturizers were statistically associated with clinical pruritus. Although our study showed that pruritus had small effects on quality of life, we also found that moisturizer usage significantly helps to improve clinical pruritus. Thus, giving moisturizer to all T2DM patients may help to improve and prevent their pruritus symptoms.

Short Communication

Type 2 diabetes mellitus (T2DM) is a major health problem in Thailand. Nowadays, up to 800 patients per month register in Thai DM clinics to follow up their illness. T2DM systematically affects the body in both long-term and short-term outcomes [1,2]. Long-term effects of T2DM cause serious common consequences such as diabetic retinopathy, peripheral neuropathy, diabetic nephropathy,

and diabetic dermopathy, while short-term effects cause troublesome symptoms such as fatigue, abnormal weight change, and insomnia. These symptoms are known to adversely affect patients' quality of life and mental health [1-3]. Dermatological manifestations in diabetes mellitus are due to disease itself, complications and their treatments. Dermatologic lesions associated with diabetes mellitus are classified into disease specific and non-specific symptoms. Consequences of neurovascular complications such as macroangiopathy, microangiopathy, and diabetic neuropathy are also formed [4-6].

Diabetic treatments can cause various dermatologic lesions. Treatment with insulin can cause allergic reactions, lipoatrophy, and insulin edema [5,6]. It has also been found that some conditions are associated with diabetics than nondiabetics such as lichen planus, eruptive xanthomas, perforating dermatosis, vitiligo, and yellow nails [5,6]. Pruritus, or itching, involves cutaneous manifestations over extended periods and often causes patients psychological distress, and causes which leads to skin infection [7,8]. Common causes of pruritus in dermatological conditions are atopic dermatitis, urticaria, psoriasis, and insect bite. However, systemic medical conditions include chronic renal failure, jaundice, chronic hepatitis, diabetes mellitus, and thyrotoxicosis [9-12]. To our knowledge, there are some studies about the association between plasma glucose level and pruritus. They found that higher plasma glucose levels are significantly associated with a greater prevalence of pruritus in T2DM patients [9].

T2DM is associated with quality of life in many areas such as family, daily life, and self-esteem [13]. Histamine level is associated with pruritus; hence, antihistamines are considered to play a role in the reduction of itching. However, there is no standard treatment guideline for regularly using antihistamine in T2DM patients [14-16]. Nevertheless, the data for an association between pruritus and health-related quality of life in Thai T2 DM patients are still lacking. Therefore, the purpose of our study was to evaluate the dermatology quality of life among Thai T2DM patients with pruritus and the association between plasma glucose level and degree of itching using Dermatology Life Quality Index (DLQI) questionnaires and the Itching Numeric Rating Scale (NRS) [17,18]. The factors considered included age, gender, educational degree, and duration of type 2 DM [1].

Materials and Methods

This study was approved by Vajira Hospital Institutional Review Board. The study design was a prospective descriptive study. Thai T2DM patients with pruritus, aged 18 years over, and who attended the out-patient DM Clinic at Vajira were included in the study. All of the other causes of pruritus (atopic dermatitis, urticaria, psoriasis, cutaneous fungal infection, contact dermatitis) and the other systemic conditions associated with pruritus such as chronic renal failure, jaundice, chronic hepatitis, thyrotoxicosis, and hematologic malignancy were excluded from the study.

Statistical Analysis

All analyses were performed by using SPSS software version 22.0. Continuous data were described as mean and standard deviation. The statistical comparisons of the DLQI results between subpopulations were performed by using Fisher's exact test and Mann-Whitney U Test. A p-value < 0.05 was considered statistically significant. Correlation analysis was made by using Spearman's Correlation Test [19-21].

Results

Of the 300 patients enrolled, 177 patients were female, and the rest were male. Table 1 shows demographic data in patients studied. Almost half of them were unemployed. More than fifty percent of them were married and living with their spouse. One hundred and fifty-nine patients graduated from primary school. The average duration for having DM was nine years, and the average plasma glucose level was 160 mg/dL while average HbA1C level is 7.9%. Table 2 shows the characteristics of pruritus in our patients studied. We found no specific area of pruritus and most of the people have pruritus in more than one area. Approximately forty percent of the patients mentioned that head, neck, body, and lower extremities are the most itch areas, while upper extremities are less affected. After univariate and multivariate analysis, our study found that serum HbA1C level above 6.5%, no usage of topical steroids and topical moisturizer were significantly associated with pruritus, while anti-histamine usage, serum fasting plasma glucose >126 mg/dL, and having diabetes for over 10 years were not relevant factors in pruritus (Data shown in Table 3).

Table 1: Demographic data of subjects (n=300).

	No	%
Gender		
Male	123	(41.0)
Female	177	(59.0)
Age (Years Old)	63.80±12.67	
Occupation		
No occupation	138	(46.0)
Employee	66	(22.0)
Government officer	33	(11.0)
Own business	45	(15.0)
Retired	15	(5.0)
Others	3	(1.0)
Educations		
No education	13	(4.3)
Primary school	159	(53.0)
Secondary school	82	(27.3)
Bachelor or above	46	(15.3)
Marital Status		
Married and living together	158	(52.7)
Married but not living together	11	(3.7)
Single	65	(21.7)
Divorced	3	(1.0)

Table 2: Characteristics of pruritus of subjects (n=300).

Pruritus Data		
Head, Face, and neck	135	(45.0)
Torso	135	(45.0)
Thigh, leg and foot	124	(41.3)
Arm, forearm, and hand	16	(5.4)
Topical Medication	64	(21.3)
Topical corticosteroid (NO)	31	(10.33)
Moisturizer (NO)	28	(9.3)
Oral medication used	21	(7.0)
Oral antihistamine	17	(5.66)
Other	5	(1.6)

Data are presented as n (%)

Table 3: The association of pruritus with relevant factors.

Factors	Univariable Analysis			Multivariable Analysis		
	OR	95%CI	p-value	O_{Radj}	95%CI	p-value
Duration of DM (yrs) <10 ≥10	1.96	(0.83-4.62)	0.126	1.70	(0.67-4.30)	0.265
FBS ≤126 mg/dl >126 mg/dl	0.91	(0.37-2.20)	0.826	1.39	(0.51-3.74)	0.519
HbA1c <6.5 % ≥6.5 %	0.20	(0.08-0.49)	<0.001	0.20	(0.08-0.52)	0.001
Topical Steroid No Yes	4.93	(1.6-15.13)	0.005	4.21	(1.17-15.11)	0.027
Moisturizer No Yes	3.85	(1.39-10.69)	0.010	3.93	(1.32-11.72)	0.014
Oral Antihistamine No Yes	1.48	(0.32-6.84)	0.618	1.26	(0.22-7.30)	0.797

Table 4 shows the numeric rating scale in each range and average score. Our study shows VAS mean score were3.15±1.93. of our subjects had a mild to moderate degree of pruritus. Table 5 shows associated factors that affect pruritus. We found that dry skin, sweating, and cold weather were statistically aggravating factors (when using univariate analysis; p-value < 0.05). However, cold weather is not statistically significant after multivariable analysis. Table 6 shows DLQI score in our patients studied. Our study found that the mean DLQI score is 1.98. More than half of our subject responded that their quality of life was not affected by pruritus [22].

Table 4: Itching Numeric rating scale.

Itching Numeric Rating Scale		
VAS mean score	3.15±1.93	
Score		
0.0 - 2.9 (Mild)	129	(43.0)
3.0 - 6.9 (Moderate)	147	(49.0)
7.0 - 8.9 (Severe)	17	(5.7)
9.0 - 10.0 (Very severe)	7	(2.3)

Data are presented as n (%) or mean±SD.

Table 5: Univariable and multivariable analysis of factors associated with pruritus.

Factors	Univariable analysis			Multivariable analysis		
	OR	95%CI	p-value	O_{Radj}	95%CI	p-value
Stress	1.93	(0.43-8.69)	0.390	0.70	(0.12-4.27)	0.703
Dry skin	3.23	(1.69-6.19)	<0.001	2.14	(1.01-4.57)	0.048
Warm bathe	2.20	(0.83-5.84)	0.113	1.56	(0.53-4.58)	0.420
Cold bathe	3.11	(0.40-24.36)	0.281	1.53	(0.17-13.54)	0.704
Sweating	6.06	(2.85-12.86)	<0.001	5.78	(2.67-12.51)	<0.001
Cold weather	3.14	(1.08-9.12)	0.035	1.78	(0.56-5.71)	0.330
Insomnia	3.22	(0.74-14.03)	0.119	1.95	(0.37-10.17)	0.428
Exercise	-	-	NA	-	-	NA
Natural Fabrics clothes	-	-	NA	-	-	NA
Synthetic Fabrics clothes	-	-	NA	-	-	NA

Table 6: DLQI score in our patients studied.

DLQI Score		
DLQI score	1.98±2.68	
DLQI		
No effect	166	(55.3)
Small effect	117	(39.0)
Moderate effect	9	(3.0)
Very large effect	7	(2.3)
Extremely large effect	1	(0.3)

Discussion

Type-2 diabetes mellitus (T2DM) is a systematic disease, in which multiple organs are involved including the dermatological system. The effects of T2DM to dermatological problems come from the disease, complications, and the consequences of treatment [1-3]. Pruritus (itching) is one of the most common clinical symptoms. It often presents in T2DM patients with adverse effects on their quality of life and mental status [7]. Of all the systemic diseases associated with pruritus, renal failure is probably the most common underlying disease. In diabetes mellitus, generalized pruritus is rare but localized pruritus is more frequent, especially in the perianal/genital region, and caused by fungal infection [23]. To date, there have been many studies about the association between plasma glucose level and pruritus [9,13]. They found that an elevated plasma glucose level is significantly associated with a greater prevalence of pruritus in T2DM patients [9,13]. Nevertheless, data for the association between pruritus and health-related quality of life in Asian T2DM patients are still lacking.

Our study showed that eighty percent of T2DM patients had mild to moderate pruritus (NRS 0.0 - 6.9). We found that most of them had clinical pruritus more to than one part of the body. The most affected areas were the face, torso, and lower extremities, while upper extremities were less affected. The diabetic profiles in our subjects were not well controlled. The average duration of having DM was nine years, average plasma glucose level was 160. Moreover, our study found that dry skin and sweating were statistically significant aggravating factors (p-value<0.05). After multivariable analysis, it seems that serum HbA1C level, topical steroid no usage, and topical moisturizer no usage were associated with pruritus in our study (p-value<0.05). In poorly controlled T2DM. Dry skin is a well-known factor which aggravates itching, so topical moisturizer is commonly effective, thus explaining its association with pruritus. There were strong associations between education, marital status and DLQI score (p-value < 0.05).

T2DM patients who have pruritus were affecting their quality of life. We found that mean DLQI score was 1.98, which means that pruritus has no, or a small, effect on their quality of life. Compared to other systemic diseases, our study had lower DLQI scores than others. Batalla et al. showed the DLQI in CLE had an extremely large effect on quality of life in more than half of the patients [24]. A study of DLQI in Thai patients with systemic sclerosis showed moderate impact on patients' dermatology-specific health-related quality of life, which is predominantly in pain and pruritus (mean DLQI score = 6.3) [21]. Boonsiri et al. reported DLQI in Thai dialysis patients showing the large impact on their quality of life, in which xerosis and pruritus were the most significant problems (mean DLQI score = 4.74) [12]. However, our study was done only in a government hospital. More than 40% of all patients had no job, and their education was below bachelor's degree level. The degree and frequency of dermatological involvement in T2DM disease, compared to other diseases such as ESRD, systemic sclerosis, and CLE seem to be less frequent. It means that dermatologic quality of life of individuals might vary due to socioeconomic, educational status, and specific systemic disease.

Conclusion

Our study found that the control of HbA1C level, usage of topical steroids and moisturizers are statistically associated with clinical pruritus. Dry skin and sweating were statistically aggravating

factors. Although our study found that pruritus had small effects on quality of life, we also found that use of topical steroids and moisturizers is significantly helps improve clinical pruritus. Thus, giving moisturizer to T2DM patients may help to improve and prevent their pruritus symptoms.

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