

การศึกษาการตรวจเท้าด้วยตนเองของผู้ป่วยเบาหวาน จังหวัดแม่ฮ่องสอน

ศิวาพร มหาทำนุโชค ส.ด.*¹

ภัทรมน พันธุ์แพง วท.ม.²

อัญชลี กีฬาแพง ส.ม.³

^{1,2} มหาวิทยาลัยราชภัฏเชียงใหม่ วิทยาเขตแม่ฮ่องสอน อำเภอเมือง จังหวัดแม่ฮ่องสอน

³ โรงพยาบาลส่งเสริมสุขภาพตำบลหมอกจำแป่ อำเภอเมือง จังหวัดแม่ฮ่องสอน

บทคัดย่อ

เบาหวานที่เท้าเป็นปัจจัยนำสำคัญที่ก่อให้เกิดภาวะต่อตัวผู้ป่วยเบาหวานเองรวมถึงระบบบริการสุขภาพ ดังนั้น การตรวจเท้าจึงมีความจำเป็นที่มีส่วนช่วยป้องกันปัญหาจากโรคเบาหวานที่อาจเกิดขึ้นได้กับเท้า วัตถุประสงค์ของการศึกษานี้ เพื่อศึกษาการดำเนินการ การใช้งาน การใช้ประโยชน์ และความพึงพอใจต่ออุปกรณ์สำรวจเท้าด้วยตนเองของผู้ป่วยเบาหวาน อาสาสมัคร คือ ผู้ป่วยเบาหวานจากการสุ่มตัวอย่างตามเกณฑ์ จำนวน 34 ราย ของโรงพยาบาลส่งเสริมสุขภาพตำบลหมอกจำแป่ อำเภอเมือง จังหวัดแม่ฮ่องสอน ดำเนินการรวบรวมข้อมูลการตรวจเท้าด้วยตนเองของผู้ป่วย ภายหลังจากการใช้อุปกรณ์สำรวจเท้าด้วยตนเอง ผู้ป่วยจะได้รับการประเมินถึงการใช้งาน การใช้ประโยชน์ และความพึงพอใจต่ออุปกรณ์ดังกล่าว

ดำเนินการวิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนา การวิเคราะห์เชิงประจักษ์ และ Wilcoxon Sign- Rank Test ผลการศึกษา พบว่า ผู้ป่วยส่วนใหญ่เป็นเพศหญิง ร้อยละ 79.40 อายุเฉลี่ย 57.53 ปี ส่วนเบี่ยงเบนมาตรฐาน 8.71 ผู้ป่วย ร้อยละ 61.76 ดำเนินการตรวจเท้าด้วยตนเอง ในจำนวนดังกล่าว ร้อยละ 55.89 ไม่ใช้อุปกรณ์อื่นช่วยในการตรวจเท้า และมีบางรายใช้กระจกเล็ก ๆ เป็นอุปกรณ์ อย่างไรก็ตาม ผู้ป่วยร้อยละ 38.24 ไม่ได้ดำเนินการตรวจเท้าด้วยตนเอง เมื่อผู้ป่วยได้ตรวจเท้าด้วยตนเองโดยใช้อุปกรณ์สำรวจเท้าด้วยตนเอง พบว่า อุปกรณ์มีคุณภาพในระดับดีด้านการใช้ประโยชน์สำหรับการตรวจเท้าด้วยตนเอง ค่ามัธยฐานของการใช้งานทางคลินิกภายหลังใช้อุปกรณ์มีค่าความสะดวกและประสิทธิผลเพิ่มขึ้นอย่างมีนัยสำคัญ ดังนั้น การตรวจเท้าโดยใช้อุปกรณ์สำรวจเท้าด้วยตนเองจึงช่วยเพิ่มความสนใจต่อการดูแลสุขภาพเท้า อย่างไรก็ตาม ควรได้รับการประเมินเพิ่มเติมในประเด็นผลลัพธ์ในระยะยาว และความคิดเห็นของผู้ให้บริการสุขภาพต่ออุปกรณ์ดังกล่าว

คำสำคัญ: เบาหวาน, ปัญหาที่เท้า, การตรวจเท้า, อุปกรณ์, นวัตกรรม

A study on the self-foot examination practice among diabetes patients, Mae Hong Son Province

Siwaporn Mahathamnuchock Dr.P.H.^{1*}

Phattharamon Phanpeang M.Sc.²

Aunchalee Keelapang M.P.H.³

¹Maehongson College, Chiang Mai Rajabhat University, Maehongson, Thailand

²Mok Champae Health Promoting Hospital Maehongson, Thailand

ABSTRACT

Diabetes mellitus (DM) foot problem is a major leading cause of burden on patients and the healthcare system. Therefore, foot examination is necessary to prevent the possible foot problem. The objectives of this research was to examine the self foot examination practice among DM patients with, and without self-foot examination device. The participants were recruited from 34 DM patients, Mueang Mae Hong Son District, Mae Hong Son Province, by criteria sampling. First, the data of self-foot examination practice without the self-foot examination device was collected. After using the self-foot examination device, the clinical usability, and the usefulness toward the device were assessed.

The data were analyzed using descriptive statistics, thematic analysis, and Wilcoxon Sign- Rank Test. The results showed the most of the patients were female (79.40%), the mean (SD) of age was 57.53 (8.71). The patients performed a foot examination by themselves (61.76%), of these groups, 55.89% had no the device to support the examination, and also used the small mirror as a device, in some cases. Hence, 38.24% had no performed a foot examination. The results shows were at a good level on the usefulness toward the self-foot examination device. The median of the clinical usability after the use of the device was statistically significantly higher than the median before clinical use in both convenient and effectiveness categories. Through the self-foot examination practice with the self-foot examination device was enhanced an attention on self-care of the foot. Nevertheless, long term outcome, and the opinion toward the device among healthcare provider needs to investigate.

Keywords: *Diabetes mellitus, foot problem, foot examination, device, innovation*

*Corresponding Author: Siwaporn Mahathamnuchock

Introduction

The diabetes mellitus (DM) in Thailand was a major public health problem that was in line with the world diabetic situation that reported in 2014 there were 8.5% of adults aged 18 years and older had diabetes. In 2016, diabetes was the direct cause of 1.6 million deaths and in 2012 high blood glucose was the cause of another 2.2 million deaths.¹ The presence of DM leads to a decrease in life quality in all domains.² Foot complications are considered to be a serious consequence of DM. A cross-sectional study of a cohort of 62,681 patients aged ≥ 25 years had shown the prevalence of foot ulcer, gangrene, and amputations were 2.05%, 0.19%, and 1.06%, respectively.³ In Thailand the prevalence of foot complication, and amputation were 1-20%, and 0.5-32%, respectively.⁴ The foot complication was due to various factors that present in low and middle-income country, coupled with the minimization, and low medical technology. Mae Hong Son province, Thailand was the poorest country between 2007 and 2014, 2016 and 2018, respectively.⁵ In 2019, there were 54.16% of diabetes mellitus (DM) patient in the health care system, of this group they can control their blood glucose only 12.44%. The incidence rate per 100,000 population was at 293.15. The crisis of this situation was needed the more effective strategy and intervention for prevention. The prevention strategy of diabetic foot problems is foot screening and education.⁶ Previous work showed that a mixture of foot screening and education was ready to decrease the incidence of amputation by 47.4% ($p < 0.05$), also as reduce the average inpatient length of stay by 21.7% ($p < 0.05$).⁷ Whereas, the little DM patient in Mae Hong Son had performed a foot examination. Especially, the late life group there was a vision problem that restricts in them foot screening.

This paper aimed to examine the self-foot examination practice among DM patients with, and without self-foot examination device, Mae Hong Son province. In order to develop a prototype community and promote the self-foot screening that also plays an important role in the effective, and prolonged DM complication's prevention.

Objective

The objective of this research was to examine the self-foot examination practice among DM patients with, and without self-foot examination device, Mae Hong Son province.

Study Design and Participants

This research was determined on interpretative paradigm, which carried out to understand the performance of foot examination, the usability, the usefulness, and the satisfaction toward the self-foot examination device among the diabetes patients. The authors used an interpretative approach (qualitative in nature) for the investigation in order to connect methods such as the literature reviews of relevant documents and an interview.⁸ To capture the comparison between before and after the clinical usability, the study design was a quasi-experimental study; pretest-posttest design. To select suitable community, the researcher made the first selection the community that the Sub District Health Promotion Hospital can provide collaborate on community prototype for DM foot problem prevention. 2nd, the DM patients or their caregiver interest and consent to participate in developing the self-foot examination device. Finally, Mok Champae Sub District Health Promotion Hospital, Mueang Mae Hong Son District, Mae Hong Son Province had selected. The participants were recruited based on DM patient population,

in May 2018 (N=56), by the criteria sampling. A sample size of the patients was determined based on the finite population proportion formula⁹. The participant was conducted in 34 the representative diabetes patients in this study. To select suitable participant, the researcher selection of outpatients with DM who met the following criteria were enrolled: (i) aged 35–85 years old; (ii) had been diagnosed type 2 diabetic mellitus patients with foot problems: nerve damage (neuropathy) and/or poor circulation; (iii) understood the purpose of the study; (iv) the patients or their caregiver can use the camera function in the smart phone. Exclusion criteria were requested to withdraw from the research.

Data Collections

Before data collections, the authors establish rapport with participants to form them feel relaxed, and begin the interview with informant topics like asking questions about their routine life to make sure relaxation. Then the researcher introduces and suggested how to use the device for self-examination diabetes foot problem, after that the questionnaire was used. The information was collected by face-to-face interview at locations chosen by the interviewees to attenuate distractions and disruptions while interviewing. The duration of the interview was 20–35 min. Ongoing an interview the data was recorded on the questionnaire, and also checked and rechecked before closing the interviews.

The instruments used in the current study are as follows: 1) the self-foot examination device. The specification of this prototype was powered by two AA size batteries, controlled by a microcontroller, the handle is made of PVC material, and the capture distance was 80 centimeters. The functionality of

the prototype includes the image capture section, angle control for shooting, the USB port transfer function is responsible for receiving image signals sent to the smartphone's backup with an analytical program (figure 1). 2) Questionnaires which comprise three parts (i) demographic characteristic of DM patients. Information regarding demographic characteristics were 10 items to interviewer does follow a formalized list of items. (ii) The usefulness, consisted of 6 items based on using the 7-point Likert scale, the interpreted for each item was 1) 1–3 score: poor quality 2) 4–5 score: moderate quality 3) 6–7 score: good quality. (iii) The clinical usability, there were 5 items aiming to investigate the convenience and the effectiveness among the device for self-examination diabetes foot problem, this part was also using the 7-point Likert scale.

The questionnaire was tested for content validity by used by the Index of Item-Objective Congruence (IOC), the questionnaire was checked by five experts in the field of chronic disease (Diabetic mellitus). The items that had scored lower than 0.5 were revised. On the other hand, the items that had scores higher than or equal to 0.5 were accepted. With regard to the reliability of the questionnaire, an overall Cronbach's coefficient alpha of 0.86 was found.

Ethical Considerations

This research was approved by Chiang Mai Rajabhat University and conducted with the participants who voluntarily participated. Their responds are kept confidential for the research only.

Statistical Analysis

The statistical analysis was used in the current study was as follows: 1) The sociodemographic, the

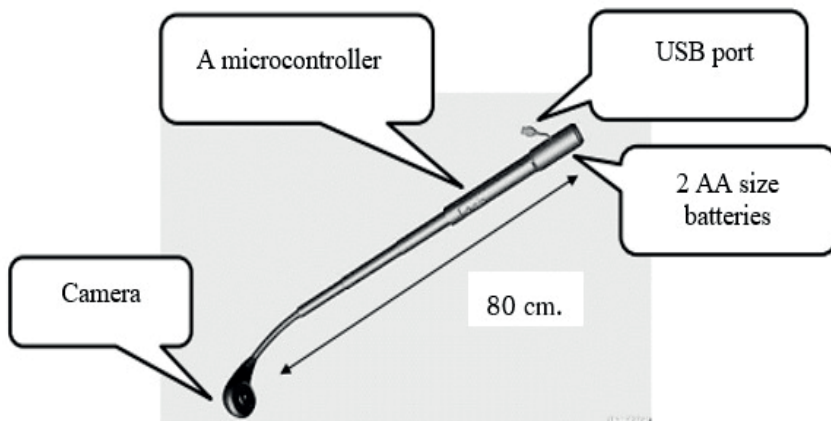


Figure 1 The prototype of self-foot examination device

usability, the satisfaction, and the usefulness toward the device for self-examination diabetic foot problem were used descriptive statistics for summarizing and present as the number, percentage, means and the standard deviation. 2) The performed foot examination was used descriptive statistic, and also the thematic analysis was conducted to interpret the performed and the devices that used on foot examination among DM patients. 3) The clinical usability was used Wilcoxon sign rank test for comparison between before and after use the device. Regarding demographic characteristics, the usability, the satisfaction and the usefulness data were analyzed using the statistical package for social science (SPSS) window software version 20.¹⁰

Results

The current study shows the results in numerical form, in a table, and in text form which comprise three parts as follows: 1) sociodemographic of diabetes patients 2) the self-foot examination practice without self-foot examination device 3) The self-foot examination practice with self-foot examination device.

Sociodemographic of diabetes patients

Table 1 shows most of the participants are female (79.40%). Nearly half of them aged 60 through 69 years, the mean (SD, Max, and Min) age was 57.53 (8.71, 71, 39) years, the most of them was elementary education (73.50%), nearly 80% were married, and about 35% were agriculturalist.

The most of the participant's presence of DM duration at 0-10 years, the mean (SD, Max, and Min) duration was 8.53 (7.14, 25 years, 3 month). The three highest presence of co-morbidity was the dyslipidemia (73.50%), the vision disorder (29.40%), and the hypertension (17.60%), respectively. The primary caregiver was their couples (76.50%).

The self-foot examination practice without self-foot examination device

Over half of the patients performed a foot examination by themselves (61.76%), of these groups, 55.89% had no the device to support the examination (only used the eyes and hands). In some cases that performed a foot check by themselves has been used a small mirror as a device. The coding that related this performance were as follows:

Table 1 Number and percentage of the socio-demographic of the diabetes patients

Variable	N = 34	%
Gender		
Male	7	20.60
Female	27	79.40
Age (years)		
30-39	1	2.90
40-49	6	17.60
50-59	9	26.50
60-69	16	47.10
70-79	2	5.90
Mean = 57.53, SD = 8.71, Min = 39, Max = 71		
Education		
Had no formal education	4	11.80
Education	25	73.50
Elementary education	3	8.80
Secondary education	1	2.90
Diploma	1	2.90
Marital status		
Single	1	2.90
Married	27	79.40
Divorced/separated/widowed	7	20.50
Occupation		
Government official	1	2.90
Company employee	1	2.90
Grocer	3	8.80
Employee	9	26.50
Agriculturalist	12	35.30
Housewife	8	23.50
The presence of DM duration (years)		
0-10	25	73.50
11-20	6	17.60
21-30	3	8.80
Mean = 8.53, SD = 7.14, Min = 3 month, Max = 25 yrs.		
The co-morbidity		
Hearing loos	1	2.90
Vision disorder	10	29.40
Hypertension	6	17.60
The respiratory system disorder	3	8.80

Table 1 number and percentage of the socio-demographic of the diabetes patients (Continued)

Variable	N = 34	%
Smoking		
No	34	100
Primary caregiver		
The coupled	26	76.50
Parents	2	5.90
Young children	6	17.60
The performed foot examination		
Yes	21	61.76
Use the eyes	19	55.88
Use the eyes, and a small mirror	2	5.88
No	13	38.24

“After cleaning myself, I used a small mirror to screening my feet”. (Female, 4 year with DM, age 53)

Nearly two fifth had no performed a foot examination (38.24%), of these groups, most of them had a short duration with DM, and they have an intention to receive the foot check one time a year in the hospital. The coding that related this performance were as follows:

“I never performed a foot examination, I had been diagnosed with DM for three months.” (Male, 3 month with DM, age 39)

“The foot examination had a yearly performed by a health care provider, at Srisangwan hospital.” (Male, 3 year with DM, age 57)

The self-foot examination practice with self-foot examination device

The Usefulness

Table 2 shows the good level of the usefulness the \bar{X} (SD) was 6.18 (0.16). The three highest item was as follows: high value 6.41 (0.93), leading to make an appropriate plan on medical consults 6.38 (0.85), and leading to clearly explain to the physician 6.13 (0.97), respectively.

Table 2 The average, standard deviation, and the quality level of the usability and satisfaction among the device for self-examination diabetic foot problem (n=34)

Items	\bar{X}	SD	Quality Level
1. Reduce anxiety about foot ulcers	6.06	1.30	Good
2. High value	6.41	0.93	Good
3. Leading more frequency foot check	6.12	0.98	Good
4. Leading to the attention on self-care of the foot	6.00	0.95	Good
5. Leading to make an appropriate plan on medical consults	6.13	0.97	Good
6. Leading to clearly explain to the physicians	6.38	0.85	Good
Total	6.18	0.16	Good

The clinical usability

According to the result of Wilcoxon Sign- Rank Test indicated that the median of the clinical usability after the use of the device for self-foot examination was statistically significantly higher than the median before clinical use in both convenient and effectiveness category (table 3).

examination intention.¹¹ One work showed the perceived barriers to performing self-foot examinations were that examinations were seen as too much trouble and patients were too busy and forgot to check their feet daily.¹²

The self-foot examination practice with self-foot examination device

The results show the good level on the device usability, and the usefulness for self-foot examination

Table 3 The mean comparisons between before and after clinical usability (n=34)

Items	The convenient			The effectiveness		
	Before	After	Asymp. Sig (2-tailed)	Before	After	Asymp. Sig (2-tailed)
	\bar{X} (SD)			\bar{X} (SD)		
1. The dorsal-plantar examination usability	4.94 (0.92)	6.09 (1.06)	.000	6.29 (1.32)	6.29 (1.32)	.000
2. The toes examination usability	4.94 (0.92)	6.15 (1.05)	.000	4.91 (1.40)	6.35 (1.30)	.000
3. Between toe examination usability	4.94 (0.92)	6.15 (1.05)	.000	4.91 (1.40)	6.35 (1.30)	.000
4. The nails examination usability	4.94 (0.92)	6.15 (1.05)	.000	4.94 (1.37)	6.35 (1.30)	.000
5. The plantar aspect examination usability	4.94 (0.92)	6.15 (1.05)	.000	4.91 (1.40)	6.35 (1.30)	.000

Discussion**The self-foot examination practice**

The current study shows over half of patients had no performed a foot examination. These results might relate to the perceived of a barrier to taking action to receive diabetes examinations such as a problem of the vision, and the musculoskeletal stiffness. Whereas, the perceived susceptibility to diabetes complication was also important. That was in line with previous studies found perceived barriers to taking action to receive diabetes complication examinations, and perceived susceptibility to diabetes complications was significantly related to fundus

practice. The participants point of the exotic device, and justify to an innovation that never used for the self-foot examination. May be the device was created based on the self-care framework that were crucial to the strong practice.¹³ The right practice, for instance: foot care, good blood glucose control, and the diabetes education can prevent up to 85% of the diabetic foot amputations.¹⁴

Moreover the device was development depend on the first and the second of the five elements among International Working Group on the Diabetic Foot (IWGDF) Guidance 2015 that underpin prevention of foot problems included: 1) identification of the at-risk foot; 2) regular inspection and examination of

the at-risk foot; 3) education of patient, family and healthcare providers; 4) routine wearing of appropriate footwear; and 5) treatment of pre-ulcerative signs.¹⁵ Especially, the key element of regular examination the risk of foot. Within, a thorough clinical examination of foot ulcers is necessary to evaluate the depth and extent of involvement, anatomic location, etiology, and presence of ischemia or infection.¹⁶

Regarding the device development process, there were the co-operation among the multi-disciplinary team includes technologist, researcher, nurse, other health care provider, and also have variety approach, to focus on the prevention of foot complication. These were in line with the recommended for prevention strategies should include a multi-disciplinary approach centered on patient education .¹⁷ Whereas, the previous study showed foot self-care practice may be insufficient to prevent the occurrence of diabetic foot ulcer among Taiwan patients with diabetic neuropathy.¹⁸

Diabetic foot problem requires frequent medical visits and high employment of resources .¹⁹ The results showed the device reduced an anxiety about foot ulcer, encouraged the patients pay attention on self-care of the foot, and clarify how to explain the present ulcer to the physician.

The participants of the current study indicated that the device promotes a more frequency uses the device for self-foot examination, and leading to the attention on self-care of the foot. It's possible this device was decrease a negative attitude among patient about self-foot examinations are not important, and take too much time, which the barrier of the more frequency for self-foot examination.²⁰ Where foot care for patients with diabetes is often inadequate, and patients have internal and external barriers to self-care that inhibit health and self-actualization. Health care

providers need to use interventions supported by current evidence-based literature and guidelines to promote self-care for people with diabetes which includes daily foot examinations.¹²

Conclusion And Recommendations

The DM patients performed a traditional method of foot examination by using on their eyes, hands, and a small mirror. The authors make a suggestion on the health care provider need to enhance the foot health behavior among the patients in the community will need to an exam more often coupled with the support of appropriate devices, especially, in cases has a short time duration with DM.

According to the self-foot examination practice among DM patients with self-foot examination device, they perceived the usability, and the usefulness. Therefore, the results of this study will be used to promote the self-care, and the prevention of DM foot complications in the community. Nevertheless, the long term outcome, and the opinion toward the device among health care provider needs to investigate.

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