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Development of foot care instrument and internal consistency test in the rural area

Parliani[1], Tri Wahyuni[2]
[1]Department of Basic Nursing, STIK Muhammadiyah Pontianak
[2]Departement of community health nursing, STIK Muhammadiyah Pontianak

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ABSTRACT

Currently, there are some comprehensive assessment tools for DFU. There is only one screening tool, but only assess risk of neuropathy, there is no complete of foot care assessment. The develop of foot care instrument is important for the nurses to provide health services and seek to eliminate physical, emotional, mental, and socio-cultural patient needs and also they play an important role in the care of diabetes .This descriptive study aimed: 1) to develop the instrument of foot care for diabetic patient, and 2) to test internal consistency in the rural area. The tool development were using: 1) literctivature review, 2) defining and categorize the item and 3) Testing the internal consistency using 23 respondents in Desa Kerawang and Desa Sumber Agung,Kubu Raya.Cronbachs Aplha were to analyze the internal consistency.The results showed that the instrument was developed as followed internal consistency used Cronbach's Alpha was 0.893 for the item which can be used and 0.991 for the item which can be done in the rural area.The total items of this study consisted of: 1) Foot care education, consisting of a) knowledge of foot care, b) foot care behavior, c) amputation risk, d) mortality risk, d) interpretation of monofilament examination, 2) foot care diabetes, a) foot and foot examination, b) routine foot hygiene, c) walking barefoot, d) using proper footwear, e) cutting toe nails, f) avoiding the use of anything rough on the feet, g) professional care when open wounds and lesions in the leg, i) routine foot examination by professionals, 3) routine foot examination, a) peripheral neuopathy, b) history of ulcer or amputation, c) foot deformity, d) peripheral arterial disease, e) level of glycated hemoglobin, 4) Diabetic foot exercises, 5) Self-care management, 6) Supporting factors consist of a) footwear, b) digital silicon divices, c) antifungal treatment, d) elastic compression stocking.In conclusion the instrument of foot care has developed and reliable in rural area. Nurses and people who work with diabetic patients can use the instrument take care of patients' foot. Further study should examine other test of validity and reliability.

Corresponding Author:
Parliani, Tri Wahyuni,
Departement of community health nursing,
Sekolah Tinggi Ilmu Keseshatan Muhammadiyah Pontianak

1. INTRODUCTION

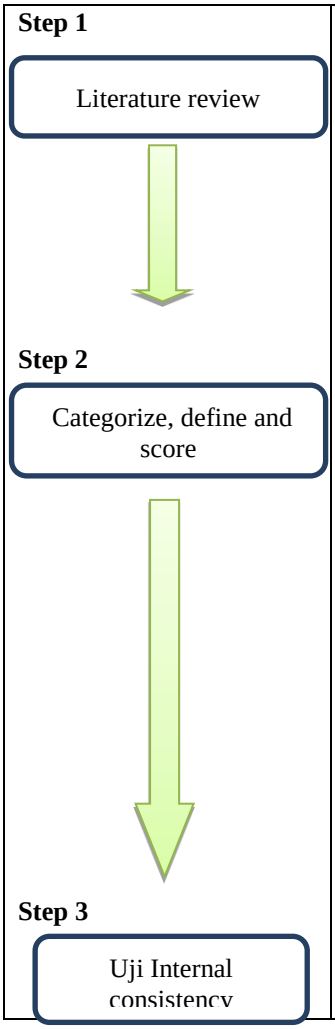
Research related to diabetes mellitus (DM) is increasing due to cases of DM which are increasing every year where it is predicted that the increase will be tripled from 2000 to 2030 [1]. Data from Daniel, Benno, Roderick, and Harald and Aguirre showed that 347 million people were diagnosed with DM and around 5.1 million people died. In 2004, approximately 3.4 million people died as a result of the effect of increasing blood glucose levels [2]. More than 80% of the deaths caused by DM are in poor and developing countries [3]. Indonesia is a developing country whose prevalence ranks 3rd for developing countries [4]. The prevalence of DM in West Kalimantan (Kal-Bar) is around 0.8% who have been diagnosed from the age of 15 years [5] According to Riskesdas,the largest number of deaths of patients with DM is between the ages of 55 and 64

years, about 4.8% of the incidence in urban areas (2%) and in rural areas (1%). Research related to DM is mostly carried out in urban areas, where this area in West Kalimantan consists of Pontianak and Singkawang [6]. From the results of a preliminary study, it was found that DM patients died because of the severe level of DM and were found in rural areas (Sanggau Regency). Most DM patients do not know that they have DM.

Diabetic Foot Ulcer (DFU) is a common complication in DM patients and the biggest factor for amputation [7]. The prevalence of DFU patients reaches 5.3% - 10.5% in DM patients [8]. Previous research by researchers obtained data as much as 9.7% of DM patients had poor self-management. This can affect the incidence of DFU and other DM complications. Prevention of DFU in DM patients is to do good foot care. The absence of instruments to measure the level of foot care and foot care guidelines in DM patients is the first step for researchers to develop foot care instruments and foot care guidelines for DM patients to reduce the incidence of DFU. Therefore, the importance of developing instruments and guidelines for treating DM patients' feet and internal consistency testing is part of this development.

2. RESEARCH METHOD

This research is an instrument development research with a reliability test with internal consistency in rural areas in DM and DFU patients. The research methods are as follows:



Step 1

The step focused on multiple literature reviews, the collected using P-Value and also Adjusted Odd Ration (AOR) from 9 references. In this step, the researcher selected the journal from Science Direct, Elsevier and Google Scholar. The researcher used two inclusion criteria to determine which journals to study. First, the journals had to be full text. Second, the journals had to have a P-Value or AOR or systematic review or meta analysis for the factors which predict DFU statistical results. Searching keywords were diabetic foot ulcer, foot care and self care management.

Step 2

The purpose of the second stage was to group, categorize and score the instrument's items. The researcher grouped some risk factors based on similar features. For examples : knowledge, foot care behavior and mortality risk included in foot care education. The risk factors supported by only 1 study were excluded.

Then, the researcher categorized the risk factors or/and items of the instrument based on their characteristics into four components, which were as follows: 1) Foot care education, 2) foot care activities 3) foot care examination, 4) Foort exercise, 5) Self care management and 6) Supporting factors.

Finally, the researcher scored each items based its characteristics. These scores were classified using three different scoring systems. In the first scoring system, an item could receive a score of either 0 or 1. This system was used for factors which could be described with yes/no answers, or by answering normal/abnormal, good/bad.

Step 3

In this phase, the researcher tested the internal reliability of the sample. For the internal reliability test, the researcher assessed 23 samples, they are nurses and health care provider who works with DM patients.

Internal reliability was examined using Cronbach's Alpha analysis which the coefficient of more than or equal 0.7 is acceptable.

Figure 1: Step Development of the instrument

3. RESULTS AND DISCUSSIONS

3.1 Research Results

3.1.1 Development of Diabetes Mellitus Patient Foot Care Instruments

Development of foot care instruments for diabetes mellitus patients consists of: 1) reviewing the literature, and 2) categories, definitions and scoring of the instruments.

3.1.1.1 Literature Review

In the literature review process the researcher used two inclusion criteria to determine which journals to study. First, the journals had to be full text. Second, the journals had to have a P-Value or AOR or systematic review or meta analysis for the factors which predict DFU statistical results and Third, The risk factors of the 9 articles published reviewed by researchers, items that can be used as guidelines for treating foot wounds for diabetic patients are 28 items, these items have been categorized according to Crowford where factors or items not included in the review literature only consist of 1 supporting journal [9].

The total items of this study consisted of: 1) foot care education, consisting of a) knowledge of foot care, b) foot care behavior, c) risk of amputation, d) risk of mortality, d) interpretation of monofilament examination, 2) foot care diabetes, a) checking feet and footwear, b) routine foot hygiene, c) walking barefoot, d) using proper footwear, e) cutting toenails, f) avoiding the use of anything rough on the feet, g) professional care when open wounds and lesions on the feet, i) routine foot examinations by professionals, 3) routine foot examinations, a) peripheral neuopathy, b) history of ulcers or amputations, c) deformities of the feet, d) peripheral arterial disease, e) level of glycated hemoglobin, 4) diabetic foot exercise, 5) Self-care management, 6) Supporting factors consist of a) footwear, b) digital silicon divices, c) antifungal treatment, d) elastic compression stockings.

3.1.1.2 Category and Scoring instruments

The data had a normal distribution which classified risk levels using $\chi \pm 1$ SD. This study resulted SD = 12 and X = 16

Table 1. Foot Care Instruments for Diabetes Mellitus Patients (Version 1)

Item	Score
Foot Care Education	0 or 1
Knowledge of foot care	0 or 1
Foot care behavior	0 or 1
The risk of amputation	0 or 1
Mortality Risk	0 or 1
Interpretation of the results of the monofilament test	0 or 1
Diabetes Foot Care	0 or 1
Examination of feet and footwear (shoes)	0 or 1
Regular foot hygiene	0 or 1
Do not walk barefoot	0 or 1
Use the right footwear	0 or 1
Toenail clipping	0 or 1
Avoid using anything rough on the feet	0 or 1
Professional care when open wounds and lesions on the feet	0 or 1
Routine foot exams by trained professionals to identify diabetic foot complications	0 or 1
Routine Foot Examination	0 or 1
Peripheral neurophaty	0 or 1
Previous ulcer or amputation	0 or 1
Structural deformity	0 or 1
Limited joint mobility	0 or 1
Peripheral arterial disease	0 or 1
level of glycated hemoglobin	0 or 1
Diabetic Foot Exercise	0 or 1
Self-care Management	0 or 1
Supporting factors	
Footwear (Footwear)	0 or 1
Digital Silicone Devices	0 or 1
Antifungal treatment	0 or 1
Elastic compression stocking	0 or 1
Scoring	
0-4 : Bad	0 - 28
4 – 28 : Middle	
28 : Good	

3.1.2 Internal Consistency Test

In this study, the internal consistency test with a total sample size of 23 samples obtained data items for item identification that have been done is 0.893 using Cronbach's Alpha 0.991 for items that can be implemented.

3.1.3 Development of a foot care guide for diabetes mellitus patients

The development of this guide is based on research instruments that have been carried out, namely based on examination and knowledge (attached in the attachment)

3.2 Discussion

3.2.1 Development of Diabetes Mellitus Patient Foot Care Instruments

In this study, the foot care instrument for diabetic patients was developed into 6 components based on risk factors and risk factor characteristics. Based on Alavi, early identification of risks for DFU is very important to reduce the amount of morbidity and mortality. Nurses as part of the inter-professional team need to detect risks for DFU and prevent DFU in patients. If the tool was simple and clear, it would be easy to implement. Item assessment is made based on the characteristics of the item. Printing items allows the tool to be objective and non-discriminatory [10].

3.2.2 Internal Consistency Test

Results are said to be reliable depending mainly on good standardization [11] and easy-to-understand instructions [12]. Another thing is objective risk factors that influence a reliable score or result. The internal consistency test was also carried out on respondents who had previously been given training related to the risk factors for DFU, so that there was a common perception in using the instrument to be tested.

4. CONCLUSION

The steps for developing foot care instruments are literature review and item identification so that there are 6 categories consisting of 1) Foot care education, 2) Diabetic foot care, 3) Foot rash examination, 4) Diabetic foot exercise, 5) Self-care management and 6) supporting factors.The results of the internal consistency test indicated that foot care instruments were reliable and could be used in a community setting.

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