

The Role of the Nurse in the Prevention of Diabetic Foot

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<p>Abstract</p> <p>Background: The diabetic foot is a complex of tissue abnormalities observed in the distal legs of diabetic patients. Primary prevention of diabetic foot ulcers focuses on a holistic approach to the management of comorbidities. Prevention of changes in the diabetic foot includes maintaining glycemic control and special foot care. This is important information that the nurse provides in patient education. The assessment knowledge of nurses in the prevention of diabetic foot is important for nurses in Almaty.</p> <p>Aim: The purpose of the study is to develop recommendations for nurses on counseling patients with type 2 diabetes mellitus for the prevention of diabetic foot.</p> <p>Methods: Quantitative research was conducted using Webropol (3.0 version) online survey. The Diabetic Foot form tool was used for data collection. The sample consisted of 103 applied bachelors. The data were analyzed using SPSS 26 and descriptive statistics.</p> <p>Results: 71.8% of the nurses who took part in the survey had not taken advanced training courses in diabetes and foot care. The majority of nurses (63.1%) do not recommend prevention of complications for patients at risk and do not monitor the patient's limbs. Only 28.2% of nurses gave recommendations to their patients and their relatives. Most nurses (78.6%) want additional education on diabetic foot.</p> <p>Conclusion: Based on the results, regarding nursing knowledge of type 2 diabetes for diabetic foot prevention in the primary health care sector, nurses mainly know the risk factors for diabetic foot but cannot respond to measures to prevent foot complications. The main objective of this study was to uncover nursing knowledge about diabetic foot prevention. Based on the results of the questionnaire it is clear that nurses lack additional knowledge.</p>		
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1 Introduction

Diabetic foot ulcers are one of the leading health problems in the world, causing economic and human losses. Approximately 8.8% of the world's adults suffer from diabetes, and this figure is projected to increase by 48% in 2045. Elevated levels of glycemia may cause macrovascular and microvascular complications. (International Diabetes Federation 2017, according to Zielinski, Paola & Martínez, 2018.)

International Diabetes Federation (2017, according to Zielinski et al. 2018) now recommends that all patients with diabetes should be tested to assess risk factors. In addition, Zielinski and colleagues (2018) note the International Diabetes Federation's statement that it has been estimated that less than one third of physicians recognize the symptoms of diabetic peripheral neuropathy and discuss them with their patients. Increasing the level of knowledge and understanding of the diagnosis, comprehensive management and treatment of diabetic foot at early stages is crucial. (Zielinski, Paola, & Martínez, 2018.)

The complications of diabetes include decrease in visual acuity, neuropathy, and amputation of a limb due to diabetic foot, and they affect the patient's quality of life (WHO 2016, according to Figueiredo et al. 2017). Diabetic foot is the incidence of infection and damage of soft tissue due to neurological diseases or ulceration associated with a pathology of the peripheral arteries. In their study, Figueirado, Barros, Santos, Pimentel, Góis, and Otero (2017) found out that many patients with diabetic foot ulcers used inappropriate shoes, had foot pain or discomfort, ingrown toenails, ulcers, and poor hygiene. (Figueiredo, Barros, Santos, Pimentel, Góis, & Otero 2017.)

Diabetes mellitus (DM) is a chronic disease characterized by the disruption of carbohydrate, protein, and fat metabolism as well as disorders in specific sugar metabolism. In the Republic of Kazakhstan, the number of patients with diabetes has been growing rapidly recently. In 2016, the number of patients with diabetes was 379,942 people, which is 2.1% of the population of Kazakhstan. According to the statistics of 2018, 23,244 patients were registered in the Republic of Kazakhstan per

100 thousand population, and in general, 424,822 patients were registered for all types of diabetes. In 2018, 53,390 patients were registered in Almaty alone, including 2,920 per 100,000 population and 254.9 when new patients were identified.

(Morbidity n.d)

In a study conducted in Thailand, incidence of diabetes in both men and women has been rising in recent years. In 2016, diabetes was the cause of death in 4% of total deaths in Thailand. The main complication of diabetes mellitus is diabetic foot ulcers (DF). There is a lack of specialist care for diabetic feet in Thailand, and the lack of specialized care in Thailand is the main cause of diabetic foot ulcers. (Khunkaew, Tungpunkom, Sim, & Fernandez, 2018.)

Subrata and Phuphaibul's article (2019) promotes collaboration between nurses and other healthcare providers and the systematic care of diabetic patients with ulcers. To care for patients with diabetic ulcers, efforts must be made to overcome theoretical knowledge and practical problems. To deepen the theoretical basis, it is necessary to study each area of patient care. The result is standard treatment to avoid severe side effects of diabetes. The main objective is to improve the knowledge of nurses working in the care of diabetes. (Subrata & Phuphaibul 2019.)

Daily care practice is very important in providing effective patient care and to combine the work of nurses and patients. Diabetic foot is a complication of diabetes that affects the overall health and social status. Diabetic foot is the most significant and devastating problem that patients with diabetes face. The results of many studies indicate that diabetic foot leads to poor health, lower quality of life and social status, reflects the general mood, and increases the burden on health workers. (Subrata & Phuphaibul 2019.)

The aim of this study is to determine nurses' knowledge of diabetic foot prevention and to develop guidelines for nurses counseling patients with type 2 diabetes mellitus on how to prevent diabetic foot.

2 Prevention of Diabetic Foot in Nursing

In his article on preventing diabetes foot disease, Shapiro (2016) sums up statistics on the diabetic foot; between 15% and 25% of patients with diabetes will develop foot ulcers, 84% of non-traumatic amputations of the extremities are preceded by an ulcer, and 34% of patients develop a new ulcer within one year after the healing of the first ulcer. In addition, there is a 50% risk of foot ulcers after limb amputation and the survival rate after a major limb amputation is 50% after three years and 40% after five years. (Shapiro 2016.)

In the adult population, the incidence of diabetes increases over the years, and so does the risk of complications. Four out of five amputations can be prevented by routine foot care and regular foot examinations. (Diabetes UK 2017, according to Anderson 2017.)

According to the National Institute of Health and Care Excellence guidelines (2016, according to Anderson 2017), patients with diabetes should be screened for the risk of developing diabetic foot at least once a year. Elderly patients with diabetes may have additional risks associated with vascular disease, poor nutrition, and limited joint movement. (Anderson 2017.)

Diabetic foot causes dry skin, damage to the skin and decreased skin sensitivity (Boulton, 2005, International Best Practices Guidelines 2013, according to Turns, 2015), and peripheral artery dysfunction. Diabetic foot ulcer is a socially important problem, as care can be expensive for patients and their families. A specialist in the care of diabetes mellitus patients should have the necessary skills. During the screening, it is important to assess the risk of developing foot ulcers and, if there is a risk, to provide appropriate treatment and advice on how to prevent foot ulcers. Timely detection of changes in the legs—worsening sensitivity of the legs, changes in the skin of the foot, or bone deformations—prevents the formation of a foot ulcer. (Turns 2015).

Informing the patient about the prevention of diabetic foot ulcers is a common clinical experience in the prevention of amputation (Dorresteijn, Kriegsman,

Assendelft & Valk 2012, according to Dominic, Visovsky & Rice 2015). However, teaching the patient self-care influences patient behavior for only a short time (Dorresteijn et al. 2012, according to Dominic et al. 2015). The main goal of diabetes care is to prevent neuropathic diseases. In patient care, changes in the foot, checking changes in the nails, and controlling glycaemia are very important. The physician or nurse should ask the patient about orthopedic products, insoles or protective equipment for the feet. When caring for patients, the pulse on the legs and skin sensations are evaluated as risk factors for lesions. Examination of patients with diabetes mellitus includes a visual observation of deformities that may occur on the soles of feet. Confident knowledge and responsibility for patient care leads to an effective result. (Dominic, Visovsky & Rice 2015.)

According to Dominic and colleagues (2015), prevention of diabetic foot ulcers should consist of a daily foot exam, during which the areas of redness on the foot, dryness, skin sensitivity, poor circulation in the feet, and cracks, height, and thickness of the nails are inspected. Patients with visual impairment need an assistant for the inspection of their feet. In the absence of an assistant, the patient must rely on the sense of touch. (Sibbald, Ayello, Alavi, Ostrow, Lowe, Botros, Goodman, Woo & Smart 2012.)

According to Mendonca, Morais, and Moura (2011), nurses play an important role in providing care and counseling for patients with diabetes. To prevent a diabetic foot, nurses need to perform a physical examination of the foot. One of the obstacles to diabetes prevention is the lack of leg examination. Examination of the limbs of patients by a nurse is aimed at preventing diabetic foot, since it is suggested that 85% of foot problems related to diabetes could be prevented. (Feitosa, Dantas, Silva & Pereira 2016.)

Chapman (2017) refers to Schaper and colleagues (2016), presenting that the five main elements of preventing foot problems are identifying the risk group, regular screening, patient education, choosing appropriate shoes, and treating pre-ulcerative symptoms. A patient registered with diabetes is considered at risk, even if they do not have a wound on their foot. Preventive foot care usually consists of a

comprehensive approach. In practice, it is necessary to inform and instill skills in patients and family members. For example, prevention and treatment related to diabetes foot care are wound risk assessment, education on how to cut nails properly and nail care, and blood sugar control. (Chapman 2017.)

According to Rehm (2017), the development of a diabetic foot ulcer is described as follows: “when the loss of protective sensation coexists, the foot continues to ulcerate to a deeper level, potentially eventually infecting the bone”. Rehm (2017) suggests that the goal of health care providers, innovators, and reformers is to promote self-responsible behavior and avoid non-compliance and non-adherence problems in diabetic foot care. (Rehm 2017.)

In the comprehensive care for the prevention of diabetic foot ulcers, an endocrinologist, an orthopedist, a nutritionist, and a vascular surgeon, orthopedic surgeon, or microvascular surgeon should be involved. Reliable information about daily examination of the feet, technique of washing and drying the feet correctly, how to cut toenails and how to deal with their corns should be effectively delivered to the patients. Therefore, improving the quality of life of the patient by preventing the incidents or recurrences of a diabetic foot, an effective and standard approach should be implemented. (Naicker, Ohnmar, Choon, Yee, Naicker, Das, & Roohi, 2009.)

The American Diabetes Association, in conjunction with other national organizations and educational institutions, have presented recommendations for the screening and treatment of patients with type 2 diabetes. Screening conducted according to evidence-based recommendations improves outcomes and significantly reduces the risk of complications. Through primary health care initiatives, clinically relevant tools such as practice screening guidelines implemented in the electronic medical record led to significant improvements in adherence to screening guideline recommendations for annual foot examination which enhances the care of the patient and improves patient outcomes. (Murphy Buschkoetter, Powell & Mazour, 2019).

Diabetic foot ulcer is common in patients with diabetes. Foot complications and amputations are one of the most important long-term problems of diabetes mellitus from a medical, social, and economic perspective. (Kumari, Subash & Jagdish 2014).

3 The Role of Nurses in Preventing Diabetic Foot

The role of nurses in preventing diabetic foot is very important. In the prevention of diabetic feet, skin temperature, cracks, calluses, and sensitivity must be examined to avoid complications. An early examination of the diabetic foot helps to determine the areas at risk of wounds using a monofilament test. Also, proper preventive measures and patient education significantly reduce foot ulcers and amputation rates. (Kumari, Subash and Yagdish, 2014.)

The nurse can determine the risk level of the patient and assess the condition of the feet. The nurse should teach the patient to manage their health to reduce the risk of foot problems. To give advice such as smoking cessation, inspection of the feet every day, asking for help if one has any concerns, and wearing appropriate footwear can reduce the risk of ulcers and amputations and improve the quality of life. (Nazarko 2019.)

Nursing knowledge of the diabetic foot is essential for the quality of nursing care and the prevention of complications. A study conducted in Brazil recommended continuing education for nurses. Health care knowledge is a fundamental tool to ensure proper service and to minimize the incidence of foot complications. (Vargas, Lima, Silva, Schoeller, Vragas, & Lopes, 2017.)

The nurse and the patient should work together. For the prevention of diabetic foot ulcers, the patient requires necessary knowledge and skills for self-care at home. (Smanioto, Haddad & Rossaneis 2014.) Information and support from nurses and other medical services enhance patient knowledge (Pietrucin-Materek et al. 2011 according to Davis, 2019).

Hospitalization of diabetic patients is mainly related to foot problems, mostly ulcers. Foot ulcers develop in about 15% of patients with diabetes. (Boulton et al., 2004, 48;

according to Foolchand & Oosthuizen, 2013.) About 50% of non-traumatic amputations are done to diabetes patients. (Viswanathan et al., 2006, according to Foolchand & Oosthuizen, 2013).

The role of the nurse is also the role of the educator. They transfer knowledge to increase the person's ability to cope with problems (Subrata & Phuphaibul 2019). Some depressed patients may need to be referred to a mental health nurse who can support them throughout the evaluation, diagnosis, and treatment process (Maydick and Acee, 2016 according to Subrata & Phuphaibul 2019). To be effective, an interprofessional approach should be used, involving the person with diabetic foot, their family, or guardian. (Subrata, & Phuphaibul 2019.)

The aim of the study conducted in Brazil by Arruda, Fernandes, Freitas, Machado, Lima, and Silva (2019) involving 90 basic health nurses, was to clarify the knowledge of nurses about the treatment of diabetic foot in primary health care. The results of the study showed that the nurses' level of knowledge about diabetic foot care was unsatisfactory. None of the nurses had satisfactory level of knowledge about the prevention of diabetic foot, and only 48.9% of the nurses perceived that the self-assessment of knowledge was regular. The health care professionals showed unsatisfactory (45.6%) and contradictory (54.4%) knowledge about the prevention and care of diabetic foot. Unsatisfactory knowledge of nurses for diabetic foot care indicates the need to update the knowledge of specialists. (Arruda et al. 2019).

Nurse-patient interaction regarding the care of diabetic foot varies in practice. Nurses working with demanding clinical cases often have interaction problems with patients in need of diabetes foot care. However, the patient-nurse interaction is necessary for the prevention, early detection, referrals, and actions to manage diabetes side complications of the feet. Emphasizing nurse-patient interaction in practice can positively affect foot health of the patients with diabetes. (Flood, 2009.)

4 Education of the Patients and Their Relatives of the Prevention of Diabetic Foot

Education of the family, the patient, and medical professionals about the prevention of diabetic foot is very important for the prevention of diseases. It is important that the patient is explained that they cannot walk barefoot at home or on the street, nor in thin-soled shoes. It should be remembered that patients with diabetes need appropriate shoes. (Barwick, van Netten, Reed & Lazzarini 2018.) A study conducted in USA showed that only 15% of patients wear special shoes at home (Armstrong, Abu-Rumman, Nixon, & Boulton 2001, according Rothenberg & Petersen 2019). It is important that the patients examine their feet and wash them daily, dry them thoroughly, use emollients to lubricate dry skin, and cut their nails correctly. However, the compliance with self-examinations is poor; it has been showed that only 30% of the patients examine their feet regularly in USA. (Pocuis, Li, Janci & Thompson 2016, according Rothenberg & Petersen 2019.) Structural training is usually provided by a clinician, nursing staff, or certified diabetes educators. In the education on the prevention of diabetic foot, video and online lessons, individual classes, group classes, blogs, and social networks can be used. When training a patient at risk for developing a diabetic foot, the psychological consequences of the disease, such as depression and anxiety, may cause interference. Patient education should include communication of risk but also the value and empowerment through preventative care and emotional support. (Rothenberg & Petersen, 2019.)

The patient needs to learn from reliable sources so that their future behavior is based on correct information (Rehm, 2018). Therefore, the role of the nurse in educating the patient is extremely relevant and significant. The nurse is a person with whom the patient can talk, find support, and consult. Nurses can help the patient to accept their disease and educate them about foot care. The patient must accept their diabetes diagnosis yet reframe it so that perspective is acquired and self-esteem maintained. A person with diabetes should know that they are a person with diabetes, not a diabetic. A strong change in this paradigm gives the person reasonable power to develop a prevention strategy. (Rehm, 2018.) Nursing work with

patients in the treatment and prevention of diabetes complications consists of explaining and communicating to patients the importance of maintaining a proper diet (Rehm, 2018); learning to account for diet and physical activity, teaching patients to conduct regular blood and urine tests for sugar and the ability to analyze the results, and teaching patients to adjust the dose of insulin depending on blood sugar in various situations.

In their study, Hunt, Henderson, and Chapman (2018) tested the effectiveness of training modules to improve the knowledge of self-management in rural patients with type 2 diabetes. These learning units were embedded electronically on the iPad. This training module consisted of ten programs such as blood glucose monitoring, healthy eating habits, complications and exercise. Before and after the training, the participants filled a questionnaire, and as a result, a significant change was obtained; it was found that this method of teaching patients with type 2 diabetes mellitus is effective and contributes to increasing the level of knowledge about diabetes education in rural areas. Based on this, the researchers concluded that patient education delivered electronically can give good result in the prevention of diabetic foot. (Hunt, Henderson & Chapman 2018.)

The sharp increase in the number of patients with diabetes leads to a significant financial burden on the health budget of each country. It is very important to emphasize patient self-management to avoid complications of the disease. Health professionals can provide advice and guidance on medications, nutrition, and healthy lifestyles. (Carlton, Elliot, Rowen, Stevens, Basarir, Meadows & Brazier, 2017). However, care activities, such as taking medicines in a timely manner, following a diet and listen to advice, all depend on the patient. The course of the underlying disease ultimately depends on the patients themselves or their caregiver. (Carlton et al., 2017.)

According to the study by Rossaneis, Haddad, Mantovani, Marcon, and Pissinati (2017), men have a higher risk for foot ulceration than women. The researchers noted that previous studies have also shown that men have a higher risk of diabetic foot damage and other complications, and it was suggested that men do not

evaluate their health critically. The researchers referred to studies by Monteiro-Soares and colleagues (2012) and Tang and colleagues (2014) stating that the reason for this lies in the fact that men are indifferent to their health and do not want to seek medical help. (Rossaneis, Haddad, Mantovani, Marcon, & Pissinati, 2017.)

5 Purpose, Aim, and Research Questions

Purpose:

The development of recommendations for nurses on counseling patients with type 2 diabetes mellitus for the prevention of diabetic foot.

Aim:

To determine nurses' knowledge of diabetic foot prevention.

Research Question:

What knowledge nurses have about the prevention of diabetic foot?

6 Methodology

6.1 Quantitative Research

The most important part of the study is the choice of method. In this study, a quantitative research method was used. Quantitative research is a type of research that can be converted into quantitative data and uses positivist evidence collection methods. Typically, quantitative research explores the confirmation or nullification of initial hypotheses. Statistical data can usually be created from numerical data. It is used to explain formal, objective, and systemic processes, and cause-and-effect relationships between events or objects.

Quantitative research is supported by a convention that assumes the existence of logical realities or laws; this is called positivism. These realities arise from what can be seen and appreciated, and they can be concentrated as objects. Quantitative

testing uses predisposition limiting methods, so the results may be more reliable. This methodology is often referred to as a logical or experimental strategy. The final goal for the researcher and the consumer is to ensure that the results are legal and reliable. (Topping 2017, 160-163).

Questionnaires allow you to collect self-reported data that would be difficult to collect in any other way. Questionnaires can be used to measure knowledge, relationships, emotion, cognition, and health behavior. This approach captures self-assessment of human observations and is commonly used to measure a patient's perception of their health and well-being. Questionnaires can be conducted in different ways through various routes, i.e. postal, personal, or increasingly online. They can be filled on their own. This should establish the validity of the study and to convince the participant of its value. A cover letter should explain why the research matters, how the information will be used, and how the respondent was chosen. It must clarify privacy and anonymity issues and provide a contact number for respondents if they have questions (Jones & Rattray, 2015, 413).

A quantitative study with electronic questionnaires made it possible to collect complete and comprehensive information about the issue under study.

6.2 Questionnaire as Data Collection Method

Nurses' Knowledge of Diabetic Foot Assessment, developed by Zahide Kaya & Anita Karaca (2018), was used in this study. This questionnaire can be used as a guiding resource in the development of the Diabetic Foot Assessment and as a valid and reliable tool for measuring knowledge of the management of diabetic foot. Permission was obtained from the study authors to use the questionnaire in this study and to translate it into Kazakh, Russian, and English.

The "Information Form of the Nurse" consists of 2 sections, a total of 20 questions. Thirteen questions were asked about the socio-demographic and professional characteristics of nurses and seven questions related to the management of diabetic foot. In this questionnaire, the reliability coefficient for The Knowledge of Diabetic Foot Treatment Form (α Cronbach's) was found to be 0.82. The reliability factor for

diabetic foot for the whole form was found to be 0.90, which is a high value of reliability for the whole scale.

The “Diabetic foot treatment knowledge level form” consists of 68 true/false questions divided into four parts: “Risk factors” (16 questions), “Foot examination” (10 questions), “Prevention of foot complications” (32 questions), and “Selection of shoes” (10 questions).

Each correct answer is encoded as one point and each erroneous answer is encoded as zero points. The minimum probable score was zero and the maximum was 68. The higher the overall level, the higher the level of knowledge about the damage to the diabetic foot.

6.3 Participants and Data Collection and Analysis

The data was collected using the Webropol 3.0 online survey software in May 2020. The evaluation of nurses’ knowledge levels of diabetic foot care management questionnaire in English was uploaded to Webropol, and a public link was made in two languages (Russian and Kazakh). The survey was conducted among students of the Applied bachelor's degree of the Higher Medical College of Almaty. The College of Applied baccalaureate trains practicing nurses with experience. The College has about 160 nurses. Of these, 50% work in clinics and 50% in hospitals. The criteria for inclusion were nurses with more than one year of work experience. The exclusion criteria were nurses with no work experience, nurses on maternity leave, and retirees.

A request was made to the Higher Medical College of Almaty to provide contact information for students of Applied bachelor's degree. The head of the Department of Applied baccalaureate provided contact details of 160 nurses (mobile phone numbers and e-mail). All respondents were individually sent links to questionnaires in two languages (Kazakh and Russian). Finally, 103 respondents completed the survey. The results were analyzed using the SPSS 26.

6.4 Reliability and Validity

In quantitative research, it is very important to determine the validity and reliability of the examination. Moreover, improving the reliability and validity of complementarities is critical when reusing validated surveys, especially when designing abbreviated scales. The way to demonstrate the reliability and validity of a survey is not easy. In any event, appropriate surveys with proven reliability and validity should be used. (Jones & Rattray 2015, 413–415.)

Reliability implies that the survey can be repeated, which means that it will quantify what it should measure in a sustainable way. This can be clearly illustrated in various ways: test-retest, inter-rater, and, moreover, internal consistency. (Polit & Beck 2008, 458.) In view of Macnee and McCabe (2008), the poll is appraised as having great inner consistency when α surpasses 0.70. Cronbach's alpha measurements can be introduced for the whole poll or independently for every space or subscale. (Jones & Rattray 2015, 417.)

Validity hints at whether the survey measures what it should measure, and whether the survey measures it efficiently and accurately. There are different types of validity. Facial validity is an emotional assessment that the elements of the scale give the impression of being applicable, clear, and unambiguous. Content validity is assessed by asking experts to judge whether the survey results fully speak idea or development for evaluation. It is moderate a powerless type of validity is a valuable starting point. The validity model establishes the relationship between Survey with "highest quality" setting measure. Simultaneous and forward-looking validity are two kinds of standard validities. The creation of validity determines how well the survey talk about the basic reasonable composition. (Jones & Rattray 2015, 417.)

The knowledge level form of nurses for the treatment of diabetic foot has been tested several times, for example, when this study was conducted in three hospitals in Turkey. Cronbach's Alpha was 0.932 which proves the reliability of this questionnaire.

6.5 Research Ethics

Permission to conduct this research was issued by the Academic Council and the Ethics Committee of the Kazakh Medical University of postgraduate education. Each participant was sent a letter with information about this study to obtain their consent to participate. Participants were informed about the study and assured of confidentiality and anonymity. Participation in the study was voluntary, and they could opt out of the study without penalty. The names and data of the nurses were encrypted. All material was stored under the researcher's password. The storage of interview data was carried out in accordance with the requirements of the law. The questions to the nurses was the same. Data was collected using an electronic questionnaire (Webropol system version 3.0). Completing the electronic questionnaire took about 30 minutes.

7 Results

7.1 Description of the Participants of the Study

This study was conducted among nurses who are studying at the Higher Medical College of Almaty in the Applied bachelor's program. Altogether 103 nurses participated in this study. The majority of respondents were aged 41–57 years (58.3%), and 103 (100%) were women. Most of the respondents (59.2%) were married. Of the respondents, 77.7% had a General Nurse (TIPO) education. The responding nurses were experienced, as 100% had worked in their specialty for more than three years. (See Table 1.)

Table 1. Demographic data of the respondents (N = 103)

		Frequency	Percent
Age	23–40	43	41.7
	41–57	60	58.3
Gender	Female	103	100
Family status	Single	22	21.4
	Married	61	59.2
	divorced widow	19	18.4
	cohabiting	1	1.0
How many years ago did you graduate from college	1–10	24	23.7
	11–20	31	29.7
	21–38	48	46.6
What is your educational status?	General Nurse (TIPO)	80	77.7
	Applied Bachelor in Nursing	21	20.4
Total		103	100

Of the respondents, 10.7% worked in the therapeutic department, 22.3% in the surgical department, 19.4% in general practice, and 34.0% in other departments.

Forty percent held leadership positions. Most of the respondents (98%) worked for a government agency. Most of the respondents (63.1%) had the highest category qualification, and 96.1% worked full-time. (See Table 2.)

Table 2. Place of work and positions of the respondents (N = 103)

		Frequency	Percent
Where do you work	therapy department	11	10.7
	surgical department	23	22.3
	Intensive care	8	7.8
	First aid	2	1.9
	General practice	20	19.4
	Primary care	1	1.0
	Administration	3	2.9
	Other (please specify)	35	34.0
Work experience (month / year):	Until 10 years	26	25.2
	more than 10 years	77	74.8
What is your job position?	Nurse	61	59.2
	Charge nurse	11	10.7
	senior nurse	25	24.3
	Other (please specify)	6	5.8
Do you have professional category?	No	21	20.4
	Second category	6	5.8
	First category	11	10.7
	Highest category	65	63.1
Employment status	Full-time	99	96.1
	Part-time	4	3.9
Total		103	100

The majority of respondents (64.1%) have met a diabetic patient at work, and 52.42% have worked with diabetics for the last ten years. Of the nurses, 28.2% were trained to care for diabetic feet, but the majority of respondents (71.8%) were untrained. Of the participants, only 36.9% had educated patients about the risk of developing a diabetic

foot. Despite this indicator, 78.6% of respondents believed that it is necessary to train diabetic patients to take care of a diabetic foot. (See Table 3.)

Table 3. Respondents training on patients with diabetic feet (N = 103)

		Frequency	Percent
Do you meet diabetic patients in your work?	Yes	66	64.1
	No	36	35.0
How many years' experience you have working with diabetic patients (please specify) :	1–10 year	54	52.42
	11–36 year	15	14.56
Have you received any diabetes foot care training?	Yes	29	28.2
	No	74	71.8
Do you educate patients with a risk / problem of diabetic foot?	Yes	38	36.9
	No	65	63.1
Do you think you need to train to care for your diabetic foot?	Yes	81	78.6
	No	22	21.4
Total		103	100

7.2 Nurses Knowledge on Risk Factors of Diabetic Foot

The majority of respondents thought that poor glycemic control (78.6%; Mean 1,2136; SD= ,41185), neuropathic foot (71.8%), peripheral vascular disease (89.3%), insufficient foot care and hygiene (78.6%), and the presence of foot edema (82.5%) are risk factors for diabetic foot. (See Figure 1.)

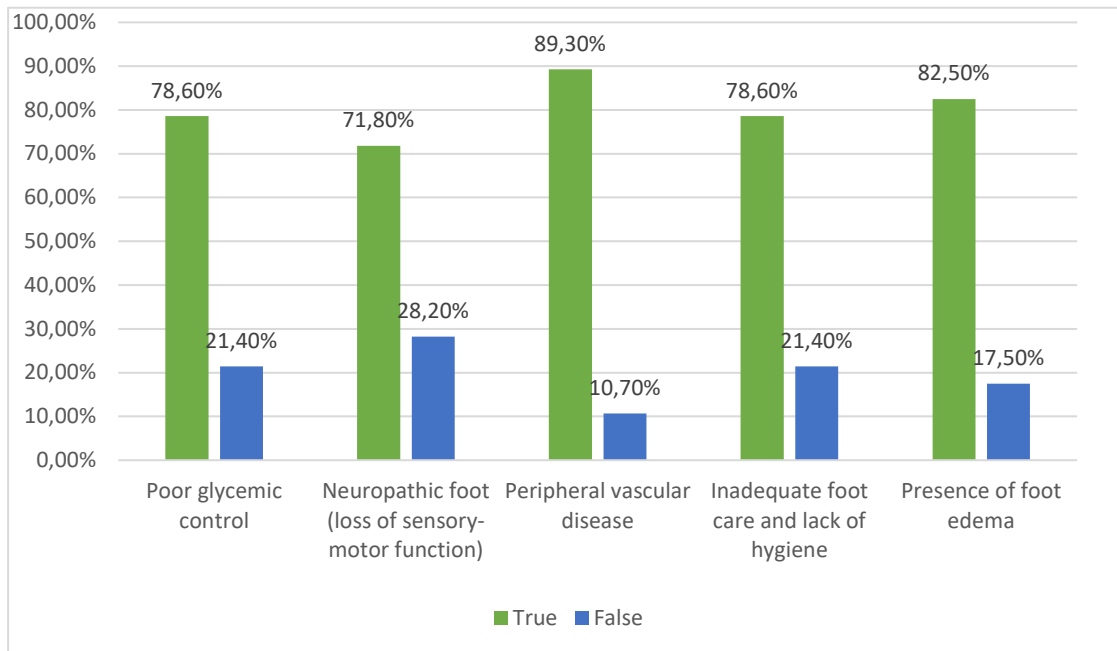


Figure 1. Risk factors (N = 103)

The majority of respondents believed that dry and cracked foot skin (68.9%), the presence of calluses on the feet (88.3%), those with a history of diabetic foot or diabetic ulcers in the opposite limb (89.3%), infection (79.6%), and injury (81.6%) are risk factors for diabetic foot. (See Figure 2.)

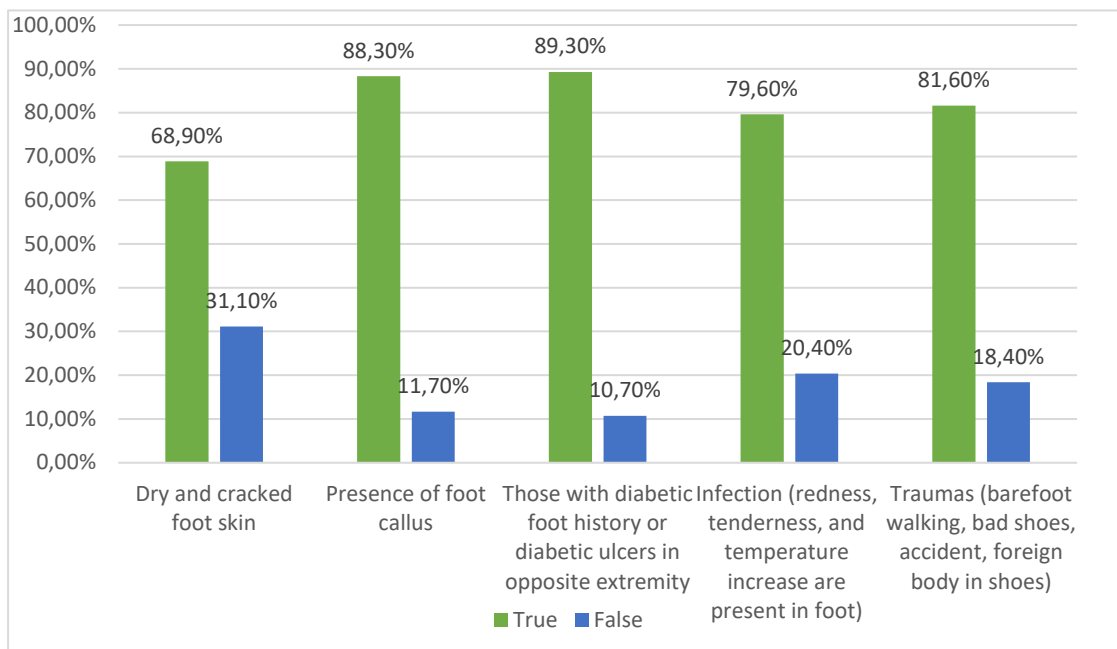


Figure 2. Foot alterations (N = 103)

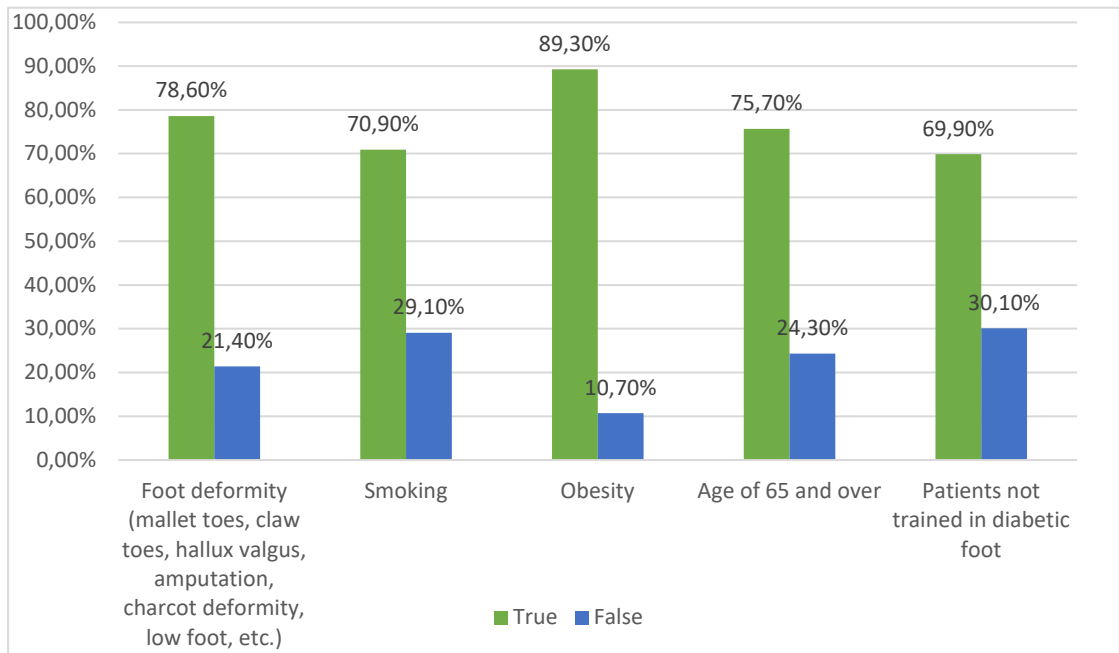


Figure 3. Complication threats (N = 103)

The majority of respondents believed that untrained diabetic foot patients (69.9%), age 65 and older (75.7%), obesity (89.3%), (70.9%) smoking (70.9%), and foot deformity (78.6%) are risk factors for diabetic foot. (See Figure 3.)

7.2 Foot Examination

The majority of respondents believe that foot skin assessment (91.3%), foot skin color control (87.4%), temperature control (73.8%), foot neuropathy assessment (87.4%), and muscle function assessment (78.6%) are important factors when examining the foot. (See Figure 4.)

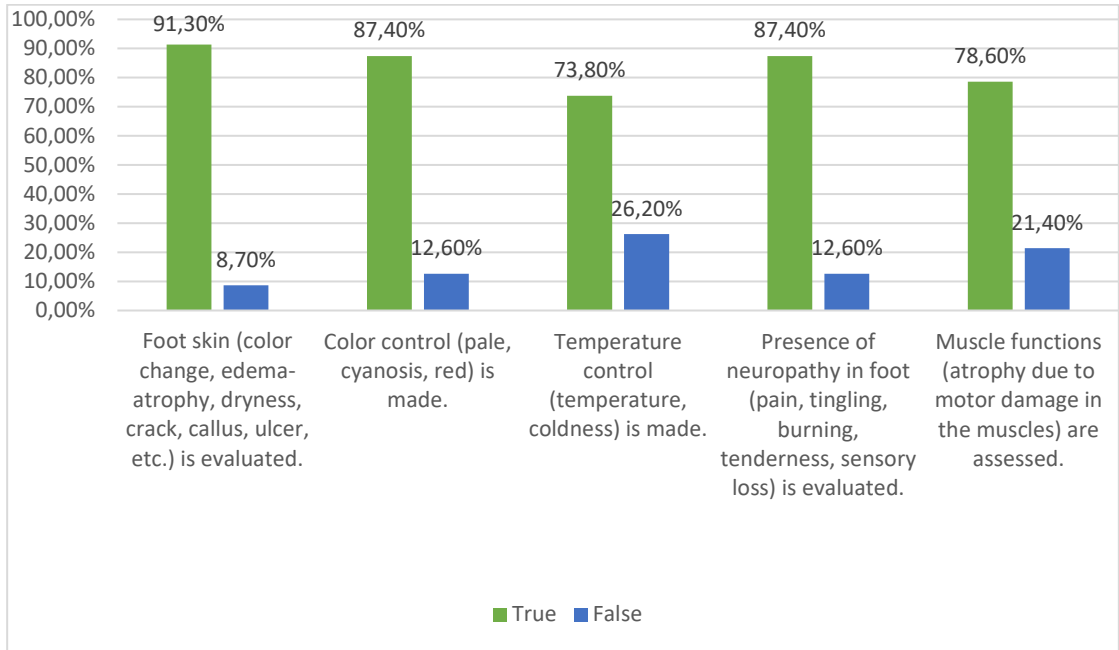


Figure 4. Foot examination (N = 103)

The majority of respondents believed that evaluating the suitability of shoes (79.6%), monitoring the nails (75.7%), evaluating the presence of deformities (85.4%), evaluating the presence of ulcers on the foot (84.5%), and monitoring the blood circulation of the foot (91.3%) are important factors when examining the foot. (See Figure 5.)

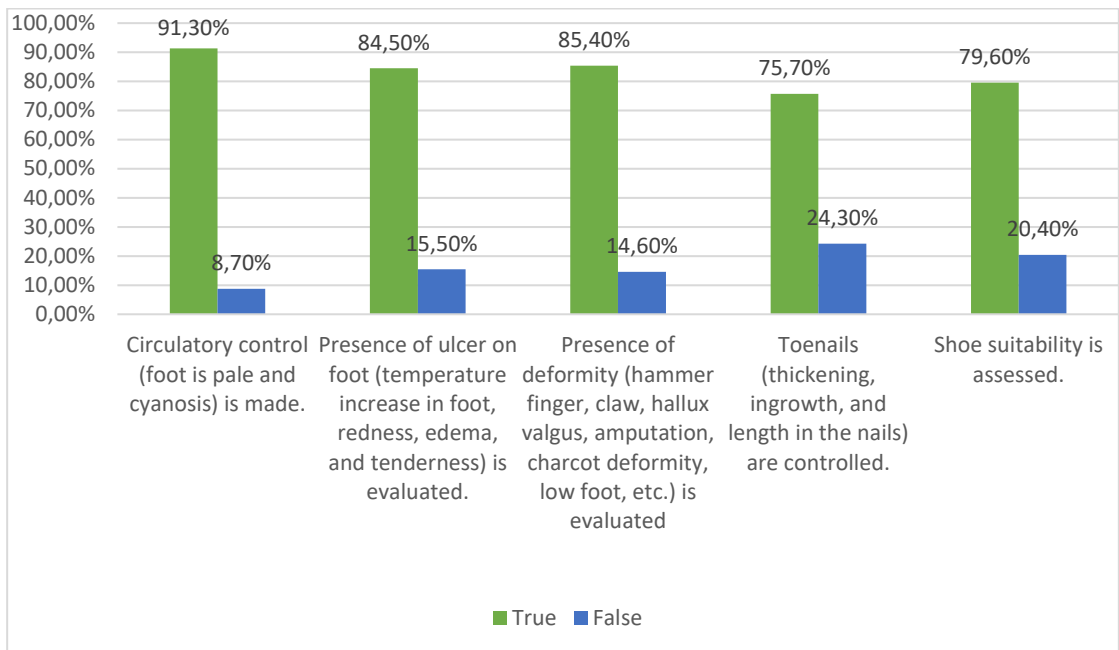


Figure 5. Changes in the legs (N = 103)

7.3 Applications for Preventing Foot Complications

The majority of respondents (89.3%) agreed that the feet should be checked daily. In addition, 91.3% of respondents believed that the feet should be washed with warm water every day; 80.6% that the water temperature should be checked; 93.2% of respondents were of the opinion that the feet, especially the spaces between the fingers, should be dried very well after each wash; and 85.4% of respondents believed that moisturizer should be applied to the feet to prevent complications of the feet (see Figure 6; Appendix 4.)

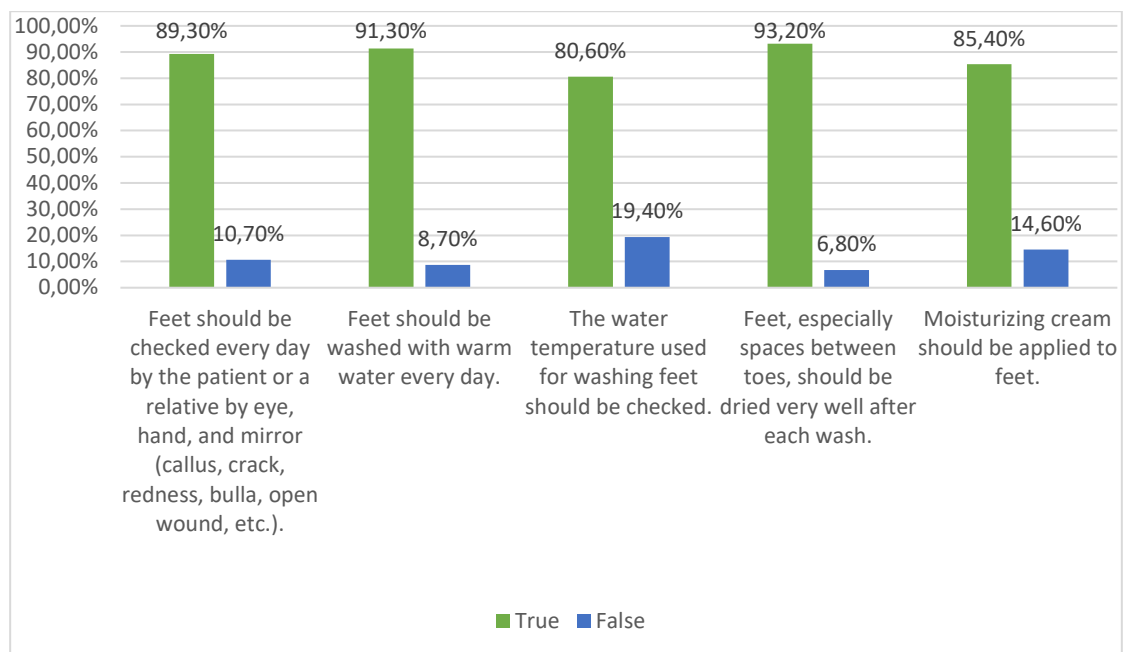


Figure 6. Applications for preventing foot complications (N = 103)

The majority of respondents (74.8%) believed that moisturizer should be applied to the spaces between the toes. In addition, 94.2% believed that toes should be dry to protect them from fungal growth, 88.3% that cutting tools and chemicals should not be used to remove calluses or hardened areas of the skin, 73.8% that callus and skin stiffness should be thinned with pumice, and 68.0% believed that exercises in the form of twisting and stretching the toes several times a day should be done to prevent the formation of calluses on the feet to prevent foot complications (see Figure 7.)

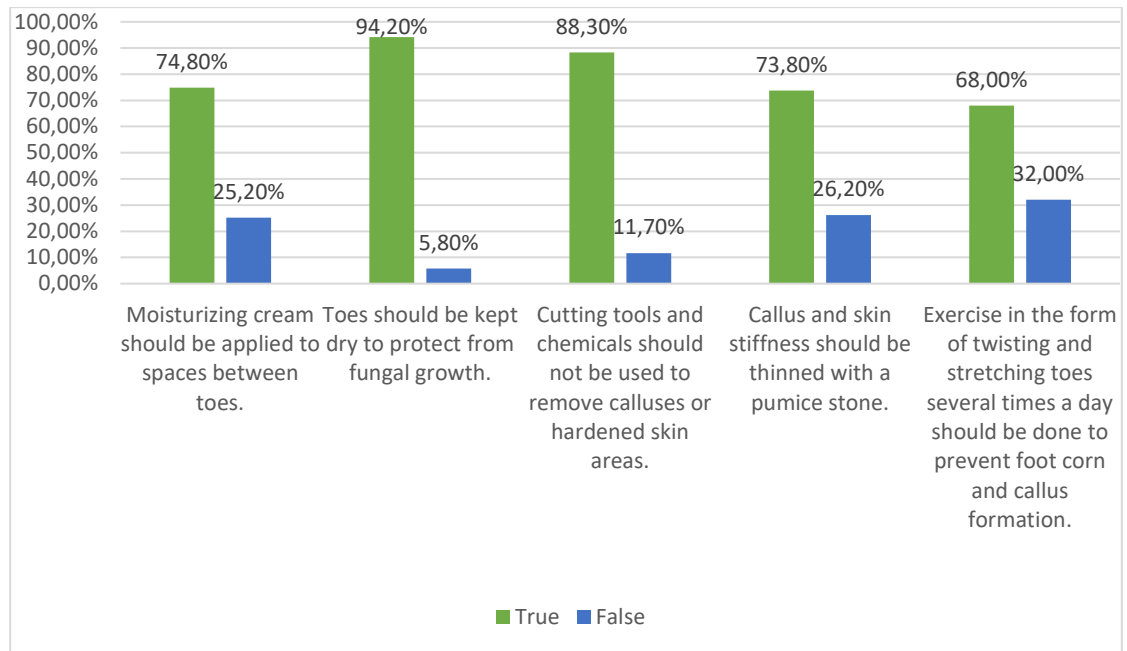


Figure 7. The prevention of diabetic foot (N = 103)

The majority of respondents (63.1%) believed that there is no inconvenience in using callus tape and band-aid; 67.0% that socks should be worn to warm the feet; 41.7% that direct heat sources should be used to warm the feet; 90.3% that socks should not be torn, crumpled, or too large; 60.2% that socks should be checked for humidity and dark color; and 95.1% that socks should be changed every day to prevent leg complications (see Figure 8).

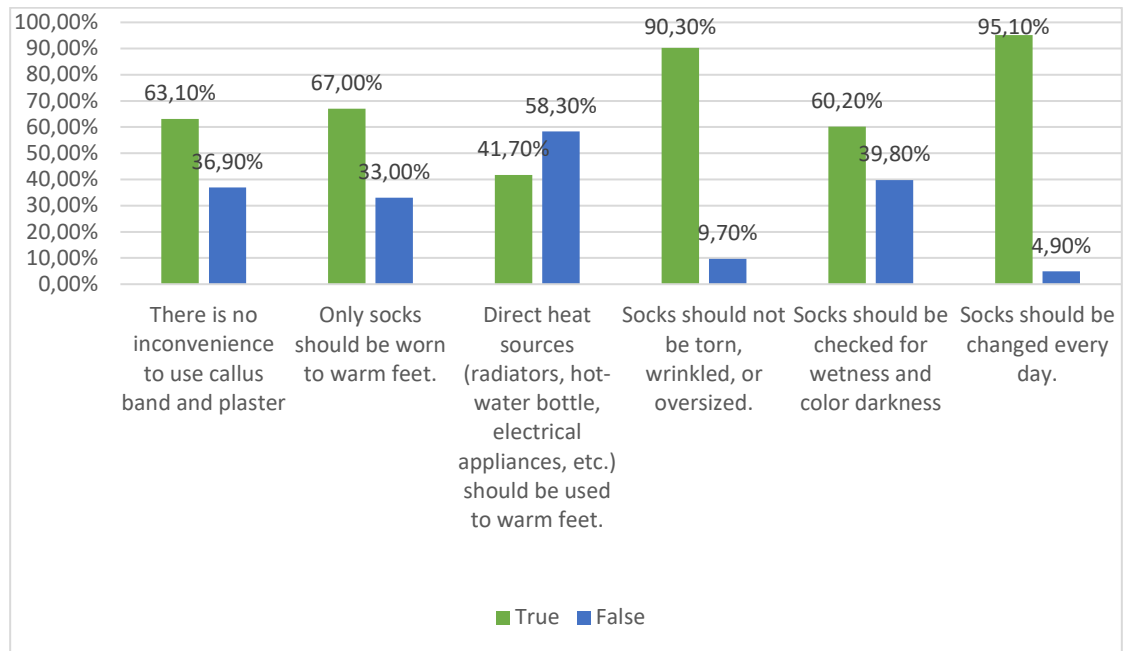


Figure 8. Hygiene of the feet (N = 103)

The majority of respondents (87.4%) believed that you should not wear rubber socks that prevent blood circulation; 82.5% that wool socks should be worn in winter and mercerized socks in summer; 69.9% that the patient should not walk barefoot; 69.9% that pressure on the feet should be removed by not standing for a long period; 61.2% that legs should not be crossed when you sit on a chair; and 77.7% that if there are clawed fingers, massage should not be done to prevent joint stiffness, to prevent leg complications (see Figure 9).

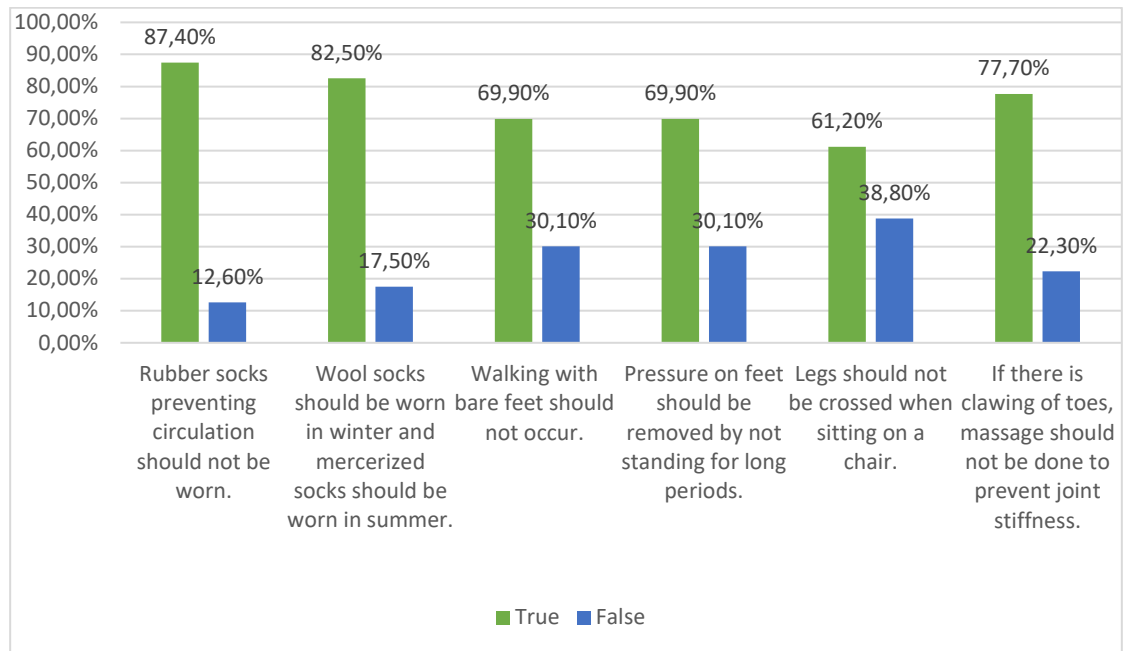


Figure 9. Blood circulation in the leg (N = 103)

The majority of respondents (76.9%) believed that toenails should be controlled in terms of thickening, growth, and length. Of the respondents, 83.5% agreed that toenails should be trimmed evenly, 83.5% that the skin around the nails should not be cut, 91.3% that thickened nails should be cut with special scissors after they soften in warm water, and 87.4% that blind patients should never trim their own nails to prevent complications on the feet (see Figure 10).

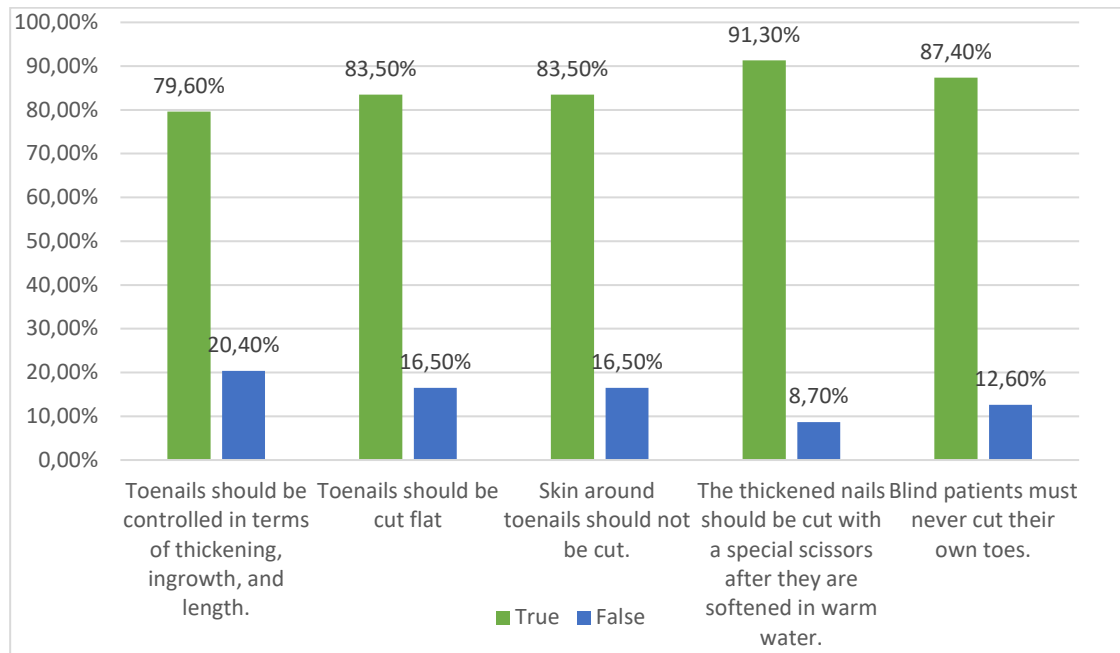


Figure 10. Diabetes nail care (N = 103)

The majority of respondents believed that nails should be cut in a circle (73.8%); any changes in the legs and toes and signs of infection should be immediately reported to the doctor (91.3%); leg exercises should be done every day to help blood circulation (95.1%); for any foot lesion, only shoes should be replaced to reduce the load on the feet (82.5%); and smoking is strictly prohibited, since this will reduce the amount of blood going to the feet to prevent complications on the feet (77.7%) (see Figure 11).

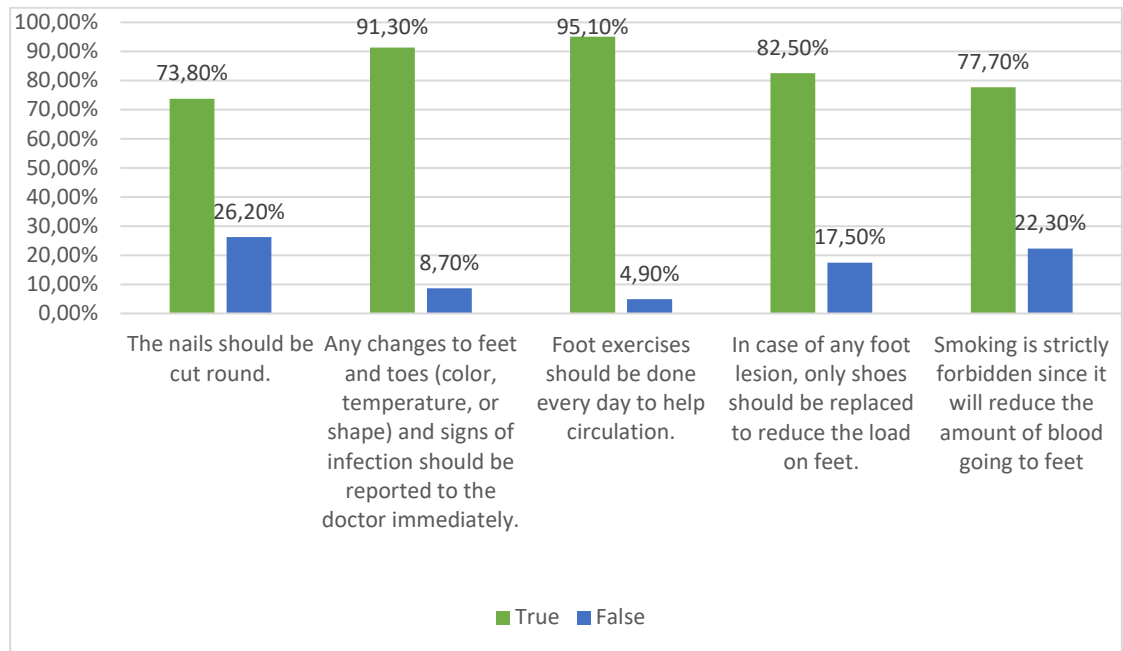


Figure 11. Foot complications (N = 103)

7.4 Footwear Selection

The majority of respondents knew that nails should be cut in a circle (77.7%), that soft and comfortable shoes should be preferred (97.1%), and that shoes should be checked for foreign bodies before each wearing (94.2%). One fifth (20.4%) knew that shoes should be worn without socks; and 92.2% that if the insoles are worn out, they should be replaced. (See Figure 12).

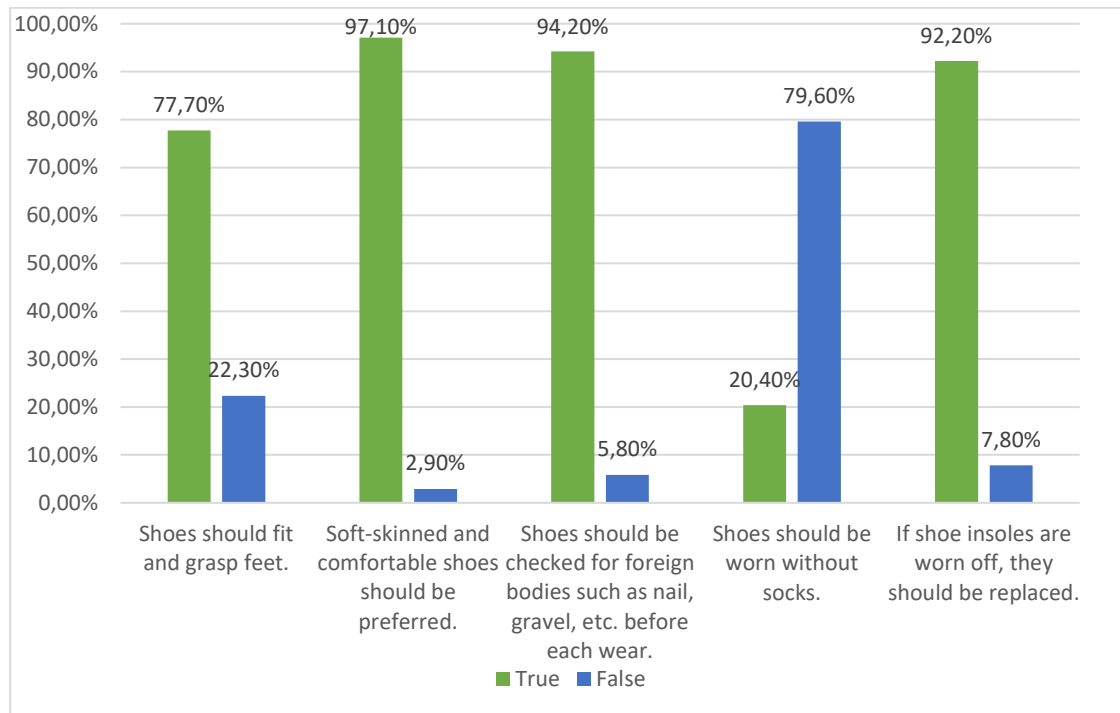


Figure 12. Footwear selection (N = 103)

The majority of respondents (86.4%) knew that shoes should not lose their external protection. Of the nurses, 35.0% believed that shoes should be painted often; 75.7% that new shoes should be worn to allow the feet to get used to them; 26.2% knew to prefer high-heeled shoes; and 92.2% agreed that if there is a deformity of the foot, one should consult a doctor for proper treatment or orthopedic shoes. These are important factors when choosing shoes for diabetics (see Figure 13).

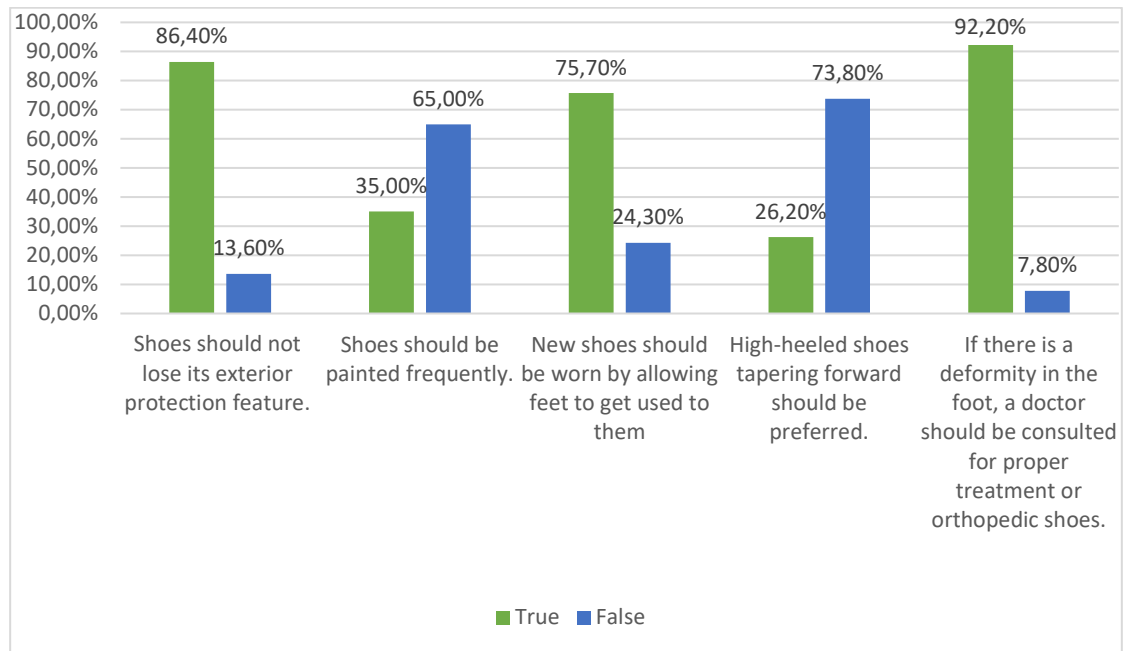


Figure 13. Comfortable shoes for diabetics (N = 103)

8 Discussion

This study was aimed at determining nurses' knowledge of the prevention of diabetic foot in patients with type 2 diabetes mellitus in the primary health care sector. Based on the results, it was revealed that nurses mainly knew the risk factors for diabetic foot but were at a loss to respond to measures to prevent complications of foot diseases. The main goal of this study was to uncover nursing knowledge about diabetic foot prevention. According to the results of the survey questionnaire, nurses lack additional knowledge.

The first result on the knowledge of nurses about type 2 diabetes mellitus for the prevention of diabetic foot is that nurses knew the risk factors for the diabetic foot, but found it difficult to answer questions about the prevention of complications of the diabetic foot. Moreover, a study by Paraizo et al. (2018) was written about nursing knowledge about diabetes (Paraizo et al. 2018).

The second main result was that 71.8% of the nurses who participated in the survey did not take advanced education courses on diabetes and foot care. This is a very low rate. In turn, this reduces the quality of medical care in the prevention of complications of diseases of patients with diabetes mellitus.

The third finding showed that the majority of nurses (63.1%) had not recommended prevention of complications for patients at risk and did not monitor the patient's limbs. Only 28.2% of nurses made recommendations to their patients and their relatives.

The fourth main result was that the majority of nurses (78.6%) did agree with the question “do you think that additional education is needed to prevent diabetic foot ulcers?”, so nurses themselves would want additional education. Moreover, based on the study by Graue et al. (2015) more and more nursing education is required (Graue et al. 2015).

Thus, for the prevention of diabetic ulcers, it is necessary to educate patients how they are examined. The active participation of nurses at various levels, including nurses with managerial skills, in the prevention of complications of a diabetic ulcer and improving the knowledge of the disease, can lead to an improvement in the condition and quality of life of patients with diabetes in the organization of medical care.

9 Conclusion and Recommendations

In order to improve the quality of prevention of complications of diabetic foot among patients registered with diabetes in the Republic of Kazakhstan, and to bring nursing and medical practices closer to international standards, continuous development of nursing education is necessary. The knowledge and views of nurses on the prevention of diabetic ulcers occupy an important place in the treatment of patients. In conclusion, it should be noted that this study will help expand the evidence base for further research to develop effective training programs for nurses.

Recommendations for Primary Healthcare Nurses

1. Every nurse in Primary Healthcare must be trained in the prevention of diabetic foot.
2. Nurses should regularly test their knowledge and be referred to evidence-based training seminars and international conferences.
3. In PHC, nurses should open *Schools for the prevention of diabetic foot* and consult patients who suffer from diabetic foot.
4. Applied nurses in independent receptions should consult patients and their relatives.

Recommendations for Medical Colleges and Universities

1. Training of nurses who work in PHC and care for patients who suffer from type 2 diabetes
2. Inviting nurses who work in PHC for conferences and round tables
3. Applying international guidelines and standards of the prevention of diabetic foot in the education of nursing students

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Appendices

Appendix 1. Analysis of questionnaires

Research	Main concepts used in the theory part of the article	Name on Questionnaire	The authors of the Questionnaire	Nro of questions of each dimensions	Usage:
Ann Shiu and Rebecca Wong 2011	Develop knowledge and competence of health care professionals in diabetes foot care	Diabetes Foot Care Knowledge Scale (DFKS)	(Leung & Shiu 2007),	14 items True False In original version consist 65 items	Ann Shiu and Rebecca Wong 2011
Kamran Munawar, Aneela Kamran and Zeeshan Ahmad 2019	access to knowledge, approaches and practice regarding the prevention, care and treatment of diabetic foot	Without name of questionnaire	Kamran Munawar, Aneela Kamran and Zeeshan Ahmad 2019	15 items Yes No I do not know	Kamran Munawar, Aneela Kamran and Zeeshan Ahmad 2019
Zahide Kaya1 and Anita Karaca 2018	to evaluate the knowledge levels of nurses of diabetic foot care management and to determine influencing factors.	The “Nurses’ Knowledge Level Form on Diabetic Foot Management”	Zahide Kaya1 and Anita Karaca 2018	68 items true/false questions divided into 4 sections	Zahide Kaya1 and Anita Karaca 2018
Wafaa H. Abdullah, Samira Al	to determine capacity	Tool I: Diabetic foot ulcer	Without name of	Tool I: Yes = 1 No = 0 Tool II:	Wafaa H. Abdullah, Samira Al

Senany, Hanaa Khaled Al-Otheimin 2017	building for nurses' knowledge and practice regarding prevention of diabetic foot complications.	Structured interview questionnaire for nurse's knowledge. Tool II: Health status assessment questionnaire. Tool III: Nurses Practice Observational checklist.	authors of questionnaire	Done = 1 Not Done = 0. Tool III:	Senany, Hanaa Khaled Al-Otheimin 2017
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Appendix 2. Permission to the research**Dear nurse!**

The purpose of this study is to develop recommendations for nurses on counseling patients with type 2 diabetes mellitus for the prevention of diabetic foot, assessing the knowledge of nurses working with patients and their relatives in primary health care in the city of Almaty.

Nurses play an important role in the healthcare system. Quality care improves public health. Currently, the image of a nurse and nursing as a profession is of vital importance for our country.

I ask you to answer the questionnaire. The questionnaire will be electronic.

The results of this study will be used to determine the level of knowledge of nurses in the treatment of diabetic foot and opportunities for improvement, which will ultimately contribute to the development of the profession of a nurse in Kazakhstan. Participation in the study is completely voluntary.

The research material is stored in a closed cabinet, and only the researcher has the key.

Researcher agrees to abide by existing conservation guidelines.

Research materials and data protection laws. Based on the results of the study, candidate dissertations will be completed, and articles will be published in international scientific journals. Study material will be lost as a result of appropriate cutting after the completion of the study.

By agreeing, you voluntarily consent to the use of the survey results for research purposes. Thank you for your support in the development of nursing!

Sincerely,**Elmira Myrzakhmet, Researcher****e-mail:****Tel: 8****Dr Johanna Heikkilä, PhD****e-mail:****Jyväskylä University of Applied Sciences****Dinara Ospanova, PhD****e-mail:****University of KazMUCE**

Appendix 3. Questionnaire Nurses' Knowledge Level Form on Diabetic Foot Management

NURSE INFORMATION

SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. Age:.....

2. Gender : female male

3. Family status

married single divorced widow cohabiting

4. How many years ago did you graduate from college? _____

5. What is your educational status?

- General Nurse (TIPO)
- Applied Bachelor in Nursing
- Academic Bachelor degree in Nursing
- Master of Medical Sciences, Specialty _____
- Doctor of Medical Sciences, Specialty _____

6. Where do you work ?

- therapy department
- surgical department
- Intensive care
- First aid
- General practise
- Primary care
- administration
- Other (please specify)

7. Work experience (month / year).....

8. What is your job position?

- Nurse
- Charge nurse
- senior nurse
- Other (please specify)

9. Do you have professional category?

- No
- Second category
- First category
- Highest category

10. Employment status

- Full-time
- Part-time
- Casual
- Not at all working Student

11. Working hours in your unit (month / year).....**12. Do you meet diabetic patients at your work:**

- Yes
- No

13. If your answer is “Yes”, answer the next question.

- How many in a day (please specify)
- How many in a week (please specify)
- How many years experience you have working with diabetic patients (please specify)

II. FEATURES OF NURSES FOR DIABETIC FOOT TREATMENT**14. Have you received any diabetes foot care training?**

- Yes
- No

If your answer is “Yes”, answer the 15th question.

15. Where did you get this diabetes foot care education? (You can choose more than one option)

- I took this as part of a nursing education curriculum
- Refresher course
- I attended the courses myself.
- Other (please specify)

16, Do you educate patients with a risk / problem of diabetic foot?

- Yes
- No

If your answer is yes, answer the 17th question.

17. Which of the following subjects do you teach? (You can choose more than one option)

- Blood sugar control
- Foot examination
- Foot Care
- shoe selection
- amputation
- Other (describe)

18. Is there a foot test for patients with diabetes in the department where you work?

- Yes
- No

19. Do you think you need to train to care for your diabetic foot?

- Yes
- No

If your answer is yes, answer the 20 th question.

20. Which of the following training topics do you need? (You can mark more than one).

- Risk factors and etiology of diabetic foot
- Foot examination
- Diabetic foot prevention initiatives
- shoe selection
- Other (describe)

Nurses' Knowledge Level Form on Diabetic Foot Management

RISK FACTORS	True	False
1. Poor glycemic control	x	
2. Presence of sense of chill, pain, burning, tingling, and tenderness in foot	x	
3. Neuropathic foot (loss of sensory-motor function)	x	
4. Peripheral vascular disease	x	
5. Inadequate foot care and lack of hygiene	x	
6. Presence of foot edema	x	
7. Presence of foot callus	x	

8. Dry and cracked foot skin	x	
9. Those with diabetic foot history or diabetic ulcers in opposite extremity	x	
10. Infection (redness, tenderness, and temperature increase are present in foot)	x	
11. Traumas (barefoot walking, bad shoes, accident, foreign body in shoes)	x	
12. Foot deformity (mallet toes, claw toes, hallux valgus, amputation, charcot deformity, low foot, etc.)	x	
13. Smoking	x	
14. Obesity	x	
15. Age of 65 and over	x	
16. Patients not trained in diabetic foot	x	
FOOT EXAMINATION	True	False
1. Foot skin (color change, edema-atrophy, dryness, crack, callus, ulcer, etc.) is evaluated.	x	
2. Color control (pale, cyanosis, red) is made.	x	
3. Temperature control (temperature, coldness) is made.	x	
4. Presence of neuropathy in foot (pain, tingling, burning, tenderness, sensory loss) is evaluated.	x	
5. Muscle functions (atrophy due to motor damage in the muscles) are assessed.	x	
6. Circulatory control (foot is pale and cyanosis) is made.	x	
7. Presence of ulcer on foot (temperature increase in foot, redness, edema, and tenderness) is evaluated.	x	
8. Presence of deformity (hammer finger, claw, hallux valgus, amputation, charcot deformity, low foot, etc.) is evaluated.	x	
9. Toenails (thickening, ingrowth, and length in the nails) are controlled.	x	
10. Shoe suitability is assessed.	x	

APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS	True	False
1. Feet should be checked every day by the patient or a relative by eye, hand, and mirror (callus, crack, redness, bulla, open wound, etc.).	x	
2. Feet should be washed with warm water every day.	x	
3. The water temperature used for washing feet should be checked.	x	
4. Feet, especially spaces between toes, should be dried very well after each wash.	x	
5. Moisturizing cream should be applied to feet.	x	
6. Moisturizing cream should be applied to spaces between toes.		X
7. Toes should be kept dry to protect from fungal growth.	x	
8. Cutting tools and chemicals should not be used to remove calluses or hardened skin areas.	x	
9. Callus and skin stiffness should be thinned with a pumice stone.	x	
10. Exercise in the form of twisting and stretching toes several times a day should be done to prevent foot corn and callus formation.	x	
11. There is no inconvenience to use callus band and plaster		X
12. Only socks should be worn to warm feet.	x	
13. Direct heat sources (radiators, hot-water bottle, electrical appliances, etc.) should be used to warm feet.		X
14. Socks should not be torn, wrinkled, or oversized.	x	
15. Socks should be checked for wetness and color darkness.	x	
16. Socks should be changed every day.	x	
17. Rubber socks preventing circulation should not be worn.	x	
18. Wool socks should be worn in winter and mercerized socks should be worn in summer.	x	
19. Walking with bare feet should not occur.	x	
20. Pressure on feet should be removed by not standing for long periods.	x	
21. Legs should not be crossed when sitting on a chair.	x	
22. If there is clawing of toes, massage should not be done to prevent joint stiffness.		X
23. Toenails should be controlled in terms of thickening, ingrowth, and length.	x	

24. Toenails should be cut flat.	x	
25. Skin around toenails should not be cut.	x	
26. The thickened nails should be cut with a special scissors after they are softened in warm water.	x	
27. Blind patients must never cut their own toes.	x	
28. The nails should be cut round.		X
29. Any changes to feet and toes (color, temperature, or shape) and signs of infection should be reported to the doctor immediately.	x	
30. Foot exercises should be done every day to help circulation.	x	
31. In case of any foot lesion, only shoes should be replaced to reduce the load on feet.		X
32. Smoking is strictly forbidden since it will reduce the amount of blood going to feet.	x	
FOOTWARE SELECTION	True	False
1. Shoes should fit and grasp feet.	x	
2. Soft-skinned and comfortable shoes should be preferred.	x	
3. Shoes should be checked for foreign bodies such as nail, gravel, etc. before each wear.	x	
4. Shoes should be worn without socks.		X
5. If shoe insoles are worn off, they should be replaced.	x	
6. Shoes should not lose its exterior protection feature.	x	
7. Shoes should be painted frequently.	x	
8. New shoes should be worn by allowing feet to get used to them.	x	
9. High-heeled shoes tapering forward should be preferred.		X
10. If there is a deformity in the foot, a doctor should be consulted for proper treatment or orthopedic shoes.	x	

Appendix 4. Analysis

Distribution of Nurses' Knowledge Level Form on Diabetic Foot Management

		Mean	Std. Deviation
1.	RISK FACTORS:Poor glycemic control	1,2136	,41185
2.	RISK FACTORS:Neuropathic foot (loss of sensory-motor function)	1,2816	,45196
3.	RISK FACTORS:Peripheral vascular disease	1,1068	,31036
4.	RISK FACTORS:Inadequate foot care and lack of hygiene	1,2136	,41185
5.	RISK FACTORS:Presence of foot edema	1,1748	,38162
6.	RISK FACTORS:Dry and cracked foot skin	1,3107	,46503
7.	RISK FACTORS:Presence of foot callus	1,1165	,32240
8.	RISK FACTORS:Those with diabetic foot history or diabetic ulcers in opposite extremity	1,1068	,31036
9.	RISK FACTORS:Infection (redness, tenderness, and temperature increase are present in foot)	1,2039	,40485
10.	RISK FACTORS:Traumas (barefoot walking, bad shoes, accident, foreign body in shoes)	1,1845	,38976
11.	RISK FACTORS:Foot deformity (mallet toes, claw toes, hallux valgus, amputation, charcot deformity, low foot, etc.)	1,2136	,41185
12.	RISK FACTORS:Smoking	1,2913	,45657
13.	RISK FACTORS:Obesity	1,1068	,31036
14.	RISK FACTORS:Age of 65 and over	1,2427	,43082
15.	RISK FACTORS:Patients not trained in diabetic foot	1,3010	,46092
16.	FOOT EXAMINATION:Foot skin (color change, edema-atrophy, dryness, crack, callus, ulcer, etc.) is evaluated.	1,0874	,28377
17.	FOOT EXAMINATION:Color control (pale, cyanosis, red) is made.	1,1262	,33371
18.	FOOT EXAMINATION:Temperature control (temperature, coldness) is made.	1,2621	,44195
19.	FOOT EXAMINATION:Presence of neuropathy in foot (pain, tingling, burning, tenderness, sensory loss) is evaluated.	1,1262	,33371
20.	FOOT EXAMINATION:Muscle functions (atrophy due to motor damage in the muscles) are assessed.	1,2136	,41185
21.	FOOT EXAMINATION:Circulatory control (foot is pale and cyanosis) is made.	1,0874	,28377
22.	FOOT EXAMINATION:Presence of ulcer on foot (temperature increase in foot, redness, edema, and tenderness) is evaluated.	1,1553	,36400
23.	FOOT EXAMINATION:Presence of deformity (hammer finger, claw, hallux valgus, amputation, charcot deformity, low foot, etc.) is evaluated.	1,1456	,35446
24.	FOOT EXAMINATION:Toenails (thickening, ingrowth, and length in the nails) are controlled.	1,2427	,43082
25.	FOOT EXAMINATION:Shoe suitability is assessed.	1,2039	,40485
26.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Feet should be checked every day by the patient or a relative by eye, hand, and mirror (callus, crack, redness, bulla, open wound, etc.).	1,1068	,31036
27.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Feet should be washed with warm water every day.	1,0874	,28377
28.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:The water temperature used for washing feet should be checked.	1,1942	,39750

29.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Feet, especially spaces between toes, should be dried very well after each wash.	1,0680	,25291
30.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Moisturizing cream should be applied to feet.	1,1456	,35446
31.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Moisturizing cream should be applied to spaces between toes.	1,2524	,43653
32.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Toes should be kept dry to protect from fungal growth.	1,0583	,23537
33.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Cutting tools and chemicals should not be used to remove calluses or hardened skin areas.	1,1165	,32240
34.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Callus and skin stiffness should be thinned with a pumice stone.	1,2621	,44195
35.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Exercise in the form of twisting and stretching toes several times a day should be done to prevent foot corn and callus formation.	1,3204	,46891
36.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:There is no inconvenience to use callus band and plaster	1,3689	,48487
37.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Only socks should be worn to warm feet.	1,3301	,47255
38.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Direct heat sources (radiators, hot-water bottle, electrical appliances, etc.) should be used to warm feet.	1,5825	,49555
39.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Socks should not be torn, wrinkled, or oversized.	1,0971	,29752
40.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Socks should be checked for wetness and color darkness.	1,3981	,49189
41.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Socks should be changed every day.	1,0485	,21596
42.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Rubber socks preventing circulation should not be worn.	1,1262	,33371
43.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Wool socks should be worn in winter and mercerized socks should be worn in summer.	1,1748	,38162
44.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Walking with bare feet should not occur.	1,3010	,46092
45.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Pressure on feet should be removed by not standing for long periods.	1,3010	,46092
46.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Legs should not be crossed when sitting on a chair.	1,3883	,48976
47.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:If there is clawing of toes, massage should not be done to prevent joint stiffness.	1,2233	,41849
48.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Toenails should be controlled in terms of thickening, ingrowth, and length.	1,2039	,40485
49.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Toenails should be cut flat.	1,1650	,37304
50.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Skin around toenails should not be cut.	1,1650	,37304

51.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:The thickened nails should be cut with a special scissors after they are softened in warm water.	1,0874	,28377
52.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Blind patients must never cut their own toes.	1,1262	,33371
53.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:The nails should be cut round.	1,2621	,44195
54.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Any changes to feet and toes (color, temperature, or shape) and signs of infection should be reported to the doctor immediately.	1,0874	,28377
55.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Foot exercises should be done every day to help circulation.	1,0485	,21596
56.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:In case of any foot lesion, only shoes should be replaced to reduce the load on feet.	1,1748	,38162
57.	APPLICATIONS FOR PREVENTING FOOT COMPLICATIONS:Smoking is strictly forbidden since it will reduce the amount of blood going to feet.	1,2233	,41849
58.	FOOTWARE SELECTION:Shoes should fit and grasp feet.	1,2233	,41849
59.	FOOTWARE SELECTION:Soft-skinned and comfortable shoes should be preferred.	1,0291	,16898
60.	FOOTWARE SELECTION:Shoes should be checked for foreign bodies such as nail, gravel, etc. before each wear.	1,0583	,23537
61.	FOOTWARE SELECTION:Shoes should be worn without socks.	1,7961	,40485
62.	FOOTWARE SELECTION:If shoe insoles are worn off, they should be replaced.	1,0777	,26896
63.	FOOTWARE SELECTION:Shoes should not lose its exterior protection feature.	1,1359	,34438
64.	FOOTWARE SELECTION:Shoes should be painted frequently.	1,6505	,47915
65.	FOOTWARE SELECTION:New shoes should be worn by allowing feet to get used to them.	1,2427	,43082
66.	FOOTWARE SELECTION:High-heeled shoes tapering forward should be preferred.	1,7379	,44195
67.	FOOTWARE SELECTION:If there is a deformity in the foot, a doctor should be consulted for proper treatment or orthopedic shoes.	1,0777	,26896