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## ORIGINAL RESEARCH

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## Foot ulcers: perception of patients with Type 2 diabetes

### *Úlceras de pie: percepción de pacientes con diabetes mellitus tipo 2*

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#### | Abstract |

**Introduction:** In the past decade, the incidence of diabetes *mellitus* has increased exorbitantly around the world and foot ulcer has become the most serious and costly complication, leading to possible amputation or even death.

**Objective:** To know the perception of diabetic patients attached to CESFAM Belarmina Paredes, Futrono, Chile, regarding the occurrence of diabetic foot ulcers in 2015.

**Materials and methods:** Qualitative research through intrinsic case study. Non-probabilistic intentional samples of cases based on criteria and convenience (12 patients), who signed an informed consent. Information was obtained through focus groups and analysis was made using data reduction. Validity was endorsed by the Ethics Committee of the Universidad de La Frontera.

**Results:** Two qualitative domains were obtained out of 495 units of analysis obtained in Level I and their consequent reduction in Level III: "Concepts and experiences lived as a result of illness and healthcare team role" and "Contributions to improve quality of care".

**Conclusion:** Participants consider that foot ulcer is a wound. Unaware of the risks, they deem amputation as a sequel. However, patients have etiological knowledge, describe signs and symptoms, and reveal pharmacological treatment. Additionally, they state changes in daily life, work absence and degree of dependency.

**Keywords:** Diabetes *Mellitus* Type 2; Diabetic Foot; Primary Care Nursing (MeSH).

#### | Resumen |

**Introducción.** En la última década, la diabetes *mellitus* ha presentado un aumento exorbitante en el mundo y la úlcera del pie se constituye como la complicación más seria y costosa, con posible amputación e inclusive la muerte.

**Objetivo.** Conocer la percepción de los pacientes diabéticos pertenecientes al CESFAM Belarmina Paredes en Futrono, Chile, en relación con la aparición de úlceras del pie diabético.

**Materiales y métodos.** Investigación cualitativa realizada mediante estudio intrínseco de casos. Muestra no probabilística, intencionada de casos por criterios y conveniencia, conformada por 12 pacientes con previa firma del consentimiento informado. La información se obtuvo por medio de grupos focales y el análisis se realizó a través de reducción de datos.

**Resultados.** De las 495 unidades de significado develadas en el nivel 1 y su consecuente reducción en el nivel 3, se obtuvieron dos dominios cualitativos: "Conceptos y experiencias vividas producto de la enfermedad y rol equipo de salud" y "Aportes para mejorar calidad de atención".

**Conclusiones.** Los participantes consideran que la úlcera del pie es una herida. Sin consciencia de riesgo, identifican la amputación como secuela; sin embargo, tienen conocimiento etiológico, describen signos, síntomas y revelan tratamiento farmacológico. Expresan cambios en la vida diaria, ausencia laboral y grado de dependencia.

**Palabras clave:** Diabetes *mellitus* tipo 2; Pie diabético; Enfermería de atención primaria (DeCS).

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## Introduction

Diabetes *mellitus* (DM) is a chronic, non-communicable disease. (1) In 2014, the World Health Organization (WHO) identified it as a pandemic and reported that 422 million people suffer from this disease worldwide. (2,3) According to the International Diabetes Federation (IDF), by 2035, this figure will reach 592 million. (4) As a result of this pathology, there are more than five million deaths per year.

One of the chronic complications of diabetes *mellitus* type 2 (DM2) is diabetic foot (DF) (3), which can result in amputation if it progresses to an ulcer. One of the consequences of such measure is the profound deterioration in patient's self-care, productivity and psychosocial functions, or even death. (2) Therefore, this is a complex disease that causes greater use of health services and requires up to 11% of the total health expenditure of each country. (3) This condition is responsible for 50% of all non-traumatic amputations. In addition, people who have one amputated leg lose the other in less than five years (5); about 20% of patients with DM2 manifest a picture of DF in the course of their life, and about 20% of them undergo amputation. (5) In Chile, in 2014, one in every 200 diabetics underwent and amputation and more than 16 000 received treatment for foot ulcers. During the last decade, the rate of amputations in patients with DM2 has increased by 28%. (6)

The measures taken by the Ministry of Health of Chile and other international organizations to prevent foot ulcers are not effective. This can be seen daily in primary health care (PHC), where patients attend the first consultation due to the presence of a skin disorder on their feet. (7) The most relevant aspect should be the identification of patients at risk, in order to act in a timely manner and prevent the onset of the lesions. The prevention of DF is important for primary care systems, since the expenses generated by the treatment of complications can be reduced—the disease requires around 54.5 billion dollars a year in Latin America only for its management—and also because the quality of life of patients can be improved, given that the disease is a fundamental part of their daily lives and that of their relatives too. (8) From this perspective, a study based on the natural history of this ailment, with prevention at different levels of care, demonstrated a reduction in amputations of up to 85% (2), which proves that DF ulcers are preventable in most cases.

Education is a fundamental tool for prevention; however, for these actions to be successful, psychological, sociocultural, interpersonal and real needs of the individual who suffers from this pathology must be considered. It is essential that this process is based on the reality and experience of patients, since many times the delivery of information does not allow an adequate participation, not forgetting that what they know and what they would like to know should also be considered. (9)

In consequence, it is important to note that inadequate perception of risk, by both the patient and the healthcare team, is a clear cause of the incorrect assessment of danger and, therefore, a human error. (10) It is possible to infer that healthcare professionals should know about the perception of their users in relation to the occurrence of signs and symptoms that afflict them. All these factors justify the development of research to learn about the perception of users regarding their health condition and determine how educational and therapeutic intervention should be done at all levels of the disease and its complications. (5)

With this in mind, the personnel of a family health center (CESFAM), in southern Chile has developed multiple strategies to reduce the onset of ulcers in DF patients. However, these measures seem to be insufficient considering that out of 667 diabetic patients, 12 developed wounds to their feet, five of them underwent amputation

and the remaining seven are still receiving assistance from nurses. (7) This has an impact on the consumption of human and material resources, which has increased progressively, and has become impossible to maintain.

It is important to note that, despite carrying out the activities suggested in the documents delivered by the Ministry of Health regarding the execution of DF assessments—education about the correct use of footwear, socks, nail cutting, grooming of the feet, proper feeding, and podiatric controls—and the cardiovascular health program, no favorable changes have been observed in terms of the decrease in the incidence of ulcers. For this reason, multiple analyzes have been carried out to determine the causes of this situation, without obtaining results that allow guiding effective improvement plans with patients. (7) Given this situation, research on the perception of the incidence of foot ulcers in DM2 patients who presented with wounds in 2015 is necessary with the purpose of contributing to improve their quality of life.

This study seeks to understand the perception of DM2 patients in relation to the cause to which they attribute the occurrence of ulcers on their feet. The objectives are to discover the meaning of the concept of ulcer in DF and DM2, to understand what it means to live with a DF ulcer and to investigate the role of the health team. This investigation is expected to provide relevant information to design more comprehensive strategies and treatments.

This contribution implies knowing and considering the unmet needs of these patients in care plans, cultural aspects involved and beliefs related to health behaviors and self-care, since these are elements that will act systematically as facilitators of the changes in their behavior to favor improvement.

## Materials and methods

Considering the nature of the research object, a qualitative, exploratory, descriptive and interpretative paradigm was applied to an intrinsic case study (11,12), whose purpose is to describe important aspects of a little known phenomenon, document it and explain its causes.

The non-probabilistic, intentional sample of cases, based on criterion and convenience (13), consisted of 12 DM2 patients who developed DF ulcers and were treated at CESFAM in 2015. The inclusion criteria were: age  $\geq 18$  years regardless of gender; normal cognitive, oral and auditory abilities to allow an effective communication and understanding of the objective of study, and willingness to participate voluntarily in the study, previously signing an informed consent.

Focus group was selected as the qualitative technique for data collection (two groups of six members each). Testimonies were collected until reaching the point of saturation, that is, repetition of ideas or gathering enough evidence to guarantee the credibility of the investigation. (14) A guideline was used to ensure that all subjects were explored, for example: Can you say what an ulcer is for you? Have you heard of DF ulcer? What do you think was the cause for the occurrence of your ulcers? An audio recorder and field notes were used, with the corresponding authorization, to support the collection of information in an exact way, as narrated by the participants themselves.

The analysis of data followed the constant comparison scheme (15) through a generative and constructive method in which inductive coding of categories was combined with constant comparison. Progressively, information that matched the object of study was reduced in three phases that formed different types of operations: segmentation and coding of units of analysis; identification of the main topics or emerging thematic nuclei, and integration and

interpretation of the results in qualitative domains. (16,17) Information was manually structured in three levels by the researchers:

*Level 1:* Identification of units of analysis (textual narrations of the participating subjects) and segmentation for grouping into descriptive categories.

*Level 2:* A system of emerging thematic nuclei or metacategories was built from descriptive categories.

*Level 3:* As a consequence of the previous level, qualitative domains were identified through a sequential and transversal analysis of metacategories.

It should be noted that under this paradigm, data collection and subsequent analysis were concurrent (12), and that categorization and segmentation were two operations that were executed simultaneously because the used criterion belonged to a certain concept or topic, where the units that made reference to a certain idea were included in the corresponding categories.

Reliability was guaranteed using standards of rigor determined by: truth value or credibility (work over a prolonged period of time, continuous observation, triangulation, verification among participants), applicability or transferability (collection of abundant descriptive data, dense and meticulous descriptions), consistency or dependence (review tracks, including field notebooks, interview notes) and neutrality or confirmability (triangulation).(18)

Ethical considerations were safeguarded since this project was authorized by the Scientific Ethics Committee of the Universidad de La Frontera through Act No. 080/2016. The following ethical principles in research were considered (19,20):

1. Implicit social value since the results will provide probable social and scientific benefits.
2. Scientific validity was assured by a rigorous design, and the products were also triangulated by researchers.
3. The equitable selection of subjects was safeguarded by identifying key informants, that is, those people who contributed to the study because they were directly related to it.
4. A favorable risk-benefit ratio, focused on minimizing potential risks and increasing benefits proportionally, was accomplished following the non-maleficence and beneficence principles, without generating conflicts to the participants.
5. Independent assessment refers to non-distortion of research results, which was endorsed by the Scientific Ethics Committee of the University.
6. The informed consent, authorized by said Committee, included respect for the voluntary and conscious participation of the subjects, offering them the opportunity to raise questions and doubts, and withdraw from the study if they wished.
7. Respect for the subjects enrolled was met by giving them the possibility of changing their mind, ensuring confidentiality of the data and delivering the results of the study.

## Results

### Level 1

495 units of analysis, relevant to the study, were obtained and grouped into five emerging categories as shown in Table 1.

As a result of this process, five emerging categories were obtained. They are presented in Tables 2, 3, 4, 5 and 6.

**Table 1.** Percentage distribution of coded emergent categories.

No.	Code	Coded emergent categories	Frequency of units of analysis	
			n	%
1	SUPD	Meaning of diabetic foot ulcers	217	43.8
2	RESA	Role of the healthcare team	183	37.0
3	SVUP	Meaning of living with diabetic foot ulcer	45	9.1
4	SDM	Meaning of diabetes mellitus 2	34	6.9
5	SESA	Suggestions for the healthcare team	16	3.2
Total		495	100	

Source: Own elaboration based on the data obtained in the study.

**Table 2.** Frequency distribution of units of analysis for the category "Meaning of diabetic foot ulcers" (SUPD).

Code	Category	Frequency of units of analysis	
		n	%
Signs and symptoms (SSUP)	Loss of skin integrity	12	5.6
	Pain	9	4.2
	Change of color	7	3.2
	Increase in size	6	2.8
	Alteration of vital signs	6	2.8
	Absence of signs and symptoms	3	1.4
	Burning sensation	2	0.9
	Temperature changes	2	0.9
	Infection	2	0.9
Treatment (TUPD)	Wound care	21	9.7
	Surgical (surgical amputation-grooming)	5	2.3
	Rehabilitation after surgical intervention	5	2.3
	Prosthesis	3	1.4
	Antibiotics	2	0.9
	Special footwear	1	0.5
Cause(CUPD)	Lack of awareness of diabetic foot care	10	4.6
	Lack of awareness of the disease	9	4.2
	Home accidents	5	2.3
	Ignorance of disease	2	0.9
	Non-compliance with the regime	4	1.8
	Interventions by healthcare personnel	5	2.3

Continues.

Code	Category	Frequency of units of analysis	
		n	%
Consequences (COUP)	Amputation	18	8.3
	Psychological damage	8	3.6
	Disability	3	1.4
	Insomnia	2	0.9
	Footwear	8	3.6
Post-diabetic foot ulcer care (CPPOS)	Foot care	4	1.8
	Attendance to check ups	3	1.4
	Regimen	2	0.9
	Pause in daily activities	2	0.9
Definition (DUPD)	Ignorance	7	3.2
	Wound	6	2.8
	Disinformation	3	1.4
Risk of suffering from it (RUPD)	Ignorance	9	4.2
	Awareness of disease	5	2.3
Care before the onset diabetic foot ulcer (CPRE)	Suitable footwear	4	1.8
	Foot care	3	1.4
	Podiatric care	2	0.9
	Attendance to check ups	1	0.5
Recognition of types of ulcers (RTUL)	Gastric	4	1.8
	Leg	1	0.5
	Foot	1	0.5
Total	217	100	

Source: Own elaboration based on the data obtained in the study.

**Table 3.** Frequency distribution of the units of analysis of the category “Role of the healthcare team” (RESA).

Code	Category	Frequency of units of analysis	
		n	%
Identification of the healthcare team (IESA)	Physician	44	24.0
	Nurse	18	9.9
	Podiatrist	12	6.6
	Nutritionist	6	3.4
	Paramedic	2	1.1
	Surgeon	2	1.1
	Psychologist	1	0.5
	Kinesiologist	1	0.5
	Social assistant	1	0.5
Health control (CSA)	Good	service	9
	Personalized	6	3.4
	Short time for attention	6	3.4
	Different physician in each control	4	2.2
	Short hours for control	3	1.6

Continues.

Code	Category	Frequency of units of analysis	
		n	%
Health control (CSA)	Incomplete	2	1.1
	Lack of punctuality in attention	2	1.1
	Negligent	2	1.1
	Lack of scheduled controls	1	0.5
	Lack of empathy	1	0.5
	Care and supervision of the feet	13	7.1
Education (EDU)	Nail care	4	2.2
	Nutrition	3	1.6
	Footwear	1	0.5
	Staff does not consider income	8	4.4
Nutrition controls (CNUT)	Scarce resources to follow regime	4	2.2
	Lack of willingness to attend controls	3	1.6
	Nutritional education	3	1.6
	CESFAM	7	3.8
Consulted services (SCON)	Hospital	5	2.7
	Rural Health Post	2	1.1
	Lack of continuity in wound care	4	2.2
Wound Care (CURA)	Good	3	1.6
	Total	183	100

CESFAM: Family health center.

Source: Own elaboration based on the data obtained in the study.

**Table 4.** Frequency distribution of the units of analysis of the category “Meaning of living with diabetic foot ulcer” (SVUP).

Code	Category	Frequency of units of analysis	
		n	%
Change of behavior (CACT)	Being aware of the risks of diabetic foot	12	26.7
	Real commitment to caring for diabetic foot	6	13.3
	Sharing experiences with other patients	4	8.9
Changes in daily living (CVDI)	Routine at home	7	15.6
	Dependency	6	13.3
	Labor aspects	3	6.8
Support networks (RAPO)	Family	2	4.4
	Children	2	4.4
	Evangelic church	2	4.4
	Diabetic club	1	2.2
Total		45	100

Source: Own elaboration based on the data obtained in the study.

**Table 5.** Frequency distribution of the units of analysis of the category “Meaning of diabetes *mellitus* 2” (SDM).

Code	Category	Frequency of units of analysis	
		n	%
Consequences of diabetes <i>mellitus</i> 2(CDM)	Diabetic foot ulcers	3	8.9
	Visual	2	5.9
	Renal	2	5.9
	Cardiac	1	2.9
	Ignorance	1	2.9
Care of diabetes <i>mellitus</i> 2(CUDM)	Pharmacotherapy	5	14.7
	Hypoglycemic regimen	2	5.9
	Alternative medicine	1	2.9
	Health check ups	1	2.9
Diabetes <i>mellitus</i> 2 (DDM)	Knowledge of etiology	4	11.8
	Ignorance	2	5.9
	Characteristics of the disease	2	5.9
Signs and symptoms of diabetes <i>mellitus</i> 2 (SSDM)	Polydipsia	4	11.8
	Weight loss	2	5.9
	Myalgia	1	2.9
	Polyuria	1	2.9
Total		34	100

Source: Own elaboration based on the data obtained in the study.

**Table 6.** Frequency distribution of the units of analysis of the category “Suggestions for the healthcare team” (SESA).

Code	Category	Frequency of units of analysis	
		n	%
Staff attention	Exclusive physician for diabetic patients	6	37.4
	More education	3	18.7
	Involvement of the physician in wound care	1	6.3
Material resources	Availability of prescribed medications	2	12.5
	Availability of equipment for controls	1	6.3
Health check ups	Longer time at controls	2	12.5
	Greater number of controls	1	6.3
Total		16	100

Source: Own elaboration based on the data obtained in the study.

## Level 2

Three thematic nuclei or metacategories emerged at this level:

*Metacategory 1:* Statement regarding concepts associated with the pathology and the role of the healthcare team.

*Metacategory 2:* Experience of living with a DF ulcer.

*Metacategory 3:* Suggestions for future consultations.

## Level 3

Based on the aforementioned level, two qualitative domains arose as shown in Table 7:

**Table 7.** Qualitative domains.

	Qualitative domains	Definition
1	Beliefs of diabetic patients associated with their pathology, the healthcare team and the experience of living with the disease.	They correspond to metacategories 1 and 2 and are directly related to specific aspects of the disease, including the concept of diabetic foot ulcer, the definition of diabetes <i>mellitus</i> , the healthcare team and what it means to live with diabetic foot ulcer.
2	Contributions from diabetic users to improve the quality of care provided by the healthcare team.	It corresponds to metacategory 3 and is directly related to the contributions made by the interviewees regarding health care for their medical problem.

Source: Own elaboration based on the data obtained in the study.

### Examples of domain 1 stories:

“[...] It is a small thing that appears on the foot and gets bigger and bigger. It has to be taken care of because if you don’t, it may lead to something severe like an amputation, as was my case [...]”

“[...] Diabetes is the malfunction of the pancreas [...]”

“[...] A doctor told me that the feet are like dead because blood does not circulate, so you could be set on fire and would not feel the toes because blood does not circulate, it does not reach, so you should not get close to the fire [...]”

“[...] One time, a doctor strongly hunted me down, looked at my exams and told me that I could have a stroke at any time and told me to leave. She did not even tell me the result, she only treated me once. So, the point is knowing what is happening, not that they scold you and scare you [...]”

“[...] The podiatrist cut me so deep that I drew blood and everything began at that point [...]”

“[...] The problem is that you are always treated by any physician, and only for like 15 minutes per patient. You don’t have time to ask anything [...]”

“[...] The change of physician means the loss of continuity of the indications, because a physician tells you one thing and you already trust him, and then it starts all over again [...]”

“[...] Humanitarianly, I have been treated better by nurses than by physicians [...]”

### Examples of domain 2 stories:

“[...] There should be a diabetes doctor, someone who will follow you up and has more specific knowledge of diabetes, someone who feels confident and committed to the issue [...]”

“[...] I would like to receive better information regarding diabetes, what the consequences of this disease are [...]”

“[...] If you are cited for exams, that they are taken early; they call you at eight o’clock and take the sample at eleven o’clock and you have to come on an empty stomach. Just imagine, I use insulin and my sugar levels drop quickly and I cannot inject myself until I eat. There should be priorities [...]”

“[...] That a doctor and a nurse checked the wounds, but there must be a doctor. Another aspect is that sometimes medications are not available and the doctor gives you the prescription so you have to buy them, so I must have money and sometimes



I don't have any. It is also assumed that medicines should not fail us [...]"

"[...] That they take a reasonable length of time for controls and that they are not done so fast. They should be done calmly because some of them just do it in a rush. Also, they should have the drugs available because the government is supposed to provide them for us and I have spent up to 22 000 Chilean pesos in the drug store when the drugs are not available in the pharmacy [...]"

## Discussion

Given the specific objective of discovering the meaning of DF ulcer and DM2, some informants reported that it is a wound while others were uninformed. If they are asked about the types of ulcers, it is inferred that they do not recognize the word "ulcer" as an injury to their feet. However, the literature defines it as a "neuropathic-based clinical alteration induced by sustained hyperglycemia, in which injury and/or ulceration of the foot occurs with or without coexisting ischemia and previous traumatic trigger". (21, p1) All of this could be supported by what was expressed as "Suggestions to the healthcare team" in relation to the service provided by the staff, more education on the subject and the frequency of health checkups, since patients ask for longer interventions by the corresponding professionals.

With respect to the risk of developing a DF ulcer, the literature states that "between 40 to 50% of diabetic patients will develop an ulcer on their feet during the course of their illness and, of these, 20% will require amputation". (21, p1) However, the key informants of this study refer ignorance of the occurrence of the ulcer, which may mean that not all of them have been educated on this issue and, therefore, do not know appropriate care measures to prevent a possible injury to their feet. In this regard, it is important to note that for DF prevention, the professional team, in addition to examining the lower limbs, must be able to motivate and educate the patients to check and care for their feet daily, encouraging self-care. (22)

Subjects identified the signs and symptoms experienced when the ulcer appeared on their feet, which correlates to a large extent to the signs exposed by the literature. (23) They recognize, particularly, the lack of awareness of care as a cause associated with the occurrence of ulcers, which coincides with the lack of guidance on how to take care of the feet. (24) In turn, amputation is mentioned as a consequence that can lead to a second amputation, which is compatible with another study carried out in North America stating that 9-20% people with diabetes underwent a second amputation 12 months after the first amputation, and that, within the 5 five years after the initial amputation, 28% to 51% surviving patients would need to undergo a second intervention on the same limb. (25)

Regarding the meaning of DM2, patients stated that they know information related to its etiology and are able identify some signs and symptoms of the disease, which coincides with other studies. (26-28) These findings may arise due to inadequate perception by the healthcare team of the educational needs of the users and reveals the need to rethink a way of working that adapts to local reality and the characteristics of the community. Therefore, education is a fundamental strategy to achieve self-care and promote commitment to health. (29,30)

Regarding the second specific objective "To reveal what it means to live with a DF ulcer", patients expressed undergoing changes in the basic activities of daily life (BADL), which are "universal, related to living conditions and to basic requirements specific to each person, and imply a minimum cognitive effort, so they are acquired early in order to achieve personal independence". (31, p268) They usually included eating, grooming, bathing, dressing, personal mobility, sleep and rest.

The revelations of these discourses are related to other studies on the topic which stress that the loss of mobility, caused by the ulcer or by the treatment received by diabetic people with injuries in their feet, generates considerable restrictions in the performance of daily life activities associated with domestic work, leisure activities and work, and cause different levels of disability that, in turn, have a negative impact on the quality of life, thus generating highly stressful situations. (32,33) This could be attributed to the feeling of threat that puts the well-being of the patient at risk; therefore, the healthcare team should implement strategies that allow patients to cope with the condition, leading to important changes that require previous information and the perception of support. (34)

In relation to the third objective, "to investigate the role of the healthcare team", professionals identified by users were physicians, probably due to their intervention and decision-making at times of decompensation of the pathology, and nurses, because of ministerial protocols (35) and wound care.

Most of the informants reported that protocolized activities carried out by the healthcare team (35), including health checkups, have a good but short personalized attention and that the rotation of physicians implies the lack of follow-up and constant changes in indications. Furthermore, they expressed difficulties for obtaining appointments, lack of punctuality in attention, failure to comply with the appointments and, finally, stressed the lack of empathy of some people who perform the interventions. This may be related to work overload in employees, since the time allocated for consultation (30 minutes) is insufficient to address this type of user. It could be assumed that the aforementioned factors reflect the flaws of knowledge acquired, since not all necessary activities described to prevent the complications of DM2 are fulfilled (29), reflecting again the importance of health education in relation to the needs of users.

With regard to wound care, they are considered adequate; however, lack of continuity was reported, especially in patients who require the procedure at home, probably because of lack of personnel, lack of coordination in case the responsible professional is absent or external factors such as lack of mobility. It has been demonstrated that multidisciplinary work regarding care of DF patients may help to accelerate the healing rate of the ulcer or influence its recurrence and the occurrence of a second amputation in diabetics. (36) This could explain the need for more comprehensive care in the management of patients with DF ulcers.

Likewise, the vast majority of key informants reported that they have received nutritional education, but aspects such as income are not considered, hindering adherence to the regimen due to low family income and the implicit expenses derived from the treatment of DF ulcers. This coincides with a study stating that compliance with dietary recommendations was mostly partial. (36) The findings of this work may be related to the fact that the healthcare team does not know the characteristics and problems of the population and, therefore, care, indications and education have not been adapted to the real context of users to respond accurately to their needs. It should be borne in mind that medical and dietary treatment influence dietary behavior, so health professionals must consider sociocultural determinants when designing and implementing treatment strategies. (36)

Finally, suggestions provided by the users endorse the need for a "multidisciplinary team focused on delivering the necessary knowledge and tools to allow patients to engage in the care of their health". (22, p26) In the last 15 years, care of diabetic patients has been proven to be optimal only when financing and human resources have sufficient quality (2), so it is essential to know and understand the perception and behaviors of DM2 patients, in order to redirect the model of care towards them, incorporating comprehensive care

that includes biological, psychological, social and spiritual well-being dimensions according to the characteristics of the community. (29)

## Conclusions

DF ulcer has been described as a wound associated to gastric ulcers in most cases. Without assuming the risk of developing it, users recognize the lack of self-care, home accidents and non-compliance with the diet as the cause of their occurrence. Actually, they understand that the consequence of DF is the amputation of the limb.

With respect to the meaning of DM2, a few users understand its etiology. Others identify signs and symptoms such as polydipsia, weight loss, myalgia and polyuria. In turn, pharmacological treatment has greater adherence compared to hypoglycemic regimen.

Regarding “what it means to live with a diabetic foot ulcer”, they stated that they have experienced changes in daily life and in home routines, absence from work and degree of dependency.

Physicians are frequently identified as participants of the healthcare team, followed in order by nurses, podiatrists, nutritionists, paramedics, surgeons, physiotherapists, psychologists and social assistants. Additionally, activities related to the healthcare team are education, taking good care of the feet and nails, diet and appropriate footwear. About health controls, good personalized attention was reported, as well as short periods spent in care, which are insufficient and done by different doctors in each control; an exclusive physician for each patient was suggested.

In conclusion, it was confirmed that health education, based on the perceived needs of users, is one of the most important strategies for self-care and prevention of this disease. It is worth noting that the results of this study are not generalizable and only represent the opinion of the diabetic patients enrolled in the CESFAM Belarmina Paredes of the Futrono borough, who presented foot ulcers in 2015.

## Conflicts of interest

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