Original Article

Functional capability of patients with diabetes with foot ulceration*

Capacidade funcional dos pacientes com diabetes mellitus e pé ulcerado

Capacidad funcional de pacientes con diabetes mellitus y pié ulcerado

Geraldo Magela Salomé[1], Leila Blanes[2], Lydia Masako Ferreira[3]

ABSTRACT

Objective: To evaluate and compare the functional capability of patients with diabetes with foot ulceration and patients with diabetes without foot ulceration. **Methods:** A cross sectional descriptive comparative study was conducted in a public hospital in the district of São Paulo. The sample consisted of 20 patients with foot ulceration and 20 patients without foot ulceration. Data were collected from June 2 to July 30, 2008. The heath assessment questionnaire-20 (HAQ-20) was used to collect the data. **Results:** There were no significant differences regarding demographic and clinical characteristics between the two groups. There were significant differences between the two groups on the total score of the HAQ-20 and items 1, 2, 3, 5, 6, 7, and 8, an in regard to physical functioning and functional capability. **Conclusion:** Findings suggest that patients with foot ulceration had worse physical functioning and functional capability than those without foot ulceration.

Keywords: Task performance and analysis; Diabetes mellitus; Foot ulcer

RESUMO

Objetivo: Avaliar a capacidade funcional de pessoas com *diabetes mellitus* e pé ulcerado. **Métodos:** Estudo analítico, transversal e comparativo, realizado em hospital público do município de São Paulo, sendo os dados coletados no período de 2 de junho a 30 julho de 2008**.** Foram selecionados para compor o Grupo de Estudo, 20 pacientes com *diabetes mellitus* e pé ulcerado; para o Grupo Controle 20 pessoas com diagnóstico médico de *diabetes mellitus,* sem úlcera no pé. O instrumento utilizado foi *Health Assessment Questionnaire-20*. **Resultados:** O grupo estudo diferiu do grupo controle, quanto ao escores HAQ-20, bem como em relação aos componentes 1,2,3,5,6,7 e 8. Também apresentaram diferença estatística significante (P<0,05) na redução da aptidão física e da capacidade funcional em relação ao grupo controle. Relacionada aos dados sócio demográficos e clínicos, não houve diferença significante entre os grupos. **Conclusão**: Os pacientes portadores de *diabetes mellitus* com pé ulcerado apresentaram alterações da capacidade funcional.

Descritores: Análise e desempenho de tarefas; Diabetes mellitus; Úlcera do pé

RESUMEN

Objetivo: Evaluar la capacidad funcional de personas con *diabetes mellitus* y pié ulcerado. **Métodos:** Se trata de un estudio analítico, transversal y comparativo, realizado en un hospital público del municipio de Sao Paulo, cuyos datos fueron recolectados en el período del 2 de junio al 30 julio del 2008**.** Fueron seleccionados para componer el Grupo de Estudio, 20 pacientes con *diabetes mellitus* y pié ulcerado; para el Grupo Control 20 personas con diagnóstico médico de *diabetes mellitus,* sin úlcera en el pié. El instrumento utilizado fue el *Health Assessment Questionnaire-20*. **Resultados:** El grupo de estudio difirió del grupo control, en cuanto a los escores HAQ-20, así como en relación a los componentes 1,2,3,5,6,7 y 8. También presentaron diferencia estadísticamente significativa (P<0,05) en la reducción de la aptitud física y de la capacidad funcional en relación al grupo control. En relación a los datos sociodemográficos y clínicos, no hubo diferencia significativa entre los grupos. **Conclusión**: Los pacientes portadores de *diabetes mellitus* con pié ulcerado presentaron alteraciones de la capacidad funcional.

Descriptores: Análisis y desempeño de tareas; Diabetes mellitus; Úlcera del pie

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* *Study carried out in the Plastic Surgery Advanced Training Course at the Plastic Surgery Post Graduation Program, Universidade Federal de São Paulo – UNIFESP – São Paulo (SP), Brazil.*

[1] *Science Postgraduation student (Doctorate) at the Plastic Surgery Postgraduation Program, Universidade Federal de São Paulo – UNIFESP – São Paulo (SP), Brazil; Coordinator of the Commission to Prevent and Cure Wounds at Conjunto Hospitalar de Sorocaba. São Paulo (SP), Brazil.*

[2] *PhD in Science, Universidade Federal de São Paulo – UNIFESP – São Paulo (SP), Brazil.*

[3] *Postgraduation student (Master) in Sciences at the Plastic Surgery Postgraduation Program, Universidade Federal de São Paulo – UNIFESP – São Paulo (SP), Brazil.*

[4] *Chief of the Surgery Department, Coordinator at the Plastic Surgery Postgraduation Program, Universidade Federal de São Paulo – UNIFESP – São Paulo (SP), Brazil.*

Corresponding Author: **Geraldo Magela Salomé**
Av.: Fco. de P. Q. Ribeiro - Jabaquara - São Paulo (SP), Brazil
Cep: 04330-020 E-mail: salomereiki@yahoo.com.br

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INTRODUCTION

Diabetes mellitus (DM) is defined as a syndrome with multiple etiologies due to the failure or inability of insulin to perform its effects on the body properly[1].

It is responsible for morbidity and mortality of a great part of the Brazilian and world population, involving people in the several phases of the cycle of life. However, it is known that a great part of its complications can be avoided with preventive measures through health programs to control DM or its chronic and acute complications[2-3].

According to the World Health Organization, in 2002, there were around 160 million people with *diabetes mellitus* worldwide and for 2025 there will be 300 million people with this disease[4].

Direct cost of DM ranges from 2.5% to 15% of the annual health budget, depending on its prevalence and level of complexity of available treatment. Estimates of direct cost for Brazil are around 3.9 billion dollars compared to 0.8 billions for Argentine and 2 billions for Mexico[5].

Cutaneous ulcers, regardless of their origin, have been studied since ancient times. Inferior limbs ulcers are becoming common in patients suffering for chronic diseases, especially those related to the circulatory system[6].

In Brazil, wounds are a serious public health problem, due to the great number of people with chronic and degenerative diseases presenting alterations in skin integrity. However, the number of individuals with wounds is not recorded. It is estimated that 15% of patients with DM will develop at least one foot lesion in their lives[7].

Functional capacity is a broad concept encompassing the ability to perform physical tasks, preserving mental activities and an adequate situation of social integration[8].

Despite this broad concept, the concept of capacity/incapacity is the one worked with in our practice[9]. Functional incapacity has been assessed as the difficulty in performing certain activities from the daily life due to some deficiency. The study of the functional capacity has helped to understand how longevity can contribute to assess health status of diabetic individuals with ulcerated foot. We know that the presence of multiple diseases may present different levels of severity, influencing people's daily lives[10]. Under this perspective, functional capacity has been considered as an indicator of the health-disease process[11].

Studying the aspects of quality of life and functional capacity will provide relevant information that may influence care to people with DM and foot ulcer. Therefore, the present study aimed to assess the functional capacity of people with *diabetes mellitus* and ulcerated foot.

METHODS

Cross-sectional analytical comparative study performed at Hospital Geral de Vila Nova Cachoeirinha, located in the south side of the city of São Paulo. Twenty patients with *diabetes mellitus* and ulcerated foot with no limit of ulceration time and number of ulcers were selected to form the Study Group. Research participants were receiving treatment in the institution where data has been collected.

Inclusion criteria in the study group were to be over 18 and to present *diabetes mellitus* and ulcerated foot. For the control group, it was to be over 18 with clinical diagnoses of *diabetes mellitus* without lesion on the foot.

People with physical or mental conditions that, according to the investigator's opinion, could not answer the questionnaire have been excluded from the control and study group.

Data have been collected from June 2nd to July 30th, 2008, after approval by the Research Ethics Committee at the Universidade Federal de São Paulo.

Data have been collected by researchers after patients gave their written consent in a previously prepared room ensuring comfort and relaxation of patients to answer the questions. Questions have been made through interviews.

Two instruments have been used for data collection. The first was a questionnaire with socio-demographic and clinical data. The second instrument used was the Health Assessment Questionnaire (HAQ-20), to assess functional capacity. It was translated into Portuguese, adjusted to the Brazilian culture and validated to be used by health services (12). It is formed by eight categories; category 1 is: dressing and grooming; 2: arising; 3: eating; 4: walking; 5: hygiene; 6: reach; 7: grip and 8: common daily activities.

Intra-observer reproducibility coefficient of each category from the Portuguese version of the HAQ-20, assessed by Pearson's correlation coefficient ranged from 0.501 to 0.793, whereas inter-observer reproducibility ranged from 0.599 to 0.779. Global score correlation coefficients from the Portuguese version of the HAQ-20 were 0.905 (intra- observer) and 0.830 (inter-observer), both factors have been considered as clinically satisfactory. The validity of the instrument has been proved through the correlation with other variables.

For statistical analysis of the results, Fisher's exact test and Student's *t* test have been applied. Null hypothesis was rejected at the 0.05 level of significance.

RESULTS

Table 1 demonstrates that 11 patients (55%) of the control group were between 61 and 80 years old and 11 patients (55.0%) in the study group were between 41 and

60 years old. Regarding gender, 11 patients (55.0%) in the control group and 12 patients (63.2%) in the study group were females.

Table 1 – Results from the comparison between groups according to socio-demographic data. São Paulo, 2008

Variables	Groups				Level descriptive
	Control		Study		
	Nº	%	Nº	%	
Age (years)					
20 to 40	3	15	3	15.0	
41 to 60	6	30	11	55.0	0.319
61 to 80	11	55	6	30.0	
Gender					
Male	9	45	8	36.8	0.743
Female	11	55	12	63.2	
Schooling					
Illiterate	9	45	7	35.0	
Incomplete elementary school	8	40	10	50.0	0.906
Complete elementary school	3	15	3	15.0	
Smoking					
Yes	13	65	14	70.0	0.741
No	7	35	6	30.0	

Table 2 – Patients from each group according to clinical data. São Paulo, 2008

	Groups				Level Descriptive
	Control		Study		
	Nº	%	Nº	%	
Hypertension					
Yes	16	80	14	70	0.721
No	4	20	6	30	
Heart disease					
Yes	16	80	14	70	0.721
No	4	20	6	30	
Type of diabetes					
Type 1	9	45	8	40	0.752
Type 2	11	55	12	60	

Table 3 - Results of the comparison between the groups regarding each HAQ-20 categories. São Paulo, 2008

Variables	Descriptive level
Category 1 (dressing and grooming)	0.010
Category 2 (arising)	0.001
Category 3 (eating)	0.045
Category 4 (walking)	0.170
Category 5 (hygiene)	0.018
Category 6 (reach)	0.010
Category 7 (grip)	0.004
Category 8 (common daily activities)	0.003
Total HAQ-20	0.001

Table 2 demonstrates that 16 patients (80.0%) in the control group and 14 patients (70.0%) in the study group were hypertensive. Sixteen patients (80.0%) in the control group and 14 patients (7%) in the study group had heart diseases. Eleven patients (55.0%) in the control group and 12 patients (60.0%) in the study group had type 2 diabetes.

On Table 3, results obtained enabled to state that groups are different regarding total HAQ-20 score, as well as regarding categories 1,2,3,5,6,7 and 8.

DISCUSSION

D*iabetes mellitus* may cause significant complications to patients such as limb ulcerations, amputations, and eye complications. Continuous and strict treatment is necessary especially for people over 40[13].

Diabetic foot causes suffering, with changes in lifestyle and quality of life and many times patients cannot perform common daily activities. There are also high socioeconomic costs due to amputations, early retirement, and loss in labor capacity at a productive age group, work absenteeism, hospital and medical costs[14].

The impact and negative interferences of being diabetic in people's lives are noticeable, thus health professionals have to be prepared to offer care to meet not only patients' biological needs but also psychosocial needs to help them overcome their limitations and find coping mechanisms.

Most patients in our survey were females, over 41, in both groups.

A study conducted by several authors with patients with diabetic ulcers showed that most patients were males, with ages ranging from 42 to 52. According to authors, these patients were at risk for ulceration or amputation[14-15].

In the present study, 8 patients (40.0%) in the control group and 10 patients (50.0%) in the study group had incomplete elementary school. Education level is definitely a factor for self-care need in elderly individuals, especially those with chronic disease since they have to deal with medications, wound dressings and diets that are sometimes complex. On the other hand, life dynamics may be different when the level of education is higher as, for example, when there is greater opportunity for work and wage.

According to Timby[16], for the mind to be able to receive, remember, assess and apply new information, a certain amount of intellectual capacity is necessary, in special cases, such as illiterate people, adjustments are necessary during the introduction of health teachings.

Smokers accounted for 13 patients (65.0%) in the control group and 14 patients (70.0%) in the study group. Studies show and increase in the incidence of type 2 *diabetes mellitus* among smokers. Smoking increases the concentration of fat in the abdomen, reduces sensitivity to insulin, and increases glucose concentration greatly

after an oral glucose tolerance test[17-18].

Smoke addiction should be avoided, 95% of all foot amputation occur in smokers, it is a traumatic procedure that can be avoided[19].

Sixteen patients (80.0%) in the control group and 14 patients (70.0%) in the study group had blood hypertension and cardiovascular diseases respectively.

People with diabetes and cardiovascular disease have worse prognoses, with lower survival in the short term, greater risk for disease recurrence and worse response to the treatment proposed[20-22].

These results confirm the studies pointing out a strong relationship between these two diseases which is extremely important as they are two chronic diseases difficult to control because both require sudden changes in the lifestyle and present important complications[14, 23].

Comparison between the groups regarding HAQ-20 variable and each of its categories shows that groups presented statistically significant difference regarding total HAQ-20 score for categories dressing and grooming, arising, eating, hygiene, reach, grip and common daily activities ($p < 0.05$). Thus, it is demonstrated that the study group has reduced physical fitness and functional capacity.

A study[24] carried out with 86 elderly patients, demonstrated that 47.7% presented good and excellent health condition, 77.9% were independent and 76.7% presented co-morbidities. The importance of health teams in the adoption of preventive measures and measures to promote health for elderly people and their families is highlighted.

Even in healthy ageing, and especially in elderly people with foot ulceration, some level of physiologic involvement is expected in the performance of common daily activities. Intensity and frequency of this involvement vary, depending on the conditions of each person in each socioeconomic and cultural context[25].

Being diabetic with foot lesion causes suffering to individuals, with changes in lifestyle and quality of life, many times, preventing them from performing social, leisure and family activities due to the loss of labor function at a productive age and to absenteeism in the work[14].

Authors[26-27] have observed decrease in quality of life in patients with ulcerated foot, especially regarding physical, social and mobility aspects, these were similar to our findings.

A study[28] showed that ulceration affects work productivity, leading to disability retirement and restricting daily and leisure activities. For many patients, venous disease means pain, loss in functional mobility and worsening in quality of life.

Changes in the ability to perform these common daily life activities reported in the control and study group, in addition to affecting patients' social lives, are a potential problem to them and their families, since a greater amount of time, energy and financial resources will be necessary to meet patients' demands depending on the activity[25,29]. Functional inability has become a challenge we must face as life expectancy is longer with an increase in the number of elderly people with chronic diseases and functional incapacity. As individuals' functional capacity decreases with age, strategies must be planned to improve the lifestyle of these individuals with or without wounds, especially with regards to a program to promote and improve muscular and joint strength in the treatment of wounds, social integration inside and outside the family context, with an adequate support system for these elderly individuals and people with wounds. These actions allow a decrease in the dependence of these individuals[10].

As these patients demonstrate some level of dependence to manage their activities either household chores, leisure, social or family activities, their autonomy will be affected and they will become dependent on their families and friends.

This survey reinforces the need to redirect health care to diabetic patients with ulcerated foot. In the routine of health services, in hospitals or outpatient clinics, in the Family Health Program among others, we should try to identify the presence of changes in functional capacity among patients living with the wound, their main care needs and the knowledge caretakers have on how to deal with incapacities.

Due to the increase in the last decades of chronic diseases and patients with wounds, it is essential to redirect academic education and training of health professionals valuing not only the content but also the care practice.

Further studies should be carried out to increase the size of the sample and to understand life magnitude of these individuals.

Limitation of this study is the number of patients, with the need for more studies to deepen understanding about the issue.

CONCLUSION

Results obtained allowed us to state that patients with diabetic foot have decreased physical ability and functional capacity, that is, they find it difficult to perform common daily activities.

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