

Original Article

## **An Investigation of the Diabetic Patient or Its Carergivers Knowledge Levels Regarding the Diabetic Foot Management**

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### **Abstract**

**Background:** Diabetic foot can be described as the foot of the individual suffering from diabetes mellitus and is characterised by the presence of ulcers, infections and the partial or full deep tissue destruction

**Aim:** The aim of the study was to investigate the knowledge level of the diabetic patients and their carers regarding the nature, the management of the disease and the complications of the diabetic foot ulcer.

**Method:** The research was conducted between March and May 2016 in the diabetic clinic and the diabetic foot ulcer clinic of the Lamia General Hospital. The sample of the study was n=160 patients and carers whom they agreed to answer an anonymous self-fulfilled questionnaire.

**Results:** The mean percentage of correct answers regarding the diabetic foot ulcer questionnaire was 66% for the patients and 73% for the carers. No significant differences were noted between knowledge and the educational level of the participants ( $p>0,200$ ). The carers had a higher mean score in the knowledge scale ( $73, 48 \pm 14, 72$ ) compared to the patients  $66, 35(\pm 14, 97)$  the difference was statistically significant ( $p=0,025$ ).

**Conclusion:** The results of the study suggest a lack regarding the knowledge levels of the patients and their carers towards diabetes mellitus and the diabetic foot. The majority of the patients choose their carers from their social and family environment limiting the health criteria and benefits.

**Keywords:** Knowledge, nurses, diabetic foot, attitude, care

### **Introduction**

Diabetes mellitus is a metabolic disease that has health, social, psychophysiological and economic consequences for the individual and the health care organisations. Its main characteristic is the increased blood glucose levels mainly due to insufficient production and absorption of insulin from the cells (Tervaskanto – Maentausta et al.,

2017). Epidemiological studies suggest a high morbidity rate of the disease. According to the World Health Organisation (W.H.O), in 2014 the patient's diagnosed suffering from diabetes mellitus worldwide where more than 422 million compared to 108 million in 1980, the growth rate for the same time period was 8.5%. Mortality rate of the diabetes mellitus appears additionally to be increased. In 2012 the worldwide deaths

due to diabetes where estimated to 1, 5 million (2, 2% of the overall deaths) where it is expected to reach 2,2 million (3,3% of the overall death) by 2030, constituting diabetes as the 7<sup>th</sup> cause of death. Additionally it is suggested that the percentage of death attributed to diabetes is much higher as the deaths caused due to complications such as heart and kidney disease have not been calculated (World Health Organization 2016).

Complications related to diabetes are common, frequent and of high risk for the health and the body integrity of the individual. They have an acute onset and usually are the initial cause of diagnosis. The chronic complications are a result of diabetic angiopathy, and are responsible for the increase in health care services demand and admission rates. Diabetic foot can be described as the foot of the individual suffering from diabetes mellitus and is characterised by the presence of ulcers, infections and the partial or full deep tissue destruction (Khanolkar et al., 2008).

The prevalence of the diabetic foot ulcer worldwide is calculated between 4-10% (Tervaskanto – Maentausta et al., 2017, World Health Organization 2016, Khanolkar et al., 2008, Zhang et al., 2017). A systematic review and meta-analysis from Zhang et al., (2017) refers that the global diabetic foot ulcer prevalence was 6.3%. The higher prevalence is in males (4.5%, 95%CI: 3.7-5.2%) than in females (3.5%, 95%CI: 2.8-4.2%), and higher in type 2 diabetic patients (6.4%, 95%CI: 4.6-8.1%) than in type 1 diabetics (5.5%, 95%CI: 3.2-7.7%).

The problems related with the feet of the individuals suffering from diabetes mellitus are the main causative factor for the increased number of hospital admission compared to the rest of the diabetes related complications. The presence of diabetic foot ulcers causes disabilities, amputations and generally a reduction of individual's quality of life. In an annual base it is estimated that 1 million individuals are amputated, where every 30 seconds a diabetic is amputated due to the presence of diabetic feet ulcer. It is estimated that 1 in 4 diabetic patients (25%) will be diagnosed with an ulcer in the lower limbs at some point in their lives (Wu et al., 2007, Richard and Schuldiner, 2008).

Primary prevention is of high importance in the effort to minimise the problem, it's most important aspects are the regulation of the blood

glucose levels and stabilisation of them in normal levels, the education of the patient for the recognition of primary symptoms and the teaching of foot care methods and techniques.

Secondary prevention includes the co-operation of the medical and the wider multidisciplinary team treating the patient, aiming at the reduction of complication, the prevention of infections and the maintenance of the functionality of the lower limbs (Pasquier 2010).

In patients where diabetic feet ulcer has healed the risk of re-ulceration is increased. In this occasion the main aim of the multidisciplinary team is the education and support of the patient emphasising in the recognition and treatment of the symptoms as a result of neuropathy (Koulouri et al., 2003).

**Aim:** The main aim of the present study was to investigate the knowledge levels of the individuals suffering from diabetes and of their carer, regarding the nature, the management of the disease and the complications of the diabetic foot.

## Methods

**Study Design:** A cross-sectional study was design.

**Description of the sample:** The sample of the study was n=160 patients and carers, which agreed to participate in the study and completed an anonymous self-fulfilling questionnaire. The research was conducted between March and May 2016 at the diabetic clinic and the diabetic foot clinic of the General Hospital of Lamia (Central Greece).

**Data collection:** Data collected by using an anonymous self-fulfilling questionnaire. To ensure the content validity of the questionnaire a review was conducted including the Greek and International scientific literature, through the databases MEDLINE, EMBASE and CINAHL. No tool could be identified that measures and assess the knowledge levels of the diabetic patients regarding the prevention, care and treatment of the diabetic foot. Thus the development of a tool that measures this variables was developed in Greek and a pilot study was completed in a population of n=15 patients and n=15 carers to investigate its validity and reliability (Raftopoulos and Theodosopoulou 2002).

The internal reliability of the questionnaire refers to the degree that all the items included in a questionnaire measure the variable under study.

This type of reliability control is very useful for the assessment of measurements that are derivative from more than one question measuring the same variable such as the knowledge level questions. The validity of the questionnaire refers to the degree that a questionnaire measure what is design to measure. The measurements of the questionnaire must relate with the variable or variables that the researcher is interested to measure. The aspects of validity that were tested for the questionnaire used in the present study were: Face validity and content validity, Cronbach- $\alpha$  was =0.72 which demonstrated good internal validity.

The final questionnaire included 35 questions, in particular 10 questions on demographic characteristics, 5 questions for self-care and carers, 6 questions about diabetes, and 14 questions about Diabetic Foot.

**Statistical analysis:** Descriptive statistics and frequency tables were performed and developed. Mean and standard deviation were used for the presentation of data. T-test and ANOVA was used for the comparison between two or more variables. The diabetic leg ulcer questionnaire was developed thus that the highest score means better knowledge levels. Each correct answer was scored with one unit and every wrong with no point. The maximum score was 15 and the lowest 0, the result was transferred to percentage. The level of statistical significance was set to  $p < 0.05$ . SPSS 22.0 was used for the statistical analysis.

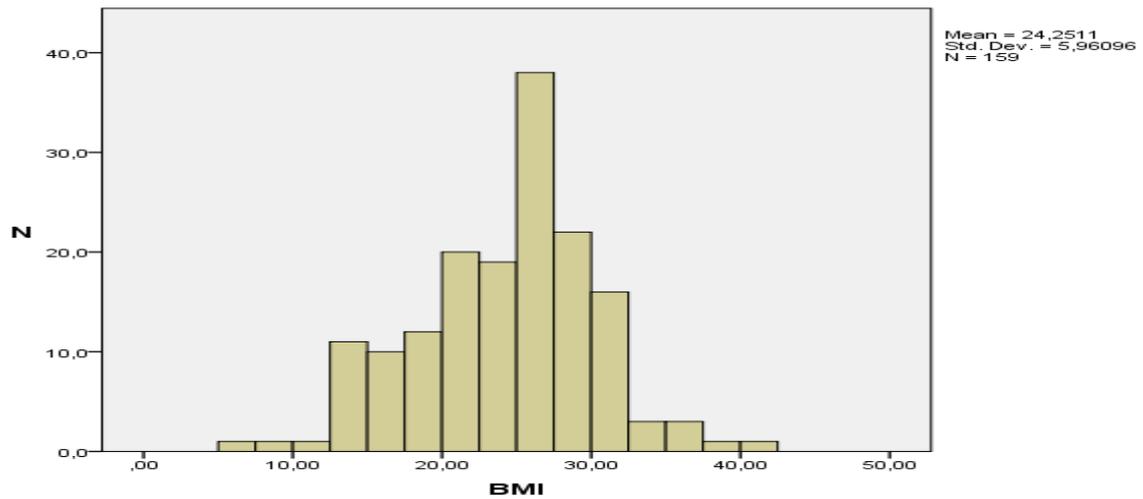
## Results

A total of 133 patients (83.2%) and 27 carers (16, 8%) participated in the study. About the patient

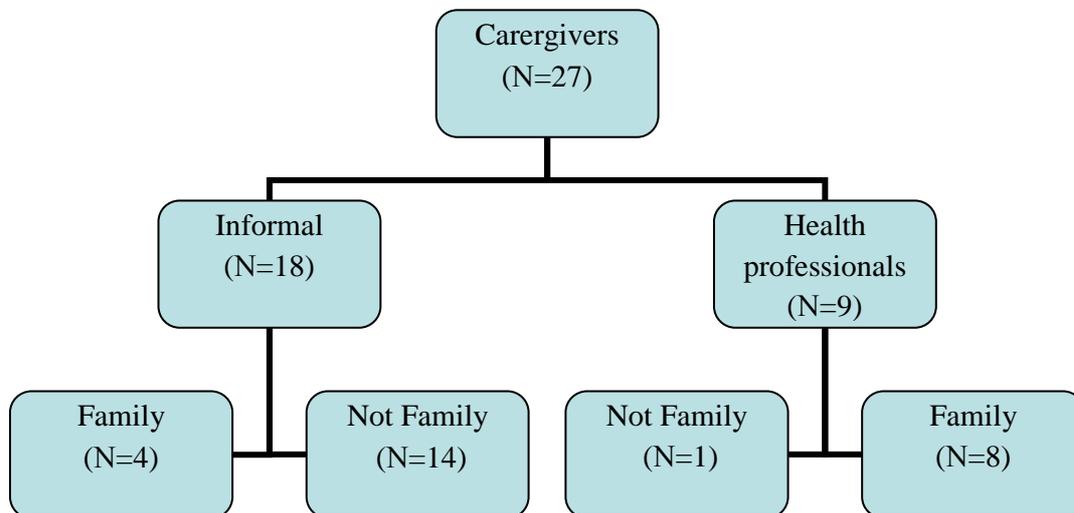
the majority of were women 61.2% and 38.1% were men. The mean age was 65.89 (SD $\pm$ 13, 98) years and the mean BMI was 24, 25(SD $\pm$ 5.96), 15% of the population were obese and 38% overweight. (Figure 1) A percentage of 17.5% reported that they were active smokers with a mean smoking of 1, 65 packages of cigarettes per day (heavy smokers). The mean value for fasting blood glucose levels was 151, 07( $\pm$ 64, 24) mg/dl. The onset of the disease was estimated at 12, 08 years, were the latest available HbA1c value was 7.42( $\pm$ 1. 56) %, with the last measurement taking place 2. 56 months before the study.

From the total of 27 caregivers 18 reported to have no professional relationship with healthcare professions and 9 were health care professionals. In the family environment of the individual belonged 12 participants from whom 8 were health care professionals. (Figure 2) The 4.8% of the caregivers did not receive any education, 26, 6% were primary education graduates, 28.6% secondary education graduate and lastly 38.1% had a university degree. The mean value of the correct answers in the whole sample regarding the diabetic foot was 67.56  $\pm$  15.12%. The mean score of correct answers in the knowledge questionnaire was 66% for the individuals suffering from diabetes and 73% for their caregiver. No statistically significant differences were noted between the knowledge levels and the educational level of the participants ( $p < 0.200$ ). The caregivers had a higher mean value in the knowledge scale 73.48 (SD $\pm$ 14.72) compared to the individuals suffering from diabetes 66.35(SD $\pm$ 14.97), ( $p = 0.025$ ). (Figure 3)

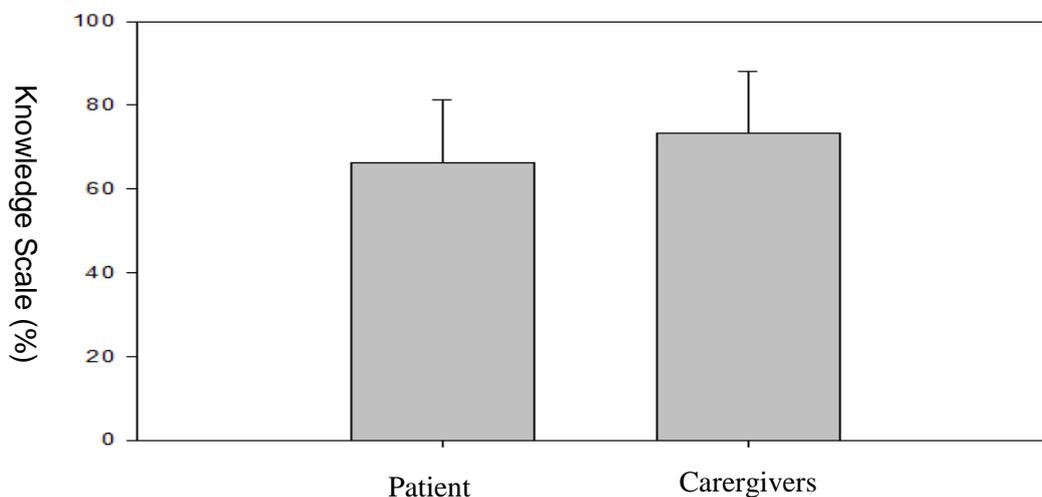
**Figure 1. The distribution of BMI in the study sample**



**Figure 2. The distribution of patient caregivers (Health professionals-informal)**



**Figure 3. Differences in the level of knowledge of patients-caregivers**



## **Discussion**

Diabetes mellitus is a chronic disease affecting the psychophysiology of the individual suffering from it. The frequent haematological measurement of the blood glucose levels, the regular visits to the doctor and the consistency to a pharmacological treatment plan are methods that have health and financial cost (Iversen et al., 2019, Strand et al., 2019). Diabetic foot is a frequent complication that affects the functionality and the psychics of the individual suffering from it. The fear of amputation co-exists with the anxiety of the disease course and the limitation of complication.

The results of the present study suggest that the knowledge levels of the individuals suffering from diabetes mellitus and their carers regarding the diabetic foot care are inadequate. This finding creates important doubts of the ability for self-caring and the appropriate management of the disease. It is generally suggested that the diabetic patients especially those that are of minimum educational level have a significant lack of knowledge related to the disease and low compliance levels with the dietary instructions. The findings apply a level of questioning in the efficacy of the educational programs aiming at the diabetic patients and their carers therefore a further investigation is required (Schafer et al., 2014).

The inadequate knowledge level of the patients and their carer regarding the diabetic foot ulcer has been documented in a number of studies. A study by Oyetunde and Famakinwa (2014), showed that nurses had inadequate level of knowledge in crucial areas of education related with the care of diabetic patients. A percentage of 29, 2% of participant's demonstrated good knowledge of the dietetics requirements of the patient, likewise 24, and 9% had good knowledge levels regarding exercise methods and the monitoring of glucose levels. The researchers conclude that the findings apply a degree of doubt in the abilities of nurses to provide training and education resulting in increased complication and insufficient care.

The diabetic foot care is one of the most complicated health care situations, as it has been found that even under strict healthcare interventions, the results are not maintainable in

length of time and consistent monitoring and training of the patients is required to succeed the desirable levels of care. The inadequate knowledge during the postgraduate training of the healthcare professionals in theoretical and practical level, leads to errors in the later stage of their careers (Rao et al., 2014).

The majority of the carers that participated in the study were non healthcare professionals. The care and the method of approach of the diabetic foot problem raise questions for the safety, healing and the improvement of quality of life (Dundar and Akinci 2017, Luo et al., 2015). A serious source of concern is the efficacy of the care at home and the adequacy of the knowledge levels that the non-health care professional's carers possess. Hence a need is created for the creation of appropriate educational regimes and planned cooperation between the multidisciplinary team and the carers (Psimmenos, 2009). The state has an important role in the management of the disease and has a responsibility to actively participate by setting specialist health care services, aiming at the promotion of self-caring, the improvement of the patient and carers knowledge, the limitation of the complication and the intercultural healthcare difficulties.

Additionally the diabetic foot ulcer has a major impact on the secondary health care services as its appearance and complications can prolong the hospital stay and increase the hospital mortality rates. The adaption of new knowledge and a positive change in the attitudes of patients should aim at the eradication of stereotypes and to enhance the pre-existing knowledge levels relating to diabetes and its complications (Nirantharakumar et al., 2013).

The education of the patients should include modern educational and up to date teaching techniques increasing the understanding from all the age groups and all the educational levels of the diabetic foot ulcer. The use of technology and the utilisation of audio visual material are some examples of how the efficacy of self-care can be improved and the lack of knowledge can be minimised. The relationship between the adaption of new knowledge with the amendment of the attitudes and the alternation of behaviour is a time consuming procedure which requires time to be established (Salari et al., 2019).

**Limitations:** The study included patients who came to the diabetic foot care clinic at least six months after diagnosis. Patients diagnosed in the last 6 months were excluded.

**Conclusions:** The results of the present study suggest a lack of knowledge in both the carers and the patient group towards the diabetic foot and diabetes mellitus. The majority of the patient chooses their carer from the social or family environment limiting the health related criteria and benefits. Community health care can have a beneficial effect in the monitoring and management of the individuals suffering from diabetes mellitus providing continuous education and educational assessment of the carer. The healthcare professionals should encourage the patients and their carer to get involved and participate in educational and health promotion activities. Home care could have a positive impact in the improvement of the knowledge levels of the patients regarding the care of the diabetic foot.

**Ethical Considerations:** All the procedures carried out in this study, in which human participants participated, complied with its ethical standards and the 1964 Helsinki Declaration. The participants were informed regarding the right to withdraw from the study at any point. The questionnaire was completed in an area where only the participant and the researcher were present, the researcher participant confidentiality was kept in place. A permission to conduct the research was granted from the Scientific Council of the Lamia General Hospital No: II/3210/23-03-2016.

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