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Original research

## Short-term effectiveness of a culturally tailored educational intervention on foot self-care among type 2 diabetes patients in Morocco

Latifa Adarmouch<sup>a,b,\*</sup>, Abdelhadi Elyacoubi<sup>b</sup>, Latifeh Dahmash<sup>b</sup>, Nawal El Ansari<sup>c</sup>, Majda Sebbani<sup>a,b</sup>, Mohamed Amine<sup>a,b</sup><sup>a</sup> Clinical Research Unit, Mohammed VI University Hospital, Marrakech, Morocco<sup>b</sup> Community Medicine and Public Health Department, PCIM Laboratory, School of Medicine, Cadi Ayyad University, Morocco<sup>c</sup> Department of Endocrinology and Diabetology, Mohammed VI University Hospital, Marrakech, Morocco

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## ABSTRACT

**Background:** Self-management education (SME) is an important yet unacknowledged aspect of diabetes care. Despite the raise of diabetes and its complications with significant burden in developing countries, research on SME interventions in Morocco is lacking.

**Aims:** To assess the effectiveness of a culturally tailored SME intervention on foot-care self-management practices among type 2 diabetes patients and to identify factors associated with practices variation.

**Methods:** We designed a pre-post prospective quasi-experimental study and recruited patients with type 2 diabetes aged 30 years old or above. The intervention consisted of an interactive group discussion using different materials: a narrative video, a PowerPoint presentation and a printed guide. Foot-care practices were assessed prior to the session and one month later using 2 items from the Summary of Diabetes Self-Care Activities (SDSCA). Binary logistic regression was performed to identify factors associated with a favorable variation, defined as an increase in the mean frequency score of foot-care by a minimum of 1 day/week.

**Results:** A total of 199 participants were recruited and 133 completed the second assessment. Mean age was  $55.2 \pm 11.2$  years old. Women represented 67% and 72% of participants was illiterate. The foot-care score mean increased from  $3.5 \pm 2.9$  days to  $5.9 \pm 1.8$  days one month after the intervention (mean variation was  $2.4 \pm 3.1$  days;  $p < 0.001$ ). A favorable variation was found among 75 (37.7%) participants. In multivariate analysis, literacy was associated with higher likelihood of a favorable variation of foot-care practices (OR = 2.82; 95%CI: 1.09–7.31) while previous education about diabetic foot was associated with lower likelihood of a favorable variation (OR = 0.26; 95%CI: 0.08–0.78).

**Conclusions:** There was a general improvement in foot-care practices after the intervention. Our findings suggest the role of literacy and previous patient education in shaping the observed variation. Culturally tailored interventions targeting other disease management domains are needed in our context.

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## Introduction

The increasing burden of type 2 diabetes mellitus (DM) poses significant challenges to health care systems worldwide. The global prevalence of type 2 DM has almost doubled in the last 30 years, from 4.7% in 1980 to 8.5% in 2014, with a higher increase shown in low and middle income countries [1]. Across the Middle East and North Africa, 35.4 million people were estimated to be living with the disease in 2015, with this number expected to increase

to 72.1 million by 2040 [2]. In Morocco, a prevalence of 6.6% has been reported among adults aged 20 years and over [3]. This disease is responsible for high rates of mortality and related morbidity here largely as a consequence of the degenerative complications. This makes the disease management complex and costly, and underlines the need for more effective preventive strategies.

Studies focusing upon the management of chronic conditions such as DM have long emphasized the importance of an active patient role, acknowledging the need to promote strategies that provide patients with an opportunity to take on a more structured and purposive role in their day-to-day care [4]. Self-management education (SME) is an important strategy that can build patients confidence and provide them with the knowledge and skills to take a

\* Corresponding author at: Clinical Research Unit, 3rd floor, Mohammed VI University Hospital, Marrakech 40000, Morocco.

E-mail address: [l.adarmouch@hotmail.com](mailto:l.adarmouch@hotmail.com) (L. Adarmouch).

more active role in their own disease management. Many studies evaluating the effectiveness of SME for chronic conditions have demonstrated positive health outcomes [5–7]. For diabetes in particular, results have indicated improvements in diabetes knowledge, levels of fasting blood glucose and hemoglobin A1c (HbA1c) [8,9].

Among DM complications, diabetic foot is a major cause of disability and premature deaths [10]. Painless neuropathic foot is the main cause of foot ulcers and amputations: patients can often not recognize early symptoms of the disease, and therefore pay less attention to even the more serious of foot injuries. Preventing foot ulcers requires strict glycemic control as well as proper foot-care: minimal foot self-care practices include systematic daily inspection of feet and inside of shoes [11]. For developing countries, factors related to poverty, literacy and environmental barriers, delays in seeking treatment, and less priority given to foot-care by both patients and health providers have been cited as major contributing factors that can increase the risk of foot complications [12,13]. For those in Morocco, foot ulcers represent both a significant yet unacknowledged threat to many patients [14], highlighting a clear gap between evidence and practice. Effective preventive measures – through early diagnosis measures and enhanced patient education- are crucial for reducing the mortality and morbidity related to this complication [15–17].

Though data focused on the incidence and burden of foot ulcers for patients with diabetes in Morocco is scarce, there is clear consensus that promoting foot self-care and regular screening of foot are key measures needed to prevent foot ulcers and amputations. At present, educational material is mainly adapted from available publications and guidelines from developed countries. To our knowledge, there has been no published research into the effectiveness of culturally tailored SME interventions for diabetes patients within the Moroccan context. More specifically, no SME intervention related to foot self-care practices among those patients is available. We hypothesized that an educational intervention using culturally targeted material may enhance the practice of foot-care among type 2 diabetes patients in our context.

The primary objective of this study was therefore to assess the effectiveness of a culturally tailored SME intervention on foot-care self-management practices among type 2 diabetes patients. A secondary objective was to identify factors associated with a favorable variation of self-care practices after the intervention.

## Methods

### Design and participants

We performed a single-arm quasi-experimental interventional study consisting of a pre-post prospective design. Target population was represented by patients aged 30 years old or above, who were diagnosed with type 2 diabetes mellitus for at least 6 months. Excluded from the study were patients not speaking Moroccan dialect or unable to participate and complete the study procedures due to physical or mental disabilities. The study sample was constituted with eligible volunteers recruited through patient organizations and primary care facilities, in 4 areas in Southern Morocco. Participants were approached by healthcare professionals and patient organizations members who briefly explained the study aim and procedures. Individuals willing to participate were invited to the study site for a scheduled group meeting with the study team.

### Intervention

The intervention consisted of an interactive educator-led group discussion, the content of which was developed after meetings

with an expert in diabetology. It included a brief overview of diabetes definition, types and symptoms as well as major complications including diabetic foot. Self-management strategies were presented and described with focus on foot care. This consisted of discussing key messages and adopted an approach of over-viewing wrong messages before discussing correct ones. Messages concerning foot care were categorized in 5 sections: 1/general foot-care (washing, drying and avoiding heat and cold), 2/nail care, 3/shoes use and choice, 4/socks use and 5/what to do in case of an injury.

Educational tools consisted of a PowerPoint presenting an overview about diabetes. A narrative video was developed using a culturally sensitive approach to the context with regard to the character, language and cultural practices. In this video, we displayed an individual performing daily activities, such as showering, going to bed, cutting nails, wearing socks, or wearing sandals to walk at home. A CD-rom containing the video was provided to participants after the session. Finally, an additional short guide summarizing the content was developed, printed and provided to participants. With regard to the content, educational messages were adapted with emphasis on the cultural expression of the corresponding concepts. The educational tools were also designed in order to be more appropriate and relevant for participants, such as presentation of the settings, character portrayal, and clothes and accessories. Moreover, due to expected low levels of literacy, we decided to privilege the use of image and sound for the developed tools.

A group of seven medical graduates were trained to conduct group educational sessions with patients. Each group attended one educational session including power point presentation, video visualization and discussion. Groups included 15–20 participants and the sessions lasted 90 min in average. Participants were invited and encouraged to contribute and interact with the rest of the group.

### Data collection

Eligible and consenting participants were interviewed by trained medical students before the educational session. The questionnaire aimed at gathering data on various domains. Socio-demographic data included sex, age, literacy, professional activity and health insurance. Disease characteristics included disease duration and medical visits over the past year. We also recorded information on previous participation to education sessions and membership of a patient organization.

For the purpose of foot self-care activities assessment, we used two items from the Summary of Diabetes Self Care Activities (SDSCA): 1/ “on how many of the last seven days did you check your feet?” and, 2/ “on how many of the last seven days did you inspect the inside of your shoes?”. Both items report on the frequency of the behavior over the past week, on a scale from 0 to 7 (number of days). One month later, participants were invited to respond once again to the two foot-care items. For this assessment, we used items from the Moroccan version of the SDSCA [18].

### Statistical analysis

Statistical analyses were performed using SPSS version 16.0 for windows. Qualitative variables were described using frequencies and percentages. Quantitative variables were described using means and standard deviations.

For foot-care, the score was computed as the mean of the ratings for the two constituting items. Pre-post variation of foot-care score was calculated using the formula (post score – pre score). We defined a favorable variation as an increase in the mean frequency score of foot-care by a minimum of 1 unit (=day/week).

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