

Jordanians with diabetes: a qualitative content analysis of footwear practices

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Article points

1. Patients' practices for examining footwear are inconsistent, and patients have misconceptions about appropriate footwear features.
2. Foot care education should be detailed and individualised.
3. Patient local context should be incorporated into content of foot education programmes.

Key words

- Content analysis
- Diabetic foot
- Footwear
- Ulceration

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Shoes are considered the most frequent reason for foot trauma among people with diabetes, thus, it is recommended that special footwear be worn to break the causal chain of diabetic foot ulcers (DFUs). The qualitative content analysis outlined here examines the narrations obtained during an interview-based survey study of foot care practices in Jordan. A total of 610 participants discussed three themes of care: strategies employed to examine footwear, aims of examining footwear, and the characteristics of shoes appropriate for people with diabetes. Regular shoe examination was a practice adopted by participants who incurred foot injuries that resulted from harmful objects found inside the shoes. Participants believed that people with diabetes should wear 'special shoes', but limited details were provided about the requirements of these special shoes. Therefore, foot care education programmes should focus on patient-controllable risks and provide detailed advice concerning footwear recommended for those with diabetes.

Footwear becomes a source of risk when it is inappropriately sized and/or shaped because soft tissue can be compressed between the hard surface of the shoe and the bony prominence. This compression is particularly damaging for people with diabetes as they are at greater risk of foot deformation, which is one factor within the causal chain that increases the risk of diabetic foot ulcers (DFUs). The causal chain also includes peripheral neuropathies (the main contributing factors) and vascular compromise (Harrison et al, 2007; Meyr and Creech, 2011).

Wearing appropriate footwear can help break the causal pathway of ulceration (Parnés, 2007). However, patients with diabetes are more likely to wear tight-fitting and enclosed shoes to enhance their feeling of a protective barrier surrounding their feet, which contributes to a risk of compression and DFU formation (Harrison et al, 2007; Meyr and Creech, 2011). Shoes that are too wide may also increase the risk of DFU due to the foot slipping during ambulation against the inner surface of the shoe (McInnes et al, 2012).

The use of appropriate footwear has many benefits for the prevention of DFU, but effectiveness depends on both the fit and the patient's compliance with implementing the clinical recommendations (Uccioli, 2006; Bus et al, 2008). Therefore, it is necessary to consider the patient's personal views in footwear practices that would be affected by cultural values. This report analyses footwear practices, as narrated by a cohort of Jordanians with diabetes.

Diabetes in Jordan

The prevalence of DFUs in Jordan is estimated to be as much as 4%, with type 2 diabetes affecting approximately 17.1% of the population, and poor glycaemic control seen in many of these people (Jbour et al, 2003; Ajlouni et al, 2008). DFU is the most common reason for hospitalisation in people with diabetes (Lawrence et al, 2004). The total direct cost of diabetes care in Jordan is estimated to be as much as JOD654 million — approximately £586 million or USD923 million — a heavy burden on the

Table 1. Participant demography.

| Variables | | Frequency | Percentage |
|----------------------|-------------------------|-----------|------------|
| Gender | Male | 307 | 50.3 |
| | Female | 301 | 49.3 |
| | Missing value | 2 | |
| Age | ≤40 years | 105 | 17.2 |
| | >40–<60 | 316 | 51.8 |
| | ≥60 years | 189 | 31 |
| | Missing value | 0 | |
| Type of diabetes | Type 1 | 182 | 29.8 |
| | Type 2 | 427 | 70 |
| | Missing value | 1 | |
| Duration of diabetes | ≤5 years | 239 | 39.1 |
| | >5–≤10 years | 147 | 24.1 |
| | >10–≤15 years | 95 | 15.6 |
| | >15 years | 124 | 20.3 |
| | Missing value | 5 | |
| Marital status | Married | 487 | 79.8 |
| | Unmarried | 105 | 17.2 |
| | Missing value | 18 | |
| Level of education | Illiterate | 105 | 17.2 |
| | Below high school level | 173 | 27.5 |
| | High school level | 170 | 27.9 |
| | Above high school level | 121 | 19.8 |
| | Missing value | 41 | |

healthcare system (Ford, 2008). Research-based clinical practice guidelines surrounding the use of appropriate footwear — a relatively simple solution — could, therefore, make the healthcare system more cost-efficient.

Study plan and methods

Design and settings

The study outlined in this article is an analysis of data collected during descriptive cross-sectional research of foot care services in Jordan (Abu-Qamar, 2014). Specifically, the analysis was conducted on the narrative responses to an open-ended question concerning footwear practices. Healthcare facilities participated in the study were a university-

affiliated hospital located in Amman, the capital of Jordan, plus all military (three) and public (four) hospitals with a comprehensive healthcare centre located in the south of Jordan. It should be noted that in Jordan, the Ministry of Health has two forms of clinics (outside of hospitals) — primary healthcare centres (PHCCs) and comprehensive healthcare centres (CHCCs). The PHCC serves a small zone and is covered by a general practitioner with a small pharmacy. Several PHCCs are connected to a CHCC that serves several zones during working hours. CHCCs are covered by specialised physicians, and include a laboratory and a pharmacy, while there are a few beds on which patients can be hospitalised for a few hours.

Data collection

The open-ended question was asked during a face-to-face interview that lasted for around 30 minutes, and guided by a questionnaire seeking information on knowledge and practices of self-care (Abu-Qamar, 2014). For the present study, the data were collected from narrative responses to a follow-up question asking participants to detail how they examine their footwear. The follow-up participants were those who had indicated “yes” in answer to the phrase, “People with diabetes are required to examine their footwear.” The narrative responses to the follow-up question were transcribed verbatim, as relayed by the participant.

Sampling

A convenience sampling approach was employed to recruit potential participants. Every person who visited diabetes clinics within the participating sites were invited to take part in the study. Clinic nurses referred potential participants to the research assistant, who interviewed the agreeing participants on an individual basis.

Ethical considerations

Ethical approval was obtained in 2010 from the Ministry of Health, Royal Medical Services and the University of Jordan Hospital; details are available in previous publications (Abu-Qamar, 2014).

Analysis and reporting of results

Qualitative content analysis was employed for developing an understanding of footwear practices. Each of the transcribed narratives was examined for repetitive words or phrases, to identify keywords (Elo and Kynga, 2008). Similar words or phrases were aggregated under subcategories which, in turn, were organised into grouped categories. The grouped categories were linked together for the purpose of developing key themes describing footwear practices. Descriptive statistics were employed to characterise study population and variables using the Statistical Package for the Social Sciences (SPSS) — IBM Statistics 22.

Participant demography

Of 1,085 participants, 767 indicated “yes” to the phrase, “People with diabetes are required to examine their footwear.” Out of these 767 individuals, 620 provided details on how they examine their footwear. Details provided by 10 participants were excluded because they did not concern footwear practices. Thus, the analysis was concerned with textual data of footwear as practiced by 610 Jordanians with diabetes.

Participants were almost equally distributed in terms of sex, and their age ranged from 17 to 85 years with a mean of 53.56 years (standard deviation = 13.36 years). Seventy per cent of participants had type 2 diabetes and 39.1% had had diabetes for ≤ 5 years (Table 1).



Figure 1. Footwear becomes a source of risk when it is inappropriately sized and/or shaped because soft tissue can be compressed between the hard surface of the shoe and the bony prominence. Patients must be made aware of this as part of any foot care education programme.

Themes

The analysis of textual data revealed three main themes:

- Care of the shoes: the means — strategies that participants reported as their approach to shoe examination
- Care of shoes: the purpose — reasons participants look after their shoes
- Care of shoes: the characteristics — what features should be included in footwear appropriate for people with diabetes.

Care of shoes: the means

Participants reported the methods they use for shoe examination, which included “survey”, “inspection”, “hands” and “tap” (Table 2). The general means of shoe examination was not mentioned in 206 of the responses. Selected participants believed shoe examination is not necessary because they wear open shoes (n=19; 3.1%) or do not walk outdoors because they typically use an automobile for outside travelling.

The word ‘survey’ was identified in 170 responses. Of these 170 responses, 135 participants specified the purpose and/or the timing of surveying the shoes among other details. Specifically, participants reported that they check their shoes before wearing. Two participants declared that they examine their shoes once a day, either before going to work or after getting home from work. One mentioned that, if they felt something unusual while wearing their shoes, they would examine the footwear. Another individual believed that examination should be conducted while buying new shoes to ensure the shoes’ suitability to their feet. Finally, a fourth group (comprising 10 people) declared they frequently examine their shoes, without specifying how often.

Participants did not detail how they survey their shoes, but 73 explained that ‘inspection’ is their strategy for surveying. The majority of these responses specified that the shoe is inspected from the inside, with no details on the frequency of or criteria for inspection.

One-hundred participants said they tap their shoes, e.g. by holding the footwear upside-down, tapping it against a surface and allowing any small objects to fall out. ‘Hands’ were mentioned in 98 responses; participants reported putting their hands inside the shoes to inspect. However, they did not

detail how and/or why they do so, responding to the question “How do people with diabetes examine their footwear?” with specific comments like “putting hands inside” the footwear. Participants mentioned they used their hands to test the integrity of their footwear and/or for the presence of objects that may harm their feet.

Care of shoes: the purpose

The two main sub-themes were ‘external’ and ‘within the shoes’, recognising that shoe examination aims to find potential sources of hazards inside the shoes or within the shoe layers. Sources of hazards ranged from “searching for anything” to specifically naming them, e.g. tacks, pins, pebbles, thorns, or pieces of broken glass from the street (Table 2). In certain responses, participants said they examine their shoes because the footwear could contain objects that they might not feel with their feet. In other responses, the declared purposes were searching for ‘something causing foot injury’. In this context, participants mentioned that they began to regularly examine their shoes after sustaining a foot injury from a foreign object later found inside the shoe.

Care of shoes: the characteristics

Participants also reported their views about features that are required to be present in shoes worn by those with diabetes. One participant acknowledged the importance of wearing medical shoes, but added that this did not translate into practice. Twenty participants believed that a person with diabetes should wear ‘medical’ shoes (Table 2). Participants added specific details of characteristics of the required shoe in terms of the size, contour, and presence of cushion. Although the frequency of responses containing these characteristics was small, participants used variable concepts/terms to express these factors, e.g. “wide”, “not compressing” and “appropriate for the foot”.

Discussion

This qualitative content analysis aimed to describe patterns of shoe examination performed by Jordanians with diabetes. The analysis found low frequencies of responses containing details about features of footwear recommended for those with diabetes, many of which contradict contemporary

“The general means of shoe examination was not mentioned in over one-third responses, with 20% of those participants believing examination is not necessary because they wear open shoes.”

| Table 2. Themes and subthemes of footwear care | | | | |
|--|------------------|--------------------------------|-----------|------------|
| Themes | Subthemes | Concepts | Frequency | Percentage |
| Care of shoes: the means | Survey | Survey | 170 | 27.9 |
| | Inspection | Inspection | 73 | 12.0 |
| | Tap the shoe | Tap the shoe | 100 | 16.4 |
| | Hands | Hands | 98 | 16.1 |
| | Not mentioned | Not mentioned | 206 | 33.8 |
| Care of shoes: the purpose | External thing | Anything | 60 | 9.9 |
| | | Strange objects | 11 | 1.8 |
| | | Anything harmful | 23 | 22.8 |
| | | Anything causing injury | 38 | 6.2 |
| | | Sharp | 36 | 5.9 |
| | | Thorn | 8 | 1.3 |
| | | Tack | 105 | 17.2 |
| | | Pebble | 72 | 11.8 |
| | | Pin | 22 | 3.6 |
| | | Glass | 32 | 5.3 |
| | | Puncture | 14 | 2.3 |
| | | Stuck to shoes from the ground | 8 | 1.3 |
| | | Dirt | 16 | 2.6 |
| | | Insects | 17 | 2.8 |
| | Hard objects | 14 | 2.3 | |
| | Within the shoes | Worn soles | 14 | 2.3 |
| | | Protrusion | 7 | 1.2 |
| Moisture | | 5 | 0.8 | |
| Care of shoes: the characteristics | Medical | Medical | 20 | 3.3 |
| | Comfortable | Comfortable | 35 | 5.7 |
| | Size | Wide | 48 | 7.9 |
| | | Appropriate | 12 | 2.0 |
| | | Not compressing | 10 | 1.6 |
| | Cushion | Padded/soft | 11 | 1.8 |
| | Contour | Low heel | 4 | 0.7 |
| | | High heel | 1 | 0.2 |
| | | Close | 7 | 1.5 |
| | Responsibility | Cleanliness | 31 | 5.1 |
| | | Ventilation | 7 | 1.5 |
| | | Dry | 1 | 0.2 |
| Family | | 6 | 1.0 | |
| Avoid prolonged wear | | 1 | 0.2 | |
| <i>Note: Totals/percentages do not add up to 610/100 because concepts were not mentioned in all responses.</i> | | | | |

recommendations. Specifically, and in agreement with previous quantitative data from Jordan (Abu-Qamar, 2014), participants mentioned that they prefer wide shoes because tight shoes increase the chance for foot injury. In reality, both tight and wide footwear choices increase the risk for foot injuries, as tight shoes compress the soft tissues between two surfaces, and loose shoes allow friction between the shoe and inner footwear (Harrison et al, 2007). Wearing tight or wide shoes is common practice among those with diabetes (Burns et al, 2002).

The authors questioned whether the tight-fitting shoes caused foot ulcers, or whether the presence of ulcers spurred people to buy roomy footwear in an attempt to reduce the seriousness of the ulcers (Burns et al, 2002). However, poor peripheral sensation is the reason people with diabetes purchase shoes that are too tight, to obtain the sense of immediate comfort (Uccioli, 2006; Harrison et al, 2007). Therefore, it is more appropriate to accept the claim that tight shoes caused the foot ulcers, and that wide shoes were used to loosen compression on the injured areas.

Data from the USA suggest that previous experience of DFUs increases the likelihood for wearing incorrectly sized shoes by five times, compared with those with no previous experience of DFUs (Nixon et al, 2006). A case-control study found mismatching between the foot and the shoe size (length) among those with peripheral neuropathy, secondary to diabetes (82%; n=85), as well as among those without diabetes (67%; n=118) (McInnes et al, 2012). McInnes et al (2012) claimed that people select the shoe by trying on pairs of different sizes to purchase the appropriate one, and they did not modify these habits after developing diabetes. Accordingly, it is recommended to identify the appropriate shoe size (width and length) using a measuring device, instead of the conventional way that depends on the integrity of peripheral sensation (Uccioli, 2006).

Research from several countries found that foot-care education is not incorporated within the context of regular diabetes care (El-Nahas et al, 2008; Abu-Qamar and Wilson, 2011; Abu-Qamar, 2014). Possibly as a result, wearing wide shoes was a practice accepted by 83% (n=901) of Jordanians with diabetes (Abu-Qamar, 2014). Similarly, reports from Egypt, UK and USA have documented that the majority of patients with diabetes wore inappropriate shoes (Harrison et al, 2007; El-Nahas et al, 2008;

Meyr and Creech, 2011). Shoe size is one of the criteria that people with diabetes need to consider to ensure safe, protective footwear (Uccioli, 2006). Examples of these criteria included the presence of straps, and the firmness and softness of the instep, heel and sole (Uccioli, 2006). Ideally, the shoe would be recommended according the category of risk for ulceration at which each person with diabetes is classified, which could change over time. In so doing, prevention activities would proceed to match risk factors — e.g. peripheral neuropathy and foot deformities — as they emerged for each individual (Uccioli, 2006).

Patients should be provided rationalisations of why special footwear practices are recommended, while accounting for how an individual's socio-cultural profile influences footwear practices (Abu-Qamar and Wilson, 2012). The nature of risk depends on the person's environment and, in this study, the purposes for which participants examined their footwear reflected the rural nature of the catchment area (the south of Jordan). Specifically, participants mentioned that they examined their shoes to find foreign objects, e.g. a thorn, tack, pebble, pin or broken glass. Therefore, it would be more helpful for foot care education programmes to contain examples of possible harm that could reach the footwear from the environment.

Educational programmes also need to pay attention to the method of shoe examination, as about one-third (n=206) of participants did not mention the method they employ to examine their shoes. In this study, attention towards meticulous foot self-care, including footwear practices, was developed by participants after the experience of foot injury. This is another indication of limitations in foot care that are required to be lifelong practices, and that should commence once a diagnosis of diabetes has been made.

Strengths and weaknesses

Strategies were employed to ensure that the evidence generated accurately reflected participants' responses. Different approaches were used independently to check the narration inserted into the document against the original written responses. However, the written responses might not reflect participants' real practices in that the provided responses were meant to be socially acceptable. A file was created

“Previous experience of diabetic foot ulcer (DFU) increases the likelihood for wearing incorrectly sized shoes by five times, compared to those with no previous experience of DFU.”

in which all decisions made during the study were documented for consistency in the decision-making process. Finally, sufficient details were reported about how the description of footwear practices was developed from the written narratives, facilitating the transferability of the study's findings.

Conclusion

This content analysis revealed findings similar to those of previous research. Specifically, participants falsely believed that roomy shoes are appropriate for people with diabetes, or that shoe examination is not necessary. Participants tended to practise "regular shoe examination" as a consequence of having sustained a foot injury due to a foreign object being present inside the shoe. This study's findings suggest these topics, as well as the features of appropriate footwear for people with diabetes, should be included in foot care educational programmes. ■

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Figure 2. The nature of risk depends on the person's environment and, in this study, the purposes for which participants examined their footwear reflected the rural nature of the catchment area (the south of Jordan).