

QUALITATIVE CONTENT ANALYSIS OF COMPLEMENTARY TOPICAL THERAPIES USED TO MANAGE DIABETIC FOOT IN JORDAN

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Abstract

In order to alleviate diabetic foot problems, patients sometimes seek complementary therapies outside the professional context. This paper describes the use of complementary remedies as a topical treatment for diabetic foot ulcers among Jordanians. Qualitative content analysis was used to analyse written responses of 68 patients with diabetes who have used complementary therapies to treat diabetic foot problems. These 68 persons represented a subgroup of the study population surveyed using a questionnaire, to the effect of investigating diabetic foot treatments provided in Jordan. Informants were recruited from eight healthcare facilities established in the southern part of Jordan plus from one hospital established in the Jordanian capital. The study was approved by the Boards of Ethics of the participating healthcare facilities. Content analysis yielded the category "Complementary Therapies Used", which included a range of household items (olive oil, sesame oil, honey, and vinegar), and also some indigenous Jordanian herbs (Wormwood, Myrrh, Caper, and Henna among others). The remedies were used either as a monotherapy or as mixtures, to the common goal of treating diabetic foot problems. Other interventions like Al-cowy were also sought from traditional healers. Educational campaigns are required to increase the awareness of patients and their families on possible hazards of unwise complementary therapy use. The decisions on the use of such therapies should be made in agreement with the attending healthcare professionals.

Keywords: Content analysis, complementary therapy, diabetic foot, Jordan, foot ulcers, prevention

Introduction

Diabetic foot is a common complication of diabetes in which sensation in, and blood flow to, the lower limb are impaired, with skin dryness increasing the possibility for ulcers to develop. Management of such ulcers is a primary concern of clinicians, patients and patients' families due to often prolonged and costly treatments calling for extended follow-up periods. Furthermore, despite efforts made to save the injured foot, in numerous cases an amputation remains the only ultimate solution, leading to a substantial disability and a poorer quality of life.

The contemporary approach to diabetic foot management sees diabetic foot care as a lifelong process that calls for close collaboration between patients and their attending healthcare professionals (International Diabetes Federation, 2005). People suffering from diabetes are urged to develop self-management behaviours in order to be able to identify risks, prevent injuries to their feet, or at least identify these injuries in their early stages and subsequently seek appropriate care. Healthcare professionals are responsible for helping patients to develop self-management behaviours, as well as for providing necessary professional interventions, such as offloading (reducing pressure on the feet), debridement and regular dressing (Kruse and Edelman, 2006). Initial interventions aim to prevent ulcers, but should ulcers occur, other healing interventions that aim to prevent infections and improve blood supply to the target area shall be in order. In other words, management of diabetic foot calls for a multidisciplinary approach aiming to maintain the integrity of the foot by utilizing different levels of prevention: primary, secondary and tertiary one. However, patients may choose treatment options offered outside the professional context, known as complementary therapies. This manuscript reports a study of complementary therapies used to treat diabetic foot ulcers in Jordan. The report on the study outcome is preceded by the outline of the manuscript background followed by details on methods employed to obtain and analyse the required data. The main findings are followed by the discussion putting the results into the available body-of-knowledge context.

Background

People may find ways or seek therapies outside the conventional medicine so as to enhance their quality of life and improve their wellbeing. Such therapies are classified as alternative, complementary or integrative medicine. A distinction can be made between these three based on their relationship with the conventional medicine. Specifically, complementary therapies are seen as a "complement" to conventional medicine, while alternative therapies represent a substitute for the latter (HealthInsite, 2011). Integrative medicine utilises both complementary and conventional medicine within the process of care (HealthInsite, 2011). In other words, integrative medicine is a model incorporating both complementary and conventional medicine within the process of healthcare, whereas complementary and alternative approaches are therapies that patients seek beyond the treatment plan compiled within the conventional medicine context (Maizes et al, 2009).

Becoming increasingly more common in the western society, complementary therapies represent the means of enhancing health that complement conventional medical treatment. There are many types of complementary therapy including physical therapies, aromatherapy, acupuncture, nutritional and herbal therapies and homeopathy (HealthInsite, 2011).

In contrast to conventional medicine, complementary therapies aim to treat the person on the whole, not just the symptoms of the disease. Such holistic practices have their historical and cultural roots embedded into customs that have accumulated over centuries of reported beneficial use across different cultural generations. In fact, complementary medicine offers therapies that can vary from one culture to another. In certain cultures, complementary therapies have become essential practices exercised on particular social occasions. For example, families in the Middle East often serve cinnamon drink after childbirth because cinnamon improves uterine contraction, and so helps to clean the uterus from blood clots and placenta fragments. Such cultural practices have deepened the importance of complementary therapies within the Middle-Eastern communities, where conventional medicine is considered as relatively new, and may not be accessible or acceptable to all people, especially to those living in remote areas. Publications from Jordan report that inhabitants of rural areas rely on herbs more than those living in urban areas (Hudaiba et al, 2008; Wazaifya et al, 2011). Accordingly, herbalists are widely available, selling preparations to treat different conditions.

Several published reports highlight the contemporary use of medicinal plants within the Jordanian community (Afifi and Abu Irmalah, 2000; Lev and Amar, 2002; Abu-Irmailehm and Afifi, 2003; Otoom et al, 2006; Al-Mustafa and Al-Thunibat, 2008; Afifi et al, 2010). Specifically, these reports have listed medicinal plants available within the Jordanian wild with indications for their use (Al-Khalil, 1995; Oran and Al-Eisawi, 1998). One study documented the practice of herbalists who were untrained, yet provided evidence-lacking treatment prescriptions (Abu-Irmailehm and Afifi, 2003). Moreover, herbal shops lacked proper storage and hygienic conditions required to maintain chemical stability of the herbs (Abu-Irmailehm and Afifi, 2003). Others studies reported about experimental investigations of pharmacological properties of medicinal plant extracts (Khalil et al, 2005 ; Al-Mustafa and Al-Thunibat, 2008). One experimental study done on mice found limited therapeutic effect of the medicinal plants under investigation on wounds, rather than being very effective as publicly claimed (Khalil et al, 2007). Similarly, another study reported herbal extracts recommended for diabetes treatment to have a limited role in controlling glucose levels in experimental rats (Hamdan and Afifi, 2004). A few reports went into patients' use of medicinal herbs for the treatment of selected illnesses such as cancer (Afifi et al., 2010), heart problems (Omeish et al, 2011) and diabetes (Otoom et al., 2006; Wazaifya et al., 2011). The reports documented patients' expectations from using these herbs and the frequency of such usage (Otoom et al., 2006; Wazaifya et al., 2011).

Limited literature on topical therapy of diabetic foot ulcers in Jordan and in the Middle East was found (Mutluoğlu and Uzun, 2009; Bakhotmah and Alzahrani, 2010). Interestingly, information supporting the use of complementary foot care remedies and oil extracted from certain herbs (cayenne, for example) to improve neuropathy was identified (University of Maryland Medical Centre, 2011). Similarly, clinicians have noticed the value of topical honey in improving diabetic foot ulcers healing (Eddy and Gideonsen, 2005; Eddy et al, 2008). The results of a prospective randomized controlled trial reported safe and effective topical use of a Chinese herbal ointment for the treatment of diabetic foot ulcers (Li et al, 2011). Within the field of diabetic foot care, publications reporting the use of home remedies as an inappropriate practice were also identified (Armstrong and Lavery, 1998; Shankhdhar et al, 2008). In addition, a phenomenological study documented that Jordanians suffering from diabetes often seek medical advice for a burn injury if home management is unsuccessful (Abu-Qamar and Wilson, 2011). The purpose of this manuscript is to describe the use of topical complementary remedies for diabetic foot ulcers management among Jordanians.

Methods

Study design

A descriptive cross-sectional design was used to compare the status of foot care services in the south of Jordan against that in Amman. Such a design was considered appropriate because no studies investigating diabetic foot care services in Jordan have been published insofar. Descriptive studies are considered appropriate for the preliminary investigation of yet unexplored topics since such studies aid in building the basis for subsequent research (Polit and Beck, 2004). Additionally, a cross-sectional study is speedy to conduct and highly efficient, enabling the researchers to collect large amounts of data on many variables from many patients without interrupting their treatment plans (Macnee and McCabe, 2008). Furthermore, the collected data mirror real life situations, giving in this particular case a realistic insight into the diabetic foot care provided in Jordan.

Setting

The study was conducted in eight hospitals and one healthcare centre established in Jordan. The healthcare centre and all of the hospitals but one are located in the southern part of Jordan, and are governed either by the Ministry of Health (MoH) or by the Royal Medical Services (RMSs). The remaining hospital is a university hospital located in Amman, the capital of Jordan.

Ethics approval

Three ethics approvals were sought and obtained from the Human Research Boards of Ethics operating under the wings of MoH, RMSs and the University-of-Jordan Hospital (UJH).

Recruitment

Diabetes diagnosis and a visit to one of the participating sites during the study period were defined as the inclusion criteria. The inclusion was limited to adult volunteers. Consequently, a decision was made to exclude patients aged 16 years because they would be hospitalized on a paediatric rather than on an adult ward. The first author approached each participating site in order to make the necessary arrangements. Following this, Letters of Invitation were posted to the directors of the participating sites. The Letters explained the purpose of the study and stated the inclusion criteria and study requirements. The Invitation Letters also brought the request for delegation of two registered nurses from each site in order to help with data collection.

Cooperation and willingness to facilitate the study were noted in all participating sites, where registered nurses (research assistants) were delegated to help with data collection. However, four sites delegated only one registered nurse (instead of two). As a result, a total of fourteen registered nurses were nominated as the research assistants foreseen to help with data collection. The first author discussed details of recruitment strategies with the research assistants and designated the premises that shall accommodate the patients who accepted to take part in the study during their interviews. All patients who visited diabetes care clinics established at the study sites from February to May 2011 were invited to take part in the study. On arrival at the clinics' registration desk, each patient with diabetes was informed about the study and invited by the clinical nursing staff to take part in it. After signing written consents, patients willing to participate were interviewed by the research assistants on an individual basis. Additionally, the research assistants approached different wards of the study hospitals seeking for hospitalised patients with diabetes.

Training of the Research Assistants

The fourteen research assistants underwent a one day-training workshop held in the nursing laboratory of the Mu'tah University, Jordan. The workshop was organized by the first author, who was assisted by two nurses specialised in diabetic foot care. The two diabetic foot care nurses trained the research assistants to conduct foot examination, including the use of 10-g monofilament for detecting peripheral neuropathy. The first author explained to the assistants the purpose of the study, their role in the study and the rights of the patients who accepted to take part in it, ethical aspects were also included. The first author also trained six additional research assistants, clinical instructors from the Faculty of Nursing, Mu'tah University, to duly prepare the data for analysis.

Data Collection

An interview-based questionnaire and a foot examination protocol were used to collect information on different aspects of diabetic foot care. The questionnaire sought information on different aspects of diabetic foot care, including the information on feet self-management. One question aimed to establish whether the informants used complementary remedies for their foot problems. If so, the informants were asked to give more details (in a narrative format) on the remedies used. Data reported in this manuscript are qualitative data given by the informants. The research assistants interviewed the informants on an individual basis and examined their feet. Each interview lasted some thirty minutes. Two research assistants interviewed some of the informants in their homes, because many patients often send a family member to a hospital to pick a monthly medication stock on their behalf, reducing thereby the possibility of meeting the eligible patients in person.

Data analysis

SPSS (Statistical Package for Social Sciences) version 17 was used to manage demographic data of the informants who reported the use of topical complementary therapies for their diabetic foot problems. Content analysis, as a method of analysing written texts, was used to examine informants' written responses (Graneheim and Lundman, 2004). With such an approach, a description of the phenomenon under investigation is developed, where keywords ("meaning units") within the text ("unit of analysis") are identified, and shortened into "condensed meanings"; those are linked to each other and coded. Similar codes are grouped into categories that can be used to develop the description (Graneheim and Lundman, 2004). Data were prepared for analysis by trained research assistants. Specifically, they rewrote the units of analysis from the completed questionnaires so as to obtain a specially designed form containing the fields into which informants' codes and textual responses were placed. Under direct supervision of the first author, the research assistants swapped the completed forms for double checking of transcription accuracy. After that, the transcripts were typed in Arabic and stored as a Word-document file. The transcripts were checked for their accuracy against the responses written in the completed forms.

The transcribed responses were read and re-read by the first author who is a native speaker of Arabic and is of the same cultural background as the informants (Jordanian). Selected words and/or phrases (meaning units) were identified in the obtained responses. Similar meaning units were grouped together and then classified into categories.

Trustworthiness of the obtained results was established using different strategies that were employed throughout the course of the study. Examples of these strategies include: the informants were selected purposefully and interviewed by the research assistants who had attended a training workshop that made them familiar with the study and their role in it, reducing therefore the heterogeneity of the data collection. Written responses included in the content analysis were carefully selected by the first author so as to match the purpose of the manuscript. Additionally, the direct involvement of the first author in verbatim transcription of the written responses and transcription accuracy checking reduced the risk of an inaccurate transcription.

As mentioned above, credibility was vouched by the fact that the first author, as an informants' national, was able to maintain the cultural context of the written responses. The second author, who is of a different cultural background (Australian Caucasian), made the reports understandable to people of different cultures. In other words, the contribution of both authors to the process of content analysis gave rise to its credibility and made the reported results understandable to people coming from different cultures, preserving at the same time the original cultural context.

Results

Out of 1,100 informants, 95 reported seeking complementary remedies for their foot problems. Out of these, 82 gave additional details on the complementary remedies used. Nine responses were excluded because they did not address any topical treatment. At a further stage of data analysis, five more responses were excluded because three of them indicated that the treatment was sought for conditions other than foot ulcers (arthritis, sciatica and joint pain) and two did not make any sense. Therefore, 68 responses referring to topical treatment of diabetic foot ulcers were included into the final analysis.

Informants' profile

The demographic profile of the 68 informants is described in Table 1. More than half of them were married males. Around 60% of the informants were non-smokers. The most commonly mentioned occupation was housewife. The mean age of the informants was 59 years (range from, 20 to 91 years). As for the level of education, most of the subjects were illiterate, followed by those who had managed to finish a primary school. The category "read and write" implies that the informant is able to read and write, but did not obtain any school degree whatsoever.

Findings from the Content Analysis

The findings from the content analysis were included into one category termed "Complementary Therapies Used". This category represents therapies mentioned in the written responses as complementary therapies used for diabetic foot problems.

A wide range of preparations were used by the informants to treat their foot problems. Preparations were used singularly or in combination with other substances. However, some responses indicated the use of more than one item without specifying whether or not these items were mixed together. Honey was mentioned in six responses as a single substance of use. However, other informants used honey in addition to other items. Table 2 lists these items by their Arabic and scientific names. One response indicated that honey and herbs were used, to treat a diabetic foot problem, but failed to provide details on the herbs used.

Items listed in Table 2 were also used either as monotherapy or were mixed with items other than honey. For example: olive oil was reportedly used as a single remedy, or concomitantly with vinegar. One informant mentioned the use of burned olive oil, and another informant indicated the use of boiled olive leaves.

Informants reported the use of the following water solutions: salt (used most frequently), sage, vinegar, oak tree fruits, fruits of Pistacia Atlantica (the Arabic Name: botum), wormwood, cloves or mustard. One informant indicated the use of water mixed with herbs (caper, wormwood, and catnip [The Arabic name for catnip is Al nana' Al barie]), applied in the form of cold compresses. In one response, the use of cloves and salt was mentioned.

The items mentioned above were also reported to be used singularly, or with other ingredients. Examples of these items include: wormwood which was used both singularly, or mixed with, for example, oil (no additional details on the type of oil were mentioned), sage and salt. Another example is the herb Myrrh (Commiphora molmol) which was used either as a singular (grinded) remedy or mixed with sesame oil. A third example is the use of sage and camomile.

Additional herbs included cleome (the Arabic name Al-Mustah) mentioned by two informants, out of which one used the herb Artemesia as well (the Arabic name: Batheran; an aromatic plant that grows in Jordan and has some reported medicinal use). In another response, the use of Indian barley was mentioned in addition to cleome. The use of Henna, a dried powder of the Lawsonia leaf used for cosmetic purposes in the Middle East since ancient times (Wikipedia, 2011), was reported in six responses. The powder of Henna is dissolved in warm water to make a paste that leaves dark brown colour on the skin and hair (Wikipedia, 2011). Responses did not contain details on how Henna was prepared for medicinal use.

The use of preparations like mulberry leaf, Dead Sea mud, castor oil and lemon & glycerine was reported without further details. Seven responses claimed the use of herbal mixtures without specifying the herbs mixed. Judging by some of the responses, the informants were blind as to the constituents of mixtures used. For instance, the responses were read as follows: "an Arabic prescription", "a mixture given by a herbalist", "it was a herbal mixture", "herbs and creams extracted from herbs", "Medicinal herbs" "...but I do not know the exact content of the mixture that I often use".

Cauterisation (burning of the skin with a heated substance [often an iron rod], the Arabic name: Al-cowy/ Al-kaiky/ Al-tecawaieh/ Kaweuh) was a treatment option mentioned in nine responses. One response implied that the informant was proud with Al-cowy outcome: "I used Al-cowy (cauterisation) with fire, and here I am now completely healed". In contrast, the use of Al-cowy to treat corns was reported as the reason for amputation because of the subsequent infection. Out of the nine responses reporting on the use of Al-cowy, two mentioned an Arabic word (Sabra) as a synonym for the word Al-cowy. Sabra is a type of Al-cowy often used for joint pain. Sabra is done using Alkaddhh (a flammable flower taken from a wild tree called "Alqureia"). A small piece is taken from Alkaddhh, balled and then put over the diseased joint. After that, a fire is set into the ball (Alkaddhh) that remains over the skin until fire extinction.

Table 1: Informants' Demographic Profile

Variable		Number	Frequency
Gender	Male	38	56
	Female	30	44
	Total	68	100
Marital status	Single	2	3
	Married	55	81
	Widowed	7	10
	Total	64	94
	Missing values	4	6
Job	Housewife	24	35
	Military Officers	2	3
	Government Officers	7	10
	Private	5	7
	Retired	21	31
	Unemployed	8	12
	Total	67	98
	Missing values	1	2
Smoking	Smoker	16	24
	Non-smoker	40	59
	Ex-smoker	10	15
	Total	66	98
	Missing values	2	2
Education	Illiterate	21	31
	Read & write	3	4
	Primary School	20	29
	High School	10	15
	Diploma*	4	6
	Bachelor Degree	5	7
	Total	63	92
	Missing values	5	8

* = two years college program after the high school

Table 2: Items used in combination with honey

English name	Arabic (vernacular) name	Scientific name/ main substance
Wormwood	Al-Sheeh	Artimisia Monosperma
Leaves of Hawthorn or Thorn Apple	Warg Al-Zaarour	Craraegus Oxyacanthus
Olive Oil	Zait Al-Zaytoon	Olive Oil
Dry Olive Leaves	Wark Al-Zaytoon Al-jaf	Oleuropein
Caper	Kaisoom	Achillea Santolina
Myrrh	Myrrh	Commiphora Molmol
Pomegranate Peel	Goshore Al- Rumman	
Germander	Al-djadh	Teucrium polium

It is apparent that Jordanians suffering from diabetes use herbs, household items (honey, vinegar, salt and water), or resort to traditional practices (Al-cowry) as complementary therapies for their diabetic foot problems. People use different combinations of herbs and/or household items for therapeutic purposes, and are largely unaware of the constituents of mixtures prescribed by traditional healers or herbalists. Although people expressed their satisfaction with such treatment outcomes, these complementary therapies may result in lower limb amputations, as was the case with one of our informants.

Discussion

This study provides a unique insight into the complementary management of diabetic foot problems. Evidence was generated from data collected from people living outside major cities, and therefore reflects a real-life situation witnessed in Jordanian regional areas. Although some quantitative studies (Bakhotmah and Alzahrani, 2010) were conducted, this is, to the best of our knowledge, the first qualitative study investigating into complementary diabetic foot therapies from where the patients stand. In the following discussion, the main findings are placed within the published literature context. Special attention will be paid to Jordan, where the prevalence of diabetes and its complications have been escalating, and where, at least to some extent, people have traditionally depended on complementary therapies.

Results obtained by this study show that some complementary therapies include the use of herbs, herbal mixtures, and common household items, but also other practices, for example Al-cowry. These results are consistent with the evidence stemming from the north of Jordan, demonstrating that people with diabetes utilise indigenous herbs (Otoom et al., 2006). However, evidence from Amman points towards the use of non-indigenous Jordanian herbal preparations as well; yet the indigenous ones are used more frequently (Wazaifya et al., 2011). Reports issued by the World Health Organization have documented indigenous medicinal plants and traditional practices to be the main healthcare resources utilised in rural areas of developing countries (World Health Organization, 2002). In this context, the use of complementary therapies in the north of Jordan (Otoom et al., 2006) is nearly double as compared to that in Amman, the capital of Jordan (Wazaifya et al., 2011). Having regard to the methodological differences between the present study and previous studies quoted above (Otoom et al., 2006; Wazaifya et al., 2011), in-depth comparisons between the two are difficult to be made. Our study focused on personal reports about complementary therapies used to treat diabetic foot problems, while the therapies reported in other studies were mainly those for treating diabetes on the whole (Otoom et al., 2006; Wazaifya et al., 2011). In contrast to previous studies, informants of the present study used topical remedies, while previous studies reported on the use of ingested herbal preparations.

Therapies used by informants included into this study are similar to those reported in a survey conducted in Saudi Arabia, that examined complementary topical diabetic foot therapies (Bakhotmah and Alzahrani, 2010). These similar therapies include Honey, Myrrh and Henna that were used either singularly or in combination with other items. Unlike the Saudi study that examined the prevalence of complementary diabetic foot therapies use (Bakhotmah and Alzahrani, 2010), our analysis did not examine the frequency of topical remedies use. The Saudi study claimed honey to be the most commonly used preparation, followed by Myrrh, while Henna is used least frequently (Bakhotmah and Alzahrani, 2010). Indeed, honey is a constituent of seven out of top-ten combinations used for diabetic foot treatment in Saudi (Bakhotmah and Alzahrani, 2010). Honey represents a widely recommended treatment for refractory diabetic foot wounds (Bakhotmah and Alzahrani, 2010). Such a recommendation is built on accumulated clinical observations on the effective honey use, and is supported by the reports on public (Bakhotmah and Alzahrani, 2010) and clinical (Eddy and Gideonsen, 2005) use, as well as by research evidence (Makhdoom et al, 2009). However, in a systematic review the available evidence was tagged as insufficient (Jull et al, 2008).

Our informants also reported the use of Al-cowry (traditional Arab cauterisation), mainly for the treatment of corns. In the previously cited Saudi study (Bakhotmah and Alzahrani, 2010), Al-cowry was not documented as a diabetic foot treatment modality. A possible explanation for this difference may lay within the fact that our study informants mostly came from rural areas, whereas the Saudi study embraced the inhabitants of Jeddah, the second major Saudi city (Bakhotmah and Alzahrani, 2010). Al-cowry is more frequently practised in rural areas than in the cities (Qureshi et al, 1998; Al-Rowais et al, 2010). Indeed, the use of Al-cowry has declined in most Arab countries and the prophet Mohammad dispirited its use as a treatment option (Al Binali, 2011). However, Al-cowry has its roots within the ancient Arabian medicine and was advocated by its practitioners who reported about the principles and indications for its use (Al Binali, 2011). As reported by the informants included into this study and documented by other research (Qureshi et al., 1998), Al-cowry is currently performed by traditional healers who may lack adequate knowledge and skills necessary for its safe and effective use. Accordingly, Al-cowry may not be beneficial, but even harmful and may predispose the skin for infection (Qureshi et al., 1998). For that matter, one of our study informants, who received Al-cowry as a corn treatment, developed a skin infection that ended in lower limb amputation. Educational campaigns to increase people's awareness on these issues, especially the awareness of rural population on possible dramatic outcomes of Al-cowry treatment, are recommended.

Our findings show that the reported complementary therapies are sometimes prescribed by herbalists, traditional healers or friends. These findings confirm the results of previous research showing family members and friends to be most frequent advocates of complementary therapies (Wazaifya et al., 2011). Furthermore, previous research found out that Jordanians with diabetes do not inform their doctors on complementary therapy use (Wazaifya et al., 2011). We are blind as to the fact whether our informants discussed their complementary therapies with their attending physicians, but have grounds to believe that they neglected to seek advice from their healthcare providers. This assumption is supported by the evidence that the informants sought advice from traditional healers or herbalists who lack training and professional education and whose practices are denied by public health organisations (Malkawi, 2009). Accordingly, one should hardly assume that

healthcare professionals have recommended such untrained people. It is our belief that Jordanians often resort to complementary therapies before seeking professional healthcare and before the illness becomes bluntly serious (Abu-Qamar and Wilson, 2011). Studies from Saudi Arabia report the unsuccessful medical (conventional) treatment to be a reason for seeking help from traditional healers (Qureshi et al., 1998; Al-Rowais et al., 2010). Diabetic foot is a condition that requires a prolonged treatment which might eventually be unsuccessful; therefore, the chances for seeking help from traditional healers are increased. Accordingly, healthcare providers need to involve patients and family members into their treatment plans and inform them about the expected conventional treatment outcomes. The involvement of family members is fundamental for patients' healthcare decisions which could include seeking help from traditional healers (Qureshi et al., 1998; Al-Rowais et al., 2010).

The use of complementary therapies to treat certain symptoms is based on accumulated reports on their successful usage that are passed from one generation to another. Accordingly, due to the lack of reported evidence on their effective and safe use, complementary therapies employed to the effect of diabetic foot problems management should be questioned. In this regard, authors have suggested the implementation of the effective Henna use for preventing and treating diabetic foot problems (Mutluoğlu and Uzun, 2009). Case reports from Turkey have documented the effective use of Henna for treating hand-foot ulcers secondary to capecitabine [a drug used for cancer treatment] use (Yucel and Guzin, 2008). Authors have argued that Henna can form a three month-lasting protective layer capable of shielding from microbial invasion (Mutluoğlu and Uzun, 2009). Due to its antifungal and antibacterial properties, Henna can also improve ulcer healing (Mutluoğlu and Uzun, 2009). However, diabetic foot ulcers may be different from capecitabine-induced hand-foot ulcers. The hand-foot ulcers are a temporary condition that can be improved upon reducing the drug dose or upon ceasing its use, whereas diabetic foot ulcers are often associated with peripheral neuropathy and peripheral vascular disease that hinder ulcer healing. Additionally, dark discoloration resulting from Henna application can make foot inspection, a fundamental part of diabetic foot care, more difficult. Thus Henna may be beneficial for preventing and treating foot ulcers, but more robust evidence is required to establish its safe and effective use. Indeed, robust evidence is also required for other complementary therapies reported in this study and other studies dealing with the treatment of diabetic foot problems.

Limitations

Results of this study should be taken cautiously due to a small sample size. Additionally, the chain of collecting, transcribing and analysing data introduces bias from different perspectives. Firstly, although research assistants underwent a training workshop, possibilities of inaccuracies in reporting the informants' responses still exist because of the variations in knowledge, experience and interest in the research topic. Secondly, informants might have misunderstood the interviewers' questions, so that the answers might not reflect the actual status of topical complementary therapy use. Thirdly, written responses were transcribed and typed into a Word document by the research assistants, so that the possibility of inaccuracies can not be fully dismissed. The final limitation lays within the possible misinterpretation of the written responses obtained and their biased translation.

Conclusion

This study highlights an important aspect of diabetic foot care in Jordan, where patients seek complementary therapies outside the conventional context. Safety and effectiveness of such therapies are questionable so that additional research is required to establish their true effectiveness and safety profile. In the meantime, educational campaigns are required so as to increase the awareness of patients and their families on possible hazards arising from an unwise use of such therapies. Due to possible harmful effects of complementary therapies, patients are required to involve their healthcare providers in decisions on their use. Similarly, as patients' decisions on complementary therapies depend on conventional treatment outcomes, healthcare providers are required to inform the patients and their families about the expected treatment outcomes, reducing thereby the possibility of patients seeking treatment outside the professional context. Considering the limitations of this study, further research is required to assess whether or not this study reflects the actual status of complementary diabetic foot therapy use among Jordanians.

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