

Targeting patient behaviours early: a review of the literature surrounding patient behaviour change in relation to foot self-care practices

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Article points

1. Patient education alone does not prevent diabetic foot ulceration development.
2. A shift in focus is now looking into patient motivations to help reduce DFUs and improve the impact of education.
3. Studies looking at both patient and healthcare-professional perspectives on foot self-care in diabetes are needed.

Key words

- Behaviour change
- Foot self-care practices
- Patient education
- Patient motivation
- Ulcer prevention

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Diabetic foot ulcers (DFUs) are becoming more prevalent and this is driving an increase in diabetes-related amputations. At the rate of increase of new diabetes diagnoses each year, this problem is becoming increasingly unsustainable. Much attention has been paid to patient education as a means of preventing DFUs, but there is little evidence that this is effective at preventing DFUs as an isolated intervention. More recent attention focused on notions of motivational interviewing and patient concordance in light of diabetes self-care more broadly has re-sharpened the focus on establishing good foot self-care practices in patients with diabetes as a DFU prevention strategy. What is missing from the literature, however, is this discussion in the context of the ‘low risk’ diabetes population. Early interventions have a greater chance at preventing DFU development before micro- and macrovascular complications of diabetes render a DFU as increasingly likely irrespective of belated intervention. Thus, this article considers the literature and argues the case for preliminary research to explore possible barriers and facilitators to foot self-care practices in people with diabetes deemed ‘low risk’ of developing foot complications.

There are currently 3.7 million people diagnosed with diabetes in the United Kingdom and an estimated 900,000 further cases are currently undiagnosed (Diabetes UK, 2018). The chronic impact of diabetes causes vascular and neurological impairment, particularly when glycaemic levels are not well controlled (International Diabetes Federation [IDF], 2015). These factors in isolation, but particularly in combination, can lead to severe foot problems, including ulceration and subsequent serious infection.

Indeed, one in three patients with diabetes will develop vascular impairment to the feet and more than one in 10 will develop diabetic foot ulceration (Kerr, 2012; National Institute for Clinical Excellence [NICE], 2016). Diabetes UK (2016) pointed out that there are over 7,000 diabetes-related lower-limb amputations performed every year in England resulting from ulceration (equating to roughly 19 per day) and that the cost of diabetic

foot ulcers (DFUs) and amputation to the National Health Service (NHS) is £1 for every £150 that it spends — a total in excess of £780m per year. The personal cost is arguably even greater with around an 80% chance of death within 5 years of a diabetes-related lower-limb amputation (Singh et al, 2005; NICE, 2016). A recent systematic review by Hoogeveen et al (2015) outlined that no strong evidence exists to support complex interventions aimed at reducing DFUs. Despite this, there is research and a working group consensus that suggests that with appropriate disease management and effective self-care behaviours, many complications, including DFUs, are deemed entirely avoidable (Ren et al, 2014; IDF, 2015; NICE, 2016). Fan et al (2014) pointed out that as many as 40% of patients with diabetes either are not aware of risk factors associated with DFUs, do not recognise foot problems and/or do not engage in essential foot self-care behaviours, such as good hygiene, visual

Page points

1. Foot self-care practices not uniquely or sharply defined.
2. The International Working Group on the Diabetic Foot has proposed most important behaviours and highlighted their importance.
3. Low-risk populations need to be the target for instilling good foot self-care behaviours.



Figure 1. Daily self-examination of the foot in diabetes. Image sourced from Razmaria (2015).

inspections and the selection and use of appropriate footwear. They go on to explain that inadequate knowledge and poor foot self-care behaviour may contribute to DFU development. Indeed Bus et al (2016) published guidelines for The International Working Group on the Diabetic Foot [IWGDF], citing good foot self-care behaviours as a key approach to prevention of foot ulcers in individuals with diabetes.

Foot self-care practices are not uniquely or sharply defined but appear within the literature to consistently comprise of: daily washing and drying of the feet; daily visual foot examinations; application of skin moisturiser; avoiding walking bare-footed (even within the home); ensuring that bathing water is not too hot; attending regular professional footcare and following the specific professional advice given in relation to foot care practices (McInnes et al, 2011; Fan et al, 2014; Bonner et al, 2016; Bus et al, 2016) (Figure 1). In addition to these physical practices, Bonner et al, (2016) within their systematic review

pointed out that these could also be extended to include understanding risk factors to DFUs and managing complications outside of clinical encounters. Thus, it appears that foot self-care behaviours, patient knowledge and patient education are closely interlinked. The literature indicates that foot self-care behaviours remain a significantly under-utilised exercise in the prevention of DFUs (Schmidt et al, 2008; Perrin et al, 2009; McInnes et al, 2011; Freitas, 2014; Neta et al, 2015).

A systematic review of the literature in this area by Matricciani and Jones (2015) supported this conclusion and further iterated that foot self-care practices should be a particular consideration for patients currently at low-risk of developing foot complications. They point out that only after individuals' risk is deemed high, or they have already developed a DFU, does the education and focus on foot self-care practices start to be more consistently applied. Indeed, Matricciani and Jones (2015) advised that this focus should come in earlier, when the

patients are deemed low risk to not only instil good behaviours and foot self-care practices early, but also because current low-risk populations are likely to become high-risk populations in time — a conclusion shared by McInnes et al (2011) and Bus et al (2016), who indicated from their own studies that good self-care behaviours are more effective if employed earlier in the disease progression.

Accordingly, a literature review was undertaken focussing on the factors that shape patient decision-making in relation to foot self-care behaviours.

Motivations towards patient behaviour change

Within the retrieved literature one key model that appears to surround the implementation of self-care behaviours is the information-motivation-behaviour (IMB) skills model (Figure 2). This is a widely-used self-care framework across different aspects of health care that posits that for health behaviour of an individual to change, they need to be informed of what is required and adequately motivated to be able to carry these behaviours out (Gagvani et al, 2010; Osborn and Egede, 2010; Meunier et al, 2016).

As systematic reviews by Dorresteijn et al (2014) and van Netten et al (2016) have indicated, patient-education alone does not appear to significantly change foot health outcomes in diabetes. It would appear that the ‘motivation’ element of the IMB framework is the area in need of further exploration and will be the focus of this literature review. Fan et al (2014) asserted that motivation for self-care behaviours in diabetes is an important area of consideration because the mild and often silent nature

of diabetes symptoms — particularly early in the disease — can mean that patients do not experience symptom-driven motivation to change their self-care behaviours. Therefore, motivation to change or adhere to day-to-day behaviours can be commonly absent in diabetes and so attention has turned to see if other variables may also play a role.

Vedhara et al (2014) pointed towards illness beliefs being a strong predictor for future foot self-care behaviours and suggested that these beliefs may drive motivation to alter self-care behaviours. In such a way, where symptom-driven motivations do not exist for an individual with diabetes, approaches to patient education that can motivate, as well as inform may be a key to improving foot health outcomes in diabetes (Osborn and Egede, 2010; Salamon et al, 2012; Vedhara et al, 2014; Meunier et al, 2016). In addition, D’Souza et al (2016) found that positive foot care behaviours were correlated with factors such as higher income, higher educational attainment, lower body weight, positive healthcare attitudes and increased awareness of diabetic foot problems. While the findings of this study were limited due to the relatively small participant sample size; the sourcing of participants from one hospital and the self-declaration of foot-health behaviours upon which the statistical data hinged, the findings were consistent with a larger study by Li et al (2014), who attempted to investigate knowledge and self-care behaviours relating to footcare in diabetes among a large number of patients with type 2 diabetes in China.

Within the greater literature on health behaviour motivation, risk preferences and illness concepts are other factors that have been identified as potential

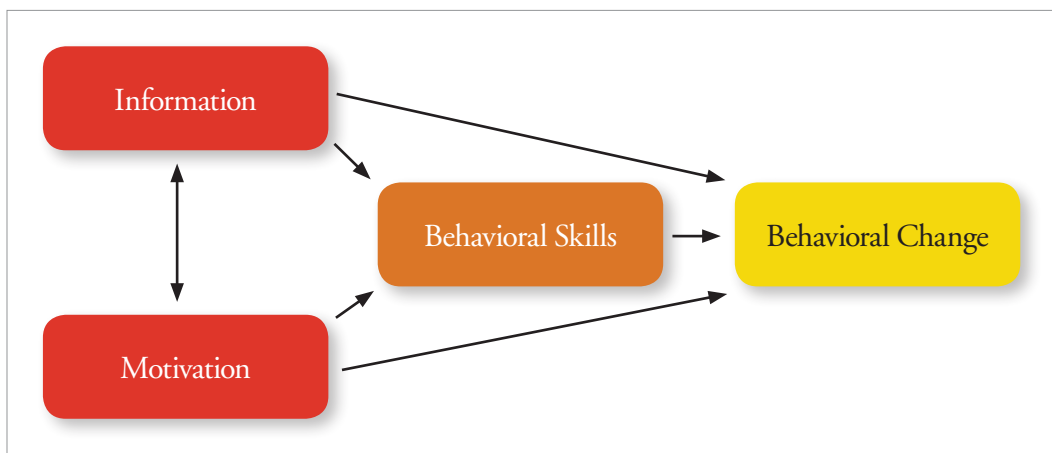


Figure 2. IMB Skills Model, Sourced from WHO (2003) via: http://adultmeducation.com/PatientRelatedFactors_2.html (accessed 14/11/2018).

influencers of adherence to self-care behaviours. Simon-Tuval et al (2016) undertook a study to examine whether the degree of risk aversion is associated with adherence to optimal self-care behaviours in type 2 diabetes in Israel. The study concluded that the more risk averse an individual with type 2 diabetes is, the greater the adherence to optimal self-care behaviours and indicated that those who display more risk-seeking behaviours may require a suitably tailored strategic approach to diabetes self-management.

The study had limitations such self-reported behaviours underpinning the data analysis rather than objective measures and the cross-sectional nature of the study meant that the results may have been time and consequence dependent and not necessarily extrapolatable. Despite this, however, this study provided a novel insight identifying the role that attitude may play in motivating behaviour change. Furthermore, it also used foot self-care behaviours as one of the objective self-care measurement indicators. Aligned with studies by Vedhara et al (2014) and Simon-Tuval et al (2016) looking at illness beliefs and attitudes, respectively, Salamon et al (2012) focussed on these concepts in the context of adolescents with type 2 diabetes to examine whether or not motivations to adhere to and/or change self-care behaviours were age-related. The results of the study indicated that a common motivating factor in adolescent patients was witnessing negative health consequences of friends or family with diabetes.

This study was rigorously conducted though limitations pertaining to study size and short time frame between diagnosis and study participation do impact the trustworthiness of the study. Notwithstanding, adolescent type 2 diabetes patients are a hard to access patient demographic and studies that generate qualitative data from these individuals' is of value. Indeed, the concept of witnessing family and friends' poor health outcomes in diabetes as a motivator for self-care behaviour change is not unique as studies by Vedhara et al (2014) and Scollan-Koliopoulos et al (2012) identified similar findings.

One final factor that emerged among the literature surrounding motivation in self-care behaviour was the concept of self-efficacy. Conclusions of the many of the studies discussed outline 'self-efficacy' as a potential factor that may help to improve the

motivation of individuals with diabetes to adhere to and/or change foot self-care behaviours. However, studies looking to investigate this specifically have found no strong evidence to support that deduction as retrieved studies in this area have heterogenic conclusions. Perrin et al (2009) investigated the relationships between foot-care self-efficacy beliefs, self-reported foot-care behaviour and history of diabetes-related foot pathology in a regional city of Australia. The conclusion of this study was that there was little association or correlation between self-efficacy beliefs and actual foot care behaviour.

Wendling and Beadle (2015) drew very similar conclusions within their US-based study, while in-depth literature reviews by Chew et al (2014) and Matricianni and Jones (2015) identified that key future research is needed to carefully consider what factors contribute to individual diabetes self-care behaviours within specific contexts if there is to be an interventional approach to improve this as a significant advancement in preventative diabetes care.

Conclusion

Considering the available evidence, there is a need to explore patient and healthcare-professional views on barriers and facilitators towards patient foot self-care practices in adults with diabetes at low risk of developing foot complications and if these views may be influenced by patient-healthcare professional communication and/or difference in perspectives. Accordingly, this literature review serves to precede research looking into this specific area of practice. ■

- Bonner T, Foster M, Spears-Lanoix E (2016) Type 2 diabetes-related foot care knowledge and foot self-care practice interventions in the United States: a systematic review of the literature. *Diabetic Foot and Ankle* 7: 29758
- Bus SA, van Netten JJ, Lavery LA et al (2016) IWGDF guidance on the prevention of foot ulcers in at-risk patients with diabetes. *Diabetes Metab Res Rev* 32(Suppl 1): 16–24
- Chew BH, Shariff-Ghazali S, Fernandez A (2014) Psychological aspects of diabetes care: Effecting behavioural change in patients. *World J Diabetes* 5(6): 796–808
- D'Souza MS, Ruppert SD, Parahoo K et al (2016) Foot care behaviors among adults with type 2 diabetes. *Prim Care Diabetes* 10(6): 442–51
- Diabetes UK (2016) *State of the Nation 2016: Time to Take Control of Diabetes*. Available at: <https://bit.ly/2QsdzXj> (accessed 08.01.2019)
- Diabetes UK (2018) *Number of People with Diabetes Doubles in Twenty Years*. Available at: <https://bit.ly/2LWSFPq> (accessed 08.01.2019)
- Dorresteijn JAN, Kriegsman DMW, Assendelft WJJ, Valk GD (2014) Patient education for preventing diabetic foot ulceration (review). *Cochrane Database Syst Rev* CD001488
- Fan L, Sidani S, Cooper-Brathwaite A, Metcalfe K (2014) Improving foot self-care knowledge, self-efficacy, and behaviours in patients with type 2 diabetes at low risk for foot ulceration: a pilot study. *Clinical Nurs Res* 23(6): 627–43

- Freitas SS, da Silva GRF, Neta DSR, da Silva ARV (2014) Analysis of diabetics according to the summary of diabetes self-care activities questionnaire (SDSCA). *Health Sciences* 36(1): 73–81
- Gagvani RM, Poursharifi H, Aliasgarzadeh A (2010) Effectiveness of information-motivation and behavioural skill (IMB) model in improving self-care behaviours & HbA1c measure in adults with type 2 diabetes in Iran-Tabriz. *Procedia Social and Behavioural Sciences* 5: 1868–73
- International Diabetes Federation (2015) *Diabetes Complications*. IDF, Brussels. Available at: <https://bit.ly/2sw7fEE> (accessed 16.01.2019)
- Kerr M (2012) *Foot Care for People with Diabetes: The Economic Case for Change*. Available at: <https://bit.ly/2VXlfUk> (accessed 16.01.2019)
- Li R, Yuan L, Guo X-H et al (2014) The current status of foot self-care knowledge, behaviours, and analysis of influencing factors in patients with type 2 diabetes mellitus in China. *Int J Nurs Sci* 13(3): 266–71
- Matricciani L, Jones S (2014) Who cares about foot care? Barriers and enablers to foot self-care practices among non-institutionalised older adults diagnosed with diabetes. An integrative review. *The Diabetes Educ* 41(1): 106–16
- McInnes A (2010) No consensus between HCPs on diabetic foot care education. *The Diabetic Foot Journal* 13(1): 29–37
- McInnes A, Jeffcoate W, Vileikyte L et al (2011) Foot care education in patients with diabetes at low risk of complications: a consensus statement. *Diabet Med* 28(2): 162–7
- Meunier S, Coulombe S, Beaulieu M-D et al (2016) Longitudinal testing of the Information-Motivation-Behavioral Skills model of self-care among adults with type 2 diabetes. *Patient Educ Couns* 99(11): 1830–36
- NICE (2003) TA60. Technology Appraisal: Diabetes (types 1 and 2) – Patient education models. Superseded by NG17. Available at: <https://bit.ly/2RsVYDQ> (accessed 16.01.2019)
- NICE (2009) *Clinical Guideline 87: Type 2 Diabetes: The Management of Type 2 Diabetes*. Available at: <https://bit.ly/2CZpxnK> (accessed 09.01.2019)
- NICE (2016) NG19: *Diabetic Foot Problems: Prevention and Management*. Available from: <https://bit.ly/2FyF9Sd> (accessed 09.01.2019)
- Neta DSR, da Silva ARV, da Silva GRF (2015) Adherence to foot self-care in diabetes mellitus patients. *Rev Bras Enferm* 68(1): 103–8
- NHS (2011) *National Minimum Skills Framework for Commissioning of Foot Care Services for People with Diabetes*. Available at: <https://bit.ly/2FjjZWM> (accessed 09.01.2019)
- Osborn CY, Egede LE (2010) Validation of an Information-Motivation-Behavioral Skills model of diabetes self-care (IMB-DSC). *Patient Educ Couns* 79(1): 49–54
- Perrin BM, Swerissen H, Payne C (2009) The association between foot-care self efficacy beliefs and actual foot-care behaviour in people with peripheral neuropathy: a cross-sectional study. *J Foot Ankle Res* 2: 3
- Ren M, Yang C, Lin DZ et al (2014) Effect of intensive nursing education on the prevention of diabetic foot ulceration among patients with high-risk diabetic foot: a follow-up analysis. *Diabetes Technol Ther* 16(9): 576–81
- Salamon KS, Brouwer AM, Fox MM et al (2012) Experiencing type 2 diabetes mellitus: qualitative analysis of adolescents & #039; concept of illness, adjustment, and motivation to engage in self-care behaviors. *Diabetes Educ* 38(4): 543–51
- Schmidt S, Mayer H, Panfil EM (2008) Diabetes foot self-care practices in the German population. *J Clin Nurs* 17(21): 2920–26
- Scollan-Koliopoulos M, Walker EA, Bleich D (2010) Perceived risk of amputation, emotions, and foot self-care among adults with type 2 diabetes. *Diabetes Educ* 36(3): 473–82
- Simon-Tuval T, Shmueli A, Harman-Boehm I (2016) Adherence to self-care behaviours amongst patients with type 2 diabetes – the role of risk preferences. *Value Health* 19(6): 844–51
- Singh N, Armstrong DG, Lipsky BA (2005) Preventing foot ulcers in patients with diabetes. *JAMA* 293(2): 217–28
- UK Prospective Diabetes Study (1999) Exploring the Impact of Diabetes UK Research: Available at: <https://bit.ly/2SPPZWB> (accessed 09.01.2019)
- van Netten JJ, Price PE, Lavery LA et al (2016) Prevention of foot ulcers in the at-risk patient with diabetes: a systematic review. *Diabetes Metab Res Rev* 32(Suppl 1): 84–98
- Vedhara K, Dawe K, Wetherell MA et al (2014) Illness beliefs predict self-care behaviours in patients with diabetic foot ulcers: A prospective study. *Diabetes Res Clin Pract* 106(1): 67–72
- Wendling S, Beadle V (2015) The relationship between self-efficacy and diabetic foot self-care. *J Clin Transl Endocrinol* 2(1): 37–41