Depression — the 'elephant in the room' for the under-utilisation of foot self-care in diabetes?

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Key words

- Foot care practices
- Patient and public involvement
- Risk identification
- Risk reduction

Article points

1. Adherence to foot self-care behaviours is a multidimensional phenomenon, determined by the interplay of several factors, including: social and economic, patient-related, health-system-related, and condition-related.
2. Depression is well known to co-exist in many people with diabetes — especially those who have suffered diabetes-related complications, such a foot ulceration and amputation.
3. The co-existence of diabetes and depression appears to heavily influence the likelihood of individuals to undertake self-care behaviour that may help to avert the worst of the diabetes-related complications, such as DFU and amputation.

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Much evidence indicates that foot self-care behaviours, specifically, remain under-utilised in the prevention of diabetic foot ulcers (DFUs). Adherence to care is a multidimensional phenomenon, determined by the interplay of several factors, including: social and economic, patient-related, health-system-related and condition-related factors. Of particular interest and relevance may be the role that depression plays in the context of foot self-care in diabetes, which is discussed in this article. Diabetes-associated depression is well established phenomenon and the prevalence of depression amongst people with diabetes is known to be in the range of 10%–15% — which is twice the rate of people without diabetes. Furthermore, the outcomes for diabetes and depression are worse when they appear together. The mechanisms of their co-existence are multiple and complex and likely involve sociological, psychological and physiological elements. Their co-existence also appears to heavily influence the likelihood of individuals to undertake self-care behaviour that may help to avert the worst of the diabetes-related complications, such as DFU and amputation.

In the UK, there are approximately 5 million cases of diabetes (Diabetes UK, 2022). Of the myriad complications of diabetes, of particular seriousness is the development of diabetic foot ulcers (DFUs). The lifetime incidence rate of a DFU is between 19% and 34%, with a yearly incidence rate of 2%, and they are the leading cause of non-traumatic lower-extremity amputations (Bus et al, 2019). This is of more striking significance when contextualised by the fact there is between a 45% and 57% risk of death within 5 years of a diabetes-related amputation (NICE, 2019; Armstrong et al, 2020). With appropriate disease management and effective self-care behaviours, many complications, including DFUs, are deemed to be entirely avoidable (Ren et al, 2014; Bus and van Netten, 2016; NICE, 2019; Bus et al, 2019).

While the role of the clinician in helping patients to effectively manage their diabetes remains a crucial aspect of diabetes care, the International Working Group on the Diabetic Foot (IWGDF) has cited good foot self-care behaviours as a key approach to prevent the development of DFUs (Bus et al, 2019). Despite this, a large integrative review identified that healthcare professionals (HCPs) frequently report that foot self-care behaviours are not undertaken consistently enough by people with diabetes (Matricianni and Jones, 2015). Given the harms and costs associated with diabetic foot disease, all approaches that may help to reduce

the incidence and prevalence of this require urgent investigation — not least efficacious and cost-effective measures like appropriate foot self-care behaviours. Among a multitude of possible factors that impact upon the undertaking of self-care behaviours (including foot self-care), the role of depression has come under increasing focus as its association with diabetes continues to be increasingly understood (Sartorius, 2018). The aim of this article is to explore the literature around the relationship between diabetes, depression and self-care in the context of the foot in diabetes and to shine a light on what could be one of the single biggest issues affecting self-care in diabetes.

Self-care behaviours

Self-care management has been defined as the capacity of the individual in managing the symptoms associated with a chronic condition through physical activity, psychosocial approaches and lifestyle changes (Tuncay and Avci, 2020). The purpose of this is to ensure that individuals can sustain their wellness as much as possible. In diabetes, self-care is a well-established facet of achieving optimal disease management and clinical outcomes because most of the day-to-day care and management of the disease is handled by patients and/or their families (Shrivastava et al, 2013).

The American Association of Diabetes Educators (2008) identified seven essential self-care behaviours in diabetes which predict good outcomes, viz.: healthy eating; being physically active; monitoring of blood sugar; compliance with medications; good problem-solving skills; healthy coping skills and risk-reduction behaviours (which includes reducing risk of foot ulceration via good foot care).

Foot self-care behaviours typically identified as what people with diabetes should be encouraged to undertake regularly include: 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 professional advice in relation to foot care behaviours (McInnes et al, 2011; Fan et al, 2014; Bonner et al, 2016; Bus et al, 2016; NHS, 2018; Diabetes UK, 2022). While this represents the optimal approach to self-care in the context of foot disease in diabetes, the pertinent question is to what extent these behaviours are typically undertaken and adhered to?

Self-care adherence

Much of the evidence indicates that foot self-care behaviours, specifically, remain under-utilised in the prevention of DFUs (Perrin et al, 2009; McInnes et al, 2011; Shrivastava et al, 2013; Freitas, 2014; Matricianni and Jones, 2015; Neta et al, 2015). Mogre et al (2019) undertook the only large systematic review to date that specifically looked at foot self-care behaviours within a range of self-care practices in diabetes to determine how well they were adhered to. Their systematic review of 72 studies included 10 that specifically looked at foot self-care behaviours in a pooled population of over 1,600. The findings of this systematic review were that only 40% of people with diabetes undertake regular foot inspections and a much lower 10% met the criteria of having "good" foot self-care practices. These numbers compared with median adherence rates of 58% for diet; 71% for medication taking and 41% for exercise behaviours, respectively. While this systematic review was limited to low- and middle-income countries, the findings were largely consistent within the literature that reported on foot self-care behaviours in many different countries, including high-income ones too (Schmidt et al, 2008; Perrin et al, 2009; McInnes et al, 2011; Freitas, 2014; Neta et al, 2015).

Adherence to care is a multidimensional phenomenon, determined by the interplay of several factors, including: social and economic, patient-related, health-system-related and condition-related factors (World Health Organization [WHO], 2003; Kardas et al, 2013). Within the literature, each of those factors appear to be frequently captured in the context of foot self-care in diabetes. Social and economic factors often concern limited health literacy, socio-economic status and social support of patients with foot problems in diabetes (Vedhara et al, 2014; D'Souza et al, 2016; Price, 2016); patient-related factors involve the person's existing knowledge, skills, and beliefs around their illness and the benefits of care (Gale et al, 2008; Beattie et al, 2014; Chithambo and Frobes, 2015; Guell and Unwin, 2015; Hill and Dunlop, 2015); the health-system-related factors include patient experiences of the health service and HCP interaction (Anders

and Smith, 2010; Marchand et al, 2012; Delea, 2015; Coffey et al, 2019); and condition-related factors most commonly appears to be co-existing depression commonly seen in diabetes (Gonzalez et al, 2008; Gharaibeh et al, 2016). While depression and diabetes have long been recognised as often co-existing, the potential role of depression as a major factor impacting upon self-care behaviours has been relatively unexplored. However, this potentially is a crucial aspect to consider if strategies aimed at improving the uptake and maintenance of good self-care behaviours in diabetes are to be effective.

Depression and diabetes — the 'elephant in the room'?

Diabetes-associated depression is well established phenomenon and the prevalence of depression amongst people with diabetes is known to be in the range of 10%–15% — which is twice the rate of people without diabetes (Lloyd et al, 2012; Bădescu et al, 2015; Semenkovich et al, 2015; Sartorius, 2018). A meta-analysis and systematic review of depression and mortality in individuals with diabetes found that not only are the outcomes of depression and diabetes worse when they appear together but that the presence of depression is linked to higher rates of complications in diabetes, to more disability and to loss of years of life (Park et al, 2013; Sartorius, 2018). This was most clearly shown in the large, seminal study by Egede (2004) of 30,022 adults in the USA, which showed that the risk of functional disability in people with diabetes was 2.42 times higher than in people who did not have diabetes; that in people with depression alone, it was 3 times higher than in people without depression; and that the risk for those who had depression and diabetes, the risk was 7.15 times higher than in people who did not have depression or diabetes.

In the context of DFUs, Jiang et al (2022) published a meta-analysis looking at the co-existence of depression and DFUs and found that from 11 studies with a total of over 2,000 participants, almost half (47%) of all those who had a DFU also had depression. While this meta-analysis was not able to identify causality in these observations — nor was it intending to — plausible reasons for the co-existence of depression and DFU were offered by Jiang et al. These included: long treatment course and recurrence of DFUs; mobility disorders; and economic burden of hospitalisation. Furthermore, there is strong evidence that complications of diabetes (such as foot ulceration and amputation) significantly increases the risk of depression (Sartorius, 2018).

Another plausible reason that the co-existence of depression alongside diabetes is associated with poorer health outcomes in diabetes is that it may affect self-care behaviours. A meta-analysis of 47 studies looking at the link between diabetes, depression and adherence to treatment regimens found that the co-presence of depression and diabetes increases the likelihood of poor self-care (including lacking in physical exercise, non-adherence to diet, irregular intake of medications for any purpose) (Gonzalez et al, 2008).

While none of the studies included within that meta-analysis provided conclusive evidence that the relationship between depression in diabetes and poorer self-care is causal, plausible mechanisms have been identified that could imply causality. These are: increased likelihood of withdrawal from society (including healthcare appointments); reduced levels of motivation; reduced coping ability and lower self-efficacy (Owens-Gary et al, 2019). These factors were all identified as the likely connection between depression and an associated reduction is self-care in a systematic review and meta-analysis of behavioural determinants of glycaemic control in type II diabetes (Brown et al, 2016).

Self-efficacy is an individual's beliefs about their capabilities to do what it takes to reach a specific goal (Bandura, 2010). It is activity specific and along with outcome expectation (belief that behaviour will have the desired effect), self-efficacy appears to influence behaviour (D'Souza et al, 2017; Sharoni et al, 2017). Thus, this concept emphasises not the actual state of an individuals' skills, but their judgment of what they believe they can do. Therefore, in the context of depression where beliefs in one's abilities and outcome expectations are often pessimistic, this potentially articulates part of the reason why

self-care appears poorer where depression is present (Devarajooh and Chinner, 2017).

Alongside this complex interplay of factors, depression may also impact self-care through how this affects their relationships with others — especially their HCPs. Patients with increased levels of depression have been shown to report more dissatisfaction with their providers citing decreased empathy and poor patient-provider communication as well as a perceived reduction in their continuity of care (Gonzalez et al, 2008; Price, 2016; Coffey et al, 2019).

One other intriguing concept relating to the role of depression in diabetes and self-care is that of a neuro-chemical nature. Serotonin (or 5-hydroxytryptamine [5-HT]) is a monoamine neurotransmitter and its biological function is complex and multifaceted but is known to modulate mood; cognition; reward; learning and memory among other things (Young, 2007). Though a causal link between serotonin depletion and depression remains unsubstantiated and even challenged, increased serotonin levels are typically associated with improved mood and a reduction in symptoms of depression (Cowen and Browning, 2015).

Prabhakar et al (2015) observe that in diabetes, depletion of brain monoaminergic activity (specifically the serotonin (5-hydroxytryptamine [5-HT]) system) may lead to the mood and behavioural complications that further add on worsening the quality life years. This infers one potential direct link between diabetes and depression on a physiological level, but what is more, serotonin levels appear to be closely associated with social status too (Ridley, 2000).

Given that socioeconomic status (SES) is comprised in no small part by ones social status (real or perceived) and lower SES appears to be associated with type 2 diabetes development and depression (Wang et al, 2010; Agardh et al, 2011) this could suggest a common, physiologic link between all three, well-associated phenomena. This could indicate that the some of challenges of self-care in diabetes emerge from a deeper physiologic place and this may require different considerations and approaches to tackle.

It is important to recognise that many factors have been posited that seek to explain the connection between diabetes and depression and it is likely the exact relationship is complex, nuanced and bi-directional (Alzoubi et al, 2018; Sartorius, 2018). Indeed, common risk factors for both conditions are probable factors that explain away at least part of the story. These common risk factors include formative childhood experiences; cell-mediated cytokine production; endothelial dysfunction and genetic factors (Sartorius, 2018). Despite this seeming complexity to this issue, there is strong evidence that physical activity can be a significant ameliorating factor for diabetes-related depression, further supporting the call for increased self-care as a key approach to mitigating the risks of diabetes complications, including foot ulceration (Schuh et al, 2016; Narita et al, 2019).

Conclusion

Depression is well known to co-exist in many people with diabetes — especially those who have suffered diabetes-related complications, such a foot ulceration and amputation. Furthermore, the outcomes for diabetes and depression are worse when they appear together. The mechanisms of their co-existence are multiple and complex and likely involve sociological, psychological and physiological elements. Their co-existence also appears to heavily influence the likelihood of individuals to undertake self-care behaviour that may help to avert the worst of the diabetes-related complications, such as DFU and amputation. Thus, this remains a crucial area for further research to help understand the underpinning mechanisms that link them together and to help develop strategies to tackle them. ■

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