

What are the treatment experiences, motivations and barriers to concordance in patients treating their diabetic foot disease with a removable aircast walker?

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- Diabetic foot ulcer
- Patient experience
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- Treatment concordance

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Diabetic foot ulcers (DFUs) are distressing and costly disease complications associated with elevated morbidity and healthcare costs. Staff at two diabetes foot clinics wanted to better understand the factors that affect patient concordance with offloading devices while recovering from DFUs. Eleven patients were interviewed who used removable offloading aircast walkers (RCW). Their experiences revealed five primary themes that mapped onto a health belief model. While their primary motivation for wearing an RCW was the fear of a worsening foot condition, this motivation was mediated by psychosocial factors that often meant RCWs were removed for prolonged periods. The analysis suggests there are opportunities for staff interventions that work in partnership with patients to promote concordance and optimise treatment outcomes.

The National Institute for Health and Care Excellence (NICE, 2016) recommends plantar pressure offloading casts as primary treatments for diabetic foot problems. Total contact casts (TCC) and removable offloading aircast walkers (RCW) are the gold and silver standard treatments, respectively. These treatments can heal diabetic foot ulcers (DFUs) at 12 weeks in 90% of people when worn (Bus et al, 2016). Patients do not always tolerate gold standard TCCs because they are non-removable and the silver standard RCW is, therefore, preferred (Health Quality Ontario, 2017; Crews et al, 2016). An Australian podiatrist survey found that 62–73% of people with a DFU were treated with RCW (Raspovic and Landorf, 2014).

Numerous studies have compared TCC with RCW. The current evidence is equivocal reporting TCC to be more effective (Elraiyyah et al, 2016; Health Quality Ontario, 2017), or finding no significant differences between the casts in terms of healing rate (Faglia et al, 2010; Morona et al,

2013). Two studies that measured the step count of people wearing a RCW found that between 28% and 66% of daily activity was taken with the RCW on, indicating that between one third and two thirds of the time people weight bear without their RCW, which can delay the healing process (Armstrong et al, 2003; Crews et al, 2016). It has been suggested, therefore, that patient behaviours influence the effectiveness of TCC over RCW. Studies have examined healing rates and outcome measures, but little attention has been given to the psychosocial influences of RCW use (Raspovic and Landorf, 2014).

Staff in two specialist diabetic foot clinics were aware of RCW concordance challenges among their patients and recognised that a better understanding of patient experiences may provide opportunity to ameliorate barriers and promote treatment concordance. This paper explores patient experiences that were gathered and analysed as part of an educational qualification for author AY. Permission was granted to undertake this practice

development initiative from the clinical lead of the services (author Natasha Patel [NP]) and from educational supervisors.

Methods

The study aimed to explore the experiences of patients living with diabetes when using a RCW, and to investigate the psychosocial and physical health challenges faced by patients when wearing their RCW. Consecutive patients attending daily foot health clinics were invited to contribute their views by their podiatrist. A total of 17 interested patients were then given a patient information sheet and consent form by author Annabel Yip Lan Yan (AY). The information sheet clearly identified that this was a student project and that patient confidentiality and anonymity would be assured. Eleven patients were interviewed, all of whom were over 18 years of age with type 1 or 2 diabetes, had used RCW to treat diabetic foot disease within the past 2 years (DFUs and Charcot's foot), and were able to converse in English. Patients who were using a RCW for reasons other than diabetic foot disease (e.g. for a broken ankle) were not interviewed.

The interview schedule was informed by interactions with patients in clinic and from the literature. It consisted of open-ended questions, with specific probes to invite description and explanation. Patients were asked about their understanding of the RCW and its impact on their lives in terms of their health beliefs and attitudes towards their RCW, how others perceived their use of a RCW (subjective norms), their social support and any emotional or physical health challenges associated with the treatment. A pilot interview was conducted by the project lead and clinical specialist to ensure face validity of the schedule, following which no changes were deemed necessary.

Each interview lasted for about 30 minutes and was conducted face-to-face in the clinic setting between February 2017 and April 2017. Interviews were audio-recorded and transcribed with patient-identifiers removed. NVivo11 was used to store and analyse the data, which followed Braun and Clarke's (2006) six-phase method. The first transcript was read by two researchers who coded key elements of meaning, which could be grouped into themes. For example, "I wear it more when I notice it really helps me" would be coded under "motivation for

wearing the aircast walker". The coding frame was then used to analyse the remaining 10 transcripts, which allowed all data to be grouped under relevant themes.

Results

Table 1 presents participant characteristics. An RCW had been worn for between 1 week and 3 years and a majority of the sample ($n=7$) had previously used a TCC. Eight of the patients were men and the majority described their ethnicity as White British ($n=7$). Analysis of the interviews revealed five primary themes.

Theme 1: factors affecting decision making

Some participants put their RCW on first thing in the morning and took it off last thing at night. Reasons for removing an RCW during the day included for bathing, changing clothes, or resting with their foot elevated inside the house. Some never wore it at home opting instead for house slippers or even going barefoot. These patients believed they would not damage their foot inside their own house. For example, a sample quote was: "When I am at home, I don't walk much, just like something to eat, and go to bed, so I don't think I am hurting my feet at home" (P11).

In contrast, the majority reported that if they knew they would be walking outside, especially for long distances, then they would be sure to put it on. At work, the RCW tended not to be an issue with office jobs, but active jobs proved to be more difficult. Some suggested that its weight could make them tired. Occasionally, they felt pressure from managers not to wear it: "Because I was under pressure at work not to wear it around, because the manager didn't like it. It was just a work thing. It would cause a problem because it would cause questions" (P2).

Theme 2: education

All participants felt well informed about how their treatment would aid the healing process by their foot care team. Many were able to describe the functions and benefits of a RCW. One explained "that it supports the foot and it offloads and isolated the foot from being in contact with the ground and controls it. It also improves the healing process" (P5).

Article points

1. Removable aircast walkers (RCW) are the most tolerated and most often used treatment for healing diabetic foot ulcers, but patients remove them too often.
2. Little attention has been given to psychosocial factors that influence patient decisions to wear a RCW.
3. Motivations to follow a treatment regimen are mediated by other factors, some of which are amenable to staff interventions.
4. The authors recommend the development of a psycho-educational intervention with peer support to help patients concord with RCWs for longer periods.

Table 1. Participant characteristics.

Participant ID	Age	Gender	T1/T2DM	Ethnicity	Employment status	Diabetic foot ulceration (DFU)/Charcot	Length of time in RCW	Previously in a TCC	Significant comorbidities
P1	63	Male	T1	White-British	Retired	DFU	8 months	Yes	Amputated left middle finger, amputated left third, fourth and fifth toes
P2	53	Male	T2	Black-Caribbean	Employed full-time	DFU	1 month	No	Retinopathy, amputated left second and third toes
P3	45	Male	T1	White-British	Employed full-time	DFU	2 1/2 years	Yes	Osteomyelitis, amputated left third, fourth and fifth toes
P4	51	Male	T2	White-British	Retired	DFU	1 month	Yes	Perioperative neuropathy
P5	66	Male	T2	White-British	Retired	DFU	3 years	Yes	Perioperative neuropathy, obesity, hypertension
P6	52	Female	T2	Black-Caribbean	Unemployed	Charcot	5 months	Yes	Chronic kidney disease stage 4, retinopathy, obesity, hypertension
P7	32	Male	T1	White-British	Employed full-time	DFU	1 week	No	Peripheral neuropathy
P8	44	Male	T1	Asian	Not working	DFU	3 months	Yes	Right transmetatarsal amputation, peripheral neuropathy, macular degeneration, glaucoma, heart failure, anaemia
P9	63	Female	T2	White-British	Retired	Charcot	6 months	No	Peripheral neuropathy
P10	56	Male	T2	White-British	Not working	DFU	3 months	Yes	Peripheral neuropathy, hypertension, congenital left hand deformity, obesity
P11	31	Female	T1	White-other	Employed full-time	DFU	2 years	No	Retinopathy, hypothyroidism, chronic kidney disease stage 3, splenomegaly, infective myositis

This information convinced some to adhere consistently to their treatment. Indeed, one participant was told that keeping her RCW on would prevent her from losing her leg. However, as outlined above, others took it off on occasion, despite being informed that they should keep their RCW on all the time.

Many participants expressed an interest in interacting with other patients who also wore a RCW. They would have liked to have heard other people's experiences before beginning their own treatment.

Theme 3: gait, balance and weight

A frequently raised topic by participants was the imbalance in height between their normal shoe and

the elevated RCW, which resulted in balance issues and affected many participants' gait, even causing hip pain for some. Certain participants found solutions in the form of elevated shoes or insoles. Others ignored the issue completely and forced themselves to adapt their gait and endure the pain.

Weight was another aspect of a RCW that prompted discussion. For many, weight was a problem initially and although they adapted, it could still be difficult to deal with when they felt weak. The distance the patients could walk varied. Some stated they would walk the same distance with or without the RCW, but others could not walk for more than 20 metres without a break.

"If I've got to walk further than 10 or 20 metres then I need to make sure there's somewhere to sit

down so I can rest ... wait till the ache in my back has gone, or wait till I get my breath back, then carry on" (P5).

Theme 4: motivations

Many participants acknowledged the inconveniences of a RCW, but accepted that the benefits of keeping it on outweighed the disadvantages. The word persistence cropped up often. There were participants for whom the RCW caused pain but, nonetheless, they endured it.

"It's for my benefit, and it's also for people here's benefit. If I'm not doing what they tell me to do and I keep on coming back and it's getting worse and worse ... It must be as frustrating for them as it is for me" (P10).

The main motivation for enduring a RCW was to prevent further damage to the foot. Protecting the wound was crucial when deciding whether to put the RCW on in the morning. This included both physical and psychological protection. Many believed that keeping their RCW on would stop them from losing parts of their foot or leg. One participant stated: "Because I want to do everything I can to help the ulcer to heal as quickly as possible. There's been all kinds of suggestions about amputations or partial amputations and so on. If it comes to that, it comes to that. But I'm going to do all I can to avoid it! So, I do what I'm told to do!" (P10).

Another common motivation for keeping the RCW on was the physical support that it provided. Most participants acknowledged that they were at a greater risk of falling due to their diabetic foot disease and, for many, the RCW was helpful to reduce that risk: "I never tripped or fell. In fact, I found that I was well supported, and I would say that you're more stable in an aircast than not having an aircast" (P5).

Theme 5: coping in public places

Many participants used public transport and their experiences of wearing their RCW during rush hour provided mixed responses. For some, if it was too crowded and they could not board the transport, but others felt that the RCW provided more security: "The boot gave me confidence during rush hour. People did kick and step on the hard plastic and, yeah, it offered a high level of

protection rather than the other shoe. That's the main reason" (P8).

Some removed their RCW as it was easier to navigate public transport without it. Others avoided public transport altogether finding it too tiresome, preferring to drive or use hospital transport. The visibility of the RCW played a large part in how the public responded to participants. A consensus was expressed that exposing the RCW helped people notice it and get out of the way or offer up their seat. Some participants wanted to make it visible, to receive such help: "If they're visible, lots of people respond. Whereas if they're not visible, they don't respond" (P1).

Conversely, a couple of participants perceived themselves as more disabled when wearing their RCW, in the literal sense that their foot was locked in one position: "It gives you a disability in the fact that it's more cumbersome. A literal disability, you can feel it's different. It's like being in a wheelchair" (P8).

Most of the interactions between participants wearing their RCW and the public occurred on public transport. Numerous positive encounters were described and the difficulties were mostly due to the bulky nature of the RCW.

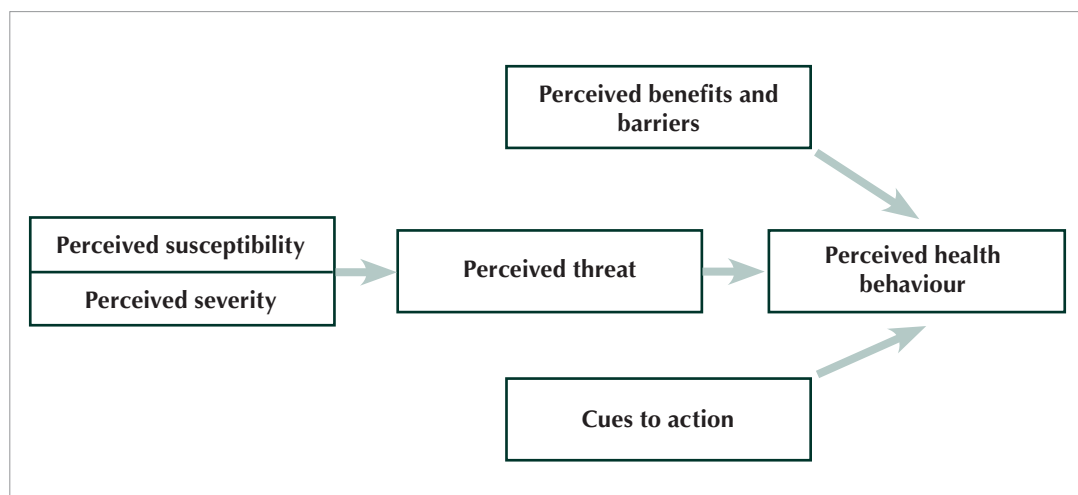
Discussion

Main findings

This evaluation of RCW use at two diabetes foot clinics revealed that participating patients were well educated by clinicians in terms of how the RCW works and protects their ulcers. Most patients agreed that they would wear a RCW when they knew they would be walking a long distance. However, patients tended to feel safe at home where they took off their RCW, assuming this would not harm their ulcers. Some patients felt forced to take off their RCW at work because their type of job created difficulties or because of pressure from their colleagues/managers.

Certain participants were wary of public transport and purposefully took their RCW off for such journeys. It was found that RCW affected gait, mainly because of the resulting height imbalance. There was evidence of gaps in knowledge about how to deal with these challenges. Though some patients found their own solutions and eventually adapted,

Figure 1: The Health Belief Model.



the findings suggest advice needs to be given at an earlier stage to overcome such difficulties.

Findings compared to wider literature

These results substantiate previous findings that people with prior foot ulceration tended to wear their RCW less at home than when away from home (Waijman et al, 2013). Patients with or without DFUs who have or at risk of a diabetic leg ulcer have also been found to be more active at home than away from home (Crews et al, 2017). Moreover, previous research by Armstrong et al (2003) identified that only 30% of patients wore their RCW for more than half of their total daily activity. The authors' findings suggest possible psychological reasons for these interruptions in treatment concordance. The Health Belief Model (Figure 1) is useful in these respects and provides a psychosocial framework to understand patient health behaviours, including diabetes self-management (Becker and Maiman, 1975).

The fear of a worsening foot condition, with possible amputations, was a primary reason for wearing the RCW (perceived threat). However, this motivation was mediated by other potential advantages and disadvantages that patients weighed up in their decision to wear their RCW or not (perceived benefits and barriers). Although patients understood the nature of their condition and treatment, they often took their casts off at home where they felt safe (cue to action). Some practical barriers also generated cues to action, such as the weight of a RCW and associated restrictions on mobility. This health belief analysis suggests

that for these patients there are opportunities for interventions that may promote treatment concordance. For example, exploring patients' use of their RCW, emphasising the importance of continued use and problem-solving any barriers and associated cues to action. In this respect, patients should be informed about the best shoes to wear on their unaffected foot to match their RCW and there should be regular reviews of any hip pain encountered because of a differential gait. The patients in this study remind us that pain should be anticipated and prevented before it occurs.

Strengths and weaknesses of the study

To the authors' knowledge this is the first study of its type that has qualitatively explored patients' treatment of their diabetic foot disease with RCW. It provides local evaluative data that can be used by the patients' clinicians to review and adjust practice. However, the data originates from interviews with only 11 patients in one geographical location. Additionally, the sample did not reflect the hospital's catchment area population, which has a much larger proportion of black, Asian and minority ethnic groups. Johnson et al (2014) has noted that different ethnic groups have different diabetes-related health behaviours. The convenience sampling method also relied on volunteers who were willing to discuss their use of the RCW. They may not be representative of all patients who use RCW.

Recommendations for research and clinical practice

This local evaluation suggests this is an important

area for further study. Formal research could be used to validate and elaborate these findings, and to assess the value of potential interventions to support patients to wear their RCW for longer. In this respect, the authors recommend the development of an educational intervention to support patient concordance including peer support. Although it is not possible to generalise these findings, other healthcare professionals who provide RCW care may want to explore the views and concerns that patients have about their RCW. Circumstances and challenges differed from patient to patient in this study and advice needs to be individually tailored.

Conclusion

A preference for RCW over TCC is understandable given the relative flexibility that RCW afford. However, the risk is that they may be used sub-optimally with consequences for the patient's own health and associated healthcare costs. Barriers to concordance are also understandable with some psychosocial factors outweighing a patient's primary desire to avoid further health complications including possible amputation. It is believed that this study reveals opportunities to ameliorate negative action cues in partnership with patients and thereby enhance the quality and effectiveness of the treatment they receive. ■

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