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Review

Overcoming barriers to self-management: The person-centred diabetes foot behavioural agreement.

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ABSTRACT

Objective: Behavioural agreements have been proposed as a clinical strategy for improving concordance with diabetes foot self-management practices, both for individuals 'At-risk' of, and with active, diabetes foot disease. This narrative review sought to explore the potential supportive role of person-centred diabetes foot behavioural agreements in promoting protective foot self-management behaviours among 'At-risk' individuals.
Conclusions: Healthcare professionals (HCPs) involved in diabetes foot risk stratification and management dedicate considerable time, effort and resources to the prevention of diabetic foot ulcers (DFU) and lower extremity amputation (LEA) and are uniquely placed to deliver person-centred diabetes self-management education and support (DSMES) interventions. Written, verbal and non-verbal agreements are consistent with a wider global move toward DSMES approaches, respectful of people's preferences, and supporting them to undertake protective self-care behaviours.
Practice implications: It is theorised that clear communication of the roles of the person with diabetes, their family or carers and HCPs may improve concordance with self-management behaviours. Rather than a punitive measure or means of facilitating discharge of 'non-concordant' individuals, person-centred behavioural agreements should be framed positively, as a means of delineating, prescribing and supporting individual diabetes foot-care responsibilities. This is an area worthy of further research.

1. Introduction

By promoting timely self-recognition of the early signs of diabetes foot disease and self-referral to specialist diabetes foot services, the severity of diabetes foot disease may be reduced [1,2]. Annual diabetes foot screening has become standard practice within the National Health Service (NHS), allowing risk stratification and tailoring of diabetes foot education and podiatric management. Throughout the United Kingdom (UK) diabetes foot patient education is supported by patient information and advice leaflets [3,4]. This terminology is problematic, however, both in its use of the term 'patient' and focus on 'education,' 'information' and 'advice.'

While both patient- and person-centred approaches place the individual, and often families and care-givers, at the centre of healthcare decisions, person-centred care considers the needs and desires of individuals beyond their 'patient' role. A further semantic challenge is the traditional language of 'education' and 'advice,' implying that self-foot care is a recommendation or choice rather than an agreed course of action. Self-foot inspection should be prescribed not advised. By handing a person with diabetes a written information leaflet, even with verbal reinforcement, this does not constitute an agreement between parties to actually undertake foot inspection or to contact relevant Healthcare Professionals (HCPs) in the event of signs or symptoms consistent with diabetes foot disease.

Reliance on terms like 'education,' 'information' and 'advice' further betray a focus on functional health literacy skills, or *knowledge*, over the interactive and critical skills essential for *action*. This review seeks to explore the concept of diabetes foot education and advice further, proposing future person-centred approaches that address, not only education, but also support people with diabetes to develop the skills and abilities necessary for daily self-management. These skills and abilities primarily concern either self- or assisted-foot inspection and prompt referral to specialist services in the event of signs of diabetes foot disease.

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2. Diabetes self-management education and support

While diabetes self-management education (DSME) and diabetes self-management support (DSMS) programmes have historically been defined as separate entities [5], recently Beck et al. [6,p. 301], proposed a combined definition for diabetes self-management education and support (DSMES) as *"the ongoing process of facilitating the knowledge, skills, and ability necessary for diabetes self-care, as well as activities that assist a person in implementing and sustaining the behaviours needed to manage his or her condition on an ongoing basis, beyond or outside of formal self-management training."*

Previous DSMES programmes have demonstrated enhanced coping [7], empowerment and self-efficacy [8], improved quality of life (QoL) [9–13] and reduced rates of depression [14,15] and diabetes-related distress [16,17] among individuals with type 2 diabetes (T2DM). Improved adherence to diet and physical activity targets [18] and a reduction in glycosylated haemoglobin (A1C) [9,16,19–25] may also limit the onset and severity of diabetes complications [26,27] for individuals receiving DSMES.

2.1. Health literacy

This combined DSMES concept bears striking similarities to Nutbeam's [28] multidimensional health literacy framework, describing a continuum of progressively more challenging functional, interactive and critical health literacy skills (Table 1). Health literacy has been positively associated with treatment adherence, particularly non-medication adherence [29]. Understanding the signs of diabetes foot disease requires functional health literacy skills, or the ability to *"apply literacy skills to health-related materials"* [30,p. 537]. In their 2015 survey, Rowlands et al. [31] reported 43% of 5 795 English adults studied possessed insufficient literacy skills while 61% of 4 767 English adults had insufficient numeracy skills to routinely understand health information.

While evidence is currently lacking for specific educational approaches in primary DFU prevention, a joint negotiated consultation style and family and social networks play key supportive roles in health information seeking behaviours [32]. Without first ensuring understanding, efforts to promote active engagement with personalised care planning, including mutually-agreed goal setting, are perhaps destined to fail [33]. Checking feet daily, however, demands more than just an understanding of the principles of foot inspection. Knowledge of foot inspection practices is, undoubtedly, the first step towards behavioural change but not the only relevant factor.

To undertake the daily task of self-foot inspection and timely communication of abnormal findings with family members, carers or HCPs requires interactive health literacy skills, *"needed to extract and understand information from various sources,"* and critical health literacy skills, allowing individuals to *"critically assess information and apply it to make health-related decisions"* [34,p. 3]. Crucially, assistance may be required from a partner, friend, family member, carer or HCP to support daily foot inspection, communicate with specialist services and attend podiatry and associated appointments.

2.2. Diabetes foot self-management education and support:

Traditional diabetes foot education initiatives are weighted towards informing people with diabetes of the signs and symptoms of diabetes foot disease. Clinical signs and symptoms are usually presented within the context of new ulceration or infection but may also be appropriate for early signs of Charcot neuroarthropathy (CN). Imparting *knowledge* is only part of the story, however. Timely specialist management, associated with improved clinical outcomes for both diabetic foot ulceration (DFU) [2] and CN [1], is more reliant on the *actions* of individuals in recognising relevant 'danger signs.'

In isolation, DSME strategies have not robustly demonstrated lasting

Table 1
Integrating health literacy and diabetes self-management education and support (DSMES) frameworks for diabetes foot self-management [5,6,28,40,50,51].

Health literacy level		Educational goal	DSMES principal	Desired outcome
1	Functional health literacy	Communication of information	Facilitating knowledge of self-management behaviours and skills	Improved knowledge of diabetes foot risk, self-foot care practices and podiatry services
2	Interactive health literacy	Development of personal skills	Facilitating self-management skills and active collaboration with HCPs	Daily self-foot inspection and timely recognition and self-referral in the presence of signs and symptoms of diabetes foot disease
3	Critical health literacy	Personal and community empowerment	Empowering individuals to implement and sustain self-management behaviours	Improved capacity to continually monitor and critically assess foot status and contact podiatry services if required

improvements in diabetes foot knowledge or self-management behaviours or a reduction in DFU or lower extremity amputation (LEA) rates [35]. Complex interventions have similarly failed to demonstrate effectiveness [36]. In their 2013 review of diabetes self-care behaviours, Shrivastava et al. [37,p. 3]. Recommended HCPs *"begin by taking time to evaluate their patients' perceptions and make realistic and specific recommendations for self-care activities."*

Diabetes foot education initiatives have historically prioritised education (DSME) over support (DSMS). To illustrate this concept, diabetes educators involved in the education and management of individuals with diabetes routinely dispense advice concerning daily self-foot inspection and assessment. We routinely screen for the ability to self-care with or without assistance but do we truly consider individual preferences in how daily foot inspection will be achieved? For those with unhindered mobility and adequate eyesight, routine foot inspection may be readily incorporated into daily diabetes self-care. For individuals with limited mobility, retinopathy or other causes of visual impairment, daily foot inspection may prove more challenging, however. These individuals typically require additional support from a partner, friend, family member, carer or HCP.

Failure to effectively self-monitor may lead to more complex diabetes foot disease, unrecognised progressive infection and may ultimately precipitate LEA. At each step of this cycle, it is the patient, family member or carer who is most likely to recognise 'danger signs' first, being responsible for 98.8% of daily foot assessments for a typical 'High-risk' individual (Table 2). This assertion is supported by the work of Baba et al. [38] who found 68% of diabetes foot issues were self-identified by people with diabetes compared with only 9% for HCPs and Jordan and Jordan's assertion [39] that 98% of diabetes management concerns self-care.

Effective DSMES approaches may improve self-recognition and self-referral by providing supportive education sensitive to individual's *"health beliefs, cultural needs, current knowledge, physical limitations, emotional concerns, family support, financial status, medical history, health literacy, numeracy, and other factors that influence each person's ability to meet the challenges of self-management"* [40,p. 1372]. Diabetes Educators must move away from simply focussing on 'education' and 'advice' to supporting individuals to achieve effective self-management.

2.3. The person-centred diabetes foot behavioural agreement

Behavioural agreements have been explored as a means of promoting treatment adherence within a range of health contexts, primarily addiction, hypertension and weight management, however evidence of effectiveness remains limited [41]. Litzelman et al. [42] incorporated behavioural agreements into their study of 352 people with T2DM, receiving a 12-month complex diabetes foot education intervention. Behavioural agreements specified desired self-foot care behaviours and were reinforced verbally over the telephone and in writing with postcard reminders. Individuals receiving this complex intervention were significantly more likely to self-report protective self-care behaviours and presented with less severe foot disease.

While not providing definitive evidence of efficacy, this study suggests positive effects may be achieved, in terms of self-foot care and outcomes, with regularly reinforced diabetes foot behavioural agreements. Several authors have recently championed behavioural agreements for individuals 'At-risk' of diabetes foot disease [43] or with chronic DFUs [44], particularly among those with a history of non-adherence or suspected comprehension difficulties. Crucially, potential benefits associated with such agreements do not rely on fear of punitive repercussions in the event of non-adherence, such as discharge from a service.

Furthermore, diabetes foot behavioural agreements do not necessarily need to be in writing, though this may be preferable. While a verbal or non-verbal, i.e. handshake, agreement may be preferred by some, particularly individuals with lower literacy skills, written information may help reinforce the precise signs each individual, or their carer, should look for and detail relevant contact information. An example 'At-risk' person-centred diabetes foot behavioural agreement is included as Table 3.

Table 2
Example annual 'High-risk' diabetes foot management schedule.

Calendar weeks (/52)	Foot check: individual or caregiver (days)	Foot check: podiatrist (days)
01–12	83	1
13–24	83	1
25–36	83	1
37–48	83	1
49–52	28.7	0.3
Total days (%): 365 (100%)	360.7 (98.8%)	4.3 (1.2%)

Table 3
Example 'At-risk' person-centred diabetes foot behavioural agreement.

Title: Our diabetes foot care agreement
Date: 19th October 2018

☐ Today we discussed the importance of applying foot cream and checking my feet daily for signs of foot injury or new redness, heat, pain, swelling, discharge or odour.

☐ If I am unable to see the soles of both feet, I will ask my nominated assistant for help.

☐ I have been assessed as being at 'High-risk' of foot ulcers or Charcot foot as I have lost feeling in my feet.

☐ We agreed that the NHS podiatry service will review my feet approximately every three months and my risk of diabetes foot disease with be reviewed each year.

☐ Should I discover a new foot problem, I will contact the NHS podiatry clinic as soon as possible on:

Name: _____
Nominated assistant: _____
Podiatrist: _____

3. Practice implications

As educators, there is a duty to ensure that the support structures available to people in our care are adequately considered. Critically, those unable to effectively self-care, should have adequate social care and support in place to assist daily foot inspection. Routine foot inspection is an important first step, however, we must also support individuals and their carers to identify 'danger signs' early and know who to contact if they discover a problem. We must be mindful of individual's health literacy skills, understanding and abilities, checking comprehension through tools like the 'Teach-back' technique, as necessary [45].

The online *Foot Risk Awareness and Management Education (FRAME)* resource [46] references learning difficulties, visual impairment and arthritis as barriers to personal hygiene and foot inspection practices, however, obesity is likely to play a greater role in future. To illustrate this point, consider the daily, sometimes twice daily, application of emollient advised for individuals 'At-risk' of diabetes foot disease. While emollient application may provide an ideal opportunity for self-foot inspection [47], this practice may be difficult for individuals with limited mobility or flexibility.

Applying emollient to the dorsum of the foot may allow the person with limited mobility to moisturise their contralateral foot through rubbing the plantar surface over the dorsum. This activity does not, however, lead to inspection of the vulnerable sole of the foot. Assistance is, therefore, required in daily foot inspection to ensure any signs of foot disease are observed and then referred on appropriately. As the term

'self-foot inspection' implies, each person with diabetes is able to examine their own feet, perhaps the term 'supported foot inspection' may be more fitting, for many.

Several tools have recently been developed to assist in self-foot inspection practices, such as the *Solesee™ Diabetes Foot Inspection Mirror* [48], or early detection of localised erythema with *Siren Smart Diabetic Socks* [49]. Any device designed to support routine self-foot inspection or assessment has the potential to improve self-identification of the early signs of diabetes foot disease. Person-centred diabetes foot behavioural agreements represent another, potentially valuable, tool at our disposal and an example has been shared (Table 3) to support educators wishing to adopt this approach.

4. Conclusion

Throughout this narrative review, person-centred diabetes foot behavioural agreements were discussed within the context of 'At-risk' DSMES. While further research is warranted, such agreements may potentially help individuals identify and understand their personal responsibilities and the necessity for structured support concerning daily foot inspection, timely identification of, and self-referral for, diabetes foot disease. Education and advice alone are unlikely to result in timely self-referral among this 'At-risk' population and, it is argued, skills and abilities must be further nurtured through structured, supported self-management strategies. People 'At-risk' of diabetes foot disease, inclusive of both DFUs and CN, may access medical, nursing, podiatry, orthotic and associated services regularly and receive routine diabetes foot screening, education and podiatric management. At each clinical consultation, every diabetes educator has an opportunity to reinforce the importance of daily self-inspection, with or without support, recognition of signs and symptoms of diabetes foot disease and how to contact local service in the event of foot problems.

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Conflict of interest

None.

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References

[1] Chantelau E. The perils of procrastination: effects of early vs. delayed detection and treatment of incipient Charcot fracture. Diabet Med 2005;22:1707–12. https://doi.org/10.1111/j.1464-5491.2005.01677.

[2] Jeffcoate WJ, Harding KG. Diabetic foot ulcers. Lancet 2003;361:1545–51. https://doi.org/10.1016/S0140-6736(03)13169-8.

[3] Stang D, Leese G. The Scottish Diabetes Foot Action Group 2016 update of the diabetic foot risk stratification and triage system. Diabet Foot J 2016;19:182–6.

[4] Diabetes UK. Putting feet first. 2019 https://www.diabetes.org.uk/get_involved/campaigning/putting-feet-first,2017. [Accessed 13 October 2018].

[5] Haas L, Maryniuk M, Beck J, Cox CE, Duker P, Edwards L, et al. National standards for diabetes self-management education and support. Diab Educ 2012;38:619–29. https://doi.org/10.1177/0145721712455997.

[6] Beck J, Greenwood DA, Blanton L, Bollinger ST, Butcher MK, Condon JE, et al. 2017 National standards for diabetes self-management education and support. Diab Educ 2018;44:35–50. https://doi.org/10.1177/0145721717722968.

[7] Thorpe CT, Fahey LE, Johnson H, Deshpande M, Thorpe JM, Fisher EB. Facilitating healthy coping in patients with diabetes: a systematic review. Diab Educ 2013;39:33–52. https://doi.org/10.1177/0145721712464400.

[8] Tang TS, Funnell MM, Oh M. Lasting effects of a 2-year diabetes self-management support intervention: outcomes at 1-year follow-up. Prev Chronic Dis 2012;9:e109https://doi.org/10.5888/pcd9.110313.

[9] Steinsbekk A, L.Ø Rygg, Lisulo M, Rise MB, Fretheim A. Group based diabetes self-management education compared to routine treatment, waiting list control or no intervention for people with type 2 diabetes mellitus. Cochrane Database Syst Rev 2015;6:CD003417https://doi.org/10.1002/14651858.CD003417.

[10] Cooke D, Bond R, Lawton J, Rankin D, Heller S, Clark M, et al. UK NIHR DAFNE Study Group, structured type 1 diabetes education delivered within routine care: impact on glycemic control and diabetes-specific quality of life. Diab Care 2013;36:270–2. https://doi.org/10.2337/dc12-0080.

[11] Cochran J, Conn VS. Meta-analysis of quality of life outcomes following diabetes self-management training. Diab Educ 2008;34:815–23. https://doi.org/10.1177/0145721708323640.

[12] Trento M, Passera P, Borgo E, Tomalino M, Bajardi M, Cavallo F, et al. 5-year randomized controlled study of learning, problem solving ability, and quality of life modifications in people with type 2 diabetes managed by group care. Diab Care 2004;27:670–5. https://doi.org/10.2337/diacare.27.3.670.

[13] Toobert DJ, Glasgow RE, Strycker LA, Barrera M, Radcliffe JL, Wander RC, et al. Biologic and quality-of-life outcomes from the Mediterranean lifestyle program: a randomized clinical trial. Diab Care 2003;26:2288–93. https://doi.org/10.2337/diacare.26.8.2288.

[14] Hermanns N, Schmitt A, Gahr A, Herder C, Nowotny B, Roden M, et al. The effect of a diabetes-specific cognitive behavioral treatment program (DIAMOS) for patients with diabetes and subclinical depression: results of a randomized controlled trial. Diab Care 2015;38:551–60. https://doi.org/10.2337/dc14-1416. dc141416.

[15] De Groot M, Doyle T, Kushnick M, Shubrook J, Merrill J, Rabideau E, et al. Can lifestyle interventions do more than reduce diabetes risk? treating depression in adults with type 2 diabetes with exercise and cognitive behavioral therapy. Curr Diab Rep 2012;12:157–66. https://doi.org/10.1007/s11892-012-0261-z.

[16] Siminerio L, Ruppert K, Huber K, Toledo FG. Telemedicine for reach, education, access, and treatment (TREAT) linking telemedicine with diabetes self-management education to improve care in rural communities. Diab Educ 2014;40:797–805. https://doi.org/10.1177/0145721714551993.

[17] Fisher L, Hessler D, Glasgow RE, Arean PA, Masharani U, Naranjo D, et al. REDEEM: a pragmatic trial to reduce diabetes distress. Diab Care 2013;36:2551–8. https://doi.org/10.2337/dc12-2493. DC_122493.

[18] Toobert DJ, Strycker LA, King DK, Barrera Jr. M, Osuna D, Glasgow RE. Long-term outcomes from a multiple-risk-factor diabetes trial for Latinas: ¡Viva Bien!. Transl Behav Med 2011;1:416–26. https://doi.org/10.1007/s13142-010-0011-1.

[19] Steinsbekk A, Rygg L, Lisulo M, Rise MB, Fretheim A. Group based diabetes self-management education compared to routine treatment for people with type 2 diabetes mellitus. A systematic review with meta-analysis. BMC Health Serv Res 2012;12:213. https://doi.org/10.1186/1472-6963-12-213.

[20] Norris SL, Lau J, Smith SJ, Schmid CH, Engelgau MM. Self-management education for adults with type 2 diabetes: a meta-analysis of the effect on glycemic control. Diab Care 2002;25:1159–71. https://doi.org/10.2337/diacare.25.7.1159.

[21] Tshiananga JKT, Kocher S, Weber C, Erny-Albrecht K, Berndt K, Neeser K. The effect of nurse-led diabetes self-management education on glycosylated hemoglobin and cardiovascular risk factors: a meta-analysis. Diab Educ 2012;38:108–23. https://doi.org/10.1177/0145721711423978.

[22] Welch G, Zagarins SE, Feinberg RG, Garb JL. Motivational interviewing delivered by diabetes educators: does it improve blood glucose control among poorly controlled type 2 diabetes patients? Diab Res Clin Pract 2011;91:54–60. https://doi.org/10.1016/j.diabres.2010.09.036.

[23] Gary TL, Genkinger JM, Guallar E, Peyrot M, Brancati FL. Meta-analysis of randomized educational and behavioral interventions in type 2 diabetes. Diab Educ 2003;29:488–501. https://doi.org/10.1177/014572170302900313.

[24] Chrvala CA, Sherr D, Lipman RD. Diabetes self-management education for adults with type 2 diabetes mellitus: a systematic review of the effect on glycemic control. Patient Educ Couns 2016;99:926–43. https://doi.org/10.1016/j.pec.2015.11.003.

[25] Pillay J, Armstrong MJ, Butalia S, Donovan LE, Sigal RJ, Vandermeer B, et al. Behavioral programs for type 2 diabetes mellitus: a systematic review and network meta-analysis. Ann Intern Med 2015;163:848–60. https://doi.org/10.7326/M15-1400.

[26] Diabetes Control and Complications Trial Research Group. Complications Trial Research Group, The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. N Engl J Med 1993;329:977–86. https://doi.org/10.1056/NEJM199309303291401.

[27] Stratton IM, Adler AI, Neil HAW, Matthews DR, Manley SE, Cull CA, et al. Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study. BMJ 2000;321:405–12. https://doi.org/10.1136/bmj.321.7258.405.

[28] Carlson EV, Kemp MG, Shott S. Predicting the risk of pressure ulcers in critically ill patients. Am J Crit Care 1999;8:262–9.

[29] Miller TA. Health literacy and adherence to medical treatment in chronic and acute illness: a meta-analysis. Patient Educ Couns 2016;99:1079–86. https://doi.org/10.1016/j.pec.2016.01.020.

[30] Cavanaugh P, Ulbrecht J. What the practicing clinician should know about foot biomechanics. In: Boulton AJM, Cavanaugh PR, Rayman G, editors. The Foot in diabetes. West Sussex: John Wiley & Sons; 2006. p. 68–91.

[31] Rowlands G, Protheroe J, Winkley J, Richardson M, Seed PT, Rudd R. A mismatch between population health literacy and the complexity of health information: an observational study. Br J Gen Pract 2015;65:e379–86. https://doi.org/10.3399/bjgp15X685285.

[32] Longo DR, Schubert SL, Wright BA, LeMaster J, Williams CD, Clore JN. Health information seeking, receipt, and use in diabetes self-management. Ann Fam Med 2010;8:334–40. https://doi.org/10.1370/afm.1115.

[33] Graffy J, Eaton S, Sturt J, Chadwick P. Personalized care planning for diabetes: policy lessons from systematic reviews of consultation and self-management

interventions. Primary Health Care Res Dev 2009;10:210–22. https://doi.org/10.1017/S1463423609001157.
[34] Copland P. The book of life. J Med Ethics 2005;31:278–9. https://doi.org/10.1136/jme.2003.005173.
[35] Dorresteijn JAN, Kriegsman DMW, Assendelft WJJ, Valk GD. Patient education for preventing diabetic foot ulceration. Cochrane Lib 2014. https://doi.org/10.1002/14651858.CD001488. CD001488.
[36] Hoogeveen RC, Dorresteijn JAN, Kriegsman DM, Valk GD. Complex interventions for preventing diabetic foot ulceration. Cochrane Lib 2015. https://doi.org/10.1002/14651858.CD007610. CD007610.
[37] Shrivastava SR, Shrivastava PS, Ramasamy J. Role of self-care in management of diabetes mellitus. J Diab Metabol Disord 2013;12:14. https://doi.org/10.1186/2251-6581-12-14.
[38] Baba M, Foley L, Davis W, Davis T. Self-awareness of foot health status in patients with type 2 diabetes: the Fremantle diabetes study phase II. Diab Med 2014;31:1439–45. https://doi.org/10.1111/dme.12521.
[39] Jordan DN, Jordan JL. Foot self-care practices among Filipino American women with type 2 diabetes mellitus. Diab Ther 2011;2:1–8. https://doi.org/10.1007/s13300-010-0016-2.
[40] Powers MA, Bardsley J, Cypress M, Duker P, Funnell MM, Fischl AH, et al. Diabetes self-management education and support in type 2 diabetes: a joint position statement of the American Diabetes Association, the American Association of Diabetes Educators, and the Academy of Nutrition and Dietetics. J Acad Nutr Diet 2015;115:1323–34. https://doi.org/10.1177/0145721716689694.
[41] Bosch-Capblanch X, Abba K, Prictor M, Garner P. Contracts between patients and healthcare practitioners for improving patients' adherence to treatment, prevention and health promotion activities. Cochrane Lib 2007. https://doi.org/10.1002/14651858.CD004808. CD004808.
[42] Litzelman DK, Slemenda CW, Langefeld CD, Hays LM, Welch MA, Bild DE, et al. Reduction of lower extremity clinical abnormalities in patients with non-insulin-dependent diabetes mellitus: a randomized, controlled trial. Ann Intern Med 1993;119:36–41. https://doi.org/10.7326/0003-4819-119-1-199307010-00006.
[43] Canales M. Does 'cognitive neuropathy' contribute to non-adherence in patients with diabetes? Podiatr Today 2018;31 https://www.podiatrytoday.com/does-%E2%80%98cognitive-neuropathy%E2%80%99-contribute-non-adherence-patients-diabetes. [Accessed 13 October 2018].
[44] Rogers C. Writing patient compliance contracts for wound care & diabetes treatments. Today's Wound Clin 2015;9 https://www.todayswoundclinic.com/articles/writing-patient-compliance-contracts-wound-care-diabetes-treatments. [Accessed 13 October 2018].
[45] Bullen B, Young M, McArdle C, Ellis MJ. Visual and kinaesthetic approaches to pragmatic, person-centred diabetic foot education. Diab Foot J 2017;20:29–33.
[46] NHS Scotland. The procedure: able to or has help to self care. 2017 http://www.diabetesframe.org/labyrinth/mnode_client.asp?id=48357&parent=48356&mode=remote&sessID=1ABCF7F9-EB6E-4E7D-8CD9-FA0E6462CD1B. [Accessed 13 October 2018].
[47] Locke J, Baird S, Hendry G. The use of urea-based creams in the prevention of diabetic ulceration. Dermatol Nurs 2012;11:26–32.
[48] Solesee. Diabetes foot inspection mirror. 2018 https://www.solesee.com/catalogue_item.php?catID=11953&prodID=88721. [Accessed 13 October 2018].
[49] Siren. Monitoring foot temperature could save your life. 2018 http://siren.care. [Accessed 13 October 2018].
[50] Vandenbosch J, Van den Broucke S, Schinckus L, Schwarz P, Doyle G, Pelikan J, et al. The impact of health literacy on diabetes self-management education. Health Educ J 2018;77:349–62. https://doi.org/10.1177/0017896917751554.
[51] Ishikawa H, Takeuchi T, Yano E. Measuring functional, communicative, and critical health literacy among diabetic patients. Diab Care 2008;31:874–9. https://doi.org/10.2337/dc07-1932.