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GP …afoot? Digital assistants can tackle diabetic patients' confusion over diet and foot care.

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Healthcare in the UK is facing a huge challenge to manage the rising costs of type 2 diabetes. Diabetes alone accounts for 10% of the NHS budget, a cost of £1 million per hour, 80% of which is spent on treating complications of poorly controlled diabetes.[1] Managing any long-term health condition requires long-term, regular support and patient motivation and clearly the current system is falling short of this task. While this is a multifactorial problem, improving dietary control and foot care would help to prevent some of the physical complications and financial costs of diabetes. A pilot project in Staffordshire has feedback from participating patients that their new digital assistants are a potential way forward to improving their disease management. Areas that patients wanted support with are diet and footcare and they felt that their smart-speaker with screen, if developed, could be just what they need. GP practices are at the forefront of healthcare services helping people to manage their condition and promote prevention, perhaps help could be 'afoot' to prevent diabetic ulcers or achieve dietary control, in the form of digital assistants.

Background

On the back of a successful pilot study[2] in Stoke-on-Trent that showed potential benefit of using smart speakers in patients' homes for a plethora of health conditions, we as 'technological enablers' have focused on diabetes. Data from a new cohort of 20 patients with diabetes, shows potential for digital assistants to improve patients' lifelong engagement with diet and footcare. Clinicians' capacity to see patients more often is limited and although there are online resources to help, perhaps these are not engaging enough over time. We need other ways for patients to be able to access support, and smart speakers have the potential capacity to provide this 24/7/365, for diabetic management support in the 21st century.

Current dietary advice is not wrong but leaves people confused and adrift

Despite the bulk of evidence[3] for optimal dietary advice for those with diabetes there remains difficulty translating this into clear plans for individuals to follow. Indeed, current best dietary advice is effectively an admission of this fact. For instance, Diabetes UK[4] advises that "one-size does not fit all" and that a healthy diet for a diabetic is approximate to that for non-diabetics, recognising that if patients are given an overly prescriptive, restricted diet then they are unlikely to adhere to this long-term. However, diets without clear rules are just as difficult to follow in the longer term. Such conflict and confusion is not a new phenomenon. A diabetic nursing paper in 1969 described that dietary advice varied, with some patients being given a strict meal plan to follow, others vague advice to "avoid sweets"[5]. It goes further to say that just because a patient was *taught* once did not mean that the person has *learnt*, and even if they did, their life circumstances could well change and they might forget. Well, how much have we really moved on in half a century? How often do we still provide information once or twice and leave the person adrift, then a year later wag the finger at their annual review? Just as it was 50 years ago, diabetes dietary information is still perceived as "vague" and "contradictory", according to our volunteer patients. A view that is also supported in the broader literature[3,5,6] and anecdotally on Diabetes UK support forums[7], indicating that this is a widespread problem.

Alexa could provide some clarity, improve accessibility and overall engagement

So, how can smart speakers help to improve the situation? Simply put: patients' questions can be answered and information accessed more easily, round the clock, at home. Above all, patients remarked at how useful it was to always have Alexa around, to be able to ask a question when the situation called for it and most were surprised at "how much it does know". Queries such as "how

many calories in…?" or "how much sugar in a…?" were very popular. Moreover, they found that accessing healthy recipes was easier by being able to ask a question rather than trawling through websites. However, before proclaiming Alexa to be the answer, it must be noted that it is not quite there yet. For example, our participants discovered that some of the health advice, recipes and nutritional information given still often originates from USA sources; and specific diabetes information was limited and not from a singular, trusted UK source, thus potentially creating further unwanted confusion. Moreover, it is not obvious that patients would be kept engaged in the long-term by their novel assistants. However, these problems are more like speedbumps than roadblocks and could be addressed by a dedicated diabetes 'skill' (app) for the device. The trick would be to use the skill to 'gamify' diabetes management[8]; use the means that app developers already employ to attract our daily interest, likes and clicks[9], but for a far more positive end, so that patients remain engaged and motivated to use the device long-term.

Preventing complications by improving diabetic footcare

Diet was not the only aspect of diabetes our cohort of diabetic patients wanted the device to help them with. They also felt that the Alexa Echo Show device with its screen, camera and portability would be ideal for regular foot monitoring. Latest figures[1] show that in the UK there are 169 amputations per week due to the development of diabetic foot ulcers. While risks for diabetic foot ulcers are complex, involving vascular, neuropathic and biomechanical factors, they are often compounded by patients' general lack of awareness about maintaining and monitoring their foot health.[10] Participating patients shared concerns about foot problems and wanted more guidance about foot self-care. Similar to the 'one-size does not fit all' approach to diet, foot care needs to be personalised too. One of the problems people face is being unable to see underneath their feet; coupled with reduced mobility and sensation this can become serious. In its current state, the Alexa device cannot do this but with a dedicated app the patient could use the in-built camera to take pictures and video, check their feet for problems to recognise deterioration at an early stage. In accordance with current best practice advice they could then seek specialist review by the Foot Protection Service[11]; maybe by an arranged videocall with their GP, podiatrist or district nurse - a 'GP afoot' service perhaps? Furthermore, Alexa could reinforce engagement with 'daily tips' such as spotting wear and tear on footwear, checking for small stones, reminders about washing feet regularly and moisturising…[12] the list goes on. Patients' use of smart speakers with visual screens like this, could provide major benefits to shared care management of diabetes and reduce limb threatening complications.

Conclusions

Managing any long-term condition poses serious challenges for patients and clinicians alike, and we need more firepower. With a digital assistant in the home that is set up to reinforce health messages, provide access to trusted information matched to best clinical management, these devices could boost patients' engagement in optimising management of their diabetes, so avoiding complications that often arise insidiously and with life-changing consequences. For GPs and many other healthcare professionals, such extra help has come when NHS resources are limited and the burden of diabetes care has become out of proportion. The potential of harnessing smart speakers for diabetes could generate benefits for patients, clinicians and the health service at large.

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