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Self management of Type II diabetes: the role of blood glucose monitoring

Michael P. Craven, Jennifer L. Martin, Alexander R. Lang, Sarah Sharples

The University of Nottingham, Faculty of Engineering

Background

In recent years the amount of medical equipment being used by patients and in non-healthcare environments has increased dramatically and, with the growing popularity of assisted living programmes, combined with an ageing population, this trend is set to continue. However, little research has been conducted on how medical technology should be introduced to patients so that it can be used safely, correctly and regularly. One group who are already required to regularly use medical devices to treat and monitor themselves is diabetic patients.

Diabetes mellitus is an illness where the average amount of glucose in the blood is too high. Once diagnosed it is treatable by controlling the blood glucose level, which is often assisted by self-monitoring of blood glucose using a meter. The two most prevalent sub-types of diabetes are Type 1 and Type 2 which account for around 95% of diagnosed cases. Type 1 diabetes is characterised by the body"s inability to produce insulin and patients are dependent on insulin which is administered by injection or other methods. Type 2 diabetes, which accounts for about 90% of diagnosed cases, is characterised by insufficient insulin production or insulin resistance where the body does not respond to the insulin produced, and is a progressive disease that usually develops later in life.

Self monitoring of blood glucose levels using a meter is a well established way for diabetic patients to manage their condition. However, although this is regularly done by the majority of patients with type 1 diabetes, it is far less common amongst patients with type 2 diabetes. Bosworth et al. (2006) state that adherence across a range of diseases is highest for treatments involving the taking of medication and lowest for lifestyle modifications. This suggests that people with type 2 diabetics will be less likely to comply with blood testing regimens than those with type 1.

The aim of this paper is to examine the human factors associated with the task of home blood glucose monitoring by people with type 2 Diabetes and to identify the barriers to adherence with blood glucose testing regimens.

Methods

A qualitative study was conducted with a convenience sample of nine patients with type 2 diabetes (7 male) who had experience with monitoring their blood glucose levels using a meter. Two semi-structured interviews were conducted and one focus group discussion. The study was facilitated by the authors and the discussion was focused around a number of questions and topics related to the participants" experiences with blood glucose testing. Specifically,

- The issues surrounding patient monitoring of their blood glucose levels and the factors that affect how (and how often) this is done.
- How blood glucose meters affect compliance with measurement regimes

Findings

The interviews and focus group responses were transcribed and then imported into NVivo, a qualitative data management and analysis software package. The data were coded and Grounded Theory was employed to structure the emerging themes. The main themes are now presented along with selected illustrative quotes from the study participants.

Aims and Motivations of Testing

The study identified significant variability between the participants with regard to the perceived aims and motivations for blood glucose monitoring. For some, mainly older patients, monitoring was seen as providing a once-a-day measure that provided peace of mind if their blood levels were normal, or an indication that they should seek medical advice if they were not. The patients reported that these motivations were broadly similar to those of the healthcare professionals responsible for their care. Other participants however saw monitoring as an opportunity to learn about their condition and how it should be managed and often tested their blood a number of times a day. These participants described their testing using words such as „control" and „understanding". For example, a number of participants reported that they had experimented with testing before and after eating and drinking to understand the effects on their glucose levels. One participant who was a keen runner reported testing before and after training sessions in order to investigate how his performance was affected by blood glucose levels.

"For me the control is back with this because I can now control my blood sugar levels pre and post exercise... without the blood sugar meter, I couldn't. Because I didn't know what was going on at all. No concept of what was happening.

These results support recent theories that patients are increasingly interested in participating in clinical decisions (Eng et al, 1998) and suggest that clinicians should communicate and engage more with patients when making treatment decisions. Studies in this area have shown that this „concordance" approach results in not only improved patient satisfaction, but also better compliance with treatment and improved patient outcomes (Vermeire et al, 2001).

It is interesting to note that the patients reported that this form of testing was discouraged by healthcare professionals and therefore they did not disclose this type of testing. A number of participants reported that they were worried about their doctor deciding that they no longer needed to monitor their blood levels and that as a result they would no longer be able to obtain testing strips. In response to this, one participant reported that they had "stocked up on test strips so that I can carry on testing even if they say I can't".

Training needs

The majority of the participants had received little training or education on how to operate the glucose meters and had to learn by trial and error how to operate it. One participant reported that an internet video clip had been more helpful than the training received from his healthcare practitioner.

"I imagined a decent sized blood blob to get the blood rather than just a little bit of red...again it was this education... Just show me…I'm visual..show me. Let me experience it let me touch it and do it"

A number reported that they had simply been given a sealed box as they were leaving the consultation and as a result had been largely reliant on the instructions provided by the manufacturers when learning how to use their device. A number of participants reported that they carried the

instructions around in order to be able to refer to them when necessary, although some problems were identified with this:

“As I get older, my eyesight gets worse, and all of these (instructions) *are in a 6 point faint font, so I have to use my glasses. What if I had to read this on a plane and I didn't have my special specs with me?”*

Barriers to Testing

A number of barriers to blood glucose testing were identified. The most significant of these was the need for patients to wash their hands before each test, with some participants reporting that they sometimes found it difficult to find somewhere hygienic to test their blood.

“Trains are dirty and it is a problem. Have to do it in rail carriages, it is unhygienic in the loos … utterly disgusting.... I don't want to test in there”.

“I like to sit down to test so that might make it difficult in grotty toilets and the nurse says you have to wash your hands”

The need to lance the finger in order to obtain a blood sample was another barrier identified to testing, specifically for older patients.

“Imagine using it with one hand, my father-in-law had a stroke. Goodness knows how you'd get on with these devices... even when I do it I am conscious of shaking, while doing all silly little things. It's not majorly tricky, but just I'm just aware of the shaking.”

It was notable that participants made little reference to the pain or discomfort that resulted from lancing the skin to obtain a blood sample.

Usability

A notable finding of this study was that one elderly participants reported that recent „improvements" to their meters had led to difficulties when using the device. This participant has been provided with a replacement device that was smaller and designed to be more portable with smaller buttons and display. She reported that, rather than telling the diabetes nurse that it did not meet her needs, she had continued to use the old device without the knowledge of the clinical staff. This provides further evidence of a lack of communication between healthcare professionals and patients and also suggests that patients are not encouraged to talk about their needs and requirements, and that healthcare staff may not adequately consider the capabilities of patients when supplying technology. The consequences of this will be patients being expected to use devices that they are unable to use effectively or safely, and this is likely to disproportionately affect patients that are elderly or have disabilities.

Related to this were the reports from some patients that they did not replace the device needles as frequently as recommended, which may lead to problems collecting blood, infection and injury or pain.

“They’ll (patients) use a jab more than once, at least, and I use mine for weeks”
“I’ve had that needle in about two months I think, I forget to change it.”

Conclusion

Blood glucose monitoring for diabetes is a well-established procedure which patients with this chronic condition are expected to perform on a daily basis,. This study suggests that there are a number of factors that prevent patients performing this correctly and safely. In addition patients may not be obtaining the maximum benefits (clinical, or in terms of feelings of well-being) from this service as a result of a lack of understanding, training and support from healthcare professionals. It is clear that more consideration of patient expectations, motivations and capabilities is required by healthcare professionals working in diabetes management.

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