

# Managing diabetes self-care when manual dexterity is limited

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## ARTICLE POINTS

**1** The pain, weakness and stiffness experienced by people with rheumatoid arthritis limits their manual dexterity.

**2** Education and support are vital in helping people with diabetes and RA to remain as independent as their disease allows.

**3** Much can be done to enhance the quality of life for patients with RA who have the added disability of diabetes.

**4** User technique is the main source of error in blood glucose self-monitoring.

**5** The insulin pen has improved the quality of life for many people with diabetes and RA.

## KEY WORDS

- Diabetes
- Rheumatoid arthritis
- Manual dexterity
- Quality of life

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## Introduction

People with diabetes frequently have other illnesses and diseases, which may affect their ability to carry out diabetes self-care. One such disease is rheumatoid arthritis (RA) which, among other things, limits patients' manual dexterity, making blood glucose monitoring and insulin injection difficult. This article examines the care currently being provided to people with diabetes in the author's area of practice – a rheumatology unit – and suggests ways in which nurses can enhance the quality of life for these patients.

Good diabetes control is dependent on the individual having the appropriate knowledge to carry out diabetes self-care (Dunning, 1998). However, if that person also has rheumatoid arthritis (RA), achieving good control can become a major problem.

Although patients with RA may look healthy, the disease often has an adverse effect on their daily lives. Riley (1998) reported that the symptoms of arthritis, i.e. pain, weakness and stiffness, may require the patient to change his/her daily routine, and that the 'patient may be unable to accomplish certain tasks or only perform them with great difficulty.' It is therefore important, when addressing the diabetes care of such patients, to take into account the many special problems they may have.

Typically, their hands become swollen, the range of movement of joints is reduced, they are unable to form a fist, and their 'pinch-grip' is lost. Casanova et al (1990) found that very little attention had been paid to the hand in people with diabetes, despite the fact that hand function is crucial for productivity and quality of life. They found that hand function in this patient group was not well described and that the problem of hand dysfunction was not commonly acknowledged.

Shield and Baum (1993) suggested that it may be necessary to carry out a national survey to determine the size and

complexity of problems arising from reduced hand function in people who are handicapped or disabled. Casanova et al (1991) highlighted the need for increased awareness and study of hand problems in people with diabetes.

Arthur (1998) points out that the degree of swelling in a joint may well influence the 'range of movement through which any particular joint can be put' and that 'any exacerbation in disease activity will increase the level of pain experienced by the patient'.

However, the literature on this subject is limited. Sinclair (1994) found that articles on diabetes research involving specific studies in older people (the client group acknowledged to have the most difficulties with blood glucose monitoring and administration of insulin) accounted for less

*Publisher's note: This image is not available in the online version.*

*Figure 1. Typical 'rheumatoid hands' with 'z' thumbs and ulnar deviation.*

than 5% of those published between 1978 and 1988.

However, it is not just the elderly who suffer from RA and poor manual dexterity; younger people and children may also be affected. Self-care and independence need to be addressed for all of these client groups. Juvenile chronic arthritis affects people under 16 years of age, and was estimated to affect 11 per 100 000 of people under 16 years of age in the UK in 1989–91, of whom 30% had severe functional impairment (White, 1998).

### Blood glucose monitoring

When looking for ways in which to improve the care provided to people with diabetes and poor manual dexterity, the author examined the blood glucose monitoring systems and insulin administration systems currently available, including 'biosensors' which were among the first meters to use non-wipe technology.

According to Gadsden (1988) user technique was the main source of error in self-monitoring of blood glucose levels. Because meters are easily available and relatively inexpensive, many people with diabetes acquire the systems, which they may then use inappropriately, often with poor technique.

Systems such as biosensors are less reliant on user technique (MediSense, 1998). They are designed to be easy to use, requiring fewer technique-dependent steps for performance of the test.

Most blood glucose monitoring systems currently available, however, do require the blood sample to be applied to a very small test area. Meters are available which are designed to make this process as easy as possible. They use a test strip holder with a raised dot on either side of the test area which can be felt with the fingers. Transfer pipettes are also available for drawing blood from the finger and carrying it to the test area for ease of application.

These methods require no wiping and no blotting. These meters are thus less reliant on user technique, which in turn reduces the risk of error and variation. This system may therefore be more suitable for a person with limited manual dexterity.

Self-monitoring of blood glucose is widely

acknowledged as an important component of treatment for people with diabetes (Giordano et al, 1990).

Quality control must be carried out on a regular basis. This comprises system maintenance, calibration, verification, and checks on the control solution. The patient with poor manual dexterity may not be able to perform all of these tasks and will require assistance from either a district nurse or diabetes specialist nurse (DSN).

Meters such as reflectance meters which have optical lenses that become coated with condensation in a humid environment or with changes in temperature need to be cleaned once a week. Biosensor technology, however, is not dependent on an optical system for measurement and blood never enters the sensor, therefore it needs less cleaning (MediSense, 1998).

### Urine testing

In the 1940s, urine testing was the mainstay of monitoring for people with type 2 diabetes (Fox and Pickering, 1995). There are advantages and disadvantages to this technique. Sinclair (1994) claimed that urine testing provides only a rough correlation with blood glucose level, particularly in the elderly, who tend to have a high renal threshold.

Urine tests rely on the principle that below a certain threshold concentration – about 10mmol/litre – glucose is reabsorbed by the kidneys and urine remains sugar free. Above the threshold concentration, however, glucose appears in the urine and can easily be measured.

Urine testing also indicates what has been going on in the blood several hours too late. Fox and Pickering (1995) compared the advantages of urine testing and blood testing, and found that:

**'Urine testing is non-invasive, urine testing is not expensive, and there is less room for error.'**

The disadvantages were that:

**'Urinary glucose is not the important variable, the threshold for glycosuria may vary with age, urine testing is useless in the detection of hypoglycaemia, and its value in type 1 diabetes is limited.'**

### PAGE POINTS

**1** Self-monitoring of blood glucose is widely acknowledged as an important component of treatment for people with diabetes

**2** User technique was the main source of error in self-monitoring.

**3** Most blood glucose monitoring systems currently available require the blood sample to be applied to a very small test area.

**4** Meters are available which are designed to make this process as easy as possible.

Added to this, people with poor manual dexterity have just as much difficulty in opening the urine test strip pots as they have in opening the foil pack that the blood monitoring strips are kept in. Titus et al (1990) emphasise that urine testing requires patients with RA to be familiar with the management of their diabetes as well as their disability.

Furthermore, Titus et al (1990) along with the British Diabetic Association (1995) believe that:

**‘Blood testing gives a more accurate picture of blood glucose than urine testing.’**

**Insulin administration**

Barnett (1995) looked at the difficulties that people with arthritis experience in administering insulin. He found that insulin pens offer more freedom and convenience to a variety of patients. They are longer than disposable syringes, which may be an advantage for people with chronic RA since they would be easier to handle

for people with poor manual dexterity (Woollons, 1996).

Pen injection devices for use with insulin cartridges are simple to load and can be operated single-handedly, although help may be needed with loading new insulin cartridges. The cartridges were designed so that they could be loaded into the pen, eliminating the need for a syringe and needle. Barnett (1995) noted that older people found insulin pens easier to use than syringes.

To avoid the problem of having to change the insulin cartridge, the preloaded pen was developed. No cartridge change is necessary and the pens are disposable, so that once the insulin has been used the pen is discarded.

Before insulin pens were developed, the ‘Palmer Injector’ was a popular choice of injection device. It consisted of a hypodermic syringe holder designed to assist self-injection for people with limited manual dexterity. It gathered the skin for injection and had controlled depth of penetration, operated by a trigger mechanism. However, the device is no longer in production.

As Barnett (1996a, b, c) points out, there have been many advances in insulin therapy and delivery systems. These advances, coupled with the increasingly important role of the patient in self-management, through better education, the multidisciplinary team approach and the availability of home blood glucose monitoring, have all improved the lot of people with diabetes.

**Patient education**

Education and support into self-care is the key to maximising patients’ independence and enhancing their quality of life.

Historically, in rheumatology, the attitude of health professionals towards RA was that since there was no known cure for the disease, or means of controlling it, there was little point in educating patients in matters such as maintaining an independent lifestyle. As a result, patients were simply told to ‘go home and learn to live with it’ (Gallez, 1998).

However, as Arthur (1998) points out:

**‘The nurse is often the one person in the team whom the patient sees**

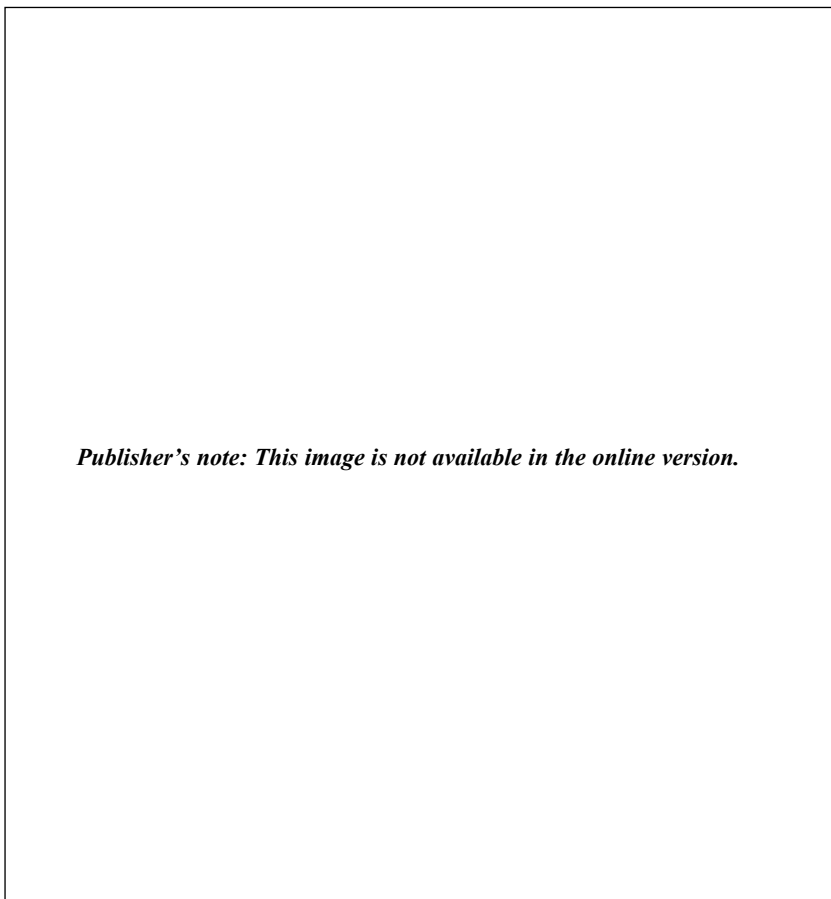


Figure 2. Patients with rheumatoid arthritis may find injections easier to perform with a pen injection device.

**regularly, and is therefore in a unique position to instigate and continue the education and information process regarding rheumatoid arthritis and diabetes self-care.'**

Education is a prominent theme within the author's practice area and in the local community. Because care of the patient with RA is palliative, patients are taught how best to manage their disease and to adapt their lifestyles so that they can cope better, and thus ensure a reasonable quality of life. Patient education requires input from all members of the multidisciplinary team, including the nursing staff, occupational therapists and physiotherapists.

Patients are cared for holistically. In professional care, the nurse needs to be aware of the importance of 'treating the whole person, rather than the disorder' (Hill et al, 1996). All of the patients' problems need to be addressed, such as those experienced by patients with RA who have the added disability of diabetes.

We aim to promote self-care, independence and confidence in being in control of their lives, thereby enhancing patients' quality of life.

Some patients with diabetes who come into the unit and self-administer insulin are able to monitor their own blood glucose. Others, however, need someone to do this for them, perhaps because of poor hand function, inadequate education, or an acute exacerbation of their RA. When patients are experiencing an exacerbation of their RA, the nursing staff take over the care of their diabetes, performing the blood glucose monitoring for them and injecting their insulin.

As soon as their RA becomes less active, patients are encouraged to monitor their own blood glucose levels, and commence self-injection of insulin. In the past, in the author's area of practice, the DSN would often be called out to attend to patients with diabetes who came onto the ward, even though there may have been no reason for the patient to see them.

It is now recognised that there is much that the ward nurse can do to assist these patients. For example, the nursing staff could teach patients to monitor their

own blood glucose, assessing whether they have sufficient manual dexterity to use the meters. They could also teach patients to self-inject insulin, demonstrate the use of an insulin pen, and recommend the use of a pre-filled pen if the patient has problems loading the insulin cartridges.

Any query that the ward nurse could not answer could then be referred to the DSN, who is, as Turnbull and Sinclair (1995) acknowledge, 'an important source of general diabetes education'.

An education programme could be developed for the nursing staff to assist them in educating patients with RA about their diabetes. Individual sessions on blood-glucose monitoring systems and insulin administration could be held, giving as much input as possible to the patient, to assist with self-care and promote independence.

### Educating the carer

Educating the carer is another important issue. Family members need to be involved with the patient's care in hospital before discharge so that they know how to assist when the patient cannot manage to self-inject or monitor his/her own glucose levels.

Carers need to be aware that because the patient may suffer from stiffness that varies throughout the day, depending on the level of previous activity, inactivity, or how active the arthritis is, they may not be able to perform their own diabetes care.

In many cases a carer or nurse has to take over the responsibility for administering the injections (White, 1992). Carers should therefore be encouraged to attend the ward to learn what is required for blood monitoring and insulin injection to be carried out effectively.

### The future

Looking to the future, Tooke et al (1996), in the Research and Development Group of the St Vincent workgroup report, state that patients would like to see the introduction of technology that avoids the need for insulin injections. Manufacturers are now investigating the possibility of administering insulin by means of nasal preparations, and these are showing great promise for people with poor hand function.

### PAGE POINTS

**1** Patient education requires input from all members of the multidisciplinary team, including the nursing staff, occupational therapists and physiotherapists.

**2** It is now recognised that there is much that the ward nurse can do to assist patients with diabetes and RA.

**3** Any query that the ward nurse cannot answer can be referred to the DSN.

**PAGE POINTS**

**1** It is not known how many people with diabetes in this country have an additional disability and how this affects their glycaemic control.

**2** More research needs to be undertaken to find a solution to the common problem of how to manage diabetes self-care when manual dexterity is limited.

**Conclusion**

It is not known how many people with diabetes in this country have an additional disability and how this affects their glycaemic control (Shield, 1993). The literature on this subject is limited.

The author was able to find only one article, an American paper, that addressed the problem of managing diabetes with poor hand function in people with RA and diabetes (Casanova et al, 1990). There was also only one article that discussed and listed diabetes aids and products for people with a physical impairment (Petzinger, 1992).

More research needs to be undertaken to find a solution to the common problem of how to manage diabetes self-care when manual dexterity is limited. ■

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