

# A practical diabetes education programme for rural Africa

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## Introduction

The effective management of diabetes is dependent upon knowledge, informed decision-making and the application of a number of skills, many times a day, by the person suffering from the disease. Over the past several years, health professionals and health educators have learned that the treatment of diabetes is much more than the prescription of drugs, insulin, and meal plans; it is largely an educational process, in which goals and objectives are the critical elements, particularly in the prevention of acute and chronic complications. In the ideal world, the preference is for a network of highly skilled people following an identified process, such as nationally set guideline-based care<sup>1</sup> to provide a collaborative, comprehensive plan of care to each individual. In the developing world, healthcare providers and nurse educators endeavour to provide a level of care commensurate with available, often meagre resources, in the most efficient, achievable way through primary healthcare systems. This helps people with chronic disease enjoy a higher level of wellness, and reduced mortality. These approaches bring together the diabetes team and the patient with his or her family and supportive others, who contribute a unique perspective to help achieve the recommended levels of diabetes control.

In 2001, the Liverpool School of Tropical Medicine (UK) embarked on a project to structure and implement a nurse-led diabetes education and self-care programme for the Hlabisa Health District in northern KwaZulu-Natal, South Africa; and also initiated a diabetes education strategy for nurses. The Magisterial District of Hlabisa is large and covers 1430 km<sup>2</sup>; the terrain is varied and beautiful, and the population of 210 000 is Zulu-speaking and predominantly rural, living in scattered multigenerational homesteads. *'There are wide differentials in living standards, literacy rates, and access to electricity and clean water, although overall social and environmental conditions are substantially better than in many other countries in sub-Saharan Africa. Healthcare infrastructure in the Hlabisa District is typical of many other rural health districts in KwaZulu-Natal and, to a lesser extent, elsewhere in South Africa.'*<sup>2</sup> There is a com-

munity hospital of 297 beds, 12 fixed nurse-run primary healthcare (PHC) clinics, and two mobile clinics for the areas not covered by the fixed clinics. Our project was designed to endorse the generic South African model of nurses trained in PHC, and to concentrate on establishing and supporting the principles of patient self-care in the management of chronic disease. The team comprised patients and their families, community health workers, one Zulu nurse and one ex-patriate diabetes specialist nurse. There were also doctors at the district hospital to whom referrals could be made when a higher level of care was required.

## Structured diabetes education for nurses

A primary healthcare, nurse-led system for chronic disease management had been previously introduced to the Hlabisa Health District, and it demonstrated cost effectiveness with high-quality outcomes, but most importantly, it was well accepted by the patients.<sup>3</sup> However, the specifics of this system had been allowed to lapse and the content no longer retained an adequate diabetes-specific focus.

Successful teaching and implementation of a patient self-care regime requires a collaborative approach, and a variety of education approaches that include, group processes, and one-to-one counselling with regular follow-up, monitoring, and support. These functions are well managed by nurses schooled in specialist care, and indeed, the quality of care is vastly enhanced by the educated educator.<sup>4</sup> We therefore engaged a local Zulu nurse to be trained in diabetes while working with the international diabetes nurse educator for the duration on the project. The structure of this nurse's training was an apprenticeship process as we simultaneously set up and implemented the patient education and district diabetes service. She also benefited from a short course at the Diabetic Clinic of Chris Hani, Baragwanath Hospital in Soweto. As a fluent English speaker and well respected member of her community, she quickly became an invaluable asset to the project and worked both as interpreter and care provider.

The Zulu nurse's training is detailed in Table 1 with enhancements to include the management of diabetes in children and adolescents, management of diabetes during pregnancy, care of the diabetic patient during periods of hospitalisation and surgical procedures, and also the special requirements of the elderly patient. Concurrent management of diabetes and other diseases was also covered as the patient population with type 2 diabetes

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Table 1 A diabetes education programme plan for nurses

<p><b>1. Aetiology of diabetes</b></p> <ul style="list-style-type: none"> <li>– What are normal blood glucose values? <ul style="list-style-type: none"> <li>– interpreting levels</li> </ul> </li> <li>– What does it mean to have high blood sugar?</li> </ul>	<ul style="list-style-type: none"> <li>• Definition and classification of diabetes: causes and pathophysiology</li> <li>• What does this mean in relation to the fasting, pre-and post-prandial states?</li> <li>• What is happening/has happened in the body? <ul style="list-style-type: none"> <li>• Signs and symptoms</li> <li>• In relation to the foods consumed</li> </ul> </li> </ul>
<p><b>2. Assessment and history taking</b></p> <p><b>Management principles of diabetes:</b></p> <ul style="list-style-type: none"> <li>• type 1</li> <li>• type 2</li> </ul>	<ul style="list-style-type: none"> <li>• The importance of listening</li> <li>• Developing clinical skills</li> <li>• Accurate recording of data</li> <li>• Meal planning/activity/oral agents/ insulin</li> <li>• The importance of regular balanced meals</li> <li>• Reducing simple sugars, simple carbohydrates and fats</li> <li>• Active lifestyles, the importance of regular exercise</li> <li>• How to recognise clinical signs indicating the need for oral agents</li> <li>• How to recognise the clinical signs indicating the need for insulin in the person with type 2 diabetes</li> </ul>
<p><b>3. Treatment with oral hypoglycaemic agents</b></p> <p><b>Treatment with insulin</b></p>	<ul style="list-style-type: none"> <li>• Time of onset, action, duration</li> <li>• Different types, onset, action and duration</li> <li>• Injection technique and site rotation</li> </ul>
<p><b>4. Diabetic emergencies and acute complications</b></p> <p><b>Care of the surgical patient</b></p>	<ul style="list-style-type: none"> <li>• Hypo- and hyperglycaemia</li> <li>• Management in hospital</li> <li>• Management in the rural clinics</li> <li>• Peri-operative care and surveillance</li> <li>• Wound care and healing</li> </ul>
<p><b>5. Care of the skin</b></p> <p>Foot care</p> <p>Care of teeth and gums</p> <p><b>Alcohol and smoking</b></p> <p>Description of chronic complications:</p> <ul style="list-style-type: none"> <li>– regular monitoring and interventions</li> <li>– how to prevent</li> </ul>	<ul style="list-style-type: none"> <li>• Daily skin inspection and hygiene</li> <li>• Neurosensory assessment with a monofilament</li> <li>• Skin and nail care</li> <li>• Diabetic neuropathy, ischaemia,</li> <li>• Importance of oral hygiene</li> <li>• Effects on general and cardiac health</li> <li>• Signs and symptoms</li> <li>• Planned proactive care as per national guidelines</li> </ul>
<p><b>6. Setting up patient care plans</b></p> <ul style="list-style-type: none"> <li>– Collaborative care plans</li> <li>– Using algorithms and following protocol: <ul style="list-style-type: none"> <li>– regular review each visit</li> <li>– annual review</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• The structure <ul style="list-style-type: none"> <li>• Sharing information between healthcare providers and departments</li> <li>• Structured to local district healthcare policy</li> </ul> </li> <li>• Referencing national guidelines</li> </ul>
<p>Protocol for sick-day management</p> <p>Protocol for hypo- and hyperglycaemia</p> <p>Protocol for diabetic ketoacidosis</p> <p>Responsibilities of the nursing sister in the management of diabetic ketoacidosis and the unconscious patient</p> <p>Policies for: disposal of hazardous waste; re-using needles and syringes; insulin storage/expiry dates/maintaining integrity</p>	



was predominantly older. Teaching methods and adult learning principles were addressed with a strong focus on fostering patient self-management through knowledge utilisation. A formal six-lecture diabetes education series was formulated for the nurses of the Hlabisa Health District (see Table 1). These lectures covered the relevant aspects of managing the person with diabetes pertinent to the district hospital environment, available resources, and the rural primary healthcare clinics.

The nurses had a good command of English and this was, therefore, an element of the project work the expatriate nurse was able to undertake independently. The environment presented many challenges and nurses could not easily be removed from front-line care to attend the lectures since staffing levels barely covered essential services. Nevertheless, both the hospital matron and the director of the school of nursing were in support of the extra education and fully endorsed the lecture series.

The six lectures were delivered over consecutive weeks at the school of nursing, and the rural clinic nurses were taught opportunistically with less formal structure to the actual delivery. This was a necessity of the environment and dependent upon workload, staffing, and time available at the end of the clinic sessions.

A patient handbook was compiled to support the education process and to reinforce the nurses' learning, with the added intention of providing a teaching tool and resource for the nurses to use when teaching patients.

## Teaching methods

Teaching strategies and methods were broad and can be subdivided into instructional methods, educational strategies, behavioural strategies, and teaching aids (see Table 2).

When deciding upon the most appropriate approach to facilitate learning, the needs assessment must pay close attention to environmental and cultural issues, and the resources available; and should ensure that the methods and materials are well planned and appropriate to the task.<sup>5</sup> Teaching methods employed were various, both

didactic and interactive in nature, and overhead transparencies were used to augment the oral presentations where an overhead projector was available. Adding the visual dimension was particularly useful and stimulated questions, helped to get the message across, and engaged the nurses in discussion both with one another and with the teacher. They had not normally been exposed to teaching aids of any kind, and thus this approach was somewhat novel, and it assisted with note-taking, reinforcement, and recapitulation at the beginning of subsequent lectures. These nurses were predominantly local, they had received all their schooling and nursing education in the area and were used to the style of learning introduced by the missionaries: learning by rote, repetition, blackboards, and few text books.

When time permitted, clinical sessions were given on the ward during rounds using particular case histories as learning examples; patient histories were followed, and care maps and nursing care plans were drawn up collaboratively. The experience of being provided with explicit rationale in the practical setting proved efficacious, it was applicable and had meaning that would not necessarily be gleaned in the classroom and the nurses seemed to particularly enjoy it.

No formal evaluation of the teaching process was carried out, but anecdotal evidence given as feedback by the nursing instructors and matron suggested these diabetes education sessions for the nurses were useful, and increased the nurses' level of awareness to deliver a more informed level of care to their patients.

## Structured diabetes education for patients

The patient education and teaching series was formulated to follow a comprehensive and complete set of lessons to cover all aspects of diabetes as a chronic disease, and to help the patients learn about principles of managing chronic illness throughout their lifespan (see Table 3). We intended to engage patients to become active participants in their own healthcare, rather than follow the traditional model where professional 'experts' prescribe the treatment for 'compliant patients'.

We wanted them to participate in shared decision-making. This was a significant departure for the patients, not only because doctors are scarce in the Hlabisa Health District, but also because doctors are somewhat revered by patients who are only able to be seen through a nursing referral in the primary health system; and the patients expect to be told what to do. The patients also consider nurses in this environment to be superior since they have achieved a higher level of education and hold a position of authority. Therefore it was a culture and power shift for the patients and health professionals alike.

All the diabetes teaching sessions were delivered to the group of patients gathered in clinic at the beginning of the day. Environments varied and often were far from optimal. This

Table 2 Teaching methods

<b>Instructional methods</b>	Didactic: lecture style/direct instruction Interactive Seminar Large/small group discussion
<b>Educational strategies</b>	Interactive Best interest of target audience Engage audience: verbal exchange Utilise new learning in practical arena Demonstration and return demonstration
<b>Behavioural strategies</b>	Direct instruction      Problem solving Discussion                Positive reinforcement Teach skills
<b>Teaching aids</b>	Add visual dimension, e.g. use of overhead projector and food models Provide visual organisational scheme Distribute printed handouts

*Table 3 diabetes education programme for patients*

- Diagnosing diabetes: classifications and types
- Basic pathophysiology: difference type 1/type 2
- Other types and causes of diabetes
- The principles of nutrition: meal planning basics
- Exercise/activity related to activities of daily living
- Pharmacological interventions
- Blood glucose monitoring: rationale and relevance
- Monitoring the disease
- The prevention of complications
- Management of acute and chronic complications
- Individual self-care regimes
- Sick-day management
- Plan of ongoing care: the importance of regular follow-up
- Care of the feet, eyes, skin, and teeth

group session was always followed by a one-on-one encounter between the patient and the diabetes nurses, and individual profiles were discussed. Patient–nurse interaction was emphasised and encouraged. As the frequency of clinic visits grew, so did the health history of each patient. Each visit was recorded on an individual flowchart held by the visiting nurses, and the details of the visit were documented in the patient ‘hold notes’, both for patient reference and to facilitate communication between health professionals and centres of care. Patients were sometimes seen by the mobile clinic nurses for example, and in this case ‘hold notes’ were invaluable. It quickly became evident that we were able to refer to a reliable record in which laboratory data were also recorded, and, therefore, treatment could be managed on the basis of those findings as well as assessing progress to date. This provided a mechanism for the diabetes team to provide holistic care, which the patients obviously found encouraging and reassuring.

The education sessions were either given by the local nurse in Zulu, or as a direct simultaneous translation. Lessons would often be prepared during the long drive to the clinic; pertinent and seasonal issues would be addressed, such as the management of diabetes during short periods of illness during the influenza season, as well as the content of the defined curriculum. This rural area of KwaZulu Natal remains an oral culture, and as there were no teaching tools until we obtained the Zakhe flip chart (see Figure 1), we relied upon a didactic teaching and learning style.

## The patient information handbook

A patient information handbook to be used by the Hlabisa hospital and clinic nurses was prepared in English with the objective of providing a teaching tool. Each section of this handbook was formulated to provide a succinct and pertinent lesson that could be directly translated by any nurse regardless of her level of knowledge of diabetes. The structure was such that the guide could be continuously updated by replacing the pages of this small flipchart-style manual with current treatment and other information. It was intended for either individual or

group session learning, and also as a resource for nurses beginning to learn about diabetes. The handbook content closely followed the structured diabetes education for patients (see Table 3)

## The Zakhe system

A colourful diabetes education training system for people with type 2 diabetes was originally devised by the German pharmaceutical company Boeringer Mannheim during the 1990s, in collaboration with the World Health Organization. Subsequently, this company sold its diabetes interest to Roche Diagnostics in South Africa and the education programme was renamed and adapted for use with several tribal populations in both community clinics and hospital diabetes out-patient departments. This programme is ‘based on a structured educational concept suitable for different cultures at the primary care level’, and for the Zulu nation the programme has been renamed ‘Zakhe’. The English translation of this word means ‘self-improvement’ or ‘rebuild yourself’ and it is essentially a system to teach behaviour modification in the management of diabetes. The content covers the basic pathophysiology of diabetes with emphasis on type 2 diabetes, signs and symptoms of the disease, and management through self-care strategies related to diet and exercise. Great emphasis is placed upon the importance of controlling the disease to avoid the development of complications. Constructed as a large free-standing flip chart with many bright illustrations and minimal text, it lends itself well to teaching large groups and is so constructed that it is most amenable to adaptation to any level of literacy. It also adapts well to being used by both professional health educators and community health workers (see Figure 1). The Zakhe model is structured to train people with diabetes in the management of their disease through lifestyle and behaviour modifications. Masike et al evaluated the effectiveness of the Zakhe system taught to 1744 patients by community health workers and registered nurses over the course of one year.<sup>6</sup> Results showed overall improvement in attitude and knowledge resulting in decreased weight, decreased blood glucose and blood pressure levels, and improved eating habits. It was concluded that the combined efforts of the multi-disciplinary team contributed to improved quality of life, decreased hospital admissions, and increased health awareness among the patients.



*Figure 1 A community health worker using a Zakhe chart*

The researchers considered the training of community health workers to be a cost-effective method of raising awareness of health issues among rural black populations, by helping patients improve their quality of life and modify their behaviour to manage a disease such as diabetes more effectively.<sup>7</sup>

### Training community health workers to deliver diabetes education

A community-centred approach to healthcare encourages a 'bottom-up' approach and can increase the responsiveness of healthcare service providers to community needs. This approach encourages ownership and participation as leaders and spokespersons are identified who may mobilise communities to motivate for and influence change. Members of the community have better knowledge of their own culture, and know what can work. The unique benefits of using locally based volunteers are cost containment, programme effectiveness by peer-to-peer interaction, and perhaps additional motivation for the volunteers themselves in their own self-care behaviours, if they also have a chronic disease.<sup>7</sup>

In South Africa, community health worker (CHW) programmes were established at the beginning of the 1990s. The workers are selected by the community, and trained by the local health sector. The number of workers per area appears to be determined by community response rather than health needs, population density, or geographical proximity to community clinics. Workers are supported by a supervisor as well as by the community health committee. In the Hlabisa area, CHWs are paid a small stipend by the government via the tribal authorities, though in some areas they are unpaid volunteers. Their responsibilities include health education and the dissemination of local health information in specified areas with which they are very familiar. Working at the population health level is a valuable asset as CHWs have 'entrance' to the chronically ill who may be homebound, and there may also be health benefits for the CHWs themselves.<sup>8</sup> Diabetes education training for CHWs in the Hlabisa health district was undertaken by the project Zulu nurse using the Zakhe model. The workers were receptive to the training and were soon working with people with diabetes in the many scattered small villages and homesteads.

This was a positive development for the diabetes project as the number of patients attending the community clinics increased as the news about the special diabetes clinics spread. The local health district offered an incentive to the CHWs to promote diabetes awareness and encouraged them to create support groups in the villages. In a short time, the monthly diabetes teaching session at the district hospital was successfully being led by CHWs. Simultaneously, peer to peer training was started so that there was an effective fanning out of workers who then began attending PHC clinics throughout the district.

The workers met regularly with the local Zulu diabetes nurse to report on the health and status of patients they

had visited in their homes, also to keep their diabetes teaching information and skills up to date. In this health district, CHWs contribute many hours to a variety of healthcare strategies across the entire vast area with positive effect, and their contribution to the health of the community is considered to be significant as they advocate for patients and forge links between health districts and the scattered communities. Evidence suggests that indeed, CHWs are a most effective and valuable healthcare resource when the job description is clear and they are adequately trained.<sup>9</sup>

Potentially, CHWs are a useful resource for further programme development and training initiatives for the management of other non-communicable diseases such as hypertension, heart disease, asthma, and epilepsy. In this area there is an established group which provides a medication surveillance service for people with tuberculosis as well as a system of home-based care to those dying of AIDS.

### Conclusion

The essential elements of this diabetes education programme comprised a simple model of structured education for PHC nurses. Culturally sensitive and explicit to the subject, it was conducted with the goal of equipping the healthcare providers with the tools necessary to engage patients in the management of their chronic disease. The framework was structured explicitly for rural remote regions and compiled in close collaboration with health district senior nurse representatives. This collaborative policy and the provision of diabetes education and training for CHWs ensured local acceptance and fostered ownership of the education programme. This in turn facilitated programme sustainability and provided a model of care for the management of diabetes that could be applied to other rural African environments.

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