Diabetes education in primary care: A practical approach using the ADDIE model

Diabetes is a chronic disease that probably requires the most attention to changes in lifestyle.

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Diabetes is an almost perfect example of a chronic disease that requires high levels of behaviour change and self-care activities. Many articles are written on the aspects of lifestyle that should be modified and what the goals should be.[1] I have previously written in *CME* on the application of motivational interviewing in consultations with diabetic patients.[2] The reality in many primary care practices is that we are often too busy managing the patient's presenting problem (e.g. sore throat, joint pains, backache) in a limited time frame to comprehensively deal with the underlying continuing problem. All too often we only have time to repeat or modify the prescription, do a blood test or hand the patient a leaflet on lifestyle change after a few words of advice. In this article I therefore focus on a more explicit approach to the incorporation of diabetic education into primary care practice using the conceptual framework of ADDIE.[3]

ADDIE stands for analyse, design, develop, implement and evaluate, and can be used to consider any educational intervention. I explore these steps specifically with regard to diabetes education in primary care.

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Analyse

Analyse the factors that are important in the design of a diabetic education programme in your practice.

Think about the diabetic patients in your practice. How many are there and what are their characteristics? Typically, you will have a large number of patients with type 2 diabetes who will be mostly middle aged or older. However, you may also have a significant number of younger patients with type 1 diabetes. How do you currently organise your care for patients with diabetes? For example, do they attend a mini-clinic on the same day each week or merely present alongside other patients in the general queue? What educational level and resources do your patients have? For example, does your practice population mostly comprise indigent patients with high levels of illiteracy and poor access to sources of information? Alternatively, your practice population may be better educated with easy access to resources on the internet. What languages are spoken? How well informed and educated are your diabetic patients already? What are their learning needs? Do your diabetic patients have a voice in the way care is organised in your practice?

Which of the health workers in your practice can play a role in the education of diabetic patients? In the public sector there may be medical officers, clinical nurse practitioners, health promoters or nutrition advisers. In the private sector you may have access to dietitians or biokineticists. Who has the expertise and the time to engage with diabetic patients?

The answers to most of these questions will be easy to most established doctors who know their practice and practice population well, but you may never have sat down with your chronic care team to explicitly analyse your patients.

Design

The design of an appropriate diabetic education programme depends on a thorough understanding of the target audience and the practice setting as described in the section on analysis. Following on from this you should be able to make some fundamental decisions about the design. For example, should you focus on group education because the patient numbers are high and the health workers have limited time or can you afford to plan for one-on-one counselling? Group diabetic education has been shown to be effective in terms of reducing glycosylated haemoglobin, medication, weight and blood pressure.[4] Likewise, you should be able to decide on who is most appropriate to deliver diabetic education or what combination of people will deliver different aspects.

The content of a diabetic education programme has been well described;[5] however, it can be structured and packaged in different ways. Table I is an example of the structure and content recommended by chronic care teams in the Cape Town public sector for patients with type 2 diabetes.[6]

Explaining diabetes in lay terms in a way that actually gives the patient an understanding of its pathophysiology is a challenging task. It allows patients to understand why and how behaviour change and medication can control their diabetes. Most educational programmes resort to metaphors, such as those shown in Fig. 1, where the cells of the body are represented as small rooms with a door that can be opened by a key (insulin) to let in the glucose (spoonfuls of sugar) to create energy.[7] The keys are made by the pancreas and sugar comes from the intestine (food) and sometimes the liver, which are also shown in the drawing. In a patient with type 2 diabetes, as shown in Fig. 1, some of the doors are closed because the keys do not work properly (due to insulin resistance) and therefore glucose increases in the bloodstream.

Table I. Content and structure of a diabetic education programme[6]

Session 1: Understanding your diabetes
- What constitutes diabetes
- Some of the common myths and facts about diabetes

Session 2: Understanding your medication
- Using medication to control diabetes
- Considerations when using medication
- Dealing with hypoglycaemia (low blood glucose)

Session 3: Living a healthy lifestyle
- What is healthy food
- What are sensible or healthy portion sizes
- How to prepare food
- Timing of meals and snacks
- Physical activity
- Other lifestyle issues (smoking, stress, alcohol)

Session 4: Avoiding complications
- The dangers of high blood glucose
- Recognising and controlling high blood glucose
- What medical assessments need to be done to effectively identify and prevent complications and when these should be done

Fig. 1. Artwork from a patient education flipchart on 'How diabetes works'.

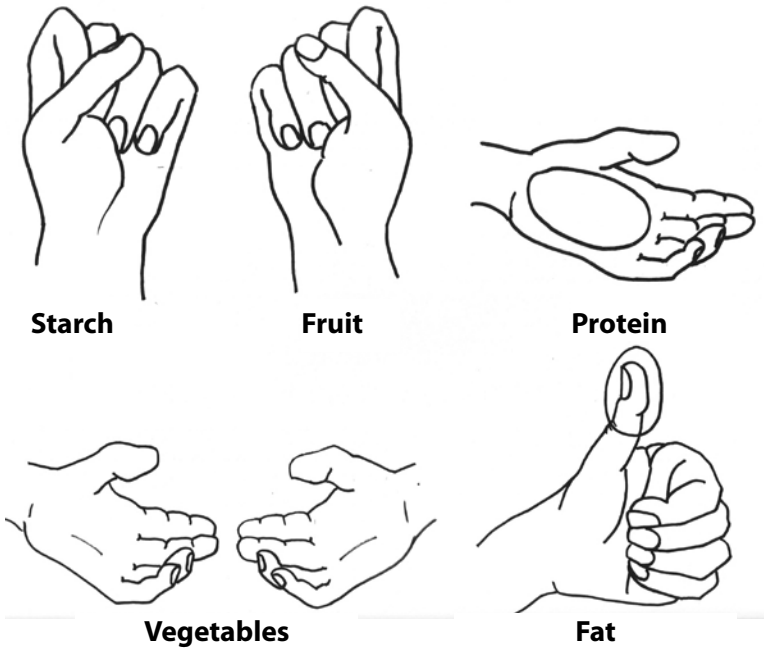

Fig. 2. The Zimbabwean hand jive.

Table II. Key messages of healthy eating in the South African Food Based Dietary Guidelines

1. Enjoy a variety of foods
2. Make starchy foods the basis of most meals
3. Use food and drinks containing sugar sparingly
4. Use fat and salt sparingly
5. Eat plenty of vegetables and fruit every day
6. Eat beans, peas, lentils and soya regularly
7. Chicken, fish, milk, meat or eggs may be eaten daily
8. Drink lots of clean, safe water
9. If you drink alcohol, do so sensibly
10. Be active

In this picture the pancreas works harder and produces even more keys to try to overcome the resistance. An understanding of diabetes must also engage with individual and cultural beliefs such as 'type 2 diabetes is just a touch of sugar' or 'you get diabetes from eating too many sweets'.

Most patients with diabetes require some form of medication and, as with all chronic diseases, adherence will be better if the patient understands the purpose of the medication, agrees with the need for it, knows how and when to take it and is informed of its benefits and possible side-effects. In particular, patients need to know how to recognise hypoglycaemia (hunger, headaches, being pale or sickly, trembling or shaking, unable to concentrate) and what to do about it. Patients should identify and have available a source of glucose (usually about 15 g) to take when they suspect they are hypoglycaemic.

The South African Food Based Dietary Guidelines for healthy eating provide a number of simple and clear messages that could benefit the diabetic patient and their family (Table II).[8] Patients should understand the different types of food (fruits and vegetables, starches and sugars, dairy, protein, and fats) and how these impact on glucose levels and waist circumference, but should also have clear guidance about portion size. Images of portion size for different food groups on a typical plate may be helpful and the Zimbabwean hand jive (Fig. 2) may also be a useful reminder.[9] In the hand jive the starches and fruit should not exceed the amount represented by two fists, the protein (meat) should not be more than the palm of your hand, vegetables should be approximately what you can hold in two hands and fat should not exceed the tip of your thumb. In addition, patients should also understand the importance of regular meals and snacks between meals, if these are needed. Finally, cooking methods may also be important as, for example, frying food in oil will clearly have a different effect than grilling, baking or boiling. The concept of healthy eating as opposed to a diabetic diet is now being promoted.

The concept of physical activity is replacing that of exercise. Exercise has often been equated with formal sporting or gym activities, which may not be accessible or affordable for many patients. Instead, the goal of 150 minutes of moderate-intensity physical activity includes activity obtained by going to work, by doing housework and as part of daily living. Moderate intensity implies that the activity will raise your pulse and make you sweat a little. It is also recommended that people with diabetes do resistance activities three or more times a week. Resistance activities use muscular strength to move a weight or work against a resistant load.

Other lifestyle issues that may be important in specific patients include smoking cessation, alcohol use and psychosocial stress. These may interact with the cardiovascular risk, glucose control and adherence to the management plan. There may also be specific challenges to lifestyle and glucose control that should be discussed, such as fasting during Ramadan, shift work or special events.

The dangers of high glucose in terms of immediate symptoms and long-term complications should also be understood and these include the effects of diabetes on the heart, kidneys, feet, brain and eyes. Knowing how to take care of your feet is important.

Table III. Tests performed routinely to assess control and detect complications at primary care level[10]

Test	Frequency
Weight (and height) and/or waist circumference	3-monthly
Blood pressure	3-monthly
Foot inspection	3-monthly
Blood glucose	3-monthly
Glycosylated haemoglobin	3-monthly
Urine protein (albuminuria or microalbuminuria if available)	3-monthly
Lipids (TC, HDLC, LDLC, TG)	Annually
Creatinine, sodium, potassium	Annually
Eye examination (visual acuity and fundoscopy)	Annually
Tooth inspection	Annually

TC – total cholesterol; HDLC – high-density lipoprotein cholesterol; LDLC – low-density lipoprotein cholesterol; TG – triglycerides.

Table IV. Resources for the development of diabetic education

Conversation maps for group diabetes education: http://www.idf.org/conversation-map-tools-and-training

International Diabetes Federation: http://www.idf.org/Diabetes_Education

Educational materials produced by the South African Sugar Association: http://www.sugar.org.za/Education85.aspx

Training in motivational interviewing: www.sahealthinfo.org and www.motivationalinterview.org

The concept that better control of diabetes can help to prevent long-term complications may lead to a discussion of the tests used to determine control and to screen for early complications (Table III). Patients should understand the normal values for these tests and their own results and may be encouraged to set goals for the next year in collaboration with the health worker. For many patients achieving ideal levels in the near future may seem an impossible task. Therefore, setting a goal of a significant reduction may be more realistic and still lead to significant risk reduction. For example, a loss of 5% body weight or a 1% reduction in HbA_{1c} may be reasonable goals.

Having decided on the format, content and structure of the education programme there still remains the issue of the style of communication and interaction. Motivational interviewing recommends that when behaviour change is the focus of interaction a guiding style is most appropriate to help the patient make and implement difficult decisions about lifestyle.[2,11] Unfortunately, in the health care setting the directing style is the dominant model and it is possible that this may even increase resistance to change in patients. The guiding style is characterised by a spirit of collaboration, empathy, direction, evocation and respect for the patient's autonomy. Direction implies that the health worker steers the conversation to the key behavioural issues, while avoiding telling the patient what to do about them. Evocation implies that commitment to change and practical solutions are elicited from the patient rather than demanded or imposed by the health worker. Respect for the patient's autonomy recognises that ultimately the patient is in charge of their own life and that one can only support and guide them. In the case of diabetes there is clearly much information that must be understood and in this situation motivational interviewing recommends an exchange rather than a transfer of this information. This implies that the health worker tailors the information to the patient's prior knowledge and beliefs and to what they are most ready to discuss, offers the information in a clear yet neutral way that does not demand a specific solution, and then engages the patient with how they can make sense of this information. The goal is an interactive exchange of ideas and information rather than a lecture on what the health worker thinks is relevant and important. Specific communication strategies and skills are well described in other articles.[2,11]

Develop

Having designed who will be involved, how they will engage the patient, the structure and content of the programme and the interactive style, there may be the need to develop skills and resources. There are many resource materials available for both individual and group interactions (Table IV) and it should not be necessary to develop your own from scratch. There may also be the need for further training of your staff to ensure a thorough understanding of diabetes or to learn communication skills. You may want to pilot some of your ideas before fully implementing them.

Implement

The diabetic education programme may then be implemented and regular opportunities provided for reflection on its success and any unanticipated issues that need attention. There may be teething problems at the beginning.

Evaluation

Most primary care facilities will not want or need to formally evaluate their programme, as in a research study. However, good clinical governance in primary care recommends that all facilities engage with continuous quality improvement cycles. This cycle has been well described elsewhere[12] and the success of your education programme should be reflected in its contribution to improved processes and outcome measures, e.g. a higher percentage of patients receiving education or a higher percentage of patients achieving targets for glucose control.

Conclusion

This article takes a practical approach to the provision of diabetic education in primary care and encourages you to design, develop and implement better education in your practice using the ADDIE model. The article refers you to a number of other sources that may assist you with the content, tools and skills that you need for success. Diabetic education does not happen in an unplanned, *ad hoc* and opportunistic manner and needs structure, systems and preparation to ensure that your patients are empowered to live with and manage their diabetes.

References available at www.cmej.org.za

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- Diabetes education requires a structured and systematic approach and the ADDIE model may assist with this.
- Practitioners should *analyse* the characteristics of their diabetic patients, their learning needs and the availability of health workers with knowledge of diabetes and capacity to engage with diabetic education.
- Practitioners should *design* the education programme by looking at the format (group v. individual approaches), who will be involved, the content and structure of the programme and the communication skills required.
- Practitioners should *develop* or acquire the necessary resource materials and skills to deliver the programme.
- Practitioners should *implement* the programme with regular opportunities for feedback and reflection on its successes, weaknesses and unanticipated effects.
- Practitioners should *evaluate* the programme through its contribution to improving processes and outcome criteria in a continuous quality improvement cycle.