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Educating the Patient with Diabetes

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Keypoints

- Diabetes education is an important cornerstone of diabetes care, and supports the philosophy of the chronic disease model.
- Diabetes education improves clinical outcomes, and requires periodic follow-up.
- Time spent with a diabetes educator is the best predictor for improvement in diabetes outcomes.
- Patients and physicians agree that diabetes education is a necessary part of care.
- Being prepared with a variety of educational delivery methods is beneficial and necessary to meet the variety of patient learning styles.
- Understanding educational theories builds a strong base for selecting appropriate approaches to meet the needs of individual patients.
- A written plan developed in collaboration with a patient and their educator and care provider offers more chance of achievement.

Introduction

Diabetes education continues to be cited as a cornerstone of effective diabetes care and supports the philosophy of chronic care models (Table 21.1) [1,2]. It is well established that the practice of diabetes self-management education (DSME) is critical to the care and management of people with diabetes, and that measurable behavior change is the unique outcome of working with a diabetes educator [3,4].

Now more than ever, diabetes educators are being held more accountable for their role in diabetes management. Over time it has become apparent that education standards and a system or framework describing self-care behavior could have an important role in supporting people with diabetes to consider behavior changes that might enhance their quality of life and support better management of their condition. The 2000 Standards for Diabetes Self-Management Education [5] and recent 2007 update [6], American Association of Diabetes Educators (AADE) Standards Development for Outcome Measure [3] and the outcomes model, the AADE7™ Self-Care Behaviors framework [7,8], now provide a common reference for establishing behavior change goals and establishing measurable outcomes. The seven self-care behaviors are: healthy eating; being active; monitoring; taking medicine; problem-solving; reducing risks; and healthy coping.

Background

Standards and educational practice guidelines

DSME is central to delivering desirable metabolic and clinical care in diabetes. DSME is a comprehensive patient education structure that involves a multidisciplinary team to help achieve the necessary metabolic outcomes and improve the lives of those living with diabetes [9,10]. Metabolic improvements such as glucose, lipids and blood pressure in type 2 diabetes (T2DM) care are best achieved with a healthy lifestyle and appropriate use of pharmacologic interventions.

In 2003, the AADE published Standards for Outcomes Measurement of Diabetes Self-Management Education [3], complementing the National Standards for DSME in 2000 [5]. This publication was subsequently updated and revised in 2007 [6]. These standards offer the educator a program framework, which is based on five evidence-based principles:

- 1 In the short term, diabetes education is effective for improving clinical outcomes and quality of life;
- 2 DSME has evolved to a more theoretically based empowerment model;
- 3 There is no one best approach;
- 4 Ongoing support is critical to sustain progress; and
- 5 Behavioral goal setting is an effective strategy to support self-management behaviors.

This publication clearly identified that behavior change was the unique measurable outcome of diabetes education [3]. In 2004, these self-care behaviors were adopted by AADE leadership, trademarked as the AADE Seven™ [7,8], and have been incorporated into a framework for educators, community leaders and

Table 21.1 Definitions.

Diabetes educator: a professional who provides education
Diabetes self-management education (DSME): the ongoing process of facilitating the knowledge, skill and ability necessary for diabetes self-care [7]
Education: a combination of interactive experiences
Instructional curriculum: a deliberate arrangement of conditions, written content, to promote actions towards an intentional goal [20]
Learning: An active goal-directed process, transforming skills, knowledge and application of values into new observable behavior
MNT: medical nutrition therapy
Teaching: a system of actions to bring about learning

medical professionals to advocate for diabetes self-care management. In addition, this framework provides the potential to be generalized to other chronic diseases and wellness care, and thrives on assessment and documentation.

Educators are guided by professional and discipline-specific scope of practice; these position papers, evidence-based research and standards for diabetes education practise the belief that behavior change can be effectively achieved by using these frameworks.

Three of the main components of DSME are an assessment, intervention and outcomes evaluation of the patient [9,11]. Ongoing collaboration and partnership between the patient and health care professionals is essential for effective DSME. The process involves interactive, collaborative and ongoing education that engages a person with diabetes in therapeutic decision-making [9]. DSME is available throughout the lifespan of the individual with diabetes and enables ongoing reassessment of self-management goals [9]. Diabetes is a progressive disease in which the clinical manifestations vary throughout the patient's lifespan [12]. Changes in stress, acute illness, aging and metabolic abnormalities can impact the clinical manifestations [12]. DSME approaches are typically adjusted as the patient's lifestyle changes and their condition progresses [9,11].

Also appreciated are the similarities and yet the variety of methodologies and delivery options to assist all people with diabetes and those affected by diabetes to achieve healthier outcomes, including adults, children, parents and older people. The purpose of this section is to introduce the concepts of how to acquire useful self-care information, and change concepts into behaviors that can be useful, measured and maintained over time. Although people with diabetes vary in age, type and duration of diabetes, the principles of education remain the same and are reflected in the following content.

Considering change

The provision of DSME is challenging in any setting, whether outpatient, private practice, community service areas or hospital

settings, and is constantly changing. A paradigm shift has occurred in diabetes education. The learner is no longer the “patient,” rather a “person with diabetes.” DSME includes a circle of further learners, and others who are affected by diabetes, such as family members, work colleagues and neighbors. The health care team (nurse, dietitian, pharmacist, physician, other providers) are not just a deliverer of information, with a complacent learner; rather they are “educators” with learners involved in an active “interactive” (go-between) process. In this paradigm, the learners are both the educator and the people involved with diabetes. Each acquires a desire to learn based on need and consider all the alternatives available to them including information, treatment choices and equipment. Both attendee and educator are adjusting to new technologies, and the ever-changing techniques, approaches, settings and fiscal directives.

In addition, researchers on diabetes education programs have adequately demonstrated increased participant knowledge and corresponding improvements in glycemic control [13–16]. The optimal approaches in DSME delivery that are associated with better outcomes focus on behavioral strategies, encourage active engagement of patients, build self-efficacy, use cognitive reframing as a teaching method, are learner-centered and evidence-based where possible [10,17].

Diabetes education is a revered first step in preparing people with diabetes to make the necessary modifications to their lifestyle. Typically, health care professionals teach patients information that they believe is necessary. Evidence indicates, however, that most of the information shared by a health care professional with patients is forgotten soon after. Up to 80% of patients forget what their doctor tells them as soon as they leave the clinic and nearly 50% of what they remember is recalled incorrectly [18]. The Diabetes Attitudes, Wishes, and Needs (DAWN) study indicates that while 50% of persons with T2DM receive DSME, only 16.2% report adhering to the recommended self-management activities [19]. The DAWN study identified key goals that need to be achieved to improve outcomes: reducing barriers to therapy; promoting self-management; improving psychologic care and enhancing communication with health care providers, people with diabetes and their primary care providers that is consistent with educational standards (DSME) previously presented.

This said, the traditional lecture format, with its instructional knowledge-based content outlines, has also changed to involve and evolve using more interactive processes. The new standards for DSME [6] offer the format of “structure, process and outcome” directives for an established program to meet. These formats serve as an influence for third party reimbursement as well as offering the educator a structured evidence-based format for program development, implementation and evaluation. The standards also encourage new opportunities for alternative program involvement of educational options. The nine curricula (Table 21.2) offer the educator a written instructional topic-driven plan for education, and intentionally closely resemble the AADE7 self-management outcome behaviors (Table 21.3). The AADE7 then offers a template for behavior change identification,

Table 21.2 Nine content areas (DSME) [6].

- 1 Describing the diabetes disease process and treatment options
- 2 Incorporating nutritional management into lifestyle
- 3 Incorporating physical activity into lifestyle
- 4 Using medication(s) safely and for maximum therapeutic effectiveness
- 5 Monitoring blood glucose and other variables and interpreting and using results for self-management decision-making
- 6 Preventing, detecting and treating acute complications
- 7 Preventing, detecting and treating chronic complications
- 8 Developing personal strategies to address psychosocial issues and concerns
- 9 Developing personal strategies to promote health and behavior change

process for change and evaluation of outcome. New and less experienced providers of education may find adopting these existing formats useful, while experienced educators may reconstruct, adapt and create more unique options. All educators are encouraged to participate in the discovery of alternative and creative activities to engage the learner and provide excitement and variety to their educational delivery methods. Mensing and Norris [20] offer instructional tips and educational skills for both.

The purpose of this chapter is to offer the educator and their colleagues the ability to review current education practice and to acquire more in-depth knowledge of interventions focusing on self-care behaviors. These behaviors can then more strongly offer information and potential behavior change opportunities based on a set of practices, presented in a curriculum framework.

The new standards and AADE7 frameworks offer educators an approach that is holistic, empowering and opportunities for patients to strengthen their independence and quality of life. The approach also supports a more public health, patient-centered approach for the person with diabetes and the educator.

Patient-centered educational approaches

Patient-centered education, or learner-centered education, is now promoted by educators moving from provider-directed to “patient-centered” care and education in line with public health and chronic disease models of illness management. Diabetes educators were early proponents of this model and quickly incorporated strategies to meet the patients’ agenda at each encounter [21].

This more patient-centered approach frees the educator to provide personalized (less didactic) information, encouraging lessons to be learned and then applied into patients’ own lives thereby providing reinforcement and follow-up. As summarized by Funnell [7], patients are more successful if they hear consistent messages and the same single messages from all care providers, educators and team members.

Diabetes education is a first step in preparing patients to make necessary modifications to their lifestyle. As many patients forget

Table 21.3 The AADE7 self-management outcome behaviors. Data from AADE website (www.diabeteseducator.org/AADE7).

- 1 Healthy eating** Making healthy food choices, understanding portion sizes and learning the best times to eat are central to managing diabetes. Diabetes education classes can assist people with diabetes in gaining knowledge, teaching food choice skills, and addressing related barriers
- 2 Being active** Regular activity is important for overall fitness, weight management and blood glucose control. Collaboration between patients, providers and educators best addresses barriers, and helps develop an appropriate activity plan that balances food and medication with the activity level
- 3 Monitoring** Daily self-monitoring of blood glucose provides people with diabetes the information they need to assess how food, physical activity and medications affect their blood glucose levels. Monitoring includes: blood pressure, urine ketones and weight. Education is offered about equipment choices, testing times, target values, and interpretation and use of results
- 4 Taking medication** Diabetes is a progressive condition. The health care team will be able to determine which medications people with diabetes should be taking and help them understand how the medications work. Effective drug therapy in combination with healthy lifestyle choices, can lower blood glucose levels, reduce the risk for diabetes complications and produce other clinical benefits
- 5 Problem-solving** Assistance to make rapid informed decisions about food, activity and medications, and develop coping strategies
- 6 Reducing risks** Effective risk reduction behaviors such as smoking cessation, and regular eye, foot and dental examinations reduce diabetes complications and maximize health and quality of life, available preventive services. These include smoking cessation, foot inspections, blood pressure monitoring, self-monitoring of blood glucose, aspirin use and maintenance of personal care records
- 7 Healthy coping** Health status and quality of life are affected by psychologic and social factors. Coping: a person’s ability to self-manage their diabetes is related to their skills. Identifying the individual’s motivation to change behavior, set achievable behavioral goals and provide support.

much of what is said in clinic, educators and clinicians must recognize the need to involve patients in determining what they feel they need and address this first as a way to engage patients, and improve their retention of information.

The information sharing among health care professionals and retention of information by people with diabetes is not enough to help them to change their behavior. The quality and quantity of effective communication between health care professionals and people with diabetes is the most critical indicator of successful DSME. Increased contact time between health care professionals and patients has been associated with better regimen adherence and glucose reduction [15].

So what is the best way to teach people with diabetes? How do we know that they are learning? What is the evidence supporting the education methods we choose to utilize? A simple elementary school approach from Anna Devere Smith, which “thinks of edu-

cation as a garden where questions grow,” seems to describe the learner-centered approach applicable for adults with diabetes most aptly [73]. People with diabetes need an appropriate environment where they can share their challenges with their lives with diabetes, ask health care professionals for help with strategies and consequently concord with the prescribed regimen.

The principles of facilitation and patient-centered intervention have been recognized to be superior to a didactic and more passive teaching approach [9,10]. One of the DSME standards states that “there is no one best education program or approach; however, programs incorporating behavioral and psychosocial strategies demonstrate improved outcomes. Ongoing support is critical to sustain progress made by participants during the DSME program” [9]. There is strong evidence that goals generated by patients produce better outcomes than goals that are generated by health care professionals [9].

There are many educational approaches that are utilized by diabetes educators to help patients acquire knowledge, skills and commitment to self-care behaviors necessary for effective diabetes care [9]. Typically, individual adult T2DM education interventions allow the educator to tailor the approach to the patient’s specific needs and consequently provide effective therapy. However, evidence indicates that group diabetes interventions can be more cost-effective, patient-centered and provide interactive learning with a high level of patient satisfaction compatible with individual interventions. The educational approaches and methods utilized in group education differ among diabetes educators. Therefore, further research is needed to determine which educational approach and method utilized by diabetes educators contributes to effective teaching that produces the best clinical outcomes in adults with T2DM. The existing best practices in group education indicate that the best outcomes are produced with an empowerment approach, which focuses on when and what patients want to learn. Problem-based, culturally tailored approaches that include psychosocial, behavioral and clinical issues relevant to the patients’ needs and readiness to learn have resulted in improved outcomes [22].

DSME aligns with a chronic disease model that indicates that educational approaches should be non-complex, individualized to a patient’s needs and lifestyle, reinforced over time, respectful to an individual’s habits, and should incorporate social support [9,23,24]. Chronic disease care approaches use similar strategies to DSME as they focus on collaborative problem definition, goal-setting, continuum of self-management training and support services [9]. The general consensus on chronic disease interventions indicates that the most beneficial components of education are individualization, relevance, feedback, reinforcement and facilitation [23–25].

How do we provide learner-centered education in a group setting? How do we evaluate everyone’s unique learning needs and provide individual attention they deserve? The complexity of the individual needs assessment and training in a group setting presents a challenge for effective self-management education. The challenge is to individualize the approaches similar to a typical

one-on-one session but in a group session. Successfully individualizing the group session allows the patients to learn, retain their knowledge and be committed to the follow-up action plan. Traditional didactic education that focuses on teaching information through lectures without patients’ engagement has been shown to be ineffective in helping patients change their lifestyle behaviors necessary to improve clinical outcomes [26–28]. Diabetes knowledge does not guarantee changes in behaviors that eventually lead to better outcomes. The learner-centered approach employs non-didactic and less passive strategies in an attempt to promote active engagement in the learning process. A patient-centered education reflects the best practices and theories that have been shown to promote patients’ knowledge retention, commitment and improved self-care outcomes. These include facilitation, empowerment, motivational interviewing, behavioral goal-setting, behavioral and psychosocial strategies, and ongoing support [26–34]. The process allows for the patients to discuss their understanding of diabetes, internalize their commitment and determine their priorities. This process also allows for ongoing implementation of short and long-term goals, which can then be monitored for progress. Patients come up with their own solutions to their own diabetes challenges instead of being told what they should do by the educator. The expectation is that by identifying what is practical and achievable, patients ultimately own their own commitments and will be more likely to accomplish the requisite lifestyle changes [28,35,36].

Effective diabetes education aligns with the principles of adult learning as adults learn most effectively when information is simple, practical and relevant (i.e. directed by their interests), the learning builds on participants’ experiences and there is a focus on application (i.e. when learning is applied to action) [37]. This process of learning involves cognition, emotions and environmental factors that impact knowledge level, skill acquisition and views [38].

Educational theory behind the practice: models and methods

The core foundation of the diabetes education philosophy is that patients are ultimately responsible for their own self-management. The assumption is that patients want to maximize the quality of their life and self-management education [39]. Health care professionals help patients identify ways to make changes necessary for a healthy way of life. Each person with diabetes differs and therefore requires unique lifestyle skill strategies that are applicable to his or her circumstances.

Traditional lecture-based didactic education approaches place the learner in the role of the recipient and the instructor in the role of the “knowledge-giver.” It does not allow the learner to think critically and perceive their own personal and social reality, which are critical steps for adapting to chronic disease [30,31]. DSME allows patients to be part of the decision-making about their self-care and management [32]. Patients develop confidence

in making informed decisions about their medical condition and can choose to act on it.

An additional approach that aligns with effective diabetes education methodology is motivational interviewing. This is closely linked with the empowerment theory as it focuses on creating opportunities for patients to come up with their own assessments and set their own goals [33]. Motivational interviewing is another example of a learner-centered intervention that is considered an effective approach to promote patients' knowledge retention, self-care commitment and improved self-care outcomes [24,33,34].

The proposed theoretical basis evident in a patient-centered diabetes education concept includes the Health Belief Model, the Trans-theoretical Model/Stages of Change, Common Sense Model, the Social Learning Theory and the Dual Processing Theory [40–43]. These commonly utilized theories in diabetes education allow for successful communication with patients through fostering effective listening, relationship building and creating an environment of respect and trust. These theories strengthen an educator's theoretical basis for an effective diabetes education technique. The theories also reflect on the approaches utilized to promote a meaningful dialogue with those involved in diabetes education. The theories help to integrate concepts better for a wider variety of individuals, regardless of age, gender or ethnicity.

Theory: the Health Belief Model

The Health Belief Model is a psychologic framework that outlines predictable health related behaviors [40]. People's life experiences and exposures to past events shape their perception of susceptibility, severity, barriers, benefits and cost of adhering to prescribed interventions. The process of diabetes education should allow for an effective discussion and exploration of beliefs which is needed to promote appropriate self-care. Without an adequate Health Belief Model patient assessment, patients may lack the necessary motivation to overcome their belief barriers.

Theory: the Stages of Change Model

Learning and making changes in one's lifestyle is a process of adjusting what can be done, when and how. The multiple interactions with patients allow diabetes educators to guide them to transition with their commitments to make the change. The Prochaska's Stages of Change Model [44] outlines the predictable process of change as patients not only learn what they are ready to learn, but also understand the reasons behind the need for change and strategies. The Stages of Change Model illustrates the five stages in a continuum of behavior change: pre-contemplation, contemplation, preparation, action, maintenance and relapse [44]. Each stage has an important role in supporting an evolutionary process whereby learners recognize the need for change, act, evaluate and react.

Diabetes educators can help patients to increase their realization of importance of change, confidence, and readiness by asking meaningful questions. Importance of change can be addressed

by asking why? Is it worthwhile? Why should I? How will I benefit? What will change? At what cost? Do I really want to? Will it make a difference? By asking how and what diabetes educators can help patients to evaluate their confidence to change. Consider asking, can I? How will I do it? How will I cope with ...? Will I succeed if ...? What change ...? When assessing readiness, start asking when? Should I do it now? How about other priorities? [45].

Theory: the Common Sense Model

The theoretical framework of the Common Sense Model is based on the balance of danger and fear control [40]. This theory implies that people will not self-regulate unless there is a significant and relevant understanding of the condition, cause, disease timeline, consequences, curability and controllability. The internal cognitive representation of the illness is balanced by emotions that require effective coping skills and appraisal.

The first component of the five assumptions in the theory is that patient identifies the condition. The second is the patient's perception on what actually caused the condition. The third consideration is of a timeline and how long the patient thinks that the condition is going to last. The fourth component of the Common Sense Model is the patient's understanding of the consequences of the disease and how it will affect their future. The fifth component relates to a patient's perception of treatment effectiveness [40]. The perceived vulnerability to diabetes complications is more significant among patients who have witnessed severe complications among people they know, such as family members or loved ones [46]. Witnessing and getting to know other patients in a group setting with varied levels of diabetes complications can allow people to internalize the necessary steps to control their condition more effectively.

Theory: the Social Learning Theory

The foundation of the group education session is a discussion among patients that allows them to learn from one other. The Social Learning Theory outlines the social context necessary for role modeling. It also asserts that the inspiration and support generated by group interaction helps patients change their behaviors [41]. Both social interactions and psychologic factors influence learning. According to Bandura [47]: "Learning skills is not enough, individuals should also develop confidence in the skills that they are learning. Success is not necessarily based on the possession of the necessary skills for performance; it also requires the confidence to use these skills effectively."

Theory: the Social Cognitive Theory

In the attempt to turn the Social Learning Theory into an observational behavior that the educator can witness, four categories can be derived from the Social Cognitive Theory [47]. In terms of the educator's role, these four categories can illuminate the behaviors seen within the group education session. The first characteristic is the role of the facilitator who creates an environment for a successful experience. The second is role modeling through

various experiences whereby the educator observes others' performance. The third is verbal persuasion, where the facilitator skillfully summarizes the information, acknowledges the situation and participants' beliefs, indicating that the problem can be managed. The facilitator actively encourages people to be verbally explicit when elaborating on their management and future choices. The final aspect involves physical and affective state of identification of physical and emotional sources of symptoms. The facilitator acknowledges and/or responds to emotional utterances by the participants [47].

Theory: the Dual Processing Theory

The Dual Processing Theory relates to a patient's individual understanding of the medical condition by allowing the learner to discover his or her own solutions. The theory dictates the need to involve patients actively in the learning process [42]. The Dual Processing Theory has two actions, such as activation of a mental representation of an issue and its interpretation based on mental retrieval of events and feelings related to it [43]. The effective group education needs to allow a learner to discover his or her own solutions which increases the patient's understanding of their medical condition.

Effective diabetes group education approaches use facilitation instead of traditional didactic teaching to produce effective learning [26–28]. The health care professional is responsible for managing the group dynamics and the scope of the group's conversation. Participants are responsible for addressing issues of relevance to their diabetes management and developing strategies to care for themselves better.

Productive diabetes education strategies utilize the best in adult education methodology that allows for patient engagement. Learning theories demonstrate that adults learn best what is personally applicable and important to them [31]. Without a meaningful learning experience, they may ignore or dismiss the presented information. Also, adults learn best in social circumstances rather than classroom settings [32]. Adults prefer to learn from discussion, incorporation of life experiences and other interactive approaches over lecture, print, computer-based or audiovisual presentations [33,48]. Effective learning activities for adults should involve participants in the learning process, motivate, promote self-determination, meet the learning needs, allow the sharing of personal knowledge and experiences, promote competence, reinforce positive behaviors and help adults to identify consequences of behaviors [32,49].

Curriculum

There are many DSME curricula available for the diabetes educator to choose that can be integrated as a complementary tool to the existing DSME curriculum or can be used as a stand-alone approach. However, most of the curricula have not been validated with sound research and studies. Many of the available curricula utilize evidence-based approaches in diabetes self-

management education but as an independent approach have not been validated.

An example of a reliable and valid curriculum has been carried out in a study by Kulzer *et al.* [26], which compared three diabetes educational methods and their effect on clinical indicators. The three educational approaches were:

- 1 A didactic method involving four sessions of 90 minutes in a group setting with a focus on knowledge acquisition, skill and information;
- 2 A group education with a non-didactic focus on self-management and empowerment that addressed the emotional side, the cognitive side and motivational interviewing to promote learning within 90 minutes over 12 sessions; and
- 3 The same empowerment focus as the second method but conducted as individual interventions for half of the 12 sessions and as a group for the other half.

The study included 181 patients with T2DM, non-insulin treated, body mass index (BMI) above 26.7 kg/m², no acute psychiatric illness and the ability to read and speak German. The results indicated no change in HbA_{1c} for the didactic group. There was a significant improvement in HbA_{1c} in the second group, which was the empowerment-based group. The third group intervention resulted in an initial improvement in HbA_{1c} that was not sustained for the duration of the study, indicating that individual intervention to deliver empowerment had no superior effect to group intervention. The results of this study build on the patient-centered educational assumptions that effectively facilitated group diabetes education produces superior clinical and behavioral outcomes than individual interventions. Also, patient-centered approaches and empowerment focused education produced better outcomes than a didactic curriculum. The applicable curriculum attempts to utilize the principles of the effective group-based empowerment education.

An example of a curriculum that is based on a collection of the evidence-based approaches but not validated as an independent strategy is the Diabetes Conversation Map™ program. In an effort to increase the availability of DSME to adults with T2DM, Healthy Interactions Inc. collaborated with the American Diabetes Association (ADA) to develop the US Diabetes Conversation Map® tools and on a global market with the International Diabetes Federation (IDF) to develop the Diabetes Conversations program [50]. The goal of the program is to engage patients more effectively through their interactions with health care professionals and to learn about diabetes and lifestyle modifications that can lead to improved diabetes self-management [51].

The Diabetes Conversation Map tools' content is based on current clinical practice guidelines that represent the best intervention approaches and national standards for DSME. The tools are designed to create meaningful discussions about diabetes between participants that are patient-focused and that help formulate behavior change goals. Patient-centered group interventions such as those used in the Conversation Map learning approach are intended to improve behavioral, clinical and meta-

bolic markers [35,36,52–55]. A few other examples of curricula are: *Life with Diabetes: A Series of Teaching Outlines* by the Michigan DRTC (ADA); *Diabetes Education Curriculum: Guiding Patients to Successful Self-Management* (AADE); *Basics Diabetes Education Curricula*, International Diabetes Center products; and *On the Road* (USDA, Joslin Diabetes Center).

In 2003, the *Technology Appraisal 60* from the National Institute for Health and Clinical Excellence (NICE) in the UK defined diabetes patient structured education as: “a planned and graded programme that is comprehensive in scope, flexible in content, responsive to an individual’s clinical and psychological needs, and adaptable to his or her educational and cultural background.” In its review of the evidence, NICE identified some principles of good practice including that: “education should be provided by an appropriately trained multidisciplinary team to groups of people with diabetes, unless group work is considered unsuitable for an individual.”

Further work published in 2005, *Structured Patient Education in Diabetes – Report from the Patient Education Working Group*, identified the criteria to be used when assessing whether diabetes structured education programs met the NICE guidance. In 2006, a self-assessment tool was developed for existing and future programs, which helped to make the criteria more explicit, and which gave programs a framework for developing an action plan so that the criteria could be met [56–58].

The key criteria for to meet NICE guidelines for structured education are that the programs must:

- Have a structured written curriculum;
- Have trained educators;
- Be quality assured; and
- Be audited.

The current status of Diabetes Structured Education in the UK includes several well-established national and local programs for both T1DM (DAFNE) and T2DM (DESMOND and X-PERT). In addition, there are a number of locally developed programs such as JIGSAW and BERTIE. Not all of these programs profess to meet the NICE guidance in its entirety, as elements of the criteria are still in various stages of development for different programs (e.g. audit, quality assurance). What is currently being expected of programs is that they are “seeking to fulfil the NICE criteria” or “working towards meeting the criteria for NICE guidance” and have development plans in place.

The main limiting factor in Diabetes Structured Education is that it does not include ongoing care and education. Once patients complete the program in its entirety they do not have a component of ongoing support to allow tailoring of the education to their changing lifestyle and diabetes care needs. The provided education becomes education for life and therefore conclusive, without opportunity for an information refresher or support mechanism needed to adjust to changes in perceived needs and preferences of people with diabetes. The lifelong process of diabetes self-management requires adjustments in knowledge, skills and motivation to assess the risks, to under-

stand what there is to gain from changing the behavior or lifestyle and to act on that understanding by engaging in appropriate behaviors. Education should be a lifelong process, starting at the point of diagnosis and remaining as an essential component of diabetes care.

Despite availability and good access to Diabetes Structured Education in 55% of primary care trusts, less than 10% of people reported attending an education course on how to manage their diabetes. A total of 16–41% of people with diabetes who had not attended a course, however, reported that they would like to attend such a course [74].

The DSME in the USA has a component of ongoing lifelong education where it is federally covered for the Medicare beneficiaries with diabetes. DSME is delivered for 10 hours initially during the first education program and 2 hours annually for subsequent education programs [59]. However, only 54.3% of people with diabetes who responded to a national survey in 2005 reported attending some type of DSME class [60]. The 2007 Diabetes Patient Market Study indicated that 26% of patients had seen a diabetes educator in the past 12 months [61]. The AADE analysis of the Center for Medicare and Medicaid Services reimbursement for DSME found that only about 1% of its applicable beneficiaries received DSME in 2004 and 2005 [62]. These results might suggest that patients with diabetes choose not to attend the DSME programs, do not know about their availability or have inadequate access. The existing trends in diabetes education rates indicates a strong probability that the Healthy People 2010 goal of increasing the DSME rate to 60% is unlikely to be achieved [63].

A systematic review of the clinical effectiveness of diabetes education models for type 2 diabetes indicates varied significance and inconsistent results in achieving desirable markers of success. The positive trends are attributable to longer term interventions with a shorter duration between the end of the intervention and the follow-up evaluation point with a multidisciplinary team approach. The inconsistencies in the markers of success and applicable approaches to measure them in the long-term constitute a barrier in their interpretation and practical applications. Also, it is unclear what is needed to prepare and support educators adequately to ensure that they can deliver programs successfully. The need for future research still exists on the comprehensive, ongoing and complex interventions education methods; this should include high quality, longer term studies with a careful consideration around the nature of any control group as well as factors and/or qualifications necessary among educators to ensure success and cost-effectiveness of education programs [64].

Patient education: engaging techniques

Education is initiated at the first encounter by asking what information the person wishes to obtain from this visit. To engage patients in the process and assess needs, a few simple techniques can be applied:

1 Ask “leading” questions, as people respond better to their own interests:

- For example, utilize the technique of open-ended enquiry stems: “Tell me about ...,” “What do you find the most challenging about ...” or “How do you ...?”
- Reflective listening stems are another source of assessment tools. The phrases “It sounds like ...” or “Let me see if I understand you ...” Allow for conversation, clarification, developing some of their own solutions and a chance for the patient to determine if you have the correct information and understand their situation. Encouraging them to tell their personal story helps open the door for a more personal collaborative relationship [65,66].

2 Encourage interaction leading to content discovery, determining the need for more information, improving accuracy and skill development. This technique is as useful for other group attendees, including family and friends who are also attending the visit with the patient.

3 Take more time to get the real story, not just yes or no answers to questions. As described by Anderson and Patrias [67]: “When patients fully describe their concerns and express their feelings, it is time to help them consider possible solutions.”

- The use of a form with leading questions, completed while in the waiting room, pre visit, can set the stage for a more patient-centered directed visit [67].
- In addition, directing enquiry statements to focus towards the AADE7 healthy behaviors assists in crafting goals and targeting behaviors and action plans for the future.

Planning ahead: experiment, reframe, facilitate, evaluate

Difficulties sometimes arise when there are time constraints or a variety of learning styles (audio, visual, tactile). New diagnoses or an unexpected change in treatment plan may also be challenging for the individual. The learning environment and acquisition of knowledge and skills can be compromised. It is to the educator’s advantage to plan ahead both for coping and problem-solving and to alter the curriculum to fit the situation. In times of stress, however, some educators may fall back on more traditional lectures, and the use of PowerPoint and pre-prepared handouts. Having a variety of core techniques, topics and alternative key delivery strategies can help to refocus back to the person, keeping the session patient-centered [20,21,65].

These core techniques help the educator regroup, and aid in planning for a variety of ways to deliver the same message.

Experiment

As you begin to understand the patient and their preferences and desires, think about experimenting with alternative ways to deliver the informational message, build skills, knowledge base and application in the real world. For example, to deliver a key message about the AADE7 domain of “healthy eating,” consider

using a local restaurant’s menu to plan a festive holiday dinner instead of the didactic teaching of the number of “carbs” in a meal plan.

Reframe the information

Change your wording; for example, instead of “dieting” – use “meal planning.” Another example in the domain of “being active” could be the reframing of “increasing activity.” Think of using a phrase such as “decreasing inactivity” and “new activity planning.”

Plan ahead

Identify at least two or three alternatives for the delivery of a concept; for example, appeal to each of the audio “Hear a message”, visual “See the message in words or picture” and tactile/kinesesthetic “Perform an activity” learning styles. In addition, the use of a variety of effective teaching learning strategies assists in moving concepts across the spectrum of age, culture and literacy.

Facilitate, don’t teach

You already know the answer and so the key to facilitation is to determine what the patient knows and what information they have on hand to begin problem-solving (discovery learning). Your expertise is, of course, implied. Drawing out information and encouraging problem-solving from the patient directly helps them integrate and synthesize information that will support future thinking and confidence.

Trust

A relationship of trust between educator and patient is the basis for successful achievement, and the patient has a right to privacy.

Evaluate

It is important to plan to keep track of content items discussed and the behavior change goals that are set. Often, educators spend the majority of their time covering the same content, repeating concepts over and over again. This may be because of educator comfort level, and preplanned content, rather than establishing what the person with diabetes might prefer. This may occur in both DSME and during medical nutrition therapy sessions. When this happens, behavior outcome goals related to healthy coping and behavior change goal-setting are often the least addressed, whereas healthy eating, monitoring and being active are the most common behavior change goals identified. Thus, mutually identified healthy coping and problem-solving goals may improve targeted appropriate educational strategies to support patients in meeting their goals and finding resources from the outside world [68].

Whitlock reviewed self-management processes and described a model for educational counseling to assist with broadening the educational experience by focusing on patient needs versus educator goals for the session. This approach consists of 5 A’s (Table 21.4): assessment, advise, agreement, assistance and arrangement. Another approach is the Mensing reference (Table 21.5) which

Table 21.4 Whitlock model.

- 1 **Assess** risks and readiness to change
- 2 **Advise** with clear personalized change advice
- 3 **Agree** by setting collaborative goals
- 4 **Assist** using behavior change techniques and social support
- 5 **Arrange** for follow-up

Table 21.5 Drafting a Written Plan. Adapted with permission from Mensing [65].

Assessment	View as critical to problem-solving – listen Tune into culture, uses new techniques
Developing a plan	Plan ahead, be practical, plan some problem-solving Keep a good pace, and include a behavioral action plan Better to cover fewer topics and select implementation plan Avoid overload
Implementation of diabetes education	Consider learning styles, readiness of learner and teacher Practice sensitivity and cultural awareness Help translate the science into everyday self-care practices Be flexible Education is ongoing, not just a one time event
Evaluate and document outcomes	Captures information, progress and fosters reinforcement Useful to patient progress, teaching strategies and process Assists with tracking educational content consistency Acknowledges potential behavior change goals, and comparisons with clinical care goals

offers a set of quick reminders, key elements and assessment, through follow-up and documentation [20,69].

Collaboration: drafting a written plan

A critical outcome of diabetes education is the patient’s behavior change plan. Self-care behaviors as the key outcome of DSME have been established. A written plan is set up with indicators such as an overall goal and an identified outcome. The goal is defined as a general non-specific health outcome (e.g. to lose weight, or to feel better). The AADE7 domains are useful categories. The patient and educator collaboratively take this goal and set up very concrete, specific actions as a plan, which describes the steps to be taken to achieve this goal. The steps are written in very concrete terms, are measurable, realistic and mark progress over time. The action steps clearly describe exactly what the patient intends to do. Educators are encouraged to help the patient determine how convinced they are that this activity will happen, how confident they are. This is sometimes objectively identified on a scale of 0–10 (not confident to extremely confident) [8,65]. This technique offers clarity and discussion, while supporting the establishment of realistic action plans. Review of

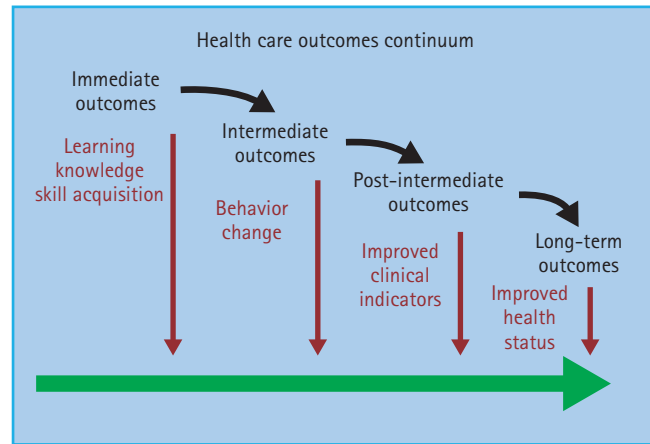


Figure 21.1 Diabetes self-management education (DSME) outcomes continuum. Reproduced from Peeples *et al.* [70], with permission from Sage Publications.

the plan at intervals assists the patient and the educator in evaluating progress towards the goal, if the goal is appropriate or if expectations and action steps need to be altered. The AADE outcomes system assists with identifying immediate outcomes (knowledge, skill) and sets the expectation for longer term outcomes, such as improved HbA_{1c}, lipids and general health status (Figure 21.1).

In addition, it has also evaluated progress, and has provided tools for data documentation, tabulation, configuration, aggregation, analysis and review. A number of data software systems are available to ease data recording. Zgibor *et al.* [68] identified that the domains of “healthy eating” and “physical activity” are the most frequently identified behaviors. Educators are encouraged to consider offering more time to identifying these problem-solving goals. Of note, patients seldom identified more than one goal, and clearly not more than one of substance, yet, as was referenced, the domains of healthy coping and problem-solving may be more useful in the long-term behavior changes that help patients toward successful accomplishments, rather than just the familiar food, activity, monitoring references [68].

In summary, educators should utilize of a wide variety of models and techniques that enhance the acquisition of information, and offer an interesting and creative educational, learning and empowering environment for all the learners, educators and patients alike.

Maintaining and promoting achievement

Measurable behavior change is the unique outcome of working with a diabetes educator. Healthy People 2010 has identified the need to increase the percentage of patients with diabetes receiving education, so that the current 40% would be increased to be at least 60% [68].

Adopting an outcomes framework, directing energy and time to developing educational plans following the guidance of the

main existing frameworks, DSME and incorporating the AADE7 approach into everyday practice is just the beginning. The structure helps to assess current preferences and behaviors of the individual with diabetes, discuss potential benefits, barriers, problem-solving and set a mutually agreed upon plan of behavioral interventions.

Key to the process lies in the follow-up. Methods for setting up measurable indicators, monitoring schedules and documentation are needed for evaluation. Summary information is then available for the patient, health care team, and potentially for insurance and regulatory purposes.

Conclusions

In summary, as more and more systems and standardized educational frameworks such as the AADE7 are implemented, behaviors and clinical outcomes will be better linked and evidence-based benchmarks will become available. Behavior change and diabetes education have been shown to be effective for short-term outcomes [71,72]. Further investigation needs to be conducted to assess long-term outcomes. Clinician and educator time will be well spent by individualizing care plans, paying attention to the process of educational information delivery methods and offering patient-centered care.

References

- Norris SL, Engelgau MM, Narayan KM. Effectiveness of self-management training in type 2 diabetes: systematic review of randomized controlled trials. *Diabetes Care* 2001; **24**:561–587.
- Piatt GA, Orchard TJ, Emerson S, Simmons D, Songer TJ, Brooks MM, et al. Translating the chronic care model into community: results from a randomized controlled trial of a multifaceted diabetes care intervention. *Diabetes Care* 2006; **29**:811–827.
- Mulcahy K, Maryniuk M, Peeples M, Peyrot M, Tomky D, Weaver T, et al. Diabetes self-management education core outcomes measures. *Diabetes Educ* 2003; **29**:804–816.
- Austin MM. Importance of self-care behaviors in diabetes management: business briefing. *US Endocr Rev* 2005; 16–21.
- Mensing CR, Boucher J, Cypress M, Weinger K, Mulcahy K, Barta P, et al. National standards for diabetes self-management education. *Diabetes Care* 2000; **23**:682–689.
- Funnell MM, Brown TL, Childs BR, Haas LB, Hoseney GM, Jensen B, et al. National standards for diabetes self-management education. *Diabetes Care* 2007; **30**:1630–1637.
- Funnell MM. National Standards for diabetes self-management education: what do they mean for providers? *Rev Endocrinol* 2007; 51–53.
- Peeples M, Tomky D, Mulcahy K, Peyrot M, Siminerio L, et al. Evolution of the American Association of Diabetes Educators' diabetes education outcomes project. *Diabetes Educ* 2007; **33**:794–817.
- Funnell MM, Brown TL, Childs BR, Haas LB, Hoseney GM, Jensen B, et al. National standards for diabetes self-management education. *Diabetes Care* 2009; **32**(Suppl. 1):S87–S94.
- International Diabetes Federation (IDF). *International Standards for Diabetes Education*. Available from: www.idf.org/webdata/docs/International%20Standards.pdf. Accessed on 23 December, 2009.
- International Diabetes Federation (IDF). *International Curriculum for Diabetes Health Professional Education*. Available from: www.idf.org/webdata/docs/Curriculum_final%20041108_EN.pdf. Accessed on 23 December, 2009.
- American Diabetes Association. Standards of Medical Care in Diabetes, 2009. *Diabetes Care* 2009; **32**:S13–S61. Available from: http://care.diabetesjournals.org/content/vol32/Supplement_1/. Accessed on 10 January, 2009.
- Gary TL, Genkinger JM, Guallar E, Peyrot M, Brancati FL. Meta-analysis of randomized educational and behavioral interventions in type 2 diabetes. *Diabetes Educ* 2003; **29**:488–501.
- Ellis SE, Speroff T, Dittus RS, Brown A, Pichert JW, Elasy TA. Diabetes patient education: a meta-analysis and meta-regression. *Patient Educ Couns* 2004; **52**:97–105.
- Norris SL, Nichols PJ, Caspersen CJ, Glasgow RE, Engelgau MM, Jack L, et al. The effectiveness of disease and case management for people with diabetes: a systematic review. *Am J Prev Med* 2002; **22**:15–38.
- Gary TL, Genkinger JM, Guallar E, Peyrot M, Brancati FL. Meta-analysis of randomized educational and behavioral interventions in type 2 diabetes. *Diabetes Educ* 2003; **29**:488–501.
- American Association of Diabetes Educators (AADE). *Guidelines for the Practice of Diabetes Self-Management Education and Training (DSME/T)*. Chicago, IL: American Association of Diabetes Educators, 2009.
- Kessels RP. Patients' memory for medical information. *J R Soc Med* 2003; **96**:219–222.
- Funnell MM. The Diabetes Attitudes, Wishes, and Needs study (DAWN). *Diabetes Care*. 2006; **24**:154–155.
- Mensing CR, Norris SL. Diabetes Spectr Group education in diabetes: effectiveness and implementation. 2003; **16**:96–103.
- Funnell MM. *Patient-Centered Education: AADE in Practice*. 2007; **3**, 7.
- Tang TS, Funnell MM, Anderson RM. Group education strategies for diabetes self-management. *Diabetes Spectrum* 2006; **19**:99–105.
- Chodosh J, Morton SC, Mojica W, et al. Meta-analysis: chronic disease self-management programs for older adults. *Ann Intern Med* 2005; **143**:427–438.
- Bodenheimer T, MacGregor K, Sharifi C. *Helping Patients Manage Their Chronic Conditions*. Oakland, CA: California Health Care Foundation, 2005.
- Glasgow RE, Funnell MM, Bonomi AE, Davis C, Beckham V, Wagner EH. Self-management aspects of the improving chronic illness care breakthrough series: design and implementation with diabetes and heart failure teams. *Ann Behav Med* 2002; **24**:80–87.
- Kulzer B, Hermanns N, Reinecker H, Haak T. Effects of self-management training in type 2 diabetes: a randomized, prospective trial. *Diabet Med* 2007; **24**:415–423.
- Yamaoka K, Tango T. Efficacy of lifestyle education to prevent type 2 diabetes: a meta-analysis of randomized controlled trials. *Diabetes Care* 2005; **28**:2780–2786.
- Funnell MM, Anderson RM. Patient empowerment: a look back, a look ahead. *Diabetes Educ* 2003; **29**:454–464.
- Vég A, Rosenqvist U, Sarkadi A. Variation of patients' views on type 2 diabetes management over time. *Diabet Med* 2007; **24**:408–414.
- Freire P. *The Politics of Education: Culture, Power, and Liberation*. South Hadley, MA: Bergin & Garvey, 1985.

- 31 Shor I, Freire P. *A Pedagogy for Liberation: Dialogues on Transforming Education*. South Hadley, MA: Bergin & Garvey, 1987.
- 32 Funnell MM, Anderson RM. Empowerment and self-management of diabetes. *Clin Diabetes* 2004; **22**:123–127.
- 33 Welch GR, Ernst D. Motivational interviewing and diabetes: what is it, how is it used, and does it work? *Diabetes Spectr* 2006; **19**:5–11.
- 34 Akimoto M, Fukunishi I, Kanno K, Oogai Y, Horikawa N, Yamazaki T, et al. Psychosocial predictors of relapse among diabetes patients: a 2-year follow-up after inpatient diabetes education. *Psychosomatics* 2004; **45**:343–349.
- 35 Mensing CR, Norris SL. Group education in diabetes: effectiveness and implementation. *Diabetes Spectr* 2003; **6**:96–103.
- 36 Trento MP, Passera E, Borgo M, Tomalino M, Bajardi F, Cavallo Porta M. A 5-year randomized controlled study of learning, problem solving ability, and quality of life modifications in people with type 2 diabetes managed by group care. *Diabetes Care* 2004; **27**:670–675.
- 37 How Adults Learn. Ageless Learner, 1997–2007. Available from: <http://agelesslearner.com/intros/adultlearning.html>. Accessed on 20 September, 2208.
- 38 Sheehan MJ. Learning and implementing group process facilitation: individual experiences. Doctoral thesis, Griffith University, 2000.
- 39 Huang ES, Brown SES, Ewigman BG, Foley EC, Meltzer DO. Patient perceptions of quality of life with diabetes-related complications and treatments. *Diabetes Care* 2007; **30**:2478–2483.
- 40 Leventhal H, Brissette I, Leventhal EA. The common-sense model of self-regulation of health and illness. In: Cameron LD, Leventhal H, eds. *The Self-Regulation of Health and Illness Behaviour*. London: Routledge, 2003: 42–65.
- 41 Bandura A. *Social Learning Theory*. New York: General Learning Press, 1977.
- 42 Chaiken S, Wood W, Eagly A. Principles of persuasion. In: Higgins ET, Kruglanski AW, eds. *Social Psychology: Handbook of Basic Principles*. New York: Guilford Press, 1996: 702–744.
- 43 Parkin T, Skinner TC. Does patient perception of consultation concord with professional perception of consultation. *Diabet Med* 2002; **19**(Suppl. 2): A14.
- 44 Prochaska JO, DiClemente CC, Norcross JC. In search of how people change. *Am Psychol* 1992; **47**:1102–1104.
- 45 Rollnick S, Mason P, Butler CC. *Health Behavior Change: A Guide for Practitioners*. Churchill Livingstone, 1999.
- 46 Harrison TA, Hindorff LA, Kim H, Wines RC, Bowen DJ, McGrath BB, et al. Family history of diabetes as a potential public health tool. *Am J Prev Med* 2003; **24**:152–159.
- 47 Bandura A. Health promotion by social cognitive means. *Health Educ Behav* 2004; **31**:143–164.
- 48 Wlodkowski RJ. Strategies to enhance adult motivation to learn. In: Galbraith MW, ed. *Adult Learning Methods*, 2nd edn. Malabar, FL: Krieger Publishing Company, 1998: 91–111.
- 49 Long, HB. Understanding adult learners. In: Galbraith MW, ed. *Adult Learning Methods*, 2nd edn. Malabar, FL: Krieger Publishing Company, 1998: 21–35.
- 50 The Diabetes Conversation Map™ educational tools. Healthy Interactions Inc. (Healthyi). Available from: <http://www.healthyinteractions.com>. Accessed on 1 June, 2009.
- 51 Bio-Medicine. Press release from June 22–26, 2007. American Diabetes Association and Healthy Interactions announce a collaboration to transform diabetes education. Available from: <http://www.bio-medicine.org/medicine-news-1/Healthy-Interactions-and-Merck-Announce-Further-Collaboration-to-Transform-Diabetes-Education-in-the-U-S-21134-1>. Accessed on 10 March, 2009.
- 52 Deakin T, McShane CE, Cade JE, Williams RD. Group based training for self-management strategies in people with type 2 diabetes mellitus. *Cochrane Database Syst Rev* 2005; **2**:CD003417.
- 53 Rickheim PL, Weaver TW, Flader JL, Kendall DL. Assessment of group versus individual diabetes education: a randomized study. *Diabetes Care* 2002; **25**:269–274.
- 54 Smaldone A, Weinger K. Review: group based education in self-management strategies improves outcomes in type 2 diabetes mellitus. *Evid Based Nurs* 2005; **8**:111.
- 55 Sarkadi A, Rosenqvist U. Experience-based group education in type 2 diabetes a randomised controlled trial. *Patient Educ Couns* 2004; **53**:291–298.
- 56 Department of Health. *National Service Framework for Diabetes: Standards* (2001); Department of Health. *National Service Framework for Diabetes: Delivery Strategy* (2003). Available from: http://www.dh.gov.uk/PublicationsAndStatistics/Publications/PublicationsPolicyAndGuidance/PublicationsPolicyAndGuidanceArticle/fs/en?CONTENT_ID=4002951&chk=09Kkz1 and http://www.dh.gov.uk/PublicationsAndStatistics/Publications/PublicationsPolicyAndGuidance/PublicationsPolicyAndGuidanceArticle/fs/en?CONTENT_ID=4003246&chk=IKNg9r2. Accessed on 10 March, 2009.
- 57 National Institute for Health and Clinical Excellence. Diabetes (types 1 and 2): patient education models (No. 60). The clinical effectiveness and cost effectiveness of patient education models for diabetes (April 2003). Available from: <http://www.nice.org.uk/page.aspx?o=TA060>. Accessed on 10 March, 2009.
- 58 How to Assess Structured Diabetes Education: An improvement toolkit for commissioners and local diabetes communities. Available from: http://www.diabetes.nhs.uk/downloads/Patient_Education_Tools_Project/Patient_Education_Tools_Project_2006.pdf. Accessed on 10 March, 2009.
- 59 American Diabetes Association Recognition Programs. Available from: <http://www.diabetes.org/for-health-professionals-and-scientists/recognition/edrecognition.jsp>. Accessed on 10 January, 2009.
- 60 National diabetes self-management class attendance data. Diabetes Prevention and Control Programs. Available from: http://www.gov/diabetes/statistics/preventive/fy_class.htm. Accessed on 20 March, 2009.
- 61 Diabetes Education Fact Sheet. 2007 Roper US Diabetes Patient Market Study. Available from: http://www.diabeteseducator.org/export/sites/aade/_resources/pdf/Diabetes_Education_Fact_Sheet-DP.pdf. Accessed on 20 April, 2009.
- 62 Diabetes Education Fact Sheet. Available from: www.diabeteseducator.org/export/sites/aade/_resources/pdf/Diabetes_Education_Fact_Sheet-DP.pdf. Accessed on 20 March, 2009.
- 63 Healthy People 2010: Summary of Objectives. Available from: www.healthypeople.gov/document/HTML/Volume1/05Diabetes.htm. Accessed on 20 February, 2009.
- 64 Loveman E, Frampton GK, Clegg AJ. The clinical effectiveness of diabetes education models for type 2 diabetes: a systematic review. *Health Technol Assess* 2008; **12**:1–116.
- 65 Mensing C. *The Art and Science of Diabetes Education: A Reference Book for Health Professionals*. American Association of Diabetes Educators (AADE), 2006: 574–574.
- 66 Pearson TL. *Facilitating Behavior Change: Hear your Patient's Story*. AADE in Practice. 2007; **4**:6.

- 67 Anderson RM, Patrias R. Getting out ahead: the diabetes concerns assessment form. *Clin Diabetes* 2007; **25**:141–143.
- 68 Zgibor JC, Peyrot M, Ruppert K, Noulet W, Siminerio LM, Peoples M, et al. Using the American Association of Diabetes Educators outcomes system to identify patient behavior change goals and diabetes educator responses. *Diabetes Educ* 2007; **33**:839–842.
- 69 Whitlock EP, Orleans T, Pender N, Allan J. Evaluating primary care behavioral counseling interventions: an evidence based approach. *Am J Prev Med* 2002; **22**:267–284.
- 70 Peoples M, Tomky D, Mulcahy K, Peyrot M, Siminerio L. AADE Outcomes Project and AADE/UMPC Diabetes Education Outcomes Project. Evolution of the American Association of Diabetes Educators' Diabetes Education Outcomes Project. *Diabetes Educ* 2007; **33**:794–817.
- 71 Bodenheimer T, Davis C, Holman H. Practical Pointer: helping patients adopt healthy behaviors. *Clin Diabetes* 2007; **25**:66–70.
- 72 Norris SL, Nichols PJ, Caspersen CJ, Glasgow RE, Engelgau MM, Jack L, et al. The effectiveness of disease and case management for people with diabetes: a systematic review. *Am J Med* 2002; **22**(Suppl):15.
- 73 Available from: http://www.medialit.org/reading_room/article8.html.
- 74 *Managing Diabetes. Improving services for people with diabetes.* Commission for Healthcare Audit and Inspection 2007, London. Available from: http://www.cqc.org.uk/_db/_documents/Managing_Diabetes_1_200707300356.pdf. Accessed on 23 December, 2009.