

Engaging and Empowering Patients to Manage Their Type 2 Diabetes, Part II: Initiatives for Success

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ABSTRACT

Type 2 diabetes (T2D) has reached pandemic proportions. The impact of it and its long-term sequelae represent a significant burden for many healthcare systems around the world, and a significant number of patients struggle to achieve the internationally recommended targets for the modifiable risk factors that optimize healthy outcomes. In the first part of this two-part review, the scene was set showing that there seems to be a knowledge, attitude, and practice (KAP) gap hindering successful management of T2D. Although theoretical knowledge about how T2D should be managed exists, the attitude of patients and healthcare professionals seems to influence the practicalities of implementing life-enhancing

changes for patients living with diabetes. Following the chronic care model, macro-level initiatives such as Finland's national diabetes program, "The Development Programme for the Prevention and Care of Diabetes" (DEHKO), encourage a coordinated, supportive policy and financial environment for healthcare system change, and are advocated by the International Diabetes Federation. Over a 10-year period, the DEHKO program aims to demonstrate that a top-down population approach to prevention, focusing on reducing obesity, increasing physical activity, and encouraging healthier eating habits, may improve the overall health of the nation. However, the patient is the focus of day-to-day management of T2D, and innovative strategies that use a community (meso-level) approach to encourage self-management, or that embrace new technologies to access diabetes self-management education or support networks, are likely to be the way forward. Such measures may close the apparent KAP gap and bring about real and measurable benefits in quality of life and life expectancy. The second part of this review describes some of the many and varied initiatives designed to engage and empower patients to self-manage their T2D, with the aim of increasing the proportion of patients reaching health-

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related targets. This will ultimately impact on national health systems and the quality of life of the nation.

Keywords: antihyperglycemic agents; cardiovascular risk; diabetes management; glycemic control; patient engagement; type 2 diabetes

INTRODUCTION

Type 2 diabetes (T2D) has reached pandemic proportions. The impact of the disorder and its long-term sequelae represent a significant burden for many healthcare systems around the world,¹ and current approaches for its prevention and management seem unable to slow the inexorable rise in its prevalence, and morbidity and mortality rates.^{2,3} Theoretical knowledge of how T2D should be managed exists, and theory tells us that patients with T2D will achieve successful clinical and health outcomes if they take control of their life and engage with self-managing their condition.^{4,5} Yet despite this theoretical knowledge, despite advances in the efficacy of antihyperglycemic agents, and despite extensive patient-focused campaigns to reinforce the importance of glycemic control, patients with T2D often struggle to achieve the internationally recommended targets for the modifiable risk factors, such as glycated hemoglobin (HbA_{1c}), blood pressure, or lipids,⁶⁻⁹ that support healthy outcomes.

The evidence presented in Part I of this two-part review suggests that the attitude of patients and healthcare professionals may be influencing the practicalities of implementing life-enhancing changes in behavior that empower patients to live positively with T2D.¹⁰ There appears to be a knowledge, attitude, and practice (KAP) gap that is hindering successful management of this condition. Review of published literature

suggests that there have been many wide-ranging initiatives with the potential to close this apparent KAP gap. But, as the prevalence of T2D continues to rise and few patients appear to be able to reach, or importantly maintain, targets for the modifiable risk factors that affect quality of life and life expectancy, it appears difficult to determine if any one approach or combination of approaches is better than any other. The second part of this review describes some of the many and varied initiatives designed to engage and empower patients to self-manage their T2D. By increasing the proportion of patients reaching health-related targets, a potentially beneficial impact on national health systems and the general overall health of the nation is foreseen. This article also asks readers to consider which initiatives have the potential to close the KAP gap in their clinical practice, and thus bring about real and measurable benefits for the quality of life and life expectancy of their patients.

ENGAGING STAKEHOLDERS

The Innovative Care for Chronic Conditions framework advocated by the International Diabetes Federation provides a schematic that encapsulates the macro- (policy and financing), meso- (healthcare organization and community), and micro- (patient and family) levels of support necessary for better outcomes for patients with all types of diabetes.^{11,12} There is no doubt that considerable input from all stakeholders is required for this framework to be a success, and thus limit the progressive nature of T2D and its cardiovascular complications.

Encouraging Behavioral Change at the Macro-Level is Necessary...

Macro-level initiatives such as Finland's national diabetes program, DEHKO (The

Development Programme for the Prevention and Care of Diabetes; Figure 1),¹³ are advocated by the International Diabetes Federation to encourage a coordinated, supportive policy and financial environment for healthcare system change towards the prevention of T2D.^{14,15} The 10-year DEHKO program comprises three concurrent strategies: a “population strategy,” which focuses on promoting the health of the entire population; a “high-risk strategy,” where prevention initiatives include screening, education, and monitoring of patients at high risk of developing T2D (eg, those with metabolic syndrome or glucose

intolerance); and a “strategy of early diagnosis and management,” which offers practical instructions for intensive lifestyle management in newly diagnosed patients.¹³ An interim evaluation of the study in 2007 suggested that preventive measures have improved, and preventive action has gained a firm foothold in primary and occupational healthcare. An improvement in the level of T2D care is also evident.¹³ The final results of this program are awaited with interest.

When a country implements a national diabetes program, it is an indication of its commitment to the prevention of diabetes and to

Figure 1. The national diabetes program for Finland.¹³ DEHKO=The Development Programme for the Prevention and Care of Diabetes. *Reproduced from: Finnish Diabetes Association. Development Programme for the Prevention and Care of Diabetes in Finland DEHKO 2000-2010. Available at: http://www.diabetes.fi/tiedoston_katsominen.php?dok_id=1275.*

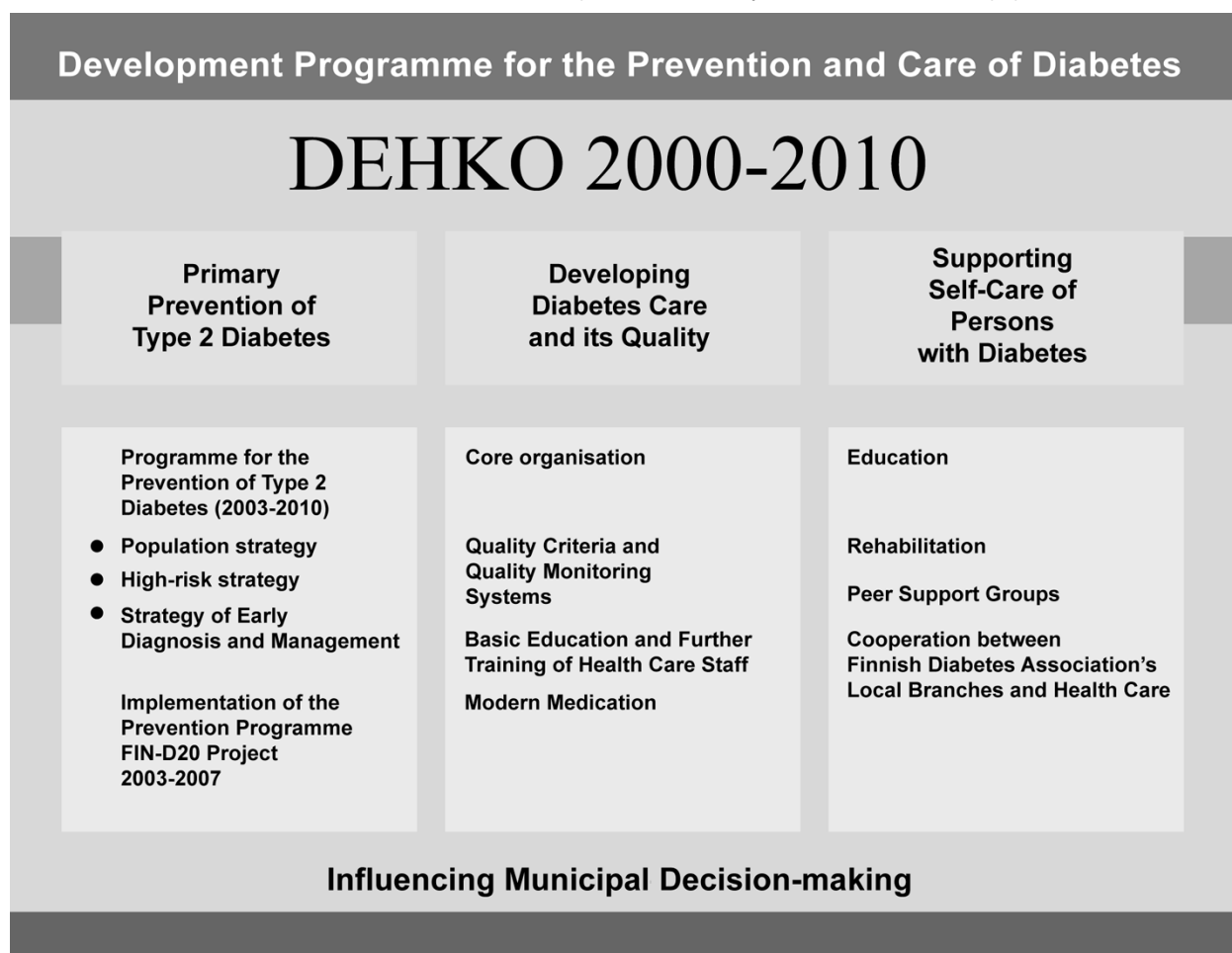


Table 1. Modifiable and nonmodifiable risk factors and associated disorders for type 2 diabetes.¹⁸ *Reproduced from: Alberti KGMM, Zimmet P, Shaw J. International Diabetes Federation: a consensus on type 2 diabetes prevention. Diabet Med. 2007;24:451-463. Copyright 2007 by John Wiley and Sons. Reproduced with permission of John Wiley and Sons via Copyright Clearance Center.*

Modifiable risk factors	Nonmodifiable risk factors
<ul style="list-style-type: none"> • Overweight* and obesity† (central and total) • Sedentary lifestyle • Previously identified glucose intolerance (IGT and/or IFG) • Metabolic syndrome: <ul style="list-style-type: none"> ▪ Hypertension ▪ Decreased HDL cholesterol ▪ Increased triglycerides • Dietary factors • Intrauterine environment • Inflammation 	<ul style="list-style-type: none"> • Ethnicity • Family history of type 2 diabetes • Age • Gender • History of gestational diabetes • Polycystic ovary syndrome

*World Health Organization criteria define overweight as a body mass index ≥ 25 kg/m².

†World Health Organization criteria define obesity as a body mass index ≥ 30 kg/m².

HDL=high-density lipoprotein; IFG=impaired fasting glucose; IGT=impaired glucose tolerance.

Figure 2. The International Diabetes Federation (IDF) population approach to diabetes prevention.¹⁸ *Reproduced from: Alberti KGMM, Zimmet P, Shaw J. International Diabetes Federation: a consensus on type 2 diabetes prevention. Diabet Med. 2007;24:451-463. Copyright 2007 by John Wiley and Sons. Reproduced with permission of John Wiley and Sons via Copyright Clearance Center.*

The IDF population approach to diabetes prevention

Based on the findings of lifestyle prevention studies, the IDF recommends that:

- Everyone is encouraged to engage in at least 30 minutes of moderately intense exercise (e.g. brisk walking) most days of the week
- Everyone should be encouraged to maintain a healthy weight
- Adults with BMI >25 kg/m² in Europeans and >23 kg/m² in Asians should be encouraged to attain and maintain a healthy weight and/or 5-10% weight reduction
- Children should be encouraged to attain and maintain weight for heights in the normal range

Priorities in developed and developing worlds:

- Approach needs to be culturally sensitive
- Cultural beliefs (e.g. about obesity) need to be understood and addressed

the care of those affected. Adopting this activity means that the country recognizes that a macro-behavioral change is needed to bring about change at meso-levels.¹⁴ The close relationship between obesity and diabetes, referred to as a “diabesity epidemic”¹⁶ also puts strategies to reduce obesity at the forefront of national diabetes prevention plans,^{17,18} especially as

obesity is the most important single modifiable risk factor for T2D (Table 1). Overall, a focus on improving the health of a larger percentage of the population than just those identified at being at risk of T2D, eg, by encouraging regular exercise, forms the basis of a national macro-level population approach (Figure 2) for the prevention of T2D (Figure 3).^{17,18}

Figure 3. National diabetes prevention plans (macro-level initiatives).¹⁸ *Reproduced from: Alberti KGMM, Zimmet P, Shaw J. International Diabetes Federation: a consensus on type 2 diabetes prevention. Diabet Med. 2007;24:451-463. Copyright 2007 by John Wiley and Sons. Reproduced with permission of John Wiley and Sons via Copyright Clearance Center.*

National Diabetes Prevention Plans	
Government initiatives should include:	
•	Advocacy <ul style="list-style-type: none"> – Supporting national associations and non-government organizations – Promoting the economic case for prevention
•	Community support <ul style="list-style-type: none"> – Providing education in schools re: nutrition and physical activity – Promoting opportunities for physical activity through urban design (e.g. to encourage cycling and walking) – Supporting sports facilities for the general population
•	Fiscal and legislative <ul style="list-style-type: none"> – Examining food pricing, labelling and advertising – Enforcing environmental and infrastructure regulation, e.g. urban planning and transportation policy to enhance physical activity
•	Engagement of private sector <ul style="list-style-type: none"> – Promoting health in the workplace – Ensuring healthy food policies in food industry
•	Media communication <ul style="list-style-type: none"> – Improving level of knowledge and motivation of the population (press, TV and radio)

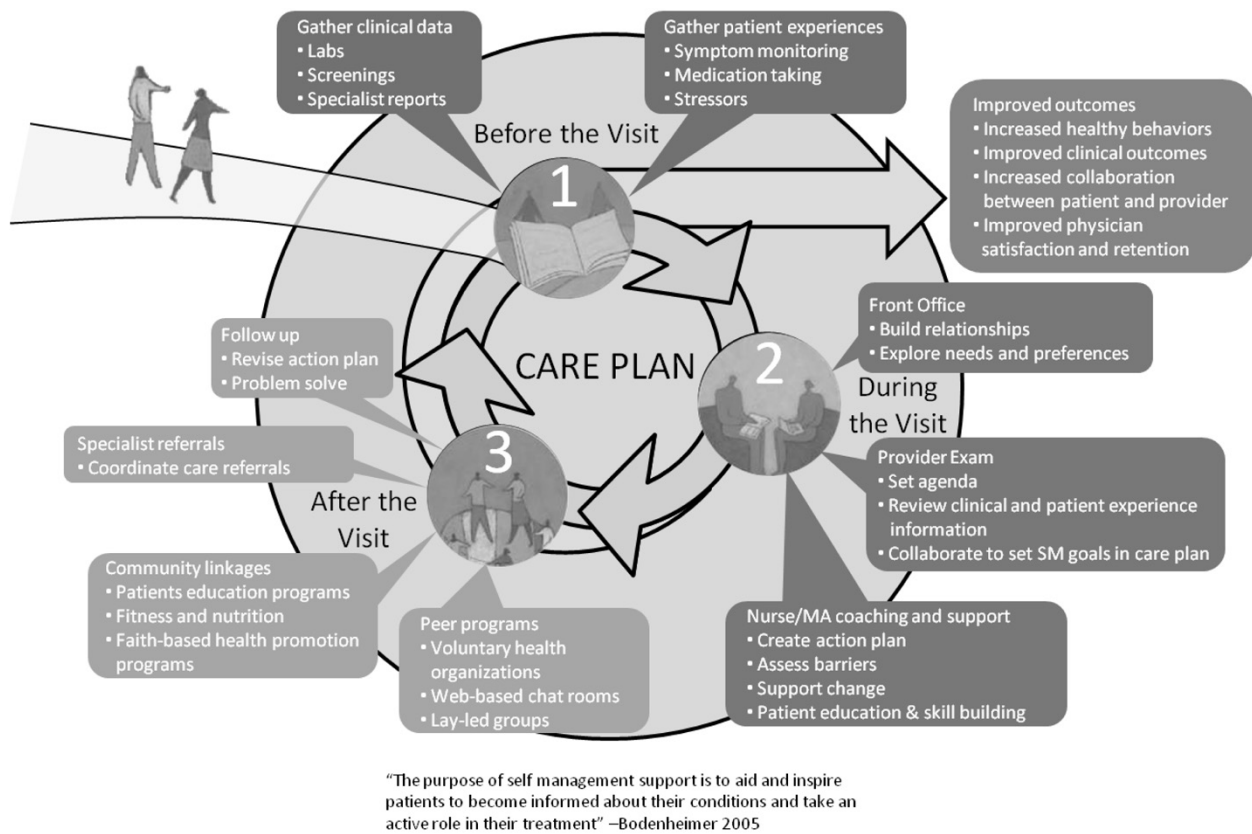
...But the Patient is Still Key and Therefore Self-Management Support is Essential

Ultimately, however, it is patients who manage T2D, not healthcare professionals.¹⁹ But the ability to make the correct decisions to enable successful self-management of a chronic illness, such as T2D, is not an innate skill possessed by all patients. Following the chronic care model, the wider community needs to become engaged in providing psychosocial support to help those with T2D self-manage their condition. By adopting innovative strategies that gain the commitment of healthcare professionals, patient support groups, and expert patients, a meso-level community approach to tackling the “diabetes epidemic” has the potential to make significant inroads towards changing the status quo for patients and their families and to increase social engagement in the wider community. A systematic review of controlled

intervention studies examining social support in diabetes (including group consultations, internet or telephone-based peer support, and social support groups) suggested that specific social support interventions positively affect patient self-care and diabetes outcomes.²⁰ In theory, programs that help to ensure that care-giving teams are prepared and proactive, that result in patients and their families becoming informed and activated, may increase the likelihood of all stakeholders making the changes needed to improve patients’ motivation, quality of life, and ultimately, life expectancy. The aim is for such “bottom-up” approaches to spread their influence to the meso-level and beyond.

Behavioral changes that encourage individuals to effectively self-manage their diabetes are more likely to be adopted if the changes are personally meaningful and high self-efficacy (confidence in ability to carry out the required behavior) is present.^{5,21,22}

Figure 4. Self-management support collaboration.³⁶ Reproduced from: “Collaborative Care: Cycle of Self-Management Support” (Schaefer J, Miller D, Goldstein M, Simmons L. *Partnering in Self-Management Support: A Toolkit for Clinicians*. Cambridge, MA: Institute for Healthcare Improvement; 2009. Available at: www.IHI.org).



Expert Patients: a Clue to Improving Patients’ Motivation?

The feel-good factor gained from helping others can be a powerful, personally meaningful motivator for patients with diabetes in the wider community to become involved in initiatives designed to encourage self-management by each and every individual with T2D. Realizing that they can make a difference may also increase their self-efficacy once they become involved. Recognizing this, initiatives that focus on recruiting “expert patients” and individuals in the wider community to act as mentors and advocates for nonexpert patients can be used to engage both the expert and nonexpert patient alike. These initiatives may also bring

a level of social or public recognition to expert patients that may act as an additional reward for these individuals.

The first requirement of any initiative designed to motivate patients to improve their quality of life and lower complications is that the program should engage with the target audience. The initiative needs to include measures that help patients understand that the required action will have personally meaningful results; for example, improved quality of life and also reduced complication rates. Secondly, for the initiative to be successful it needs to encourage self-efficacy so that patients are empowered to adopt the required behaviors that fulfill their expectations, thus reinforcing their engagement with the program.²¹ In

these circumstances, the patient is naturally in control of day-to-day decisions that affect their health. However, healthcare professionals, and indeed the community at large, need to realize that there is a requirement to support patients to enable them to take a more active role in improving their health.¹⁹ A traditional prescriptive or “do-as-I-tell-you” approach from healthcare professionals does not encourage self-management. The more demanding role of the healthcare professional in offering self-management support, including involvement in providing diabetes self-management education, is considered essential, perhaps even critical, for success.²³⁻²⁶

It Should Be Self-Management Education not Health Education

Health education provided in isolation is insufficient to bring about behavioral change as it is usually a one-way communication, from the educator to the student. Enhancing self-management skills and confidence by encouraging a problem-solving approach allows patients to construct an action plan, and can empower, motivate, and engage individuals to improve their health outcomes, whatever their health literacy status.^{27,28} Through use of behavioral strategies, such as the “5A’s” (assess, advise, agree, assist, arrange) construct, which encourage collaborative action rather than dictatorial instruction, healthcare professionals and patients can formulate personalized action plans that include specific behavioral goals and ways to overcome barriers to attain them.²⁹⁻³¹ This type of approach also encourages the use of “ask-tell-ask” or “closing the loop” techniques to ensure that patients get the information they need and that information is understood.^{31,32} Similarly, motivational interviewing, a patient-centered direct communication technique

designed to change behavior by exploring and resolving ambivalence, has been applied to self-management support in various chronic disease populations.³¹ One study by Lorig et al. in patients with arthritis,³³ suggested that self-management groups led by patients achieved similar results to those led by professionals. Patients taught by a professional demonstrated a greater knowledge of their disease, whereas patient-taught groups had significantly greater changes in relaxation and exhibited a tendency towards reduced disability. However, a meta-analysis evaluating its effectiveness did not indicate that this technique produced any significant effects on HbA_{1c} control.^{31,34}

WHICH INITIATIVES AIM TO IMPROVE SELF-MANAGEMENT?

Educating the Educators: Self-management Toolkits and Structured Education Programs

A 2008 systematic review of literature published on educational interventions in diabetes suggests that education delivered by a team of educators, with reinforcement made at additional points of contact, may provide the best opportunity for improvements in patient outcomes. However, it was unclear what resources need to be directed at the educators to ensure successful delivery of these educational programs.³⁵ The US Institute for Healthcare Improvement considers that the best way forward for healthcare professionals to embrace the idea of self-management support is through collaborative activities (Figure 4), rather than directive ones. One example of such an activity is the development of a toolkit to assist healthcare professionals support patient self-management.³⁶ In the UK, the Diabetes Manual based on the UK Medical Research Council’s complex intervention

framework was developed as a structured education program for patients managed in a general practice environment.³⁷ It was designed to increase self-efficacy for diabetes self-management by first educating healthcare professionals (for example, practice nurses) in self-management support techniques and then providing them with self-management interventions that would consequentially lead to measurable improvements in HbA_{1c} and cardiovascular risk factors, self-efficacy, and quality of life in their patients.³⁷

However, the key unknown is whether the level of training of educators affects the success of the education.³⁵ Further data from randomized controlled trials (RCTs) demonstrating the benefits of the many varied initiatives to educate the educators and patients on meaningful T2D outcomes are needed. Indeed, a first report from an RCT of the effects of the UK Diabetes Manual demonstrated no significant difference on HbA_{1c} between the intervention and control group, although use of the Manual achieved small improvements in diabetes-related distress scores and confidence to self-care.³⁸ Similarly, use of a UK program, Diabetes Education and Self-Management for Ongoing and Newly Diagnosed T2D (DESMOND), did not improve glycemic control compared with usual care, but did result in greater improvements in weight loss and smoking cessation along with positive improvements in beliefs about illness.³⁹ Such national programs are usually costly to design, initiate, and implement, and thus far the level of benefit and overall return on investment for some initiatives appear somewhat limited. In routine clinical practice, limited resources, burgeoning costs, and reimbursement constraints limit both contact time between healthcare professionals and patients, and the ability of healthcare professionals to assist them in self-management.⁴⁰

The costs associated with conducting evidence-based research that will support the use of interventions also hinder their implementation. For example, the direct research and personnel costs of establishing a practice nurse-led RCT to assess the effectiveness of the Patient Engagement and Coaching for Health (PEACH) study were considerably higher than anticipated. In addition, a lack of research skills among practice nurses required intensive support from the research team.⁴¹

The measures used to assess the success of self-management programs should align with the goals of the program.⁴² In the USA, the American Association of Diabetes Educators (AADE) considers changes in patient behavior to be the outcome most sensitive to its diabetes self-management support. Measures of seven self-care behaviors are recommended to determine the effectiveness of such programs at the individual and population levels: blood glucose monitoring; problem-solving; taking medication; psychosocial adaptation; reducing the risk of complications; being active; and eating. Other evaluation measures may include rates of adherence to guidelines, patient health outcomes, patient satisfaction, reduced healthcare utilization, and increased patient productivity.⁴² However, for diabetes self-management programs to become more widely accepted, it is important to report intervention-related costs (encompassing both development and implementation) and, where feasible, cost-effectiveness or other economic outcomes. Increasingly, complex computerized modeling and simulation techniques are being employed to estimate the future savings from a reduced risk of diabetes complications.^{43,44}

In an age of uncertain government funding, industry-healthcare partnerships may provide a way to both develop and implement numerous initiatives that will ultimately benefit patients

through the availability of educational grants. For example, FORWARD, sponsored jointly by an AstraZeneca/Bristol-Myers Squibb alliance, is a pan-European medical educational program that will utilize “train-the-trainer” programs and interactive web-based technology (an e-platform) to cascade best practice recommendations for T2D agreed by a core faculty of international and national experts comprising general practitioners, nurses, and junior hospital staff at the forefront of diabetes management.⁴⁵ By building an online educational community for healthcare professionals it is hoped that these initiatives and other similar programs will help healthcare professionals engage with and empower patients to self-manage their condition.

A patient-oriented online initiative, “Taking Control of Your Diabetes,” which is funded by a number of industry partners, helps bring together patients and a range of healthcare professionals, in order to provide comprehensive advice and information on T2D.⁴⁶

Using Interactive Communication Technologies

Increasing the use of interactive communication techniques and technologies (eg, radio, television, telephone, email, video, and computer links) to disseminate information and communicate with a wider audience has been shown to help address health literacy deficits and encourage self-efficacy.⁴⁷

In the USA, the Informatics for Diabetes Education and Telemedicine (IDEATel) project installed telemedicine units (web-enabled computers to upload blood glucose and blood pressure readings) into the homes of an ethnically diverse, medically underserved population of older (≥ 55 years) patients with T2D.⁴⁸ By using videoconferencing, the patient’s case manager could discuss various aspects of their diabetes,

counsel them about nutrition and activity, and help them formulate a self-management plan with specific attainable goals. IDEATel increased self-efficacy over time, which was both directly and indirectly related to improved glycemic control but not blood pressure or lipid levels.⁴⁸ The reasons for this are unclear, although this may be due to a lesser emphasis on behavioral changes that would improve blood pressure and lipid levels.⁴⁹

With advances in cell phone technology has come the facility to connect directly to individuals and provide a means of giving self-management support at anytime and anywhere. A 2008 systematic review identified 18 studies that evaluated the use of a cell phone to provide health information to persons with diabetes or obesity. This review concluded that providing care and support via cell phones and text messaging improved diabetes-related health outcomes by increasing knowledge and self-efficacy, improving the uptake of those carrying out required self-management behaviors.⁴⁹ In nine out of the ten studies that measured effect on HbA_{1c}, those that received education and care support via cell phone reported significant improvement in control.⁴⁹

Similarly, in a study of 35,423 people with diabetes, hypertension, or both, the use of secure patient-physician email was associated with a significant improvement in the efficacy of care received. Between 2006 and 2008, according to the Healthcare Effectiveness Data and Information Set, patients using the system were more likely to be screened for nephropathy and retinopathy, and had lower HbA_{1c} and low-density lipoprotein cholesterol levels compared with patients that did not. Over 550,000 distinct email threads were established containing over 630,000 exchanged messages; in 85% of cases the threads were initiated by the patients.⁵⁰

Repositories for personal health-related information, such as that provided by Google Health⁵¹ or Microsoft HealthVault⁵² utilize internet technology to urge individuals to “take charge of your health information” by providing a “safe, secure, and free” place to organize personal records. Such services also allow those providing support to access these records but emphasize that it is the individual who has control of what records are loaded and who accesses them. Both services also contain links to online health services including applications to upload data from health and fitness devices (eg, glucometers, blood pressure devices, pedometers). Although it should be remembered that many of the links are to information and applications provided by commercial suppliers, similar internet-enabled repositories could also provide a means of communication that engages patients.

However, whilst technology has increased access to a vast amount of information about all aspects of T2D management, not all of this information is easily accessible to all socio-economic groups or geographical regions. Even for those who have internet access, the level of literacy and language skills of the individual will affect whether the information or concepts are easily understood or not. In the USA, for example, over one-third of adults are classed as having only basic or below basic literacy levels, while in some parts of the developing world approximately one-third to one-half of the population is estimated to be illiterate.^{53,54}

A recent initiative in Germany, Vision2, uses a DVD format to present information about T2D in a fun way as infotainment. By targeting this initiative at close friends and relatives as well as the patient, the aim is to foster better understanding so that the patient’s local community of friends and family can collectively embrace the concept of healthier living, and

thus also help the patient to self-manage their T2D. The DVDs include animated sequences and diagrams explaining diabetes, and how the potential development of complications can be prevented, namely through a broad and intensive cardiovascular risk management program, and how lifestyle can be modified to reduce the cardiometabolic risk. The package includes DVDs with 12 individual films/modules each lasting 20 minutes, and an accompanying booklet, an exercise book and quiz, and access to an internet portal with additional information such as an energy balance calculator, recipes, and to the Vision2 web site.⁵⁵ Also included is a Nordic walking educational film hosted by a former Olympian and world-champion walker that demonstrates proper technique for this activity. The program emphasizes that lifestyle changes can be tailored to the type of social circumstances and daily pattern of life that the individual wants to lead.

It is the intention of the authors to show that healthier lifestyle changes can be implemented in a normal family, without giving up fun and pleasure. This can be delivered at a very high standard, to everyone, at any time. This can also be repeated many times. Furthermore, as the general practitioner is also familiar with the content of the DVD, the patient can easily discuss and ask questions if they have any uncertainties. Tests have shown that all sides: patients, their relatives, and their general practitioners were very happy with this form of additional education.

Involving the Wider Community: Expert Patients, Lay-Led Programs, and Social Networks

Individuals with high levels of health literacy can become expert patients who understand their condition better and have worked out

how to manage it. These individuals can be encouraged to act as advocates to raise the health literacy levels of others and thereby encourage self-efficacy and help them to self-manage their diabetes. Expert patient programs are one way of coaching patients on how to improve self-management, and lay-led self-care support groups have been successfully used for patients with chronic conditions like diabetes. These groups have been shown to improve self-efficacy and energy levels with cost-savings to healthcare systems, and can also be used to reach out to ethnic minorities.⁵⁶⁻⁵⁸

Creating e-groups and virtual collaborative projects can connect and support those who want to work together (patients, family members, healthcare professionals) to improve self-management.⁵⁹ The Global Alliance for Self-Management Support (g@sms) initiative provides a collaborative platform for both organizations and individuals (patients and healthcare professionals) with an interest in a chronic illness to network online and provide or gain mutual support.⁶⁰ This site includes a link to the expert patient program for Spanish citizens. By including YouTube videos from an expert patient forum held in Spain in December 2009, the internet site can also be used to help doctors realize the importance of motivation, and support patients by showing how this approach can impact positively on outcomes that have previously been difficult to influence. As well as providing social support for patients by encouraging social networking, g@sms also aims to benchmark best practices and global clinical research interventions.

Live interactive team workspaces created using Web 2.0 technology can also enable healthcare professionals to collaboratively author and comment on publications that aim to distil and disseminate the best available knowledge on how to meet the challenges faced by people living

with multiple chronic diseases. Team workspace hosted on the Observatory of Innovative Practice for Complex Disease Management portal (www.opimec.org/comunidad/)⁶¹ has recently allowed collaborative authorship of a book focusing on the global challenge of helping people to live with multiple chronic diseases.³⁰

Social networking via the internet or via new many-to-many mobile telecommunication tools such as Twitter may also provide a new model for diabetes self-management education that will both engage and support patients. These methods of engagement are likely to be important avenues of communication to reach and educate younger people. Though the potential benefits that social networking brings are recognized, such as the ability to share experience with others in a similar situation, and the opportunity to reach a wider audience, there is also an awareness of the potential for misinformation. One possible solution is a Wikipedia-style volunteer system, led by experts in the field, to monitor and validate the information provided through the network.

Engaging the Whole Community, not Just T2D Patients: a Population Approach

“In societies that encourage unhealthy lifestyles, information and education alone will not succeed. Attention must be paid to the creation of an environment and conditions that are conducive to achieving and maintaining an active lifestyle and healthy eating habits.”^{17,18}

As well as its role in prevention of disease, the attitude of the wider community to lifestyle modification can play a role in helping those with T2D to make the lifestyle changes that help them with self-management.

To support this aspect of health improvement, national campaigns have been introduced to engage a broader audience. For example, the UK

National Health Service is currently running the “change4life” campaign with the slogan “Eat well, Move more, Live longer” that is aimed at improving the health of the whole nation.⁶² The web site encourages active participation by membership registration, identifies sports facilities and fun activities by postcode locality, as well as offering dietary advice and top tips for healthy families.

In the Netherlands, a prevention protocol, “Be active, eat right” aimed at overweight children is being evaluated in a cluster RCT.⁶³ The WISE CHOICES program uses an integrated CD-ROM and interactive voice response dietary change intervention that combines behavior problem-solving theory with a high degree of user choice. The aim of this is to help adult women increase their consumption of fruits and vegetables and decrease consumption of fat.⁶⁴

Improving Pharmacotherapeutic Strategies and Outcome Measurement

As discussed in Part I of this review,¹⁰ pharmacological advances and new therapeutic management strategies may help improve glycemic control but any benefits they can offer must be clearly demonstrated in extensive clinical trials, which should ideally include outcome measures that are meaningful to patients.

Newer pharmacotherapeutic agents that mimic physiological phenomena more closely with potentially fewer adverse effects, such as weight gain and hypoglycemia (often also triggering additional eating and thus weight gain), combined with management strategies that involve patients in decision-making may encourage patients to adhere to therapeutic lifestyle changes (TLC) treatment and attain therapeutic goals. However, recent findings from large studies such as the Action to Control Cardiovascular Risk Diabetes (ACCORD),⁶⁵

Veterans Affairs Diabetes Trial (VADT),⁶⁶ and The Action in Diabetes and Vascular Disease: Preterax and Diamicon Modified Release Controlled Evaluation (ADVANCE) study,⁶⁷ suggest there is increasing evidence that HbA_{1c} target levels need further review and that an individually agreed target level may be more appropriate.

There is still a need to re-evaluate which measures are meaningful to patients and what patients need to know in order for them to understand the impact that reaching recommended targets has on their quality of life and life expectancy. Perhaps the results of fact-finding initiatives such as the pan-European PANORAMA diabetes study (www.clinicaltrials.gov identifier: NCT009165313), supported by an AstraZeneca/Bristol-Myers Squibb alliance, may provide useful insight into what constitutes meaningful patient-focused outcome measures that engage patients and improve self-management.

SUMMARY

It is clear that the factors that engage patients to take control of their life and self-manage their T2D are complex. Over the last few years, there have been many and varied initiatives aimed at both healthcare professionals and patients. New communication technologies make it easier to exchange ideas, disseminate information, and elicit social support to increase health literacy and self-efficacy. Newer pharmacotherapeutic agents that mimic physiological phenomena more closely, with fewer adverse effects, may encourage patients to adhere to treatment and attain therapeutic goals. There is a need for further research to quantify whether any innovative strategy improves self-management to the extent that it adds value to the management of T2D, by increasing the number of patients who reach target. Whether these strategies will be able to

reverse or at least slow the inexorable rise in diabetes prevalence remains to be seen. The key building blocks for success are the innovative strategies that empower and engage patients to take ownership, and provide them with the psychosocial support to continue to do so. "All patients with chronic illness make decisions and engage in behaviours that affect their health,"⁶⁸ but the role of healthcare providers and indeed, society as a whole, is to ensure that those with T2D or at risk of developing it make the right decisions for them and engage in the most suitable initiatives. Through new technologies such as multimedia (newsletters via the internet, DVD series, etc) and the global reach of social networking, new avenues for engaging patients are opening up. Providing support for self-management for health-related problems via social networking will become increasingly more acceptable. So perhaps it is the initiatives that increase social interaction by live, two-way communication, as well as the development of technologies which allows such communication, that will have the greatest potential to close the KAP gap.

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