

Self-care of the diabetic foot: A literature review

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Diabetic foot ulcers can markedly reduce quality of life for people with diabetes and are expensive for the NHS to treat. Research suggests that supporting people with diabetes to carry out self-care improves health outcomes and quality of life. However, self-care in the management of the diabetic foot is a cause for debate among some clinicians. In this review of the literature, self-care of the diabetic foot is discussed with regard to the factors influencing people with diabetes' ability to carry out self-care, and the role that podiatrists can play in facilitating good self-care practices.

High costs (approximately 5% of the total NHS budget in 2002 [Wanless, 2002]), and marked reductions in quality of life for the person affected, are associated with diabetic foot ulcers. Research suggests that supporting people with type 2 diabetes to carry out self-care for their condition improves health outcomes and quality of life (Department of Health [DH], 2005a; Tomkins and Collins, 2006). In practice, however, engaging people to carry out self-care is often a challenge for healthcare professionals, including podiatrists encouraging self-care of the diabetic foot.

Despite the emphasis on evidence-based practice within the NHS, as a profession podiatry is relatively new to the concept of integrating research evidence into practice (Vernon and Campbell, 2006). This article reviews the literature on the factors influencing the ability of people with diabetes to carry out self-care with the aim of helping podiatrists to incorporate research findings into their practice.

Literature review

Keywords for the review were determined (type 2 diabetes; self-care; podiatry; self-efficacy) and a key word tree was created. MEDLINE, the Cumulative Index to Nursing and Allied Health Literature, Allied and Complementary Medicine, PsycINFO, Applied Social Sciences Index and Abstracts, EMBASE and Google Scholar databases were searched. Search limiters were set to English and adults. Citations from some of the articles retrieved from the databases were followed up.

A total of 1693 papers were retrieved. Papers were excluded if they: (i) included comorbid conditions, (ii) related to acute care, (iii) related exclusively to type 1 diabetes (because it was considered that the urgency to maintain life in type 1 diabetes was a different motivational factor from that involved in the management of a chronic condition, such as type 2 diabetes), (iv) provided guidance on foot assessments, (v) validated research tools or measured the outcome of an intervention.

Article points

1. Supporting people with type 2 diabetes to carry out self-care improves health outcomes and quality of life.
2. Engaging patients to carry out self-care is often a challenge for podiatrists.
3. To help podiatrists with this process, a literature review was carried out to identify the barriers to self-care.
4. The review suggests four themes of self-care that podiatrists can reflect on: self-efficacy and autonomous self-regulation, patient barriers, patient information, and concordance.

Key words

- Type 2 diabetes
- Self-care
- Podiatry
- Self-efficacy

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Page points

1. Self-care is defined by the Department of Health as “the care taken by individuals towards their own health and wellbeing”.
2. Surveys around self-care suggest that people want more information to facilitate self-care.
3. Podiatrists need to tailor advice on self-care to the person’s capability to self-care and their risk category.
4. Podiatrists wishing to encourage self-care need to become skilled at effective communication and assessing the ability of patients to carry it out as advised.

Of the 1693 papers retrieved, 112 were fully reviewed and themes related to patients and self-care in type 2 diabetes were identified.

Four themes emerged from the papers reviewed: self-efficacy and autonomous self-regulation; patient barriers to self-care; patient information and self-care; patient–clinician relationship. These themes, and their implications for podiatry practice, will now be examined.

What do we mean by self-care?

The DH (2005a; c) describes self-care as “the care taken by individuals towards their own health and wellbeing, this is extended to include care to children, family friends, neighbourhood and communities”.

Surveys around self-care tell us that people are requesting more information and support to help them manage their conditions (DH, 2005c). People rate support from clinicians highly as an enabler to achieve self-care (DH, 2005c). However, anecdotal evidence from podiatrists suggests that patients with type 2 diabetes prefer clinician-led care. Former advice on foot care placed an emphasis on routine clinic care may be responsible for this. Now that there is increasing evidence in support of people with diabetes undertaking self-care to improve health outcomes (DH 2005c), podiatrists wishing to encourage their patients to do this need to become skilled at effective communication and assessing the ability of patients to carry it out as advised. Furthermore, such advice needs to be tailored to the patients’ capability to self-care and their category of risk for foot problems.

“Self-efficacy” appears in literature as a concept associated with an individual’s ability to self-care (Sigurdardóttir, 2004). It is used as an important predictor of health outcomes in chronic disease management and is amenable to change (Walker et al, 2007). The concept of autonomous self-regulation refers to a person achieving self-control in self-care tasks, which involves self-direction and self-discipline. To achieve this, Sigurdardóttir (2004) observed that flexible self-care should be achieved, which is dependent on knowledge,

physical skills and emotional control to fit it in with their lifestyle and enable them to maintain good diabetes control. Clinician feedback, through appraisal and support for the adjustments made (according to self-care performance) is important in assisting people with diabetes to achieve autonomous self-regulation (Walker et al, 2007).

The research papers reviewed here measured self-care by examining adherence to specific self-care behaviours, such as diet, exercise, blood glucose monitoring and foot care, alongside suggested strategies for improving adherence (Glasgow et al, 2001; Hearnshaw and Lindenmeyer, 2005). Successful measures of self-care have been judged clinically through blood pressure monitoring, an absence of the biochemical complications of diabetes, good glycaemic control, lipid profiles within specified clinical ranges, microalbuminuria monitoring and quality-of-life measures (Glasgow et al, 2001; Hearnshaw and Lindenmeyer, 2005).

While these are useful, movement away from medical measures towards psychological and social models of self-care can give a richer understanding of how self-care fits into people’s lives (Simmons, 2001). These models can suggest patterns that indicate which people are more likely or less likely to self-care. Patients who fail to engage in self-care may do so because they face a number of barriers, and these barriers require examination.

Patient barriers to self-care

People with diabetes need to undertake a variety of self-care practices and integrate them into their lifestyles to avoid complications, thus requiring them to become experts in juggling the priorities of their different self-care practices as their disease-state changes (Rubin, 2001; Whitemore et al, 2002; Bayliss et al, 2003; Sigurdardóttir, 2004; Hearnshaw and Lindenmeyer, 2005). People with diabetes can become overwhelmed by this, which itself can act as a barrier to effective self-care, improved physical health and quality of life (Rubin, 2001). Podiatrists should be empathetic to this fact when suggesting additional self-care regimens.

Research has identified barriers to self-care. These can be divided into psychological, psychosocial, educational and internal and external physical categories (Simmons, 2001). Internal barriers may relate to a lack of information and the beliefs a person may hold concerning a specific health problem and its treatment. These can be mediated by external factors such as strong and supportive interpersonal relationships, contact with role-models coping with the condition, and appropriate clinical care (Clark, 2003).

Age, time since diagnosis, gender, educational attainment and wider health issues appear to impact on self-care behaviours:

- | Older people are generally perceived to be more adherent to self-care than young people (Morrongiello and Gottlieb, 2000; Aljaseem et al, 2001; Clark, 2003). However, in podiatry, self-care in older people with diabetes can be compromised by obesity and retinopathy, limiting the ability of some to reach and see their feet (Neil, 2002).
- | The longer the duration of diabetes, the less likely people are to feel competent to self-care, because of the influence of competing comorbidities and the fear of doing something wrong (Bayliss et al, 2003; Thoolen et al, 2006).
- | In terms of gender, in the studies considered, men with diabetes generally received more social and dietary support from partners than women. Women, who often have stronger social networks, sometimes received more conflicting information as a result of this (Whittemore et al, 2005). In addition, difficulty in adhering to exercise was reported, yet higher levels of other physical activity were declared (Whittemore et al, 2005). Hjelm et al (2002) found that women were more likely to seek professional help and preventive care, whereas men commonly presented with acute foot problems.
- | Research has also found that those who have higher levels of educational attainment are more likely to self-care (Walker et al, 2007).
- | Poor physical health (e.g. eye disease, neuropathy, nephropathy, macrovascular disease, physical limitations) was found to impact negatively on self-care (Bayliss et al, 2003; Chambers et al, 2006; Walker et al 2007). These conditions can limit or remove an individual's independence and force reliance on family, friends and healthcare services (Bayliss et al, 2003; Chambers et al, 2006; Walker et al, 2007).
- | Patients experiencing low mood or depression can show apathy and lack the desire to self-care, while mental illness compromises the ability to self-care (Bonds et al, 2004; Peyrot et al, 2004; Chambers et al, 2006; Walker et al, 2007).

Patient information and self-care

Providing education for people with diabetes that will aid them in overcoming barriers to self-care is important in encouraging effective self-care. Some researchers have suggested that podiatrists should think more creatively about how to do this (Brown et al, 2002; Sigurdardóttir, 2004; Garrett et al, 2005).

Didactic methods of delivering information have been criticised as ineffective because they position patients as passive learners (Garrett et al, 2005). Group education interventions that use a collaborative format, where people actively participate in the learning process through small group discussions, role-playing and interactive techniques, may be more successful in achieving behavioural change, especially if they address underlying attitudes and motivations rather than just knowledge about diabetes (Garrett et al, 2005). Interventions based on behavioural theories have been found to promote self-efficacy and behavioural change among people with diabetes (Cooper et al, 2003; Garrett et al, 2005; Steed et al, 2005; Ko et al, 2007).

However, not all people with diabetes wish to be empowered to engage in self-care (Jahng et al, 2005; Schneider et al, 2006; Cegala et al, 2007). In some instances, increasing a person's knowledge of their medical condition can make them less inclined to engage in self-care as they fear attempting to manage something they do not fully understand, especially if it is explained in biomedical language (Gillibrand

Page points

1. In podiatry, self-care in older people with diabetes can be compromised by obesity and retinopathy, limiting the ability of some to reach and see their feet.
2. People with a longer duration of diabetes are less likely to feel competent to self-care because of competing comorbidities and the fear of doing something wrong.
3. Educating people with diabetes to overcome the barriers to self-care is important in encouraging effective self-care, and podiatrists should think more creatively about how to do this.
4. Group education interventions that move towards a collaborative format may be more successful in achieving behavioural change, especially if they address underlying attitudes and motivations, rather than just knowledge about diabetes.

Page points

1. Professionals should promote alternative sources of information, such as the internet, NHS Direct, Diabetes UK, local pharmacists, The Expert Patient Programme, local support networks and assistive technologies, as supportive health resources for patients.
2. In the initial consultation, people's keenness to listen to podiatrists may be overridden by their anxiety at not knowing what to expect from the consultation.
3. To promote concordance in self-care, professionals should identify an individual's "stage of change" and his or her readiness to undertake specific self-care activities.
4. Concordance implies a shared understanding between clinician and patient about treatment and management, and this may in part be promoted by training in consultation skills for both those giving and receiving treatment.

and Flynn, 2001; Parry et al, 2006). Moreover, those who are seriously ill have been reported as having a preference for a more passive role and are reassured by a paternalistic approach on the part of the clinician (Martin et al, 2003; Jahng et al, 2005) Both of these factors mean that, in certain circumstances, people with diabetes increase their dependence on clinicians (Gillibrand and Flynn, 2001; Parry et al, 2006). However, these findings contrast with those of Chambers et al (2006) who found that the more severe a health problem the more motivated individuals are to engage in self-care.

A range of reasons for non-attendance at education sessions for diabetes, such as not having time, trouble reading, stress and transportation difficulties have been reported (Graziani et al, 1999). Other reasons include low perceived seriousness of the disease, no perceived benefits and denial or fear of what was to be learned (Graziani et al, 1999; Rhee et al, 2005). Those with higher HbA_{1c} levels were more likely to have lower educational attainment (Rhee et al, 2005).

Despite barriers to education, awareness of alternative sources of information on diabetes management needs to be improved (Persell et al, 2004). Such information is available from the internet, NHS Direct, Diabetes UK, local pharmacists, The Expert Patient Programme, support networks through local PCTs and assistive technologies (DH, 2005b; c); Chambers et al, 2006; Walker et al, 2007). Chambers et al (2006) recommended that clinicians acknowledge and promote these as supportive health resources for the people they treat. However, clinicians should advise patients on sourcing credible and valid alternative information to support their self-care practices.

Clinical practice: Aiming for concordance not compliance

It is reported that some podiatrists blame the person receiving treatment for non-compliance when attempts to encourage self-care fail (Lutfey, 2004; Smith et al, 2006;

Walker et al, 2007). However, there may be reasons for non-compliance that podiatrists need to reflect on.

Smith et al (2006) maintain that, in the initial consultation, people's keenness to listen to their podiatrist is overridden by their anxiety at not knowing what to expect from the consultation. Parkin and Skinner's (2003) examination of an outpatient setting found only 45% congruency of recall for decisions made between clinician and patient post-consultation. Additionally, Skinner (2004) noted that one quarter of the instances of inaccurate information recall were due to the use of complex medical terms during the consultation.

Chatterjee (2006) argued that gaps between clinicians' desired outcomes and those achieved suggest a need to look beyond the clinical issue and seek to bring concordance to the consultation. Concordance implies a shared understanding between clinician and patient about treatment and management (Walker et al, 2007), and this may in part be promoted by training in consultation skills for both those giving and receiving treatment (Skinner, 2004; Smith et al, 2006).

Concordance may also be achieved by clinicians supporting people with diabetes in developing general self-management skills for the effective management of their condition (Skinner, 2004). The ability of clinicians to encourage self-care, or the extent to which providers elicit and acknowledge patients' perspectives, support patient initiatives, offer choice about treatment options and provide relevant information, while minimising pressure or control, is known as "autonomy support" (Walker et al, 2007). This has been associated with patient motivation and increased competence (Williams et al, 2005).

Research suggests that to promote concordance in self-care there is a need to identify an individual's "stage of change" – his or her readiness to undertake specific self-care activities (Koenigsberg et al, 2004; Chambers et al, 2006; Tomkins and Collins, 2006). Clinicians are encouraged to explore

personalised barriers to self-care, adopting patient-centred consultation styles, and to advise on one or two specified behaviour changes at a time so that the goals set are considered achievable (Bayliss et al, 2003; Koenigsberg et al, 2004; Nagelkerk et al, 2006). Problem-solving strategies are advocated as an effective way to overcome barriers to change and to optimise self-care (Whittemore, 2000; Tomkins and Collins, 2006).

Implications for podiatry practice

Self-care in the management of the diabetic foot is a cause for debate among some clinicians. This literature review suggests that the degree of self-care promoted should reflect a patient's capability and risk status. While promoting effective self-care may be a daunting undertaking for the podiatrist with an already busy clinical schedule, there are training resources and publications available to help (Rollnick et al, 1999; World Health Organization, 2003; Chambers et al, 2006; Tomkins and Collins, 2006; DH, 2008; The Health Foundation, 2008).

This review has highlighted issues for consideration and ways that people with diabetes might be supported to engage in self-care activities. In particular, the authors suggest that:

- 1 People with diabetes could be assessed using patient-centred consultation styles to identify their ability and stage of preparation to undertake self-care.
 - 1 Acknowledging people's characteristics, perspectives and potential barriers to engaging in self-care, and setting appropriate targets in conjunction with them, is preferable to the expectation of compliance.
 - 1 Encouraging self-efficacy and self-regulation must be an ongoing activity supported by feedback from, and reflection by, podiatrists.
- Optimal foot regimens are paramount to people with diabetes in reducing progression to foot ulceration, and clinicians supporting people to develop good self-care practices can play a central role. ■

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Aljaseem LI, Peyrot M, Wissow L et al (2001) The impact of barriers and self-efficacy on self-care behaviors in type 2 diabetes. *The Diabetes Educator* **27**: 393–403

Bayliss EA, Steiner JF, Fernald DH et al (2003) Descriptions of barriers to self-care by persons with comorbid chronic diseases. *Annals of Family Medicine* **1**: 15–21

Bonds, DE, Camacho F, Bell RA et al (2004) The association of patient trust and self-care among patients with diabetes mellitus. *BMC Family Practice* **5**: 1–7

Brown JB, Harris SB, Webster-Bogaert S et al (2002) The role of patient, physician and systemic factors in the management of type 2 diabetes mellitus. *Family Practice* **19**: 344–9

Cegala DJ, Street RL Jr, Clinch CR (2007) The impact of patient participation on physicians' information provision during a primary care medical interview. *Health Communication* **21**: 177–85

Chambers R, Wakley G, Blenkinsopp A (2006) *Supporting Self-Care in Primary Care*. Radcliffe Publishing, Oxford

Chatterjee JS (2006) From compliance to concordance in diabetes. *Journal of Medical Ethics* **32**: 507–10

Clark NM (2003) Management of chronic disease by patients. *Annual Review of Public Health* **24**: 289–313

Cooper HC, Booth K, Gill G (2003) Patients' perspectives on diabetes health care education. *Health Education Research* **18**: 191–206

Department of Health (2005a) *Self Care – A Real Choice: Self Care Support – A Practical Option*. DH, London. Available at: <http://tinyurl.com/d5vq96> (accessed 25.01.09)

Department of Health (2005b) *Public Attitudes to Self-care Baseline Survey*. DH, London. Available at: <http://tinyurl.com/d7kgmc> (accessed 25.02.09)

Department of Health (2005c) *Supporting Self Care – A Practical Option: Diagnostic, Monitoring and Assistive Tools, Devices, Technologies and Equipment to Support Self Care*. DH, London. Available at: <http://tinyurl.com/cl2syq> (accessed 25.01.09)

Department of Health (2008) *Policy and Guidance, Self-Care*. DH, London. Available at: <http://tinyurl.com/cum899> (accessed 25.01.09)

Garrett N, Hageman CM, Sibley SD et al (2005) The effectiveness of an interactive small group diabetes intervention in improving knowledge, feeling of control, and behavior. *Health Promotion Practice* **6**: 320–8

Gillibrand W, Flynn M (2001) Forced externalization of control in people with diabetes: A qualitative exploratory study. *Journal of Advanced Nursing* **34**: 501–10

Page points

1. This literature review suggests that the degree of self-care promoted should reflect a patient's capability and risk status.
2. Another suggestion is that people with diabetes could be assessed using patient-centred consultation styles to identify their ability and stage of preparation to undertake self-care.
3. Acknowledging people's characteristics, perspectives and potential barriers to engaging in self-care, and setting appropriate targets in conjunction with them, is preferable to the expectation of compliance.
4. Optimal foot regimens are paramount in reducing progression to foot ulceration in people with diabetes; supporting patients to develop self-care practices has a central role here.

“Clinicians need to explore personalised barriers to self-care, adopting patient-centred consultation styles, and to advise on one or two specified behaviour changes at a time so that set goals are considered achievable.”

- Glasgow RE, Toobert DJ, Gillette CD (2001) Psychosocial barriers to diabetes self-management and quality of life. *Diabetes Spectrum* **14**: 33–41
- Graziani C, Rosenthal MP, Diamond JJ (1999) Diabetes education program use and patient-perceived barriers to attendance. *Family Medicine* **31**: 358–63
- Hearnshaw H, Lindenmeyer A (2005) What do we mean by adherence to treatment and advice for living with diabetes? A review of the literature on definitions and measurements. *Diabetic Medicine* **23**: 720–8
- Hjelm K, Nyberg P, Apelqvist J (2002) Gender influences beliefs about health and illness in diabetic subjects with severe foot lesions. *Journal of Advanced Nursing* **40**: 673–84
- Jahng K, Martin LR, Golin CE et al (2005) Preferences for medical collaboration: Patient–physician congruence and patient outcomes. *Patient Education and Counseling* **57**: 308–14
- Ko SH, Song KH, Kim SR et al (2007) Long-term effects of a structured intensive diabetes education programme (SIDEPE) in patients with type 2 diabetes mellitus – a 4-year follow-up study. *Diabetic Medicine* **24**: 55–62
- Koenigsberg MR, Bartlett D, Cramer JS (2004) Facilitating treatment adherence with lifestyle changes in diabetes. Available at: www.aafp.org/afp/20040115/309.html (accessed 15.03.09)
- Lutfey K (2004) Assessment, objectivity and interaction: the case of patient compliance with medical treatment regimens. *Social Psychology Quarterly* **67**: 343–68
- Martin LR, Jahng KH, Golin CE, DiMatteo MR (2003) Physician facilitation of patient involvement in care: Correspondence between patient and observer reports. *Behavioral Medicine* **28**: 159–64
- Morrongiello BA, Gottlieb BH (2000) Self-care among older adults. *Canadian Journal on Aging* **19**(Suppl 1): 32–57
- Nagelkerk J, Reick K, Meengs L (2006) Perceived barriers and effective strategies to diabetes self-management. *Journal of Advanced Nursing* **54**: 151–8
- Neil JA (2002) Assessing foot care knowledge in a rural population with diabetes. *Ostomy/Wound Management* **48**: 50–6
- Parkin T, Skinner TC (2003) Discrepancies between patient and professionals recall and perception of an outpatient consultation. *Diabetic Medicine* **20**: 909–14
- Parry O, Peel E, Douglas M et al (2006) Issues of cause and control in patient accounts of type 2 diabetes. *Health Education Research* **21**: 97–107
- Persell SD, Keating NL, Landrum MB et al (2004) Relationship of diabetes-specific knowledge to self-management activities, ambulatory preventive care, and metabolic outcomes. *Preventive Medicine* **39**: 746–52
- Peyrot M, Rubin RR, Lauritzen T et al (2004) Psychosocial problems and barriers to improved diabetes management: Results of the Cross-National Diabetes Attitudes, Wishes and Needs (DAWN) study. *Diabetic Medicine* **22**: 1379–85
- Poradzisz M (2002) Variables affecting quality of life and adherence in adults with type 2 diabetes. *Dissertation Abstracts International* **62**: 11–B
- Rhee MK, Cook CB, El-Kebbi I et al (2005) Barriers to diabetes education in urban patients: Perceptions, patterns, and associated factors. *The Diabetes Educator* **31**: 410–17
- Rollnick S, Mason P, Butler C (1999) *Health Behavior Change: A Guide for Practitioners*. Churchill Livingstone, Edinburgh
- Rubin RR (2001) Facilitating self-care in people with diabetes. *Diabetes Spectrum* **14**: 55–7
- Schneider A, Körner T, Mehring M et al (2006) Impact of age, health locus of control and psychological comorbidity on patients’ preference for shared decision making in general practice. *Patient Education and Counseling* **61**: 292–8
- Sigurdardóttir AK (2004) Self-care in diabetes: Model of factors affecting self-care. *Journal of Clinical Nursing* **14**: 301–14
- Simmons D (2001) Personal barriers to diabetes care: Is it me, them, or us? *Diabetes Spectrum* **14**: 10–2
- Skinner TC (2004) Psychological barriers. *European Journal of Endocrinology* **151**(Suppl 2): T13–17
- Smith J, White M, Dyas J et al (2006) Empowerment – a dysfunctional relationship? *British Journal of Podiatry* **9**: 63–7
- Steed L, Lankester J, Barnard M et al (2005) Evaluation of the UCL diabetes self-management programme (UCL-DSMP): A randomized controlled trial. *Journal of Health Psychology* **10**: 261–76
- The Health Foundation (2008) *Co-creating Health*. Available at: <http://tinyurl.com/c45m96> (accessed 25.02.09)
- Thoolen BJ, de Ridder DT, Bensing JM et al (2006) Psychological outcomes of patients with screen-detected type 2 diabetes: The influence of time since diagnosis and treatment intensity. *Diabetes Care* **29**: 2257–62
- Tomkins S, Collins A (2006) *Promoting Optimal Self-care: Consultation Techniques that Improve Quality of Life for Patients and Clinicians*. Available at: <http://tinyurl.com/cahew7> (accessed 29.01.09)
- Vernon W, Campbell J (2006) An introductory guide to putting research into practice: The why, who and how of podiatry research. *Podiatry Now* **9**: 18–20
- Walker J, Payne S, Smith P et al (2007) *Psychology for Nurses and the Caring Professions*. 3rd edn. Open University Press, Milton Keynes
- Wanless D (2002) *Securing Our Future Health: Taking a Long-term View*. HM Treasury, London. Available at: <http://tinyurl.com/dybcz3> (accessed 29/01/09)
- Whittemore R (2000) Strategies to facilitate lifestyle change associated with diabetes mellitus. *Journal of Nursing Scholarship* **32**: 225–32
- Whittemore R, Chase SK, Mandel CL et al (2002) Lifestyle change in type 2 diabetes: A process model. *Nursing Research* **51**: 18–25
- Whittemore R, Melkus GD, Grey M (2005) Metabolic control, self-management and psychosocial adjustment in women with type 2 diabetes. *Journal of Clinical Nursing* **14**: 195–203
- Williams GC, McGregor HA, King D et al (2005) Variation in perceived competence, glycemic control, and patient satisfaction: Relationship to autonomy support from physicians’. *Patient Education and Counseling* **57**: 39–45
- World Health Organization (2003) *Adherence to Long-term Therapies: Evidence for Action*. WHO, Geneva. Available at: <http://tinyurl.com/cjkcj8> (accessed 17.03.09)