

EMBRACING THE EVIDENCE ON PROBLEM SOLVING IN DIABETES SELF-MANAGEMENT EDUCATION AND SUPPORT

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ABSTRACT

BACKGROUND: Problem solving is integral to successful self-management by those with diabetes, yet it is reportedly the most difficult skill to teach. The American Association of Diabetes Educators hosted a Problem Solving Symposium during which 15 invited thought leaders from multiple disciplines examined current knowledge about problem solving and the translation of empirical findings into the practice of diabetes self-management education. This report summarizes the moderated discussion and highlights the key points of interest to diabetes educators and other providers involved with diabetes care.

METHODS: The participants reviewed findings from the literature and engaged in a moderated discussion with the aim of providing practical advice for health care practitioners regarding problem solving in diabetes self-management.

RESULTS: Eleven key points emerged from the discussion, along with practical recommendations for developing and implementing effective problem-solving interventions.

CONCLUSION: Problem solving is a process, an intervention, and a set of skills. The process consists of several steps, beginning with identification of the problem. Problem solving interfaces with other self-care behaviors and is influenced by the provider's skills as well as the patient's own perspectives, background, and external factors. Diabetes educators can help patients become experienced and skilled in problem solving. Approaches must be tailored to the patient; this can be facilitated by conducting a thorough patient assessment. Further research is needed to shed more light on approaches to problem solving in health education settings. Lessons learned from this research may be used to guide research and practice in diabetes self-management education as well as across the field of health promotion.

Key words: problem solving, diabetes, self-management

INTRODUCTION

The cornerstone of successful outcomes in diabetes is effective self-management, which requires daily decision making¹. Because of the complexities of the disease, many people with diabetes continually face the need to solve complicated problems adroitly². Problem solving for the person with diabetes is a prerequisite for making decisions that ensure consistent engagement in healthy behaviors³. Diabetes educators include the problem-solving process into diabetes self-management education (DSME) instruction and diabetes self-management support (DSMS). Problem solving is, however, the behavior for which diabetes education goals are least frequently set and, according to diabetes educators, is the most difficult skill to teach^{4,5,6}.

Sixteen participants (Table 1) representing multiple disciplines from practice, academia, and the government convened for an invitational *Problem Solving Symposium* in Chicago, Illinois, USA, to examine current knowledge about problem solving and the translation of empirical findings into the practice of diabetes self-management education and training (DSME/T). Their deliberations addressed multidisciplinary perspectives and the intersections of the literature on diabetes education practice, conceptualization of problem solving, and problem solving research in diabetes.

The Symposium featured a roundtable discussion focused on the following questions:

- Are there diabetes-specific tools (instruments, surveys) available to assess problem solving?
- Is there an association between problem solving ability and glycemic control?
- Why is it important to focus on verbal reasoning and the coping aspect of problem solving as well as on quantitative problem solving (numeracy)?
- What may be the interaction between how diabetes-specific problem solving is assessed and diabetes behaviors?
- What is the application of diabetes-specific and non-diabetes-specific problem solving with regard to hyperglycemia, hypoglycemia, and sick-day management?
- How can findings from qualitative research advance quantitative research with regard to diabetes-specific problem solving?

Symposium participants distilled findings from the literature, with the aim of providing practical advice for health care professionals regarding problem solving in diabetes self-management^{7,8,9,10}. They also considered information extracted from the AADE7 System® data repository of diabetes self-management education information (also known as IMPACT)¹¹. In addition to the roundtable discussion, the agenda included a summary of a systematic review on problem solving in diabetes self-management and a presentation on commonsense and self-regulation models of health behavior, as applied to self-monitoring blood glucose in type

Table 1: Participants

Discipline	Name/Credentials	Affiliation
Health Psychology	Barbara Stetson, Ph.D.*	Associate Professor Dept. Of Psychological & Brain Sciences University of Louisville
Informatics	Suzanne Boren, Ph.D., MHA	University of Missouri
Behavioral Science	Edwin Fisher, Ph.D	Professor Department of Health Behavior and Health Education, School of Public Health, University of North Carolina at Chapel Hill
Health Policy and Aging	Howard Leventhal, Ph.D	Professor Institute for Health, Health Care Policy and Aging Research Rutgers, The State University of New Jersey
Health Psychology	David Schlundt, Ph.D	Director, Clinical Outcomes & Behavioral Science Unit, DRTC Vanderbilt Prevention & Control Core, Vanderbilt University
Behavioral Science	Russell Glasgow, Ph.D	Research Scientist Clinical Research Unit, Institute for Health Research, Kaiser Permanente
Behavior and Prevention	Ronald Iannotti, Ph.D	Staff Scientist National Prevention Research Branch, Institutes of Health
Health Psychology	David Randal, Psy.D., LP, CDE	International Diabetes Center, Park Nicollet
Health Psychology	Joe Nelson, M.A., LP, CST	Psychologist Golden Valley, Minnesota
Diabetes Education/ Clinical Pharmacy	Dan Kent, PharmD, CDE	Clinical Pharmacy Specialist Group Health Cooperative, Seattle, WA
Health Psychology/Public Health	Laurie Ruggiero, Ph.D	Professor of Community Health Sciences, Institute for Health Research and Policy School of Public Health University of Illinois, Chicago
Endocrinology Research	Catherine Barnes, Ph.D., RN	Research Associate Endocrinology Department Emory University
Practice/Research/Health Economics	Karen Fitzner, Ph.D.***	Chief Science and Practice Officer American Association of Diabetes Educators
Nursing/Diabetes Education	Terry Lumber, CNS MSN CDE BCADM	Director Inova Diabetes Center
Dietetics/Diabetes Education	Maggie Powers, PhD, RD, CDE	Research Scientist International Diabetes Center
Gerontology	Edith Burns, MD	The Medical College of Wisconsin's Program to Strengthen Geriatrics Education Medical College of WI

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2 diabetes¹². The symposium was chaired by a member of the AADE Research Committee and facilitated by a professional moderator.

The *Problem Solving Symposium* marked the first in a series of symposia examining the seven essential self-care behaviors (Healthy Eating, Being Active, Taking Medication, Monitoring, Reducing Risk, Healthy Coping, and Problem Solving)¹³. The series has two objectives: to examine published findings on each behavior, and to develop recommendations to apply to practice.

This report provides background information on problem solving, a summary of the moderated discussion, and highlights the key points that apply to diabetes educators and other providers involved with diabetes care.

BACKGROUND

At the broadest level, problem solving can be defined as a process that is used to achieve important life goal and when used to address barriers to self-management, problem solving an essential patient skill¹⁴. Within this diabetes context, self-efficacy (e.g., a person's belief in his/her ability to successfully perform the tasks involved in diabetes self-management over the lifespan), is a critical element of the problem solving skill¹⁵. A person with diabetes must keep their problem-solving skills sharp because on any given day, a high or low blood glucose episode or a sick day will require them to make rapid, informed decisions about food, activity and medications¹⁶. This skill is continuously put to use because stability is never fully attained: the disease is progressive, chronic complications emerge, life situations change and the patient is passing through different stages of life^{17,18}. Problem solving is also a fundamental part of how providers manage people with diabetes. Within diabetes care, the skill is implicit in what diabetes educators and other providers do with patients to help them self-manage the disease (Table 2).

Table 2. Core components (key steps) of problem solving*

<p>Identifying and understanding the problem</p> <p>Collaboratively setting goals</p> <p>Generating alternative strategies</p> <p>Selecting among the alternatives</p> <p>Checking or assessing the feasibility of the chosen alternative</p> <p>Implementing the negotiated plan; trying it out</p> <p>Monitoring and assessing the plan's impact</p> <p>Using problem solving to adjust the plan until goals are achieved</p>

* Based on psychology literature on problem ^{19,20} and self-regulation³²

Classic conceptual perspectives dating back to 1927 on components of the problem solving construct address general clinical applications^{19,20,21}. Peyrot and Rubin link this foundation to the problem solving-health behavior that is a component of diabetes education and the related knowledge base²². These and other authors provide information on key ingredients of problem solving including: 1) recognizing and understanding the problem; 2) collaborating on goal setting; 3) generating alternative solutions; 4) selecting among the alternatives; 5) checking or assessing the feasibility of the chosen alternative; 6) implementing the negotiated plan; 7) monitoring and assessing the plan's impact; and 8) using problem solving to adjust the plan until goals are achieved. These steps, including influences of modeling by others were influenced the psychology literature on problem solving and self-regulation²³.

Research on diabetes and other chronic illnesses, behavioral theory, and findings from the learning sciences contribute methods that may enhance the effectiveness of problem-solving programs. Recent literature indicates interactions between diabetes distress, low self-care adherence, barriers to self-management and inadequate application of coping and problem-solving skills. Table 3 presents recent literature on problem solving, self-management and diabetes distress. This body of literature indicates that effective interventions would include feedback, problem-based learning techniques, incorporation of patient-centered motivational logic, identification of patterns of adherence and related barriers, and implementation methods that allow patients regular access to skill-building activities and support. Problem solving by those with diabetes is a form of primary control via engaged (or approach-focused) coping²⁴. Utilization of an active problem-focused style of approaching barriers to self-management has been related to lower A1C values, whereas a disengaged or avoidant style has been related to higher A1C^{25,26}.

Problem solving is a key component of quality DSME/T and diabetes self-management support (DSMS)^{13,27}. Inclusion of problem solving in the National Standards for Diabetes Education is based upon the mapping of self-care behaviors to 15 content areas of the 1995 National Standards²⁷. The self-care behavior framework aligns with a paradigm shift in diabetes education from a content-driven practice to an outcomes-driven practice that focuses on collaboratively working with people with diabetes to establish patient-centered goals for addressing behavior change that affects clinical and health-related outcomes²⁸. Within this context, problem solving involves a variety of skills and activities that are undertaken by people with diabetes that allow them to recognize, address and overcome barriers to effective self-management of their illness in the context of daily life²⁹. Diabetes educators collaboratively address barriers, such as physical, emotional, cognitive, and financial obstacles and develop coping and problem solving strategies with the people they serve³⁰.

The points that follow consider the problem solving behavior as both a behavior that is undertaken by those with diabetes and as a fundamental element of how providers work with this population.

Table 3: Problem Solving, Self-Management and Diabetes Distress

Title and Citation	Objective	Conclusion
Are patients' initial experiences at the diagnosis of type 2 diabetes associated with attitudes and self-management over time? ¹	Investigate experiences of 192 people with T2 and diabetes-related distress and self-management over time using a questionnaire.	Less diabetes distress is associated with reassuring messages from health care providers at the time of diagnosis and provision of a clear action plan.
Behavioral medicine interventions in diabetes ⁴⁸ .	Review RCTs published from Mar 2008 – Sept 2009 on behavioral medicine interventions in people with diabetes.	For people with diabetes who have a high level of diabetes-related distress or insufficient blood glucose awareness, behavior medicine interventions are effective.
A detailed profile of cognitive dysfunction and its relation to psychological distress in patients with type 2 diabetes mellitus ⁴⁹ .	Compare the cognitive profile and psychological well-being for 119 adults with T2 to a control group on 5 major cognitive domains, psychological well-being (Symptom Checklist-90-R; Beck Depression Inventory).	Psychological distress did not correlate with cognition or biomedical characteristics. Cognitive disturbances and psychological distress seem independent symptoms of the same disease.
Problem Solving and Diabetes Self-Management – Investigation in a large multiracial sample ¹⁴ .	Assess self-management behaviors, biological and psychosocial measures, and completed Diabetes Problem-Solving interview (DPSI) in a sample of 506 adults with T2.	Diabetes problem solving measured by the DPSI, is an important patient skill related to multiple diabetes management variables.
Relationships between emotional distress, empowerment perception and self-care behavior and quality of life in patients with type 2 diabetes ⁴⁴ .	Investigate relationships among demographics, disease characteristic, emotional distress, empowerment perception, self-care behavior and quality of life in those with T2.	For those diagnosed with diabetes, health professionals should evaluate emotional distress, provide emotional support and apply empowerment strategy to promote quality of life.
The relationship between diabetes distress and clinical depression with glycemic control among patients with type 2 diabetes ⁵⁰ .	Clarify whether diabetes distress is related to glycemic control and self-management while measures of depression are not.	There is a significant association between distress and A1C.
Depressive symptoms in the first year from diagnosis of Type 2 diabetes: results from the DESMOND trial ⁵¹ .	Describe the development and prevalence of depressive symptoms the first year after diagnosis with T2.	Depressive symptoms in the first year from diagnosis of Type 2 diabetes: results from the DESMOND trial.
Relation of stressful life events to metabolic control among adolescents with diabetes: 5-year longitudinal study.	Determine relationship between stressful events and metabolic control.	Lack of good self-care is likely to be a primary mechanism associated with poor metabolic control for older adolescents and stressful life events.

KEY POINTS FROM DISCUSSION

POINT 1: *The literature defines problem solving as a multidimensional construct.*

Hill-Briggs & Gemmell examined definitional/framework issues, assessment and intervention approaches, and health care concerns. Authors and peer reviewers used a modified version of the QUOROM Statement Checklist^{12,31}. The review defined problem solving as a multidimensional construct encompassing verbal reasoning/rational problem solving and coping. Despite reported associations between problem solving and diabetes outcomes among adults, the Hill-Briggs found limited evidence for specific recommendations regarding the integration of problem-solving training methods into DSME, suggesting the need for further research. The findings of the systematic evidence review corroborate reports that many diabetes educators find problem solving difficult to integrate into practice¹². Bonnet, et al., also note that patients have difficulty with self-care skills involving application of problem solving³². More recent literature (see Table 3) provides greater insights into the effectiveness of problem-solving approaches in addressing diabetes distress, enhancing self-efficacy, fostering patient empowerment, and improving blood glucose awareness to achieve better health outcomes. In addition, patient-centered or collaborative approaches to care, DSME, and DSMS are being encouraged³³.

POINT 2: *Problem solving is a process, an intervention, and a skill set.*

Problem solving is a step-by-step process, an intervention, and a set of skills. It is multifaceted and something people do all the time. DSME about problem solving is *not* didactic instruction of concrete factual information about self-care recommendations. In DSME and DSMS, problem solving involves helping patients build analytic and decision-making skills that allow them to achieve self-identified behavioral goals. It also helps them to achieve acceptable diabetes control in the context of the many competing demands of living (family, work, recreation, financial, etc.). Members of the diabetes care team also engage in problem solving to advance care plans and help people with diabetes achieve optimal outcomes.

Classic conceptual perspectives on the components of problem solving as put forth by D'Zurilla and Goldfried in 1971, its clinical applications, and application to diabetes intervention may provide a foundation for the problem solving-diabetes education knowledge base²⁰. The core components, or steps, of problem solving (Table 2) have been identified, based on the psychology literature on problem solving by D'Zurilla and Nezu and self-regulation by Leventhal and colleagues^{19,34}. This construct emphasizes problem solving as a process employed to achieve important life goals³⁵. When used by health care providers to work with a patient, the problem-solving process becomes an intervention. When people differ in their ability to use this process to solve problems, problem solving can be referred to as a skill set. Each step of the process can be thought of as a task to be accomplished, a component of an intervention, or a set of skills needed to accomplish that task.

POINT 3: *Problem solving interrelates with other self-care behaviors and is impacted by the provider's problem-solving style.*

Problem solving cuts across all other self-care behaviors that people with diabetes need to address. In this way, it is similar to a clinical quality improvement (CQI) framework—which aims to optimize patient care by consistently and systematically tracking and managing behavioral outcomes as an ongoing aspect of care for the purpose of assessing and improving educator impact—problem-solving approaches are integrated into all that the patient or educator does, across all diabetes behavior domains³⁶.

The need to delineate the core skills used in problem solving and the ways in which these skills might correspond to specific health-related behaviors adds complexity to DSME/T practice. This is complicated further by the three different views of problem solving as a process, an intervention, and a skill set. Problem solving in diabetes care is *not* the promotion of healthy eating or physical activity *per se*. It is in some ways a distinct set of thoughts and behaviors for analyzing problems, setting goals, and choosing solutions. The application of problem-solving approaches to diabetes education requires language that clarifies whether problem solving is being used as a process, a set of interventions, or a collection of skills. Approaching problem solving first as a process has two advantages: 1) allows educators to outline the steps essential to any problem-solving intervention; and 2) enables patients to begin identifying the core cognitive and behavioral skills associated with each phase of the process.

All health practitioners bring their own inherent expectations, problem identification acumen, and problem-solving skills to the clinical setting. The question arises: How does a provider's problem-solving style affect his/her use of problem-solving interventions? Clinical experience suggests that flexibility is important, because patients' challenges related to diabetes self-management or other health behaviors vary within the context of their environment, daily lives, and events. Practitioner expectations may differ greatly from those of patients, and flexibility in understanding and responding to the patient's needs greatly impacts the process and outcome of a patient encounter. For example, if a practitioner thinks the patient needs to know certain information, this information might be emphasized in the absence of assessment and a comprehensive problem-solving approach. This, however, is sub-optimal.

Symposium participants felt that health practitioners often are highly skilled in providing structured information and directive feedback across all diabetes behavioural domains and psychosocial aspects. However, they often lack the flexibility or ability to integrate problem-solving skills and teachable moments when the feedback they receive from patient is not what they expected.

POINT 4: *The first step in problem solving is identifying the problem.*

The issues that people with diabetes bring to their health care visits are paramount. Many patients come to education sessions looking for instructions in the steps of self-management

and want specific directions on “what to do.” Other patients are more receptive to a more collaborative approach and want to know how to manage different diabetes-related problems in different situations. Still others may not be interested in or ready to make changes in their behaviors or lifestyles. The inherent capabilities, health literacy, and skill levels of individuals influence their priorities, needs, and interests. Therefore, a key issue for patient education and problem solving is readiness for self-care and behavior change^{37,38}.

Problem solving starts with identifying and understanding the problem. This involves determining whether a problem exists, what kind of problem it is, and how the problem is interfering with diabetes self-management. It is generally agreed that some people do not have good problem *identification* ability, which may be a separate issue from problem *solving* ability. Before anyone can begin to engage in problem solving, the individual must realize that a problem exists and must understand the complexities of the problem. For example, a person with diabetes who repeatedly has elevated fasting blood glucose readings must identify morning hyperglycemia as a problem and must understand which elements of his/her self-care routine (e.g., evening snacks, omitted insulin doses, a faulty sliding scale) are contributing to high fasting glucose concentrations.

POINT 5: *The role of the health care provider in problem solving needs to be fully clarified.*

What is the role of the diabetes educator and other practitioners in problem solving? The following questions and considerations may help clarify this role and may be useful in the development and evaluation of problem-solving interventions:

- Does the practitioner work with a patient through a problem-solving *process* to solve a specific problem—or does the practitioner teaches patients concrete problem-solving skills?
- Should the focus of diabetes education be on a behavior change goal or on problem solving?
- Practitioners frequently encounter patient perspectives, responses, and goals that differ from their own expectations and from what are clinically desirable, yet effective educators are able to approach DSME/T and related problem solving seamlessly. What is it about these education sessions that make them effective? Do optimal approaches to seamless problem solving include use of modeling or think aloud decision-making strategies?

Diabetes educators can help patients become experienced and skilled in problem solving so that they may be able to either expand or contract the problem-solving process. This is dependent on the problem’s complexity and the patient’s experience in solving similar problems. Research shows that expert problem solvers possess greater depth of knowledge to use in problem identification and analysis and spend less time explicitly considering goals and options¹. Educators must keep in mind that different approaches are needed for different patients and situations, such as the elderly person with type 2 diabetes versus the youth with type 1 diabetes. Moreover, Schneider et al. show that adolescents and parents often

have different diabetes management styles, with some using a very adaptive, problem-solving approach that requires frequent adjustments and others following a fairly methodical style that emphasizes consistency; both styles can lead to successful diabetes management³⁹. The problem-solving process during DSMS, which is a critical aspect of ongoing support, “need to reflect the dynamic and evolving conditions of patients’ “real-world” environment and life circumstances³⁵.

Studies have evaluated specific approaches to training educators in problem-solving interventions with patients and have reported improvement in clinician skills^{40,41}. The optimal approach to training educators and other health care providers in effective problem-solving approaches remains unclear.

POINT 6: The personal perspectives, background, and external factors that patients bring to education sessions are likely to influence problem solving.

The personal perspectives, goals, and self-care objectives of persons with diabetes can impact their approach to problem solving and may differ from those of the educator or other provider. Educational background and health literacy may be limited. Some patients may not follow a daily routine for diabetes self-management or other aspects of their lives. Sleep cycles and routines may vary, as might work schedules. Family life may be chaotic. Diabetes behaviors such as physical activity or diet may be unstructured and unmonitored.

As an illustration of conflicting educator-patient goals, consider the example of a diabetes educator whose goal for a patient is to limit carbohydrate grams or serving sizes or specific foods such as potatoes with butter. In contrast, the patient’s goal (which is consistent with his personal history, culture, ongoing lifestyle, and preferences) is reflected by the statement, “I want to eat Mom’s mashed potatoes forever.” In other sample scenarios, patients may adopt a more regimented approach to setting goals for their diabetes self-management, focusing only clinical outcomes and not considering their lifestyle or potential personal obstacles that might arise.

A thorough assessment enables the educator to understand limitations posed by literacy and identify cultural beliefs and personal preferences that can influence how the patient perceives and approaches solving diabetes-related problems.

POINT 7: Measurement of successful outcomes of problem solving in diabetes education is important.

Outcomes that can be positively impacted by problem solving may include biological measures such as hemoglobin A1c, blood pressure, lipids, and body weight. Blood glucose control can be assessed using downloaded data from electronic meters. Validated psychological assessment tools can be used to quantify such outcomes as depressive symptoms, stress, and quality of life. Changes in diabetes distress that is experienced by the patient, should be assessed by the diabetes care team, and are therefore also measurable outcomes⁴².

The discussants noted that diabetes educators and other providers are well aware of how clinical outcomes such as A1c are measured and recorded, but awareness of how to conduct and record behaviorally-oriented measurements is less clear. The Diabetes Problem-Solving interview (DPSI) is an example of a tool that can be used for such assessments¹⁴.

POINT 8: *Successful problem solving requires translating findings into practice and ongoing support.*

Although the literature describes the core components of problem solving that constitute the steps of the problem-solving process, time constraints in clinical practice often pose a significant barrier to including all these components in health encounters. Busy diabetes educators might be tempted to either rush through the steps or collapse them into a few (e.g., setting a specific session goal and teaching related skills). However, any effective problem-solving intervention must include all the core components of problem solving (Table 1) and must consider patient issues. Moreover, effective diabetes care teams build upon the current evidence and standards for DSME support by integrating the clinical, behavioral and psychosocial aspects of problem solving in DSME and DSMS^{43,44}. Clarification of the best strategies for optimizing the limited time available is a priority. It is important to note that diabetes educators' own problem-solving skills may significantly determine their ability to teach problem-solving skills.

POINT 9: *Interventions in problem solving must address highest-priority goals and issues.*

Diabetes control is important, but for some individuals with diabetes, cardiovascular risk reduction may be a higher priority. For others, social-emotional issues such as stress or depression may be at the forefront. A thorough patient assessment—which is essential to competent diabetes education practice—can be used to tailor problem-solving interventions so they specifically address the patient's needs and priorities. Unfortunately, anecdotal evidence from diabetes educators reveals that many health professionals abbreviate or omit the assessment and jump to the solution.

POINT 10: *Adopting practical recommendations can help ensure effective problem solving.*

Participants of the *Problem Solving Symposium* outlined several recommendations for developing and implementing problem-solving interventions in diabetes education. These are detailed in Table 4. Among the educational strategies suggested, motivational interviewing is considered effective for addressing problem solving⁴⁵. The process of gathering evidence to support practices and modify approaches in response to the evidence is key to advancing high-quality patient care⁴⁶. Members of the care team who provide self-management and support interventions are encouraged to use feedback to inform, reward and motivate behavior by providing relevant information to patients on their performance levels, clinical indicators, behaviors, or problem-solving progress^{47,43}.

Table 4: Practical recommendations and approaches to problem solving in diabetes education

Recommendation for the Educator	Rationale / Comments
Ask focused questions during the patient assessment.	Focused questions help ascertain present difficulties, knowledge gaps, lack of resources or support, unawareness of opportunity for improvement, etc. Sample Questions: Over the past 7 days, how many days have you not been able to eat on schedule because you were busy at work?
Be thorough with each problem-solving step.	Avoid compressing steps; avoid racing to the end to develop the strategy. Strategy: Perform a thorough assessment, as it relates to each identified problem. Then follow the diabetes education process ⁴ .
Clarify expectations and collaboratively set realistic, meaningful goals.	Identify patient-provider differences in expectations, and focus on personal incentives and goals. Patient beliefs and incentives are important in self-care ^{34,12,53} . Incentives can be negative as well as positive. Strategy/Assessment: Understand patient's lifestyle, level of motivation and constraints. Sample Questions: <i>What is it at work that prevents you from eating on time and how could that be changed?</i> <i>Tell me how I can help you to develop a work schedule that will allow you to eat on time?</i> <i>Let's set a goal together - assuming you work 5 day s/week, how many days a week do you think it is possible to alter your schedule to eat on time? If eating on time is not possible, what alternative arrangements can be made?</i>
Consider simple, practical assessment tools, and use them with flexibility.	Suggested tool: Diabetes Problem-Solving interview (DPSI) ⁵⁴
Acquire skills as needed.	Problem solving skills for the patient to embrace and improve – self-actualizing; develop self-efficacy based on improved understanding of their diabetes and potential complications, blood glucose awareness, planning ahead for vacations; choosing meals when dining away from home; implementing behavioral strategies for medication adherence; self-medication, sick day management, and knowing where to look for help. Patient centered skills are needed by the educator in conducting assessments to consider the context of behaviors, collaboratively brainstorming solutions, and creating action and follow-up plans increase the educator's use of these approaches ⁴⁰ . Also needed for effective problem-solving sessions: skills in listening, observing, probing, and guiding. Teaching strategy: Incorporate patient empowerment and self-advocacy, address problem solving within all 7 self-care behaviors, and continued DSMS.
Look beyond the health care realm.	Consider patient issues beyond specific health care behaviors (e.g., social isolation of the patient). Strategy: Psychosocial and environmental assessment and depression screening.
Use behavioral strategies.	Behavioral/psychosocial interventions to help patients make and sustain behavioral changes. Self-monitoring approaches with goal setting, behavioral contracts, or action plans ¹⁰ , and cost-effective reminder prompts (e.g., telephone calls between visits) may promote behavior change and address diabetes distress. Strategy: Patient contracts that are collaboratively developed and agreed to by patient and education team; ongoing interaction and follow up.
Focus on engagement in the educational process.	Good success rates are reported for approaches to enhancing engagement (e.g., integrating motivational interviewing ⁵⁵ into sessions on weight loss in type 2 diabetes ⁴⁵ and community-based resources/supports. Suggested teaching strategy: Motivational interviewing.
Encourage team involvement.	Better outcomes can be achieved when all members of the diabetes care team recognize and reinforce the patient's self-care management. Each team member has different skills and expertise that can enhance problem-solving interventions ⁵⁶ . Strategy: Diabetes care team routine interactions/communications and evaluation/assessment on a quarterly basis for active patients.

POINT 11: *The knowledge base about teaching and engaging in problem solving will continue to evolve.*

Decades of study in the social and behavioral sciences have investigated problem solving as a process; new research has added to our understanding of its application for health education, DSMS and behavior change for those who have diabetes and their health care providers. To support the application of problem solving in diabetes care, development of tailored, validated methods for observing patient-provider interactions to quantify problem-solving processes and skills is warranted.

Several questions are pivotal to the development of clinical tools and recommendations for problem-solving interventions in diabetes self-management and other areas of health care:

- What are the essential components of problem-solving interventions that are most effective in helping people with diabetes change self-care behaviors to better manage the illness?
- How is problem solving best assessed as a process, an intervention, and a skill set?
- What is the best way to teach diabetes educators and other providers to use problem-solving methods with patients—and how do we determine if these providers have improved their problem-solving skills and interventions?
- How do we recognize when a patient has become more effective at solving problems?
- How does assessment of the effectiveness of problem solving fit practically into a patient's daily life?
- Is there enhanced value in having structured problem-solving schedules or tools?
- How do problem-solving assessment, provider training, and patient intervention fit within the structure and communication of the interdisciplinary care team?

CONCLUSION

Problem solving in diabetes self-management is multifaceted and defined as a process, an intervention, and skill set used by individuals with diabetes and related chronic conditions. The problem-solving process involves eight key steps, beginning with identifying the problem. Problem-solving skills interface with other self-care behaviors and are influenced by the diabetes educator's or other provider's skills and practice style as well as by the patient's personal perspectives, background, and external factors. Diabetes educators can help patients become experienced and skilled in problem solving, keeping in mind that approaches must be individualized to the patient. A thorough assessment can be used to tailor problem-solving interventions to the patient's highest-priority goals and issues. Further research is needed to address questions regarding approaches to problem solving in health education settings. Lessons learned from this research may be used to guide research and practice in diabetes self-management education as well as across the field of health promotion.

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