



Translation of Research into Practice: Problem-Solving for Diabetes Self-Management and Control

Abstract

Diabetes is a complex disease requiring daily self-care decision-making. Solving complex problems adroitly is one of the biggest challenges facing people with diabetes. Addressing these problems requires multidimensional behaviors that encompass a logical and systematic approach, known as problem-solving. A systematic review on the topic concluded that there are gaps in the current state of evidence. In spite of these gaps, useful approaches to teaching problem-solving are available for use by diabetes educators and other members of the diabetes care team. This paper provides practical guidance for the educator along with practical checklists and a case study to facilitate problem-solving interventions and models.

Diabetes is a complex disease requiring daily self-care decision-making. Solving complex problems adroitly is one of the biggest challenges facing people with diabetes.¹ Addressing these problems requires multidimensional behaviors that encompass a logical and systematic approach, known as problem-solving.

Problem-solving is a learned behavior involving strategies for problem resolution. The individual is required to select, apply, and evaluate the effectiveness of the chosen strategy.² Problem-solving activity also involves problem specification; goal and barrier identification and application of skills; knowledge and experiential learning. Problem-solving is a prerequisite for decision making that allows a person to consistently engage in healthy behaviors on a day to day basis.³

There is general concurrence that problem-solving is inherent in all aspects of diabetes self-management education/training (DSME/T).⁴ Diabetes educators are encouraged to continually weave the problem-solving process into instruction; and yet it is the most difficult skill to teach.¹ Due to gaps in knowledge and the complex nature of the skill, it is difficult to define and effectively measure.⁵ This paper focuses on the distinctive use of the term problem-solving and how problem-solving is used to address interacting social and behavioral impediments to diabetes self-management.

In addition to building upon the findings from a systematic review of problem-solving, this opinion paper integrates recent literature and suggestions offered at the AADE Problem-Solving Summit that took place in December 2008. The Summit brought together 15 attendees representing multiple disciplines from practice, academia and industry to discuss what is currently known about problem-solving in diabetes and the state of sciences regarding translation of empirical findings into practice. The paper is designed to assist educators who desire guidance on how to effectively incorporate

problem-solving into DSME/T interventions and practice and those who engage in research.

Background

In 2007, Hill-Briggs and Gemmell conducted a systematic review on problem-solving and diabetes.¹ The review, which includes findings from 52 studies, draws on the best health services research principles and methods to examine specified categories of outcomes according to the DSME core outcomes measurement continuum (learning, behavior change, clinical improvement and improved health status). The authors considered the evidence to determine whether problem-solving is: 1) an outcome that can be measured and practically assessed, and 2) associated with self-management behaviors and clinical outcomes, and if so, whether it is an effective intervention for diabetes education.

The literature includes other informative studies such as Zoffman and Kirkevold's paper that was published in 2005.⁶ These authors report on how different approaches to problem-solving can either empower or disempower patients, considered both patients and provider problem-solving approaches, and stress that problem-solving is restricted by how one views life and disease. Keeping life and disease apart, a core factor in problem-solving, involves a pattern of conflicts between patient and health professionals that result in the provider viewing the patient as a problem and/or problem-solving being done by the provider. This leads to disempowerment. The authors found that a compliance-expecting approach did not change these patterns and a failure-expecting approach sustained the negative pattern. A mutually-expecting approach neutralized the conflict and empowered patients as problem solvers.

Davis et al, note that effective treatment and problem solving programs focus on identifying areas that are most amenable to change and emphasize only one or two behaviors that matter to the patient per encounter.⁷ These authors advocate for solution focused interventions, such as use of the "Miracle Question", goal contracting and scaling of questions. The Hill-Briggs review (Table 1) found that there are key steps to an effective problem-solving approach. These steps are addressed in the sections below and are adaptable to the characteristics of the person with diabetes (e.g., age, literacy level, culture) and the complexity of the problem.

In the systematic review, Hill-Briggs and Gemmell concluded that the current state of evidence is not strong enough to make specific recommendations for systematic integration of problem-solving training methods into DSME/T for different patient groups and outcomes. Gaps in knowledge remain and studies vary considerably which makes it difficult to create definitive statements about the best interventions or the overall effectiveness of problem-solving strategies. For example, poor problem-solving is associated with poor glycemic control. It remains unclear how one influences the other and whether the same techniques apply to both children and adults. Furthermore, additional research is needed to measure the influence of problem-solving behaviors on process and health outcomes.⁸

In spite of these gaps, the Problem-Solving Summit attendees concur that useful approaches are available for use by diabetes educators and other members of the diabetes care team. Such guidance is discussed below along with practical checklists and a case study to help learn more about applying problem-solving interventions and models.

Problem-Solving in Practice

Problem-solving helps people with diabetes expect and manage, the unexpected and allows educators to recognize challenges to proper care. The educator and person with diabetes can then work to overcome these challenges.⁹ This section provides tips and resources (e.g., sample questions for assessing a person's ability to problem solve and a case study) to help educators work with this difficult concept. The tips and tools for integrating problem-solving into practice are based on evidence from research findings.

Problem-Solving Orientation

Findings from the Problem-Solving Summit suggest that during DSME/T, the problem-solving process builds on models (e.g., IDEAL model, patient empowerment model needed, and those used in teaching engineering, math and science)¹⁰⁻¹³ to help people identify/solve problems. The IDEAL model is one of the most well known models. It is a step-by-step process to help the educator and person with diabetes work together to manage problems. Theories underlying DSME/T encourage diabetes educators and people with diabetes to collaboratively address barriers to their diabetes self-management; such as physical, emotional, cognitive, and financial obstacles; while developing coping strategies to help people with diabetes deal with each problem as it arises. (Table 2)

Goal setting is the first step in the sequential problem-solving process. (Table 3) To begin, the educator and person with diabetes generate a variety of approaches to address the problem. Next, the individual chooses which approach they want to employ. Rehearsal or role play is recommended as people may not know what to do even if it appears to be common sense. A list of actions for working through problem-solving in a DSME/T session is presented in Table 2. Table 4 offers questions and statements that were developed by the authors of this paper to assist the practitioner.

In adopting the process for problem-solving offered in Table 2, diabetes educators can use a questioning approach to assess personal priorities that link back to collaborative goal setting. By including analogies to help people with diabetes find real-life problems on which to base his/her process (such as balancing a checkbook, forgetting lunch, running out of gas), the educator can help the person with diabetes develop strategies for the next time a real-life problem occurs. DSME/T aims to help the person with diabetes recognize that every effort to manage his/her diabetes can be a valuable learning experience that helps them keep on track and in charge.

Tools for Practitioners

There are several tools and documents available to help the diabetes educator integrate problem-solving into their DSME/T program. For example, Guidelines for the Practice of Diabetes Education (available at:

http://www.diabeteseducator.org/export/sites/aade/_resources/pdf/PracticeGuidelines2009.pdf), are based on the AADE7 Self-Care Behaviors and outline the roles and responsibilities for each level of educator.¹⁴ Other resources are available to point readers to easy-to-understand resources that discuss the ins and outs of diabetes. The National Diabetes Education Program (NDEP), for example, provides patient resources in many languages for free. These are available at: <http://ndep.nih.gov/>.

Problem-solving Case Study

Translation to Practice: Empowering people with diabetes to take charge of their health through the acquisition of problem-solving skills should be essential for DSME/T interventions. Educators can use patient-specific problem scenarios, allowing the person with diabetes to identify solutions, recognizing that the person is an expert in his/her problem and how to solve it. This case study illustrates an effective approach.

Person with diabetes: Steve W. is 44 years old, male, lives with his mother, and has a part-time job working at a billiard parlor. He was diagnosed with type 1 DM at age 10. His father left the family shortly after he was diagnosed, leaving his mother to raise him and his sister without support. His mother became over involved in his care and is still caring for him. He has no health insurance. He is partially blind due to retinopathy and has neuropathy in his feet, but no other apparent physical dysfunction. He is on a program of fast acting insulin with meals and long acting insulin at bedtime. He acknowledges his A1C is about 9 or 10 and the presenting problem is frequent severe lows that require paramedic intervention and emergency room visits once or twice a month.

During the initial interview, he identifies pain with injections and testing, making it clear he will do no more testing than what is absolutely necessary. He is resistant to seeing a dietitian. Steve expresses a desire to become independent and reports anger about being in his mother's household and being taken care of, however, financially, he seems to have no other choice. A pattern of arguments with his mother over food and lifestyle is well established. Steve has no friends, and few interests other than pool and on-line poker which he plays in his room. His work hours keep him up very late at night which is when he has most of his low glucose events.

As an educator:

- What would get your attention with Steve?
- What problems do you see?
- How would you prioritize these problems?
- What are your goals for Steve and what are Steve's personal goals?
- What are the barriers preventing him from using reasonable diabetes care?

The following examples illustrate potential personal and social-environmental barriers that a diabetes educator might consider for prioritization and goal setting, and in some cases, referral to allied health professionals. The educator may begin by considering some of Steve's likely personal barriers.

- How might his health beliefs impact his self-care?

- Are there other areas in his life over which he perceives he has some control?
- How does his anger impact his self-care?
- What strategies is he using to manage his anger?
- What non-health related activities does Steve engage in that might promote self-esteem, a sense of purpose and responsibility?
- What is his knowledge of appropriate food selections, meal plans, recommended frequency, duration and intensity of exercise, and optimal medication adjustments?
- How have his past experiences with self-care and health problems impacted his thoughts and feelings of control regarding his diabetes and his involvement in his care?
- How might his sleep schedule impact his regimen?

The educator could then explore social-environmental barriers with Steve.

- How does his physical living environment impact his day-to-day ability to carry out adjustments in self-care?
- How does health-related communication with his mother impact decisions about self-care?
- How might social isolation play a role in his diabetes care decisions and behaviors?
- What are Steve's barriers to reaching out for support to friends, relatives and providers?

As an educator, how would you work with him? As noted above, there are several models and techniques that you might use. You might, for example, generate possible solutions, which link to the IDEAL problem-solving steps.⁶ You may opt for the IDEAL, patient empowerment, or a similar approach. Some educators use a blended strategy. The following is how one educator combined pieces of different models and theories to integrate problem-solving into other AADE7 Self-Care Behaviors (monitoring and healthy coping) to work with Steve to achieve his goals.

Steve's case is ongoing and the following is what has happened so far.

1. He was referred for family therapy and he is going with his mother. They have worked on his hostility and the fights about food at night. They are making progress.
2. He was confronted about his lack of testing and it was suggested that this might be a way to problem-solve the lows at night. His response was to refuse to do any more testing. A discussion was held regarding safety issues. His approach to problem-solving was to think it through on his own and to lower his insulin doses by a certain percent. This resulted in reducing the frequency of lows dramatically. He has had no paramedic calls in the last two months. Although the logical professional way to deal with his issue was not his style, his own approach was very effective.
3. He is discussing jobs and what might fit with his thinking.

4. He seems to be very responsive to taking his own initiative in seeking solutions that are effective for him even though they may be different from the usual way of thinking.

Summary

Diabetes educators strive to provide a learning environment to help guide people with diabetes find ways to smoothly navigate daily life, while managing an evolving array of diabetes related decisions. Most decisions involve a series of smaller decisions intertwined with various components of daily health care including food management, taking medication, monitoring and so forth.¹⁵ The context for these decisions is dependent upon the person with diabetes' ability to identify the situation and apply problem-solving skills to enhance his/her care, goal-setting, repertoire of experiences, and the application of skills and knowledge to diabetes self-management.

The Hill-Briggs and Gemmell Systematic Review and the AADE Summit attendees view problem-solving as a construct that is interwoven with other behaviors and is also a unique skill unto itself. Diabetes educators recognize that the problem-solving behavior intersects with other AADE7 Self-Care Behaviors (healthy eating, being active, monitoring, taking medication, healthy coping, and reducing risk). Although questions remain and more research is needed, the experts at the Problem-Solving Summit concur that there is sufficient evidence to verify that appropriate diabetes education on problem-solving is essential for effective self-management by people with diabetes.

Conclusion

Problem-solving is valuable for the integration of knowledge and skills that are fundamental to DSME/T. In practice, problem-solving involves problem identification, definition, and specification; goal and barrier identification as a prelude to generating a set of potential strategies for problem resolution and applying these strategies to implement a solution. Additional research on problem-solving is needed to add to the body of knowledge and fill in existing gaps. Translation of this research into practice is essential for the integration of techniques for teaching problem-solving for DMSE/T.

Table 1 - Problem-Solving Systematic Review Key Findings

- Disease control variables (A1C, hyperglycemia, hypoglycemia, emergency department visits) are consistently associated with problem-solving in adults.
 - Ineffective/poor problem-solving abilities are associated with poor glycemic control in adults; the findings are inconsistent regarding children.
- Among the problem-solving studies that have been reviewed, self-management behaviors are the least frequently examined outcomes based on the tools (e.g., ratings, instruments, scales) typically used for assessing problem-solving.
- Studies of specific interventions report:
 - Positive effects on dietary intake and self-monitoring of blood glucose.
 - Weak and inconsistent evidence on physiological outcomes; only 37% of the studies reported an improvement in A1C following the intervention.
 - Variability in A1C level changes, however, it is difficult to draw conclusions, particularly over time.
 - Strong evidence for the effectiveness of interventions on isolated self-management behaviors, no matter the individual's age.

Table 2 - Actions for Working through Problem-solving in a DSME/T Session.4

- Identify the problem
- Define the problem
- Collaboratively set the goal
- Compare current behavior to a standard
- Make a decision as to what is needed, based on the goal that has been set
- Brainstorm possible solutions and identify alternatives
- Assess presence of skills for execution.
- Choose the solution to use
- Implement the strategies (assuming the skills are present) and act on the solution(s) in daily life
- Utilize feedback to learn from the results

Table 3 - Sample Process for Addressing Problem-Solving in DSME/T

<p>Standards of Care</p> <ul style="list-style-type: none"> • Make referrals and prescribe • D-SMART¹ questions relating to problem-solving • Focused physical assessment; e.g., vision, ambulation, sensitivity • Medication assessment emphasizing follow through and the ability to sustain regular care • Clinical assessment to include labs (frequency of blood glucoses; testing reflexes, pt's plan) • Developing awareness of long term and acute complications • Include coping strategies in psychosocial adjustment; assess one's ability to do cognitive reframing • Social assessment with a focus on communication to obtain support • Economic assessment; availability of tools to support DSME/T • Assess for readiness • Functional problem-solving assessment 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<p>Goal Setting</p> <ul style="list-style-type: none"> • Set behavioral, problem-solving and clinical goals to address deficits in all areas of the assessment • Prioritize goal setting based upon assessment 	<input type="checkbox"/> <input type="checkbox"/>
<p>Identify Personal Barriers</p> <ul style="list-style-type: none"> • Thoughts from beliefs about vulnerability to negative outcomes • Emotions such as sadness, anxiety or anger • Knowledge and skills related to food selection, meal plans, duration and intensity of exercise • Physical symptoms such as pain • Influence of past experiences 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<p>Identify Social-Environmental Barriers</p> <ul style="list-style-type: none"> • Weather • Social support from family, friends, co-workers and health providers 	<input type="checkbox"/> <input type="checkbox"/>

¹ Information about D-Smart is available at <http://tde.sagepub.com/cgi/content/abstract/33/5/833>.

Table 4 - Sample Problem-Solving Questions and Statements

- Sometimes it can be tough to decide what to do when your blood glucose level is higher or lower than you would like it to be.
- Let's talk about what might be happening when you are running high (or low).
- What would factor into your plans when deciding how much medication to take, what to eat or whether or not to exercise?
- What is your goal blood glucose level?
- How does the reading you see on your meter compare to your goal?
- What do you think led up to the need for a high blood glucose reading?
- What are potential ways you could reduce your blood glucose level?
- How might eating certain foods impact your blood glucose levels?
- How about medication?
- How would you expect exercise to impact your glucose level?
- Now that we have looked at the possible influences of each, what do you anticipate might influence your ability to make an adjustment in each self-care step (diet, medication, exercise) when your blood glucose level is high (or low)?
- Sometimes unexpected situations can arise depending on where you are, your schedule or your mood.
- Unexpected situations can affect your ability to make adjustments when they are needed.
- By identifying the challenges that may arise, and by having strategies in mind for managing them, you can recognize challenges when they occur and be ready to take control over your diabetes decisions and care. Which of these strategies have you had the most success with in the past?
- Which strategy is most likely to work for you?
- Can you think of things that have interfered with your ability to make appropriate decisions or to follow through with optimal adjustments? Alternatively, this may be approached from the positive— can you think of some things that have helped you?
- When did you feel most successful, most confident with your ability to make appropriate decisions? (Try to elicit the most recent, salient situation and strive to have the person with diabetes describe scenarios that have previously occurred or are anticipated).
- Let's decide which adjustment is the best fit for you in the situation you described to me.
- Next, let's identify your personal challenges for actually making this adjustment.
- What are some ways that you might handle each personal challenge? (Provide prompts to ensure consideration of issues related to preventing the high/low situation in the first place, as well as managing the context of the behavior such as the setting, interpersonal issues, emotions, thoughts and time management).
- We have come up with a good list of strategies for managing your diabetes decisions and follow through with adjustments in your regimen.
- It will be important to remember these so that you have a "tool box" of plans to manage challenges when they arise in your day-to-day activities.

- When highs and lows occur, or you miss an opportunity to manage them the way you would like. Think back to what might have led to this, what you would do differently if this situation should arise again, and consider it as a learning experience so you can apply your “tool box” in the future.

Authors

Joseph Nelson, MA, LP

Barbara Stetson, PhD

David Randal, PsyD, LP, CDE

Russell Glasgow, PhD

Karen Fitzner, PhD

Ronald Iannotti, PhD

Edwin Fisher, PhD

Donna Tomky, MSN, RN, ANP-C, CDE

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