

Commonalities in Effective Behavioral Interventions for Children and Adolescents With Type 1 Diabetes: A Review of Reviews

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A major public health trend of the 1990s was to focus on health status and health-related quality of life outcomes.^{1,2} Work in the field of diabetes treatment and research during this time provided examples of this focus,³ and much research has benefited, both directly and indirectly, from many of these earlier studies.⁴⁻⁶ It is in the spirit of this focus on health status and quality of life, along with these earlier studies, that many current efforts to examine, understand, and refine interventions aimed at promoting physical and psychological health outcomes are conducted. Pediatric diabetes is no exception, with at least three comprehensive reports being published since 2000 on the effectiveness of behaviorally oriented interventions to optimize health outcomes in children and adolescents with type 1 diabetes.⁷⁻⁹

Hampson et al.⁷ conducted a meta-analysis to determine which behavioral interventions were effective in promoting psychosocial, metabolic, self-management, and diabetes knowledge outcomes. Their statistically rigorous approach highlighted certain treatments, particularly those with a theoretical foundation, that offered greater promise in terms of psychological and physiological outcomes.¹⁰⁻¹² Further, they were able to provide a quantitative examination of the public health impact of these interventions through use of the RE-AIM framework.¹³ However, their overarching conclusion about behavioral interventions for adolescents with type 1 diabetes was that they offered small to medium beneficial effects across these outcomes.

Northam et al.⁸ provided a comprehensive review of the literature on behavioral interventions for children and adolescents with type 1 diabetes across psychological and metabolic outcomes. They noted that most interventions contained some aspect of psycho-educational or cognitive-behavioral techniques ultimately aimed at promoting behavior change related to diabetes management. However, most used nonstandardized, study-specific interventions that involved multiple components, making it difficult to draw conclusions across studies.

Finally, a recent systematic review and meta-analysis⁹ aimed at identifying the effectiveness of psychological interventions on metabolic outcomes concluded that, overall, psychological interventions in children and adolescents with diabetes show weak but significant evidence of improved health outcomes. These authors also noted that psychological outcomes were improved in the few studies that included measures of these constructs.

Although these three reports take different approaches to examining effectiveness, vary in their approaches to the actual review, and include studies with varying methodological limitations, a singular theme appears about the state of behavioral interventions for children and adolescents with type 1 diabetes: although there is promising evidence of effectiveness, there is still much work to be done. Considering that this theme will likely prompt more research and more refined treatment approaches, it is positive. However, the global nature of reviews such as these (i.e., reviewing treatment pack-

ages and synthesizing findings across all approaches), provides conclusions that are generally insufficient to guide clinicians and researchers to the most optimal intervention components or approaches. Thus, it is the aim of this article to reexamine and integrate the findings of these three earlier reviews, focusing on using their findings to suggest the most effective components of behavioral interventions for children and adolescents with type 1 diabetes.

Optimizing Diabetes Management in Children and Adolescents

The management of type 1 diabetes in children and adolescents is a complex and difficult process. This process includes person- (age, physiological, and emotional developmental levels), diabetes- (duration of diabetes, treatment regimen), family- (family structure and functioning), and system- (access to care, availability of multidisciplinary care) specific factors. Findings from the Diabetes Control and Complications Trial^{3,6} highlighted the benefit of intensive insulin therapy and optimizing glycemic control in adolescents. Recently, Springer et al.¹⁴ published an article on the benefits of intensive insulin therapy in a large pediatric diabetes center, with nearly 70% of their sample ($n = 465$) meeting the therapeutic goal defined by the American Diabetes Association.¹⁵ These results are encouraging, yet they are not ubiquitous across diabetes centers; glycemic control remains largely suboptimal in most pediatric populations.^{16,17} Given the complex nature of diabetes management and these findings, much work remains in promoting optimal management

of type 1 diabetes in children and adolescents.

In addition to intensification of the treatment regimen, achieving optimal therapeutic outcomes requires targeting the behavioral processes linked to health outcomes. Specifically, adherence, psychological factors, and family factors have all been targeted in efforts to promote optimal diabetes outcomes in youth.^{10,11,18–26} For youth with diabetes, these factors are necessarily intertwined. Type 1 diabetes is embedded in the individual and family system, making nearly every component of daily life part of the diabetes lifestyle. It is not surprising, then, that Wysocki,²⁷ in a review of behavioral assessment and treatment in pediatric diabetes, notes that treatment of suboptimal diabetes management and control should follow a thorough assessment of personal, family, and contextual factors. Subsequently, efforts to improve adherence behaviors should consider both individual and family factors as either promoting or putting up barriers to effective management and should recognize the functioning of both nested in the sociocultural environment. Improving both individual skills (e.g., coping skills, problem-solving) and family management processes (e.g., diabetes-specific communication, responsibility-sharing, conflict), with consideration of relevant contextual factors (e.g., school system, resources) can be helpful in achieving better diabetes outcomes.

Effective Treatment Components

As discussed previously, the existing reviews of behavioral interventions for children and adolescents with type 1 diabetes necessarily used a global approach in analyzing the effectiveness of these interventions. In this review, we attempt to extrapolate from the successful intervention studies specific components that appear to be efficacious across approaches. Further work to refine interventions by examining the components, testing them, and then conceptually and empirically applying them to full treatment packages would advance the field of behavioral intervention in diabe-

tes management. Nonetheless, given the research findings to date, the following constructs and components appear to be characteristic of effective intervention approaches.

- Approaches need to be theoretically grounded. In the review by Hampson et al.,⁷ interventions derived from a theoretical foundation demonstrated greater efficacy than those that were not theoretically based. Substantial work has been conducted in developing and testing behavioral theory; this work should guide the development and refinement of behavioral interventions for children and adolescents with type 1 diabetes.
- Tailoring the intervention to be diabetes-specific appears to be key. There is evidence to suggest that the interventions reviewed can improve family processes in general, but the key processes for effective management and control appear to be those that are diabetes specific. For example, as a treatment package, Behavioral Family Systems Therapy (BFST)²⁸ has been adapted to the treatment of youths with type 1 diabetes and successfully promoted family-based skills related to communication and conflict.¹⁸ However, when the intervention was adapted to be more diabetes-specific (BFST-Diabetes, or BFST-D), improvements in adherence and diabetes control occurred.¹⁹ Additional components of BFST-D have prior empirical support and include behavioral contracting related to diabetes management tasks, goal-setting, diabetes education, psycho-education, parental participation in simulated diabetes tasks (e.g., monitoring and treating simulated hypoglycemia), and possible extension into the social networks of the youth. Because diabetes is embedded in the daily lives of these youths and their families, even interventions specifically targeting family processes, such as communication, conflict, and problem solving, need to address these processes as they relate to diabetes management.
- Experiential learning is a must. Interventions that contain specific activities in which patients and family members apply the skills being addressed appear to promote more effective management. For example, interventions such as Coping Skills Training (CST)¹² and family-focused teamwork (TW) include direct skill-building and parent-child process components.^{10,24} CST, combined with intensive insulin management, has been shown to produce better diabetes control and promote improvements in quality of life up to 1 year later.¹² TW interventions, which seek to improve sharing of diabetes-related responsibility while reducing diabetes-related conflict, have led to improved diabetes outcomes and quality of life.^{10,22,24} These interventions include practical behavioral strategies that are practiced both during the intervention and outside of the clinic setting.
- Flexibility is required. While there are certainly many commonalities across children and their families, specific needs may vary. Differences in child developmental levels and capabilities, parent-child relationships, family structure, and social context will affect family needs and issues. Successful interventions each address the development of diabetes-specific skills and capabilities (e.g., more adaptive family functioning in BFST-D, more effective coping skills in CST, more teamwork for diabetes management in TW); however, they also provide flexibility within the overall structure to address the individual needs of each family.
- The intervention setting and method of delivery should meet the needs of the participants and the mechanisms for sustainability. In previous research, interventions conducted in the clinic, at homes, and in community settings have all been shown to be effective, as have individual, family, group, and system interventions. Thus, the location and

delivery method must be balanced with practical considerations of cost, personnel, and other resources. The most suitable method of delivery is one that fits best with the available resources and can be practically sustained over time, maximizing participation, effectiveness, fidelity of implementation, and maintenance. In other words, one size does not fit all.

- Interventions should be designed or adapted with attention to relevant socio-cultural factors of the population being served. Thus, when adapting a previously successful intervention to a different population, the relevance of the intervention approach and components must be evaluated. Unfortunately, little research has addressed differential needs or the effectiveness of intervention approaches across racial, ethnic, cultural, or socioeconomic groups. This is likely due to the difficulty in obtaining sufficient numbers of participants in any one group from a single clinical site for comparative analyses. Practitioners working with these populations may benefit from needs assessment and formative evaluation to ensure that the intervention approach taken is implemented in a way that is culturally relevant and sensitive to the unique needs and challenges of the target population.

In summary, the research on behavioral interventions for children and adolescents with type 1 diabetes demonstrates that such strategies offer small to moderate effects on physical and psychosocial outcomes. However, given the long-term outcomes associated with improved glycemic control, even small to moderate effects may translate into substantial public health benefit. Moreover, a review of effective interventions to date suggests common components or constructs that are important across differing approaches and theoretical perspectives. Application of these components to existing or newly developed treatment packages should enhance the treatment's utility and effective-

ness. Although much work remains to be done, research to date offers an array of effective behavioral strategies for promoting the psychological and physical health of children with diabetes.

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