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A Systematic Review of Transitional Care for Emerging Adults with Diabetes



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The prevalence of diabetes and prediabetes in adolescents is increasing. A systematic review of 31 research articles focusing on transitional care for adolescents or emerging adults with diabetes or prediabetes was completed. Studies focused on those with type 1 diabetes, not type 2 diabetes or prediabetes, and were primarily descriptive. Major findings and conclusions include differences in pediatric versus adult care delivery and the importance of structured transitional programs using established recommendations of leading national organizations. Implications include future research on program development, implementation, and evaluation that is inclusive of adolescents and emerging adults, regardless of diabetes type, or prediabetes.

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EMERGING ADULTHOOD IS a newly recognized developmental period of life from the late teens through the twenties (Arnett, 2000; Garvey et al., 2014; Ritholz et al., 2014). During this period, emerging adults explore their identity and experience many new transitions, demands, expectations, and roles as they develop from dependent adolescents to independent young adults (Arnett, 2000). For emerging adults with chronic health care conditions, one transition that must be considered is the move from parent-directed pediatric to self-managed adult healthcare. This transition addresses the medical, psychosocial, educational, and vocational needs of the emerging adult with a lifelong chronic condition (Blum et al., 1993).

In adolescent diabetes care, transitional care from pediatric to adult health services is a high priority. Diabetes is a complex, chronic disease that is increasing in prevalence worldwide (Patterson et al., 2012; Vehik & Dabelea, 2011). In children and adolescents in the United States between 2001 and 2009, the prevalence of type 1 diabetes increased

by 21%, affecting males and females, most racial/ethnic, and age groups (Hamman et al., 2014). The incidence rate of type 1 diabetes is rising across Europe by an average of approximately 3%–4% per year (Patterson et al., 2012). In Europe, new cases of type 1 diabetes for youth under 5 are predicted to double by 2020, and the prevalence of type 1 diabetes in youth under 15 is predicted to rise 70% by 2020 (Patterson, Dahlquist, Gyurus, Green, & Soltész, 2009). As the prevalence of type 1 diabetes in youth increases worldwide, transition from pediatric to adult healthcare services and learning to live with a lifelong chronic condition will become a global concern.

Type 1 diabetes leads to absolute insulin deficiency due to beta cell destruction (American Diabetes Association, 2015); whereas, type 2 diabetes is due to a progressive insulin secretory defect and insulin resistance, often characterized by excessive weight gain (Cali & Caprio, 2008). Concomitant with the rise in pediatric obesity is an increased risk for the future development of type 2 diabetes and *prediabetes* (Reinehr et al., 2009). Prediabetes consists of impaired fasting glucose 100 to 125 mg/dL (5.6 to 6.9 mmol/L), impaired glucose tolerance to a 2-h oral glucose tolerance test (OGTT) of 140 to 199 mg/dL (7.8 to 11.0 mmol/L), or

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A1C 5.7%–6.4% (American Diabetes Association, 2015). In the United States National Health and Nutrition Examination Survey (NHANES) of participants aged 12 to 19 years from 1999 to 2008, the prevalence of prediabetes/diabetes increased from 9% to 23% (May, Kuklina, & Yoon, 2012). Between 2001 and 2009 the prevalence for type 2 diabetes increased by 30.5%, in both sexes for ages 10 years and up, and among Hispanic and non-Hispanic white, and African American youth (Hamman et al., 2014). In light of these increases, there is an urgent need not only to identify youth at risk for prediabetes and type 2 diabetes, but also to ensure appropriate transitional care and ongoing screening into emerging adulthood.

Not only are the rates of prediabetes and diabetes among adolescents increasing and placing a greater demand on health systems for transitional care, emerging adults are also at increased risk for declining health status during this time in transition of health care. At the beginning of emerging adulthood, which coincides with the transition from pediatric to adult care, glycemic control in those with diabetes is known to decrease significantly (Bryden et al., 2001; Insabella, Grey, Knafel, & Tamborlane, 2007). Optimal glycemic control during this time of life reduces the likelihood of serious long-term health complications later in life. Specifically, tight glycemic control during adolescence and emerging adulthood decreases both microvascular and neurological diabetes complications (Blonde, 2012; Silverstein et al., 2005). Seamless transitional care is needed in order to optimize glycemic control for emerging adults and to reduce future complications.

In 2001, the Institute of Medicine's landmark publication, *Crossing the Quality Chasm: A New Health System of the 21st Century*, provided evidence that the U.S. health care delivery system too often fails to deliver high quality care. Given the expected onslaught of emerging adults with or at risk for developing diabetes and ongoing challenges to address existing gaps in care delivery, a growing abyss may ensue. More young adults may experience suboptimal health care utilization, poor glycemic control, acute exacerbations, and chronic complications, some of which may go undetected (Peters & Laffel, 2011).

There are ongoing efforts to promote the value of seamless, coordinated, and developmentally appropriate care by leading United States organizations, such as the U.S. Department of Health and Human Service's Maternal and Child Health Bureau (2008), the American Academy of Pediatrics (Cooley & Sagerman, 2011), and the American Diabetes Association (Peters & Laffel, 2011). However, there is currently no consensus model of transitional care for adolescents and emerging adults with diabetes in the United States. Other countries have also addressed transitional care for adolescents with diabetes; however, the majority of evidence worldwide remains at the level of expert agreement or clinical experience rather than being based upon well-conducted randomized controlled trials or meta-analyses with quality ratings (Peters & Laffel, 2011).

Recent publications address the importance of transitional care for youth with type 1 diabetes and propose frameworks for establishing comprehensive models of care (Hanna, 2012; Van Wallegghem, MacDonald, & Dean, 2012). Recent systematic reviews have focused on identifying the level of evidence and describing the evidence on diabetes transitional care (Hanna & Woodward, 2013), examining the impact of transitional care on health outcomes and health behaviors in those with type 1 diabetes (Sheehan, While, & Coyne, 2015), and investigating the experiences of diabetes transitional care from the perspective of the patient, parent, and provider (Sheehan et al., 2015). However, these reviews excluded adolescents and emerging adults with type 2 diabetes or prediabetes whose numbers have drastically increased (Dabelea et al., 2014). The health risks associated with the emerging adult period for those with diabetes, in addition to the increase in older adolescents diagnosed with diabetes and prediabetes, indicate an urgent need for innovative and successful care models for transitional care and beyond. (Winocour, 2014) Therefore, the purpose of this systematic review was to examine the level of evidence from primary research for the process and outcomes of transitional care programs for adolescents and emerging adults with either type 1 diabetes, type 2 diabetes, or prediabetes. Our original PICO (patient, intervention, comparison, outcome) question was: What are the major components of transitional care programs (interventions) and health outcomes compared to usual care for adolescents or emerging adults with type 1 or type 2 diabetes or prediabetes? We also explored studies that reported perceptions of patients, providers, and parents regarding current and proposed transitional care programs. Our intent was to provide a synthesis of the best evidence to inform clinicians, researchers and policy makers of key components of a model of high quality transitional care for emerging adults with diabetes or prediabetes.

Methods

Design

A systemic review was conducted primarily following the Joanna Briggs Institute (JBI) guidelines (Aromataris & Pearson, 2014) and the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement (Liberati et al., 2009; Moher, Liberati, Tetzlaff, & Altman, 2009). The PRISMA statement provides a 27-item checklist and a four phase flow diagram that include items deemed essential for transparent reporting in systematic reviews. PRISMA helps to ensure transparent and complete reporting so that the benefits and harms of an intervention study may be assessed (Liberati et al., 2009; Moher et al., 2009).

Search Criteria

The inclusion criteria for target studies were: a) data-based investigations that addressed health care transition for emerging adults with diabetes or prediabetes; b) focused on adolescents aged 14–18 years and/or emerging adults aged 19–29; c) qualitative or quantitative; and d)

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