

The Social Context of Managing Diabetes Across the Life Span

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Diabetes self-management is crucial to maintaining quality of life and preventing long-term complications, and it occurs daily in the context of close interpersonal relationships. This article examines how social relationships are central to meeting the complex demands of managing Type I and Type 2 diabetes across the life span. The social context of diabetes management includes multiple resources, including family (parents, spouses), peers, romantic partners, and health care providers. We discuss how these social resources change across the life span, focusing on childhood and adolescence, emerging adulthood, and adulthood and aging. We review how diabetes both affects and is affected by key social relationships at each developmental period. Despite high variability in how the social context is conceptualized and measured across studies, findings converge on the characteristics of social relationships that facilitate or undermine diabetes management across the life span. These characteristics are consistent with both Interpersonal Theory and Self-Determination Theory, 2 organizing frameworks that we utilize to explore social behaviors that are related to diabetes management. Involvement and support from one's social partners, particularly family members, is consistently associated with good diabetes outcomes when characterized by warmth, collaboration, and acceptance. Underinvolvement and interactions characterized by conflict and criticism are consistently associated with poor diabetes outcomes. Intrusive involvement that contains elements of social control may undermine diabetes management, particularly when it impinges on self-efficacy. Implications for future research directions and for interventions that promote the effective use of the social context to improve diabetes self-management are discussed.

Keywords: diabetes management, social support, family, adolescent, emerging adult, couples, peers

Diabetes self-management is crucial to minimizing complications and maintaining quality of life, and it is most effective when it occurs in the context of close supportive relationships. However, the heavy demands of managing Type I (T1D) and Type 2 diabetes (T2D) can alter the nature

of one's social world and undermine the coping and emotional resources of support providers. Individuals with diabetes seek and receive support from many sources, including family, parents, friends, peers, romantic partners, and the health care team. These social resources and the nature of their involvement change across development and may be particularly important during major developmental transitions. As individuals increasingly live longer with diabetes (Hunter, 2016), it is imperative to understand how to utilize support resources to enhance diabetes management and quality of life in patients and families.

Psychologists are uniquely positioned to inform the scientific and medical community about social relationships that facilitate or undermine diabetes management across the life span. Psychologists are guided by broad theoretical perspectives that identify dimensions of social behavior most central to promoting effective diabetes management. For example, two well-established psychological theories converge on the importance of high social support and low

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social control as qualities of interpersonal transactions that may facilitate diabetes management. Interpersonal theory purports that social behavior varies along two orthogonal dimensions, including affiliation versus hostility and dominance versus submission (Kiesler, 1996). Interpersonal transactions are generally promoted by behaviors involving high affiliation (warm, friendly) but derailed by hostility and dominance (Kiesler, 1996; Trobst, 2000). Self Determination Theory (SDT) is a broad theory of human behavior and motivation that predicts that social contexts that fulfill three basic psychological needs—connectedness (feeling loved and cared for), competence (feeling effective), and autonomy (feeling behaviors are freely chosen)—promote autonomously regulated behavior (Ng et al., 2012; Ryan & Deci, 2000). Thus, both theories predict that social transactions conveying love and acceptance without undermining one's sense of efficacy or autonomy—high social support and low social control—are likely to promote good diabetes management behaviors across time.

Although neither interpersonal theory nor SDT has been systematically used to study the social context of diabetes management, we use their predictions as a guiding heuristic to explore the aspects of social relationships that may be central to meeting the challenge of managing diabetes across the life span. We focus on three key times of development: childhood and adolescence, emerging adulthood, and adulthood and aging. For each section, we initially discuss the most challenging aspects of diabetes management at that time of development. We then review research showing mutual influences between diabetes management and social relationships, highlighting how the illness may alter the social context and how the involvement of others

may facilitate or undermine diabetes management. We conclude by discussing implications for research and practice. A full review is beyond the scope of this article, but we highlight the most consistent and compelling findings and refer to reviews where possible. It should be noted that research has focused mostly on T1D during childhood to emerging adulthood, and on T2D during adulthood, consistent with the age at which diabetes is commonly diagnosed. Although T1D and T2D require different treatment regimens (see Hunter, 2016), both have complex behavioral demands that can be challenging to patients and support providers.

The Social Context of T1D in Childhood and Adolescence

T1D is most often diagnosed before children have the necessary skills to complete the complex tasks of managing diabetes independently, making it critical that parents and other adults are involved in its management. Initial diagnosis requires parents to adapt emotionally to the knowledge that their child has a serious illness that may reduce quality and length of life. Parents must rapidly master and teach others about their child's T1D care, and constantly work to help the child achieve tight blood glucose control and avoid hypoglycemia while facilitating normal development. Parents may experience psychosocial difficulties as they adapt to these disruptions in their roles, family routines, and future expectations.

Adolescence brings new challenges to T1D management, as evidenced by longitudinal deterioration in adherence (King, Berg, Butner, Butler, & Wiebe, 2014) and glycemic control (Helgeson, Siminerio, Escobar, & Becker, 2009) across ages 10 to 18. Understanding such deterioration is important because patterns of T1D management that are established during adolescence extend into adulthood (Bryden et al., 2001). These patterns of management are because of a host of biopsychosocial processes, but at least partially reflect shifts in the social context of T1D management, as parental responsibility for management declines and peer influences increase. Peers are commonly cited as a source of emotional support and companionship by adolescents with T1D, but may undermine diabetes care if adolescents alter or neglect their illness to reduce stigma or increase peer acceptance (see La Greca, Bearman, & Moore, 2002; Palladino & Helgeson, 2012, for reviews). Finally, the relationships that families have with health care providers shift from a triadic relationship between the parent, child and physician, toward a dyadic patient–physician relationship.

Effects of T1D on Social Relationships

The demands of managing T1D can disrupt family routines, and change the family climate in which the child



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develops. In a meta-analysis, Pinquart (2013) found families of children with T1D reported lower parent–adolescent relationship quality than those without. However, a recent analysis revealed families with T1D displayed a combination of high organization (i.e., rules for family responsibility), moderate control, and high cohesion (i.e., warmth and support) more than those without T1D (Missotten, Luyckx, & Seiffge-Krenke, 2013). Families with T1D may thus balance the need for structure and control with warm support.

The demands of parenting a child with T1D can take an emotional toll on parents, who are ultimately responsible for their child's diabetes care. Parental distress is elevated shortly after diagnosis, often normalizing the year after diagnosis (Whittemore, Jaser, Chao, Jang, & Grey, 2012). However, 20%–30% of parents of children or adolescents with T1D endorsed clinically elevated levels of psychological distress (i.e., symptoms of general or diabetes-specific anxiety or depression; Whittemore et al., 2012). These findings are concerning because maternal depressive symptoms are associated with less attuned and positive parenting of adolescents with T1D, and with poorer illness management (Jaser & Grey, 2010; Wiebe et al., 2011).

Research on peer relations of youth with T1D is limited. Two recent meta-analyses found that youth with versus without a chronic illness displayed lower social competence (Martinez, Carter, & Legato, 2011; Pinquart & Teubert, 2012), but the effect across all illnesses was small and conclusions regarding the social competence of youth with T1D were inconsistent. Helgeson et al. (2007) found adolescents with T1D were equally likely to have a best friend and a boyfriend or girlfriend than those without, and re-

ported similar levels of positive and negative peer interactions (Helgeson, Reynolds, Escobar, Siminero, & Becker, 2007). It may be that the social behaviors (e.g., prosocial vs. aggressive behaviors) of children with T1D influence peer relations more than features of the illness per se (Alderfer, Wiebe, & Hartmann, 2002).

Effects of Social Relationships on T1D Management

Parental responsibility for completing T1D management tasks declines steadily across adolescence, which is problematic if it occurs prematurely before the child has the capacity or motivation to manage T1D independently (Wysocki et al., 1996). Wiebe et al. (2014) demonstrated that longitudinal declines in parental responsibility were associated with declines in adherence primarily when adolescents did not display concomitant growth in self-efficacy beliefs. Thus, better T1D management occurs when shifts in parental involvement are attuned to the adolescent's competence and self-regulation skills. From the perspective of SDT, such developmentally attuned involvement may be helpful because it increases the likelihood that adolescents experience success and feel effective in their diabetes self-care.

Healthy adolescent development involves interdependence with parents, making it important for parents to remain involved to facilitate effective diabetes care even as their direct oversight wanes (see Young, Lord, Patel, Gruhn, & Jaser, 2014, for review). Coded observations of positive parent–adolescent interactions (Jaser & Grey, 2010), and self-reports of both high quality parent–adolescent relationships (i.e., feelings of warmth and acceptance) and parental monitoring (i.e., having regular contact with the adolescent, being knowledgeable about and supervising diabetes care) are associated concurrently with better T1D management (Berg et al., 2008; Ellis, Templin, Naar-King, & Frey, 2008). King et al. (2014) found that longitudinal declines in relationship quality and parental monitoring predicted subsequent declines in adherence. Consistent with SDT, which predicts that social contexts are adaptive when they fulfill a basic need for competence, these associations were mediated by adolescent self-efficacy.

Although the hazards of parental under involvement are well established, involvement that is intrusive or controlling (e.g., miscarried helping, overprotection) may also undermine T1D management—even when well intentioned (Anderson & Coyne, 1991). For example, older 10- to 15-year-olds reported poorer adherence when they perceived mothers' efforts to help with T1D as controlling (Wiebe et al., 2005). In a daily diary paradigm, Berg et al. (2013) found that parents' intrusive efforts to promote diabetes management may not be uniformly helpful. Parents attempted to influence their adolescent's diabetes manage-



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ment (e.g., reminded; persuaded to do better) on days when they were worried because of heightened diabetes problems. Although these strategies were associated with improved blood glucose levels the next day, they also undermined adolescents' daily self-efficacy beliefs (for those who were high in self-efficacy).

These findings demonstrate the complex interpersonal challenges families face as they attempt to manage T1D while developing the adolescent's autonomy and diabetes skills. It is not uncommon for T1D management to become a source of conflict between parents and adolescents, which is problematic because family diabetes conflict is associated with poorer diabetes management and glycemic control (Hilliard et al., 2013). The developmental challenge of remaining involved while supporting adolescent autonomy may best be met when parents and adolescents work as a team, sharing responsibility for diabetes management (Anderson, Brackett, Ho, & Laffel, 1999) and collaborating when diabetes problems occur (Wiebe et al., 2005).

Adolescents report that peers have important influences on their T1D, but it is not clear whether peers help or hinder diabetes self care. In a review, Palladino and Helgeson (2012) concluded that the associations of peer support with diabetes management and glycemic control are weak and inconsistent, with some studies finding that positive peer relationships are actually associated with poorer glycemic control. This may occur if affiliating with peers is deemed more important than managing diabetes (Drew, Berg, and Wiebe (2010). In contrast, negative peer relations are consistently associated with poorer diabetes management and glycemic control (Palladino & Helgeson, 2012). For example, adolescents' conflict with friends was associated with

poorer adherence and metabolic control, and rejection by friends was associated with poorer psychosocial well-being (Helgeson, Lopez, & Kamarck, 2009).

A few studies have examined the role of health care providers in T1D management during childhood and adolescence. Wiebe et al. (2008) found improved glycemic control when providers encouraged increased parent-adolescent collaboration. A separate study, however, found physician support for parents was not related to parental support for adolescents with T1D (Carcone, Ellis, Weisz, & Naar-King, 2011). The manner in which providers engage with families may be important. A longitudinal study showed that patient centered communication was associated with improvements in adherence and glycemic control among adolescents. Consistent with SDT, this association was mediated by adolescents' higher perceptions of competence in diabetes self-care (Croom et al., 2011).

Interventions to Alter the Social Context of T1D Management

Interventions that alter the social context provide important information for the role of social relationships in T1D management. Such interventions are well developed for children and adolescents with T1D (see Hilliard, Powell, & Anderson, 2016). Family interventions to promote parent-child teamwork and collaboration (Anderson et al., 1999) and to alter negative family interactions surrounding T1D (Wysocki et al., 2007) have been successful at maintaining parental involvement, minimizing conflict, and improving T1D management. Peer support interventions are rare. One pilot study targeted adolescents with T1D and a best friend (Greco, Pendley, McDonell, & Reeves, 2001), finding improvements in peer knowledge and support, but no change in adolescent adherence. However, coping skills training to enhance an adolescent's ability to manage T1D in problematic social situations, including those involving peers, has been effective at improving quality of life and glycemic control (Grey, Boland, Davidson, Li, & Tamborlane, 2000). Finally, behavioral interventions delivered by health care providers have also been developed (Hilliard et al., 2016). Although not intended to target the patient-provider relationship per se, enhanced satisfaction with the relationship occurs and may be a component of intervention effects.

Summary

Findings identify two dimensions of social relationships—warmth and control—that have implications for families of children and adolescents with T1D. Consistent with the interpersonal framework and SDT, warm and friendly interactions with family and friends are related to good diabetes outcomes, whereas conflictive interactions are related to poor outcomes. Aspects of social control are

more complex, potentially disrupting diabetes self-care if basic needs for autonomy and competence are thwarted. The benefits of autonomous support extend to the health care context, where physician behaviors that enhance competence may improve management.

The Social Context of T1D in Emerging Adulthood

Emerging adulthood is a period of development spanning ages 18–25 that follows adolescence but occurs before many traditional adult responsibilities are assumed (Arnett, 2000). It is a time of numerous transitions (e.g., moving out of the family home, attending college, entering serious romantic relationships, and choosing jobs or careers) that are associated with increased freedom and reduced parental monitoring, both of which may combine to threaten psychological well-being and increase risk behavior. It is not clear whether emerging adults with T1D have higher psychological distress levels than comparison groups (Jacobson et al., 1997; Palladino et al., 2013), but their normatively high levels of distress have been linked to poor self-care and glycemic control (Hislop, Fegan, Schlaepi, Duck, & Yeap, 2008). Disturbed eating behavior is a concern among emerging adults with T1D. The onset for bulimia commonly occurs in late adolescence and early adulthood, and rates of eating disorders are higher among those with than without T1D – particularly in females (Jones, Lawson, Daneman, Olmsted, & Rodin, 2000). Disturbed eating behavior is dangerous for those with T1D and has been linked to diabetes-related complications (Rydall, Rodin, Olmsted, Devenyi, & Daneman, 1997). Alcohol use also increases in late adolescence and emerging adulthood, and is risky for those with T1D as it increases hypoglycemia and may impair the judgment needed to execute proper self-care.

The social context of T1D changes during emerging adulthood. Parental involvement further declines, while contact with peers and romantic relationships increases. Emerging adults face an additional challenge of transitioning from the pediatric to adult health care system. This transition is difficult because pediatric and adult health care differ substantially in their approach and there is often little preparation for the transition (Peters, Laffel, the American Diabetes Association Transitions Working Group, 2011). Pediatric services often adopt a family centered team approach, whereas adult services are described as focusing on the individual more than the family and on the physiological aspects of disease more than the social aspects of illness management. The transition out of pediatric care is accompanied by numerous difficulties. Clinic attendance declines, which is problematic because attendance has been linked to better glycemic control (Bowen, Henske, & Potter, 2010) and is necessary to identify early diabetes-related complications. Earlier transitions from pediatric to adult health

care appear associated with poorer glycemic control (Helgeson et al., 2013).

Given the numerous transitions that emerging adults with T1D face, diabetes management may decline (Wolpert & Anderson, 2001). It is unclear whether glycemic control deteriorates; such information is commonly accessed from medical records, and is not available for emerging adults who do not attend clinic (Lyons, Becker, & Helgeson, 2014). However, less than one third of 18–26 year-olds were found to engage in self-care consistent with recommendations (Hendricks, Monaghan, Soutor, Chen, & Holmes, 2013). Also, the beginning of diabetes-related complications may appear during emerging adulthood, enhancing the risk for subsequent complications in later adulthood (Bryden, Dunger, Mayou, Peveler, & Neil, 2003).

Effects of Diabetes on Social Relationships

Relationships with parents change across emerging adulthood. Responsibility for daily diabetes management (e.g., blood glucose testing, diet, insulin administration) has now shifted from parent to emerging adult, but the shift in responsibility for nondaily tasks (e.g., filling prescriptions, making appointments) lags behind (Hanna et al., 2013). Yet, parents remain an important source of support. In-depth interviews with emerging adults with T1D revealed that parents were more likely to provide diabetes-related assistance than peers or even romantic partners, because of their history of responsibility sharing and a lack of competence among peers and romantic partners (Sparud-Lundin, Ohrn, Danielson, & Forsander, 2008).

There is limited research on the implications of T1D for peer and romantic relationships during emerging adulthood, even though peers are central and serious romantic partnerships develop during this period. One study found emerging adults with T1D reported fewer friends than an acute illness control group (Jacobson et al., 1997), while a second reported no differences in the number of friends between those with and without T1D (Pacaud et al., 2007). Helgeson et al. (2015) showed that emerging adults with T1D reported less friend support than those without T1D across three years (ages 18–20), but no differences in friend conflict. With respect to romantic relationships, Jacobson et al. (1997) found that emerging adults with T1D were equally likely to have a romantic partner as the comparison group, but reported less trust and friendship in the romantic relationship. Helgeson et al. (2015) found that romantic relationships of emerging adults with versus without T1D were viewed as equally supportive for males, but as less supportive for females. Thus, T1D has the potential to alter friendships and romantic relationships, but more research is necessary.

Effects of Social Relationships on Diabetes Management

Family support remains an important predictor of diabetes outcomes among emerging adults. In a longitudinal study, parental support during adolescence predicted fewer depressive symptoms and less alcohol usage during emerging adulthood for those with T1D (Helgeson et al., 2014b). Gillibrand and Stevenson (2006) showed that family support was the strongest psychosocial predictor of self-care behavior among 16- to 26-year-olds with T1D. Parent support in late adolescence also predicted positive changes in psychological well-being, decreases in smoking, and better self-care over a 1-year period during the transition to emerging adulthood (Helgeson et al., 2014b). By contrast, parent controlling behaviors predicted increased risk behavior and poor health outcomes among emerging adults, but this association was weaker for those with versus without T1D. Parental control may thus have more complicated relations to outcomes in the context of emerging adults with T1D (Helgeson et al., 2014a).

Although researchers and health care professionals understand that friends and romantic partners play a role in T1D management during emerging adulthood, few studies have examined the implications of such relationships for diabetes health among emerging adults. A longitudinal study of friend support and conflict across the transition to emerging adulthood found that friend conflict was a stronger predictor of health behavior changes over the next year (i.e., increases in alcohol usage and binge drinking) than was friend support (Helgeson et al., 2014a). Helgeson et al. (2015) examined support and conflict from both friends and romantic partners in emerging adults. Romantic relationships were a stronger predictor of diabetes management and psychological well-being than friend relationships in emerging adults, but the implications of romantic relationships differed as a function of illness status. Emerging adults with T1D were less likely to benefit psychologically from supportive aspects of romantic relationships and more likely to suffer from conflictual aspects of romantic relationships than those without T1D.

Interventions to Alter the Social Context of Diabetes

Few behavioral interventions for emerging adults with T1D exist, particularly those involving their unique social contexts. We know of no interventions involving the family, friendships or romantic partners of emerging adults. However, interventions to promote support from patient peers (i.e., other emerging adults with diabetes) may be helpful. Markowitz and Laffel (2012) piloted a peer support group intervention, helping emerging adults with T1D problem-solve and support each other when dealing with diabetes-specific stress. Although not a controlled trial, participants

displayed improvements in glycemic control and diabetes distress from baseline to the intervention. The American Diabetes Association has published recommendations for transitioning youth to adult care (Peters et al., 2011), but interventions targeting the health care provider context of emerging adults have not been systematically tested.

Summary

Research on emerging adults is quite limited, but available data suggest parents remain central while friends and romantic partners become more involved. Emerging adults with T1D display better adjustment with supportive relationships, but poorer adjustment with controlling and conflictual relationships. This is consistent with interpersonal theory and SDT, but the processes underlying such associations have not been studied. Finally, the possibility that diabetes alters the effects of interpersonal transactions (e.g., parental control associated with less adversity in those with vs. without T1D) is fascinating, but requires additional research.

The Social Context of T1D and T2D in Adulthood and Aging

Adulthood and aging pose new challenges for individuals with diabetes. Young and middle-aged adults manage diabetes in the context of competing demands of work and child rearing. Older adults manage diabetes in the context of other health conditions (e.g., cardiovascular disease, cancer, dementia), some of which are because of long-term complications of diabetes. Age-related changes may exist in the management of T1D and T2D across adulthood. For instance, hypoglycemia is more frequent among elderly patients with T1D, potentially because of their different treatment regimens, as are micro- and macrovascular complications (Schutt et al., 2012). Treatment regimens may need to be altered for older adults (Kirkman et al., 2012), especially those experiencing cognitive decline (Kodl & Seaquist, 2008). Older adults with diabetes are a diverse group ranging from healthy individuals with few chronic illnesses to individuals requiring extensive care with daily living and experiencing end-stage chronic illnesses and cognitive impairments (Kirkman et al., 2012).

The social context of diabetes diagnosis and management changes across the adult life span. As noted previously, during emerging adulthood the social context expands beyond parents and friends to include romantic relationships, some of which become enduring and important sources of support for diabetes management. During late adulthood, spouses of those with diabetes may have to deal with the accumulation of long-term complications of the disease, including cognitive impairments (Johnston, McCrimmon, Petrie, & Astell, 2010). Such complications may require greater assistance from spouses at a time when spouses are

dealing with their own chronic conditions, potentially bringing adult children to the social context. The social context may also differ for those diagnosed with T1D versus T2D. Adults with T1D bring their diabetes to new romantic relationships, while adults with T2D are most likely diagnosed while involved in long-standing romantic relationships (Stephens et al., 2012). Because most research on the social context of diabetes during adulthood has examined T2D, we do not know whether T1D or T2D hold differing implications for how social relationships affect or are affected by diabetes among adults.

Effects of Diabetes on Social Relationships

Research on how diabetes affects social relationships in adulthood has focused mostly on the spouse. Whisman, Li, Sbarra, and Raison (2014) found that the incidence of diabetes (collapsing across T1D and T2D) is linked to lower marital quality. August et al. found that spouses who tried to influence a patient's diet and exercise behaviors perceived greater burden of T2D (August, Rook, Stephens, & Franks, 2011), and more stress and negative marital interactions (August, Rook, Franks, & Parris Stephens, 2013). In addition, a daily diary study revealed that daily diabetes symptoms were associated with lower relationship enjoyment and higher marital tension for both patients and spouses (Iida, Stephens, Franks, & Rook, 2013). Thus, the marital relationship is clearly affected by daily experiences with T2D, and partners' daily stress experiences may impair their ability to be involved in autonomy-supportive ways.

An important area for future research is to understand how diabetes management affects other relationships within the family—especially children—as well as friendships. In a qualitative study, adults with T1D reported that diabetes affects children in the home, although adults tried to protect especially young children from the effects of diabetes (Rintala, Paavilainen, & Astedt-Kurki, 2013). Hypoglycemia and accompanying mood changes appeared especially frightening to children. We are unaware of research on the effect of diabetes on adult friendships.

Effects of Social Relationships on Diabetes Management

The involvement of families and spouses or romantic partners in T2D management can be beneficial or detrimental. Consistent with interpersonal theory and SDT, qualitative interviews and self-report surveys reveal that support for diabetes care is helpful, but active undermining (e.g., tempting patient with poor food choices), nagging and criticism are unhelpful (Henry, Rook, Stephens, & Franks, 2013; Mayberry & Osborn, 2014; Stephens et al., 2012). In a daily diary study, spousal support for T2D dietary management was associated with next day increases in dietary

adherence, whereas spousal efforts to persuade the patient to follow a healthy diet and criticism of food choices were associated with next day decreases in dietary adherence (Stephens et al., 2012). Similar results occur for exercise behaviors, where spousal support was linked to more physical activity and spousal control to less physical activity (Khan, Stephens, Franks, Rook, & Salem, 2013). Beyond supportive and unsupportive behaviors, Johnson et al. (2013) found that couples who worked together to solve stressful events engaged in better self-care. Consistent with SDT, this association was partially mediated by heightened self-efficacy beliefs. Further, direct social support from family and friends for taking medications, physical activity, and keeping medical appointments was associated with improved health outcomes over time among those with T2D in late life (Nicklett, Heisler, Spencer, & Rosland, 2013).

Some findings suggest that spousal involvement may be less helpful or more detrimental when individuals have high autonomy needs or are unable to utilize their social context because of long-standing attachment styles likely laid down in childhood. For example, Cohen et al. (2005) found that individuals with T2D who had an avoidant attachment style viewed their spouse's support less favorably. Spousal control was especially detrimental when patients had expectations that their spouses should not be involved in their diabetes management (Rook, August, Stephens, & Franks, 2011). Similarly, negative aspects of spousal protective buffering (i.e., hiding worries about person with diabetes) were exacerbated when patients perceived high personal control over their T2D (Johnson et al., 2014).

The health care provider is an important source of support for adults with diabetes (commonly studied in mixed samples of T1D and T2D). Better diabetes management occurred when physicians provided information in a participatory and inclusive manner (Heisler, Cole, Weir, Kerr, & Hayward, 2007). Ciechanowski et al. (2004) linked patients' attachment styles to diabetes outcomes by considering the ways they engage with health care providers. Those with a dismissing attachment style had poorer diabetes management, partially because they had a less collaborative patient-provider relationship. Such findings reveal that both patient and provider factors may influence the link between the health care provider context and diabetes management.

Interventions to Alter the Social Context of Diabetes

Most interventions to support diabetes management in adults have focused on lifestyle interventions with individual patients. Social support interventions have most commonly focused on support from patient peers, with a limited literature involving spouses or family members. A recent review concluded that interventions to enhance support from fellow patients living with diabetes show promise, but

the evidence is limited and inconsistent, potentially reflecting heterogeneity in the definition, training and delivery of peer support (Dale, Williams, & Bowyer, 2012). Family support has long been argued to be an important focus for intervention among adults with diabetes (Fisher & Weihs, 2000), but the few studies that have targeted family support have been inconsistent in their approach and have generally not demonstrated an effect on diabetes management (Mayberry & Osborn, 2014). More recently, however, Sorkin et al. (2014) found that a mother-daughter dyadic intervention targeting lifestyle factors in Latina mothers with T2D and their overweight or obese adult daughters resulted in increases in supportive behaviors, reductions in undermining behaviors, healthier eating, and weight loss. Interventions targeting a more collaborative patient-centered relationship with providers have also been developed to empower patients and support their daily self-care decisions. Such interventions appear to improve diabetes management, but are more effective when they focus on direct support for patients' active participation in diabetes care rather than on changing provider behaviors (van Dam, van der Horst, van den Borne, Ryckman, & Crebolder, 2003).

Summary

The social context of diabetes in adulthood has primarily focused on spousal and patient-provider relationships, while interventions have commonly focused on patient peers. The two dimensions of the interpersonal framework capture well the types of social behaviors that are likely to be important during adulthood. Behaviors characterized by high warmth and autonomy support appear to be helpful for adult diabetes management, while behaviors with features of hostility (or low warmth) and control (e.g., criticism, undermining, nagging) appear to be unhelpful. Consistent with SDT, there is some evidence that social behaviors are likely to facilitate or undermine diabetes management partially through their effects on self-efficacy.

The Macrol level Social Context of Diabetes Management

We have focused on various social contexts that may relate to diabetes management fairly directly (family, friends, partners, health care providers), but these interpersonal diabetes transactions are embedded within larger macrol level social contexts that may influence both social relationships and diabetes in a multidirectional fashion (e.g., sociocultural contexts, health system contexts) (Marrero et al., 2013; Modi et al., 2012). Health disparities for both T1D and T2D exist, such that lower SES and racial/ethnic minority populations experience poorer diabetes management and greater burden of disease across the life span (Hunter, 2016). Complex societal and economic factors can create

barriers to effective diabetes management at multiple levels that are not under the direct control of the individual or members of their social context. Ellis et al. (2012) developed a multisystemic intervention that targets barriers to diabetes management across multiple social contexts (e.g., parenting skill deficits, poor family school communication, barriers to keeping clinic appointments). This intervention was effective at improving diabetes outcomes for high risk low income and minority youth with T1D.

This broader social context may alter the need for, access to and effectiveness of social relationships to support diabetes management. For example, children from African American and lower SES families are more likely to live in single parent households, which are associated with poorer glycemic control (Modi et al., 2012). Youth from lower SES and some racial/ethnic minority groups may also experience lower relationship quality and higher conflict with parents (e.g., Drew et al., 2011; Hilliard et al., 2013; Main et al., 2014). These aspects of parental involvement are commonly associated with poorer diabetes management, but may hold different implications for racial/ethnic minority families. Main et al. (2014) reported parent-adolescent diabetes conflict was associated with poorer adherence among Caucasian, but not among Latino youth with T1D. In adults, African Americans are more likely to live in multigenerational families with adult children rather than a partner. Their support resources thus span an extended family network, lowering the relevance of family research that has focused almost exclusively on spousal support. The social context of diabetes management may also hold different implications for those with lower health literacy (i.e., lower ability to understand health information). Supportive family behaviors were higher among lower health literacy adults with T2D, but obstructive family behaviors were more likely to undermine their diabetes management compared with higher health literacy adults (Mayberry, Rothman, & Osborn, 2014). These select examples highlight the need for future research to include more heterogeneous samples and to investigate systematically how the interpersonal diabetes transactions described above interface with broader macrol level social contexts.

Conclusions and Implications

Diabetes management occurs in a complex interpersonal context where social relationships simultaneously affect and are affected by diabetes across the life span. Across development, it appears that family members are the most involved and influential sources of support. This is most obvious in the pediatric literature, where sustained, warm and autonomy-supportive parental involvement is a central component of successful management. The nascent literature on emerging adults reveals that parents continue to be an important resource well into young adult-

hood, and spousal involvement plays a central role in adult and aging populations. The daily context of friendships and the more distal interpersonal contexts of peers and medical providers play a role, but when multiple social contexts have been studied simultaneously, family influences on diabetes management predominate (e.g., Carcone et al., 2011).

Although we have described reciprocal associations between diabetes management and different social relationships separately, members of one's social context are interdependent. Carcone et al. (2011) found support from adult peers facilitated a mother's ability to support her child with T1D, demonstrating that one source of support can influence levels of another source of support. Helgeson et al. (2014a) reported that friend conflict was associated with poorer glycemic control among emerging adults with T1D in the absence of parental support, but not in the presence of parental support, demonstrating cross-domain buffering where one source of support alters the effects of another source of support. There is also evidence that different sources of support serve different functions, such as when families provide tangible aid and friends provide emotional support (La Greca et al., 2002), suggesting that combinations of supportive resources will be most beneficial. The manner in which multiple sources of support work in tandem to facilitate diabetes management has rarely been studied, but may be a fruitful focus for future research.

There is convergence on the types of social relationships that help or hinder diabetes management across these varied social, developmental, and illness contexts. High quality social relationships characterized by warmth, collaboration and acceptance are consistently associated with good diabetes outcomes, while relationships characterized by conflict and criticism are associated with adverse outcomes. Although under involvement of one's social context is clearly linked to poor outcomes, interpersonal transactions that have features of intrusive involvement or social control are more complex. Intrusive efforts to influence an individual's self-care behaviors may have dual effects, simultaneously supporting diabetes management (at least in the short term), but potentially undermining self-efficacy beliefs and diabetes self-care in the long term. Such findings are quite consistent with SDT, which emphasizes the adaptiveness of social contexts that fulfill basic needs for connection, autonomy, and competence. There is also some evidence that aspects of controlling behavior may be helpful or at least not harmful for diabetes management when combined with warmth and support (e.g., Missotten et al., 2013; Mayberry & Osborn, 2014). This is consistent with interpersonal perspectives on social support, where common measures of social support have been found to include combinations of warmth and control (Trost, 2000). Neither SDT nor interpersonal theory has been systematically applied to the social

context of diabetes management, but may provide important theoretical perspectives to guide future research and interventions.

Research on the interpersonal context of diabetes is becoming increasingly sophisticated, but there are limitations that need to be addressed for research to progress. First, there are major gaps in the populations that have been studied, with developmental stage often confounded with type of diabetes. We know little about the social contexts of youths managing T2D and adults managing T1D, and research on emerging adults remains limited. Second, there is great diversity in how the social context is conceptualized and measured across studies. Some measures are general while others are diabetes specific, some focus on the quality of relationships while others focus on the characteristics and functions of supportive transactions, and different measures are often used to tap similar constructs. This makes consistent findings more impressive, but creates obstacles to interpreting disparate findings and developing targeted interventions. Interpersonal theory may provide a useful framework for identifying the common features of helpful and unhelpful social contexts across disparate measures. For example, collaboration which is consistently helpful likely contains features of warmth and control, while conflict which is harmful likely contains features of hostility and control. Third, research has commonly focused on demonstrating rather than explaining associations, resulting in a limited understanding of the mechanisms through which social relationships may affect diabetes outcomes. Testing more complete and theoretically based models of the processes linking social relationships to diabetes outcomes is a high priority for future research. Fourth, a life span developmental perspective has rarely been considered, even though diabetes is a chronic condition that must be managed across the life span. Cross-sectional research is common, sometimes with very large age ranges, and age is often analyzed as a control rather than a moderating variable. Furthermore, longitudinal research that extends across developmental transitions is rare, making it difficult to identify early risk and protective factors that can be targeted to prevent later problems. Fifth, there is a critical need to understand whether the social relationships that facilitate or undermine diabetes management occur differently across broader cultural and socioeconomic contexts.

This review also holds important implications for interventions to facilitate diabetes management across the life span. Successful interventions to bolster family support have been developed for pediatric populations, but there is surprisingly little research on family interventions for adults. Across development, warm, supportive, and collaborative relationships facilitate diabetes management, while behaviors that undermine self-efficacy or generate conflict impair diabetes management. Interventions can capitalize on family members' desires to be helpful (Mayberry &

Osborn, 2014) by targeting communication skills to facilitate this supportive context, and helping family members identify when their involvement may undermine the patient's self-efficacy so that they can alter their involvement accordingly. Those with diabetes may benefit from learning to communicate to others what is and is not helpful, and to engage their social context so as to have access to social resources when needed. Diabetes requires daily management behaviors that can become burdensome for patients and families; interventions will thus need to facilitate the effective involvement of others, while minimizing the toll this involvement may take. The interdependence between individuals with diabetes and their social context is a tremendous resource for effective diabetes management across the life span. Psychologists and other scientists have made significant progress in understanding the aspects of social relationships that facilitate or undermine diabetes. We are now poised to continue the development of intervention approaches that utilize this social context to promote better diabetes management and improve quality of life in patients and families across the life span.

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