

Diabetes Self-care in Education:
Mapping Educational Policy and Empirical Research

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Abstract

Diabetes Mellitus (DM) is a chronic metabolic disorder that affects many people worldwide. Despite the prevalence of DM in Canada, few studies have examined the impact of DM in education, especially in relation to the development of self-care at school. Diabetes self-care is a learned behaviour that individuals with DM develop in partnership with others in the context of their daily lives (Vallis, Higgens-Bowser, Scott, Murray, & Edwards, 2004). It refers to coping with the chronic illness in the pursuit of implementing a diabetes management regimen—making healthy food choices, participating in daily physical exercise, monitoring glucose levels, and taking medication as prescribed by the physician to achieve glycemic control and emotional wellbeing. This paper explores the configuration of diabetes management in Canadian public education systems and describes the educational policy context in which diabetes self-care emerges into being through the agency of key health and educational stakeholders. Future studies that map how Canadian educational practitioners work to support the development of self-care, while giving expression to a socially organized practice of diabetes management at school, can yield fresh insight on an underexplored domain of social science research.

Keywords: diabetes, self-care, educational policy, duty of care, diabetes management

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A recent visit to a pediatric clinic furnished me with fresh insight on the contemporary context of care undertaken for students with diabetes in Canadian schools. I learned that health professionals and educational stakeholders share a common vision: students with diabetes require the support of school and health personnel to attend school and to participate in the activities of the school. I also learned that, through this vision, health and educational personnel work to construct a socially organized practice of diabetes management to support the self-care development in the child with diabetes. This encounter brought back a flood of memories; as a child living in Anchorage, Alaska, I learned to develop diabetes self-care at school amid the support of peers, my teachers, and the school nurse. It called into mind my experience in being an elementary educator teaching in Northern Ontario. I distinctly recall being asked to participate in a workshop on diabetes and its management, after the school at which I was teaching learned that one of its students had become diagnosed with diabetes. While my visit to the clinic triggered the recollection of past experience, it additionally prompted me to seek out statistical knowledge of diabetes and to learn how Canadian schools in particular have oriented educational stakeholders in the care of students with diabetes.

Statistical Map of Diabetes

The World Health Organization (2013) has reported that approximately 347 million people worldwide have diabetes mellitus (DM). DM is a chronic metabolic disorder marked by a persistent inability of the body to produce enough (Type 1 diabetes) or sufficiently use (Type 2 diabetes) insulin. Individuals with DM thus require injections of insulin or take oral medications to offset the lack of insulin being produced in or used by the body. While currently the greatest

number of people diagnosed with DM is between 40 and 59 years of age, roughly 78,000 children develop DM every year (International Diabetes Federation, 2013). In Canada, the diagnosis of DM is on the rise, especially among individuals under the age of 20 (Public Health Agency of Canada, 2011). Indeed, the Canadian Chronic Disease Surveillance System (CCDSS) released a report in 2009 that claimed as many as 3,287 Canadian youth (≤ 19 years old) were diagnosed as having diabetes (Type 1 and Type 2), thus bringing the total number of Canadian youth stricken with diabetes to 25, 693 representing a prevalence rate of approximately 0.3 percent (Public Health Agency of Canada, 2011). These statistics suggest that Canadian schools with slightly more than 300 students are likely to have at least one child with DM in their care. Such statistics indicate that a number of Canadian school children face the need to develop diabetes self-care while at school and in relation to other educational stakeholders, including teachers, school health personnel, and peers.

Diabetes Self-care

Although today there is no cure for DM, it can be managed, with serious health complications delayed or prevented (Tannous, Khateeb, Khamra, Hadidi, & Natour, 2012). Self-care behaviour is, and will remain, a critical element in the management of DM (Gonder-Frederick, Cox, & Ritterband, 2002; Rubin & Peyrot, 2001). Diabetes self-care encompasses the practice of self-management, self-monitoring, and symptom management (Richard & Shea, 2011); these three facets of self-care work to promote the optimal health and wellbeing of the individual with DM (Vallis, Higgens-Bowser, Scott, Murray, & Edwards, 2004). Self-care allows individuals with diabetes to cope with the chronic illness in the pursuit of practicing a continuous, self-disciplined management regimen—making healthy food choices, staying physically active, monitoring blood sugar, and taking medications as prescribed by the physician

to achieve glycemic control and emotional wellbeing. Teaching children with DM how to manage their disorder in the school setting can lead to improved academic performance and feelings of inclusion among their peers (Kovaks, Goldston, & Iyengar, 1992; Sandberg & Barrick, 1995). These insights gained from empirical studies highlight the need for further research to understand how self-care is constructed among educational stakeholders in the school setting. The purpose of this paper to describe the documentation of diabetes management in Canadian schools and to outline, through a review of the literature, some of the factors and experiences that shape the development of diabetes self-care at school. The paper ends with a discussion on the need for further research to explore how diabetes self-care is constructed in Canadian schools.

Diabetes Mellitus in Canadian Schools

Legislation

The documentation of diabetes management in Canadian schools is structured by existing legislation governing education. Education in Canada is a provincial responsibility. Such legislation therefore set out the duties of teachers and other school board employees according to the provincial jurisdiction. In general, the legislation does not prescribe positive duties to administer medical treatment. However, each statute does require that school personnel adequately supervise the students under their care. Some statutes explicitly require teachers or principals to monitor the health and safety of students. For example, the Saskatchewan Education Act (1995) provides that a principal has a duty to “exercise general supervision over the well-being and good order of pupils” (p. 98). Similarly, the Nova Scotia Education Act (2013) requires teachers to “attend to the health, comfort, and safety of the students” (Section 26 (n)). The Prince Edward Island School Act (2013) requires both teachers and principals to attend to the health, comfort, and safety of students (pp. 33-34). These statutes and others like them serve

to inform the reasonableness of school personnel in their duties to exercise care over their students, while, at the same time, their legislation delegates regulatory powers that shape the educational relationships teachers and students can expect to form in the school setting.

According to the Canadian Diabetes Association (CDA, 2004), provisions that speak to the health and safety of pupils, such as those which appear in the provincial education statutes, impose an additional obligation on school administrators to assist in or manage medical treatment. This pan-Canadian advocacy organization has long lobbied provincial governments over the expressed need for schools to adopt care practices that promote the health and wellbeing of children with DM. Its efforts have not gone unnoticed. In June 2008, the New Brunswick Department of Education (NBDE) released a comprehensive guide for diabetes management at school. This guide expanded upon many of the recommendations for diabetes management at school issued by the CDA. Furthermore, diabetes care at school in New Brunswick is deemed an “essential service” (see NBDE, 2008a), meaning that all teachers in New Brunswick’s public education system must practice an ethic of care consistent with the standards of practice for diabetes self-care outlined in an official provincial policy guidebook on school-based diabetes care.

While students with allergic reactions have been recognized by Ontario educational policymakers (e.g., Sabrina’s Law), similar measures have not been put into place for students with other chronic conditions, such as diabetes, except in New Brunswick. In 2010, a private member’s bill that proposed to set out various rights for pupils with diabetes at school was introduced in the Ontario legislature. While the bill did not reach the status of law, parliamentarians supported its expressed call for schools to adopt special caring practices consistent with diabetic children’s need to incorporate frequent glucose monitoring, meal

planning, and insulin injections into their school routines (Legislative Assembly of Ontario, 2010).

Memoranda

Provincial policy directions are further delivered through policy directives, otherwise known as memoranda, issued to district school boards and school authorities to outline bureaucratic expectations regarding the implementation of legislation (Howlett, Ramesh, & Perl, 2009). In Ontario, Policy/Program Memorandum No. 81 (1984) addresses inter-ministerial responsibilities for the provision of health support services in school settings for pupils who require them to attend school. This memorandum (1984) describes how health support services, such as speech language services; the provision of medication, catheterization, and lifting and positioning; and other services, are to be shared among three Ministries: Ministry of Education (OMOE); Ministry of Health and Long-Term Care (OMHLTC); and Ministry of Community and Social Services (OMCSS). The provision for the administration of medications (e.g., injections of insulin) is a clause in PPM 81 that works to support the medical management regimen of certain pupils (such as diabetic students) who require assistance in their care at school. Similarly, in New Brunswick, Policy 704 (1999) defines the specialized care programs and services for children with health support needs in all of the provinces' publicly funded schools. These provincial policies (PPM 81 and Policy 704) and others with similar provisions (see British Columbia Ministry of Education, 2013) define a type of care that works to make available access to schooling for school-aged children with health support needs. Students with DM who have their disorder disclosed to the school and who claim an inability to self-manage their illness are eligible to enrol in School Health Support Services (SHSS) or some equivalent program to invoke appropriate institutional support centered on receipt of customized therapeutic treatment.

The process of developing diabetes self-care at school thus emerges into formation through the context of care framed by the SHSS; it occurs amid certain coordinated actions facilitated by the agency of educational stakeholders, notably school health personnel, teachers, parents, and the child with diabetes.

The Context of Diabetes Management at School

In provincial jurisdictions, diabetes management at school is facilitated through specialized care-interventions that work from the assumption that DM is a disorder with health support needs (Diabetes Advocacy, 2013). Upon the pupil's disclosure of his or her DM to the school, educational stakeholders enter into a pathway of care that involves setting into practice a socially organized schema of diabetes management. Some Canadian schools invoke a model of care that reflects the design of the public education system as a whole, while others put into play a form of diabetes management that represents the vision of a particular Board of education or school district council. For example, the Alberta Ministry of Education (2013) does not have specific policies relating to the care and treatment of students with DM in school, although there are policies in the area of special education that include students who require specialized health care services.

These policies require the parents of the student with DM to give written authorization for the receipt of health-related services. They must provide written procedures for storing and/or administering medication, including by whom and when the medication is to be administered, side-effects, storage, and doctor's name and phone number. In British Columbia, individual school districts have policies in place outlining responsibilities of school boards, administrators, and staff which reflect differences in the approaches taken by schools in different parts of the province. In Abbotsford, for example, parents/guardians have the primary responsibility for

communicating information about serious medical conditions of their child to the school; completing the Medical Alert Planning Form and assuring that the prescribed medication is available to the school. The principal and the school staff have the responsibility for ensuring the safety and well-being of students during school hours and during after-school activities organized by the school; collecting information from parents/guardians of medical alert condition students; and providing a safe and supportive environment for medical alert condition students so they can participate in activities leading toward the goals of schooling (Abbotsford School District, 2008). Similarly, parents of children attending the Surrey School District are required to complete a Medical Alert Form (Surrey School District, 1997). However, more than one staff member must be trained in the administration of the medication and/or the management of the medical condition to provide an alternative person in the case of absence or unavailability. This policy further suggests that a teaching assistant may be made available to aid the child in “blood glucose monitoring requiring specific action based on results” (Surrey School District No. 36, 1997, p. 5).

Provisions of Care under Tort Law

The provisions of care in school settings vary from school to school, yet each inform educational practitioners about their duty to act in context. These provisions also contextualize the meanings attributed to the legal category of “tort law” (MacKay, Sutherland, & Pochini, 2013, p. 15). Torts are a series of civil wrongs that serve to inform the public about what ought to constitute a reasonable action so as to avoid causing harm to others, where the injury is “reasonably foreseeable” (MacKay et al., 2013, p. 16). For example, it is common knowledge that when someone is driving a car he or she must take precautions to avoid causing accidents that involve other vehicles or pedestrians. Another vehicle on the road or a pedestrian crossing

the street is “reasonably foreseeable,” that is, a reasonable person expects to encounter other traffic, and perhaps a pedestrian, while driving the car. With this in mind, a reasonable person drives in such fashion that works to minimize the risk of accidents.

Some other examples of the duty of care are not as intuitive. Should a school bus driver be responsible for injuries incurred to a student with diabetes who has exited the bus in a state of hypoglycemia? While the Supreme Court of Canada has not encountered this scenario before, it is reasonably foreseeable that a situation like this may arise and have deadly consequences. Therefore it is important to strike conversation about what would be an appropriate expectation to hold for the bus driver as he or she exercises care over the safety of his passengers.

While the imposition of a duty of care does not require a person to take steps to eliminate the possibility of harm, the principle does expect the same person to take reasonable steps to minimize the risk of injury. Consider the case of the teacher and a student with diabetes. It is reasonably foreseeable that the student may experience hypoglycemia if he does not eat at certain times of the day, such as lunchtime. The teacher owes a duty of care to the student to minimize the risk of hypoglycemia from missing lunch. The duty probably does not require the teacher to ensure the student eats his lunch but to provide him with at least access to his food. A reasonable person in this case would probably allow the student to access his foods when necessary so as to avoid the potential for an emergency situation; therefore, this action represents the standard of care the teacher must meet.

Although the law imposes a consistent duty of care on teachers, the standard of care it imposes on them varies according to the circumstances. For example, the organizing of social life under the design of diabetes management at school induces the need for a special set of competencies and knowledge that would be useful for supporting the initiative of diabetes self-

care—that is, the agency of the student to take on the duties of insulin dosage and administration, glucose monitoring, and carbohydrate counting so as to achieve an optimal glycemic index. Furthermore, the documentation of diabetes management in Canadian schools shows that self-care is under the shaping influence of a regulatory script that makes educational stakeholders responsible for performing diabetes management in a particular way. Historically, the approaches taken by teachers to implement a model of school-based diabetes management in Canada reflects an interpretation of the duty of care (Unsafe at School, 2012). The reasonableness of care is not always the same, regardless of circumstance. Rather, what counts as reasonable care is to be found in the particular circumstances having regard to the relationship between teacher and student. Given that school-based diabetes management varies from one province to another, different conceptions of where injury is “reasonably foreseeable” underpin each of these examples. The most striking contrast in the models of care undertaken by the provinces in regards to diabetes management exists in the case made between the Ontario and New Brunswick public education systems.

Two Differing Models of Diabetes Management at School

Similar to other schools in Canada, Ontario and New Brunswick schools offer educational programs and services tailored to the needs of their students (New Brunswick Education Act, 1997; Ontario Education Act, 1990). Since 1984, Ontario school boards have delivered specialized care programs and services for children with special health support needs (e.g., children with DM). These programs and services of care are governed by PPM 81 and operate under the mandate of the Community Care Access Centre (CCAC)—a health care organization that deploys health care practitioners to schools when specialized care services are required to support students with the health support needs at school. On the other hand, New

Brunswick's SHSS program has been in place since 1999 (see NBDE, 2008b). The specialized care made available to students with health support needs is not vested under the authority of some health care organization, as it is in the case of Ontario; rather, the New Brunswick Department of Education exercises full authority over the practice of diabetes care in the school setting. Not only do PPM 81 and Policy 704 serve to inform the reasonableness of teachers in their respective duties to address the health supports needs of students in Ontario and New Brunswick schools but each also guarantees access to schooling for school-aged children with health support needs.

The Shared Care Model

Despite differences in the SHSS program at the provincial level, the public education system in both Ontario and New Brunswick constructs diabetes care in the image of a shared care model. The notion of *shared care* is used to refer to a collaborative partnership—specifically, a type of ethical relation summoned in the context of distinct stakeholders, which works to address the health support needs of the student with DM. These stakeholders demonstrate their agency through bureaucratic powers appropriated in the context of the SHSS program. Whereas individual stakeholders designate actors playing in stakeholder roles such as parents, teachers, or health care professionals, a governmental actor refers to the branch of government whose vested interest in the SHSS shows up through formal government documents, including policy documents, memorandums, and guidebooks. Each stakeholder, whether individual or governmental, holds an ethical obligation to care for the health support needs of the student with DM in the context of the SHSS program.

The shared care model that operates to address the health support needs of children with DM in the context of Ontario and New Brunswick schools also works to represent an example of

chronic disease management in education. Successful management of chronic disease requires more than the implementation of evidence-based clinical practice guidelines (Newbold, Smith, & Francis, 2008; Nurmi & Stieber-Roger, 2012). It requires reframing existing community and healthcare systems (Murcko, Donie, Endlsey, & Cooper, 2006). Unlike the approaches used to manage acute episodic illness, approaches to chronic disease require significant investment to create and support individuals with chronic illness who are informed and engaged in their care and motivated to collaboratively work with caregivers (CDA, 2013). Innovative public policy and delivery system redesign have been recommended as essential requirements to fully support chronic disease management in publicly funded institutions, especially education (Arent, 2003).

Ontario's Shared Care Model for Diabetes Care

In Ontario, the SHSS integrates community, education, and health systems in the organization of care (OMHLTC, 2008). Specifically, PPM 81 outlines how three branches of government have enabled public education in the province to acquire the distinction of addressing the health support needs of students while they receive schooling. Since the inception of the school health support services (SHSS) in 1984, the Community Care Access Centre (CCAC) has had the mandate for the delivery of the SHSS, with funding from the Ontario Ministry of Health and Long-Term Care (OMHLTC). In their role, the CCAC administers the SHSS program and typically uses contracted providers to deliver services in schools. The nature of services provided within the program include direct therapy and nursing services, consultative services (e.g., the training of educators and families), and the provision of related medical supplies, including the injection of medication when and where necessary (Ontario Ministry of Education, 1984). The OMHTLC assumes responsibility for assisting school boards in the training and direction of school board staff on therapy programs related to developing a diabetes

self-care regimen at school, such as glucose monitoring, physical exercise, and dietary food intake.

Ontario boards of education have developed formal policy guidelines that serve to extend the provisions of the SHSS program to the school setting. For example, the Algonquin and Lakeshore Catholic District School Board authored the *Diabetes Management Policy Statement S-2009-04-2*(ALCDSB, 2009). This particular policy features distinct diabetes management guidelines for which each school in the district is held to account. All educational stakeholders in the ALCDSB are able to access the information about how diabetes management in the school is conceived as a shared responsibility. Teachers, in particular, are encouraged to envision themselves as integral partners in this task. Similarly, the Limestone District School Board (LDSB) has formulated policy surrounding the issue of diabetes management at school (LDSB, 2006). Like the ALCDSB policy on diabetes management, the LDSB's *Diabetes Handbook* features an outline of the LDSB's philosophy of diabetes management as well as the general operating procedures that inform the model of diabetes care at school.

New Brunswick's Shared Care Model for Diabetes Care

The SHSS and its framework of shared care in the New Brunswick public education system are administered differently. Whereas in Ontario the SHSS is implemented through three branches of government, in New Brunswick, the model is discharged exclusively through the functions of one branch of government—specifically, the New Brunswick Department of Education. Unlike in Ontario (where the provision for the SHSS program is governed under the mandate of the CCAC and further regulated through educational policy at the school level), the New Brunswick SHSS program is entirely exercised by the work of educational stakeholders whose collective interests find expression at the school level. In general, parents, school

personnel (e.g., administrators, teachers, and educational assistants), and the child with DM all work together in partnership to construct a model of diabetes care in the school setting.

While health care professionals may offer consultative advice upon request in the development of operationalizing the care of DM in the school setting, such professionals have no predetermined role to play in the effort to draft a diabetes care plan nor do they enjoy an official role in the management of the SHSS program. Instead, parents help to configure the diabetes care plan in conjunction with school personnel and their child with DM (NBDE, 2008a). Specifically, parents whose children require health support services, such as students with DM, are obliged to provide the school in writing about how school personnel may take action to ensure that appropriate care is being delivered to their child at school. Such parents are also required to document relevant health status information of their child, to inform the school of medication management procedures, and to cover all the costs associated with medical equipment (e.g., glucose monitor, insulin pump, biohazard containers), supplies (e.g., lancets, syringes, insulin vials), and services rendered (e.g., emergency first responders). Teachers follow through on the therapeutic (care) advice of the parent, specifically assuming primary care responsibilities in the context of the school setting. These primary care responsibilities may include assuming different levels of care as requested by the parent. For example, whether the teacher administers, assists, supervises, or reminds the child with DM in the care of her or his disorder at school.

Interpretations of the Shared Care Model

The distinct invocation of the SHSS program for each province corresponds with different interpretations of chronic disease management and its implicit notion of shared care for the management of diabetes in the school setting. Although teachers in both provinces are

required to receive medical training to furnish themselves with the necessary knowledge and skills to address medical emergencies like hypoglycemia and hyperglycemia, the level of care teachers assume is not fixed at the point of medical emergency intervention. Rather, teachers hold the authority to extend the provision of care in the context of the SHSS program to include more interventionist measures like administering, assisting, supervising, or reminding the diabetic children in the use of their glucose meter to check blood glucose levels or arranging a safe place at school for children to administer their insulin injections. These measures serve to recognize at what stage of development the child is able to care for his or her disorder, while, at the same time, acknowledging the wider circle of the health support needs that arise in the school setting.

Whereas Ontario teachers assume a peripheral role in the SHSS program, where at most they are required to follow through on therapeutic advice given to them from consultation with parents and health care providers, teachers in New Brunswick assume a central role in the SHSS program, having to instruct children directly to care for their disorder through modes of caring. These policy provisions of school-based diabetes care give meaning to the responsibilities schools assume in the care of children with DM. While all Ontario Boards of Education draw from external consultants to inform their model of school-based diabetes care, New Brunswick Boards of Education draw a model of school-based diabetes care from the input of parents.

Despite the differences in how schools may care for students with DM, school-aged children with DM nonetheless are presented with significant sources of chronic stress that can impact their ability to adhere to treatment regimens (Compas, Jaser, Dunn, & Rodriguez, 2012). Further, pediatric illnesses like DM are exacerbated by stress encountered in other aspects of children's lives. It is therefore essential for teachers to understand the ways that school-aged

children with DM cope with their stress in the context of the school to better explicate processes of adaptation to illness and to develop effective interventions to enhance coping and adjustment.

Themes of Diabetes Self-care at School in the Literature

Diabetes is a very human condition. Even to those of us with many years of clinical practice in diabetes, the infinite diversity of individual response to diabetes is a constant source of amazement but also professional enhancement... Diabetes and its consequences have a fundamental physical basis, but these are deeply intertwined with complex psychosocial issues. Such interrelationships are considerable, sometimes subtle; sometimes overwhelming (Shaw, 2000, pp. ix-x).

Diabetes care in the school setting is widely believed to require the creation of a complex caring partnership struck among multiple stakeholders. There is a need for integration of the student into a health system equipped with specialist care providers corroborating to promote a disciplinary practice of long-term management, rather than a system in which care is provided episodically (see Richard & Shea, 2011). Clinicians have described the “importance of the community in chronic disease management” (Bobo, Kaup, McCarty, & Carlson, 2011, p. 172), where care providers utilize an understanding of self-care, coping with illness, and chronic disease management to guide the provision of health services catering to the needs of children with diabetes (see Erickson, Splett, Mullett, & Heiman, 2006). Echoing these suggestions is a systematic research literature describing the interplay of self-care behaviours, coping with illness, and caring interventions (e.g., Compas, Jaser, Dunn, & Rodriguez, 2012; Kelo, Martikainen, & Erikson, 2011; Richard & Shea, 2011).

Partnerships with teachers

Teachers are integral partners in the task to manage diabetes at school (Newbold, Smith, & Francis, 2008). Parents tend to assume that the school would handle the diabetes (Ginsburg et al., 2005), and children generally expect their school to have a better understanding of it (Amillategui et al., 2007; Amillategui et al., 2009; Nabors et al., 2003). In particular, the school health support team could improve its practice of diabetes care if teachers reminded children of diabetes tasks (Lehmkuhl & Nabors, 2008; Wagner, Heapy, James, & Abbott, 2006) and offered to help them learn to recognize the symptoms of hypoglycemia (Lehmkuhl & Nabors, 2008). Some children desire more flexibility from their teachers in making allowances to test blood sugar levels and to treat their diabetes when and where needed (Lin, Mu, & Lee, 2008; Nabors et al., 2003), while others require more involvement from teachers, nurses, and friends with respect to their self-care (Herrman, 2006; Nabors et al., 2003). Outside the classroom, participating in school athletics, such as after-school sports, is often challenging for students with diabetes because treatment supplies are not available or the teachers running these activities do not possess enough knowledge of diabetes (Nabors et al., 2003) to remind children about testing and balancing rest and snacks, and to recognize the onset of hypoglycemia (Lehmkuhl & Nabors, 2008).

Partnerships with classmates and health professionals

Peers and health care professionals similarly play important roles. Children want classmates to remind them when to take their tests and snacks and to support them when they are in diabetic distress, such as experiencing hypoglycemia or hyperglycemia (Lehmkuhl & Nabors, 2008; Lin et al., 2008; Nabors et al., 2003; Wagner et al., 2006). Many children find it helpful to meet with other children with diabetes because they provide understanding and support

(Herrman, 2006; Miller, 1999). The presence of health professionals on site may well increase children's perceptions of their safety at school (Miller, 1999; Nabors et al., 2003). In particular, nurses or emergency responders could be called to address severe episodes of hypoglycemia (Lehmkuhl & Nabors, 2008). While children usually acquire diabetes-related knowledge and skills from physicians, nurses, and dietitians in the context of clinical settings (Alderson, Sutcliffe, & Curtis, 2006; Schmidt, 2003), they also tend to practice their knowledge of diabetes and its management at school in partnership with teachers and school health practitioners (Bobo et al., 2011).

Developmental stages of childhood

The physiological, psychological, social and emotional demands placed upon a child with DM can be challenging for his or her management of the illness. Children and adolescents with DM face the world with the challenge of needing to develop a series of interconnected, purposeful actions aimed at regulating aspects of the self and the environment under the stress of a distinctly incurable and protracted illness. Furthermore, these individuals orient to the world through the force of coping mechanisms that are tailored to help them manage their life with DM. Compas and colleagues (2012) documented the literature on the nature of coping with chronic illness in childhood and adolescence. They define coping as "an intentional action, initiated in response to a perceived stressor, that is directed towards either external circumstances or an internal state" (p. 460). Their systematic review of over 100 empirical studies about coping in youth with diabetes found that research has consistently shown higher levels of effort to change a stressor and lower levels of avoidance coping were associated with better adherence to the diabetes treatment regimen. For example, an individual with diabetes who uses problem solving to figure out how many carbohydrates he is about to eat and what dosage of insulin he

ought to take stands in a better position to achieve an optimal glycemic index than someone who neglects to consider these factors. This finding indicates that developing diabetes self-care (e.g., practicing glucose monitoring, making dietary food choices, and taking medications) does not occur in a vacuum, but instead is inextricably linked to the performance of coping responses. Furthermore, as a child grows, diabetes self-care would evolve in accordance with changes in insulin requirements and management strategies (AboutKidsHealth, 2010). During the earlier stages of a child's growth and development, parents inevitably have more responsibility for the management of glycemic levels. As children mature, they become more capable of taking on these responsibilities.

These results are consistent with previous studies that have shown that age of the child with diabetes influences the performance of self-care. For example, Nabors, Lehmkuhl, Christos, and Andreone (2003) conducted a mixed methods study with 105 school children (60 boys and 45 girls) aged 6 to 14 years (~10 years old, SD +/-2 years) and their parents. They used focus groups, interviews, and surveys to ask the participants to self-report their perceptions of supportive behaviour by nurses, teachers, and classmates that helped them achieve adherence to their diabetes regimen at school. While gender played no significant role in shaping perceptions of the supportive behaviour by members of the school health support team, age proved to be a factor in the type of care recommended by the children. All else being equal, older children (aged 11 to 14 years) were more likely to take care of their diabetes independently than younger children (between 6 and 10 years).

Adolescence can be a particularly difficult time for management of glycemic levels as adolescents take on responsibility for the management of their disease at the same time as hormonal changes affect glycemic levels and impact insulin requirements. Body weight issues

and eating disorders, more frequent among adolescent females than males, may incite some adolescents to adopt practices that are detrimental to the management of glycemic levels, such as omitting or modifying insulin doses as a means to control their weight. The stress of caring for a child with DM can also strain the health of a parent. Parents or guardians of children with diabetes live with the daily demands of round-the-clock monitoring of glycemic levels in their children. Daily activities include administering insulin injections, managing diets, and monitoring physical activity levels.

Directions for Future Research

This discussion paper has brought attention to the configuration of diabetes self-care in school settings. Diabetes self-care is an embodied skill set that works to promote the optimal health and wellbeing of individuals with diabetes. The formation of self-care occurs in the context of everyday life. Thus children with diabetes develop self-care while they attend school and as they acquire a formal education. An analysis of educational policy has revealed a perspective on the ways in which Canadian school systems generally orient educational practitioners in the care of students with diabetes. While no public education system in Canada is exactly alike in terms of the way students with diabetes may enter into the experience of education, the pathway of care that is organized around the health needs of these students generally follows from a familiar line of logic. Access to schooling involves attending to the health and wellbeing of all students. Students with diabetes have unique health care needs that involve levels of intervention from specialist staff or informed caregivers when and where necessary. Thus schools must take appropriate measures to deliver a form of care that attends to the health-related needs of students with diabetes so that actions made on behalf of these students in the educational environment work to meet a common understanding of the health and

wellbeing of the students. Although Canadian educational practitioners give tacit consent to the duties of care as would a responsibly prudent parent under the traditions of common law, such exercise of care varies by context. The formation of self-care should therefore be expected to differ on account of the personal and environmental factors that make up the topology of care brought into being in the school setting. Empirical research in the development of self-care at school has given substance to these suspicions. For example, qualitative research involving the generation of self-report data from the perspective of parents, children with diabetes, and health professionals has found that, when schools form close ties among teachers, health personnel, and classmates in support of attending to the health support needs of students with diabetes, the socially organized practice of diabetes management that forms in the process is better equipped to support the development of self-care in the child with diabetes according to the child's ability to care for his or her disorder. While existing research has found a strong correlation between self-care ability and age of the child with diabetes, less attention has been paid to the experience of caregiving among educational practitioners in the development of self-care. Future research that explores the contextual factors and experiential variables that make up caregiving for children with diabetes should promise to yield further insight on the formation of self-care behaviours amid the socially organized practice of diabetes management in the school setting. These results would help to reveal an understanding of how significant educational policy and teaching practice is in the development of self-care.

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