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What Shapes Diabetes Self-Efficacy? Demographics, Social Relations and Health Perceptions

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Abstract

Purpose: The purpose of this study is to examine how demographic factors, social conditions, and health perceptions shape Diabetes Self-Efficacy (DSE) in order to enhance diabetes self-management.

Methods: This article reports the results of a survey of 97 type 2 diabetes patients in a primary health care clinic located east of Toronto (Canada). Regression analyses examined the relationship between self-reported healths, self-reported A1C, social capital, social support, MD support, household income, education, gender, age, and time since diagnosis and DSE.

Results: Social capital, social support, MD support, income, and age showed no significant relationship to DSE. Gender, time since diagnosis, and education showed a significant association to DSE. Perceived health variables self-reported A1C and self-reported health showed the strongest relationship to DSE.

Implications: The survey results suggest a potentially fruitful line of research that might examine a feedback mechanism that appears to be at play whereby DSE affects perceived health and perceived A1C, while the latter, over time, influence DSE. The paper then suggests a follow-up protocol that future research may employ to discern the nature and strength of the feedback mechanisms implied by the results. Improved understanding of how and to what extent this feedback mechanism operates will have significant consequences for how information is delivered to patients to encourage improvements in DSE and self-management behaviours.

Keywords: Type 2 diabetes; Diabetes self-efficacy; Diabetes self-management; Self-reported health; Social capital; Social support

Introduction

Confidence in the ability to attain designated performances, or "self-efficacy", is essential to the appropriate management of one's health and well-being [1,2]. Several studies on diabetes management show that diabetes self-efficacy (DSE) positively affects behaviours that improve diabetes self-management (e.g., healthy eating, exercise, glucose testing, foot care) and health outcomes [3-7]. Most view DSE as an independent variable, expecting those with higher DSE to better manage their condition, maintain their health, and avoid complications [8,9]. Far less is known about how and to what extent social status, social capital and social support shape the development of DSE. DSE likely is a central ingredient to one's "health capability"-the "individual's ability to achieve health goals"-and one's health capability is shaped by the economic, social, and cultural milieu within which one is embedded [2,10,11]. The "health capability" approach-derived from Amartya Sen's more general "capabilities approach" [12,13] offers a framework for understanding the value of empowering patients to make choices regarding their health. Advancing DSE can help counter external influences that may limit health capability and constrain choices that might improve self-management. This study is part of a larger investigation that explores the impact of social conditions on the management of type 2 diabetes [11]. Our in-depth interviews with diabetes patients suggest that individuals' health capabilities mediate the impact of broader social conditions on diabetes self-management: social conditions impact health capabilities, dietary choices, and health, while diminished or improved health, in turn, affects health capability. This finding anticipates the "feedback loop" proposed below whereby DSE both anticipates and derives from (perceived) health status. Moreover, several respondents from more modest backgrounds successfully managed their diet and physical activity levels to take control of their condition, while others from more privileged circumstances appeared less in control. A host of factors particular to each individual situation may account for these differences. The broader aim reported here is to ascertain whether and to what degree social conditions-e.g., social status, social capital, and social support-influence diabetes self-efficacy and, in turn, diabetes self-management.

Method

This study was undertaken in collaboration with a local health care clinic in a medium-sized city located east of Toronto (Canada), from January 2011 through December 2012. The clinic is situated amid a largely working-class community where automobile assembly and manufacture has dominated economic activity. Clinic leaders shared a common interest in examining facets of diabetes, a condition they saw as becoming increasingly prevalent among their patients. The study was part of a larger investigation that used questionnaires and in-

depth interviews to examine how social capital and support affected diabetes management [11]. The University of Ontario, Institute of Technology's Research Ethics Board reviewed and approval the research in March, 2010 (process file number 09-101). The sampling, interviewing, transcription, and data analysis processes took place from June 2010 through October 2012.

Sample

Clinic patients with diabetes were invited to complete a two-page questionnaire immediately before or after an already-scheduled appointment. The invitation script informed potential subjects of an incentive for completing the questionnaire-ten dollars and free parking. This small incentive might skew this non-random sample toward those on the Clinic's roster with less disposable income. Also, while appointment costs are covered by Provincial insurance, it is likely that some with diabetes do not visit routinely and the sample also might slant somewhat toward more conscientious patients. A total of 139 completed the questionnaire identified them as having type 1 diabetes; 97 identified themselves as having type 2 diabetes; and 23 either did not answer or indicated "don't know". Thus, the analysis is restricted to the 97 respondents clearly identified as having type 2 diabetes.

Data

The questionnaires included standard social status indicators to identify participants' age, gender, education, income, and household size (ethnicity was excluded due to sample homogeneity). The study relied on various sources for the scales used for diabetes self-efficacy [14] social and professional support [15], and social capital [16]. Cronbach alpha reliability scores were computed for the three major scales, and all showed sufficiently high levels of reliability for inclusion in our study-diabetes self-efficacy (α=.859), social support (α=.916), and social capital (α=.693).

Analysis

The analysis described here was largely exploratory, designed to determine whether and how data from our in-depth interviews of patients might pertain to the wider population in the Clinic. Using the data from questionnaire responses, the investigation employed regression analyses to examine whether and to what degree social status, social capital, and social support variables affected DSE. As discussed above, income, education and social capital variables are positively associated with most health-related variables, and we suspected they would be with DSE as well. We expected the same for the two support variables included (i.e., social and MD support). Our in-depth interviews identified social support as particularly influential in shaping dietary management [11]. Further, since respondents would most likely gain confidence and better manage diabetes over time, a positive relationship was expected between age, time-since-diagnosis, and DSE. Gender differences in self-efficacy depend on the action domain toward which self-efficacy applies. To our knowledge, no studies offer an account for gender differences with respect to DSE. Nonetheless, related studies find men take more risks, use fewer health services, and take fewer preventive care measures than women [17,18]. Though far from universal, interviews from our larger investigation found that women tended to plan, purchase, and prepare meals and, thereby, retained greater control over their diet-a key facet of DSE.

The study included self-rated health and self-reported A1C levels in its preliminary model. We theorized that the two variables, usually seen as shaped by DSE, might, in turn, influence DSE as well-just as high DSE bolsters the likelihood of successful diabetes management, viewing one's self as successful reinforces a confident outlook. Although our cross-sectional data cannot assist in disentangling the causal sequence, in view of other findings [11], it is suggested below that a feedback mechanism may operate that future research should examine. Thus, the analysis explored whether the social status, capital, and support variables might affect these variables and, possibly indirectly, DSE.

Results

Table 1 shows income and education levels that largely match what one might expect, in view of the historical reliance on manufacturing of the city where the clinic is located-levels substantially below that of the provincial or national populations. Overall, 97 respondents ranging from 30 to 92 years of age identified as having type 2 diabetes; the median age in the sample was 61. While the sample is skewed toward women, this departs only slightly from the gender mix on the roster of diabetes patients from which the sample was drawn.

	N (%)
Gender	
Female	60 (62%)
Male	36 (38%)
Age	
Mean	60 yrs
Median	61 yrs
Range	30 – 92yrs
Education	
Less than high school	13 (14%)
High school diploma	43 (45%)
College diploma	30 (32%)
Baccalaureate degree or higher	9 (9%)
Current household income	
Less than $10,000	5 (5%)
$10,000 to $24,999	33 (35%)
$25,000 to $39,999	14 (15%)
$40,000 or more	41 (44%)
Time since diagnosis	
Less than 1 year	10 (10%)
1 to 3 years ago	26 (27%)
3 to 5 years ago	14 (14%)
More than 5 years ago	47 (49%)

Table 1: Sample characteristics

According to Table 2 (column 1) self-reported A1C and self-rated health show the strongest association with DSE, whereas the association of social capital and support variables with DSE was virtually nil. Among demographic indicators, neither income nor age demonstrate a significant relationship to DSE; time since diagnosis showed a stronger relationship (albeit above the conventional significance threshold) – the longer the time since being diagnosed the higher the DSE. As expected, however, gender showed a significant association with DSE, whereby women reported higher DSE than men. Finally, the data did not support the expected, positive association between educational attainment and DSE. Further analysis, explained below, suggests that education level does not associate consistently with DSE, due to the variable's interaction with the Self-Related Health variable.

	Column 1		**Column 2**		**Column 3**	
	Diabetes Self-Efficacy		**Self-reported HbA1c**		**Self-reported Health**	
	(DSE)		**(SR A1C)**		**(SR Health)**	
	B	P	B	P	B	P
(Constant)	4.88	0.021	3.704	0	0.491	0.591
Self-reported A1C	-0.837	0.002	--	--	--	--
Self-rated health	0.828	0.001	--	--	--	--
Social Capital	-0.048	0.902	0.197	0.318	0.153	0.447
Social Support	0.409	0.102	-0.234	0.054	0.111	0.363
MD Support	0.081	0.736	-0.029	0.815	0.08	0.531
Household income	0.181	0.404	-0.073	0.501	0.19	0.109
Education (highest degree)	-0.766	0.03	-0.279	0.106	0.075	0.668
Gender (0=Male, 1=Female)	0.943	0.041	-0.152	0.506	0.265	0.269
Age	-0.018	0.298	-0.018	0.034	0.003	0.698
Time since diagnosis	0.379	0.054	0.142	0.149	-0.092	0.368
R^2		0.496		0.226		0.145

Table 2: Associations between social capital and support, demographic attributes, self-report variables and DSE

The investigation of how our variables related to self-reported (SR) A1C (Column 2) and SR Health (Column 3) identified just one noteworthy correlate – age showed a significant association with SR A1C. Below we explore the prospects of a feedback process likely at work between SR Hb1c, SR Health, and DSE that complicates the approach to understanding the dynamics of DSE and the two variables, which then might confound other relationships.

Discussion

Social capital and support

Apart from the striking connection found between SR A1C, SR Health, and DSE, what appears most perplexing is the absence of any consistent relationships found between DSE and social capital and support variables – variables often found to associate with various aspects of health and well-being. For instance, while civic participation, neighbourhood context, and MD support might seem too distant or episodic to clearly influence DSE, the expectation was that the network of family and friends that orient and encourage healthy (or unhealthy) behaviours would offer a more proximate, routine, and direct impact on DSE. A prior examination of the effects of social relationships on dietary behaviours largely bore this out [11]. This result might be a partial function of the limited variation in socio-economic status that characterized our sample.

Demographic attributes

Variation in socio-economic status in our sample seems limited, possibly due to its modest size and the broad categories used to capture income levels an annual income of "$40,000 or more" at the high end allows significant status differences to remain undetected. If there is a real relationship between income and DSE it might only be exposed at markedly higher income levels. Further, while education categories seemed adequate, the sample was skewed toward the lower end, generally reflecting formal education levels of the population of the clinic and the working-class community at large. We did find an unexpected negative relationship between education and DSE. An analysis of subgroups found that DSE decreases with education for lower SR health, but increases with education for higher SR health. The underlying cause may lie in an unmeasured, confounding variable. Figure 1 depicts this interaction among variables (education and self-reported health), such that the sign for education's slope, in relation to DSE, is not stable.

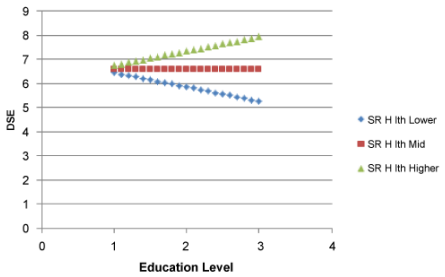

Figure 1: Impacts of Education on DSE for different levels of SR Health

The larger number of respondents who report "very poor" or "poor" health essentially pulls the aggregate coefficient for education downward, yielding the negative sign shown in Table 2, column 1. Nonetheless, the question remains as to why higher education relates to lower DSE for low SR health respondents, yet higher education associates with higher DSE for high SR health groups? We speculate that some other variables intervene to further complicate the relationship. For instance, "chance" locus of control (e.g., an orientation that views health as mostly a matter of luck) relates to

socioeconomic status [19]. Thus, it seems plausible that those with more education would be more inclined to credit or blame themselves for their good or poor health – those with more education would attribute their poor health to inept self-management (not bad luck) and their good health to excellent self-management (not good fortune). Alternatively, for participants who are mentally and physically in (self-perceived) reasonable health, the expected positive correlation of education to DSE is seen to apply. The relation breaks down for respondents who perceive themselves in ill health. This non-linear, observed response is consistent with other findings that relate sociodemographic factors to depression wherein those with lower education levels were found to be somewhat less susceptible to depression [20]. If it is possible that combined Low SR Health and Low DSE are sometimes a proxy for depressive symptoms, then it would be consistent if proportionally fewer Education 1's than expected were in the quadrant of the table possibly or sometimes linked with depression.

Results show that women report higher DSE than men. Overall, women reported higher levels of health than men, which, in turn, relates to higher DSE. The nature of the relationship between SR Health and DSE is more complex than many suggest, however, and the next section outlines how future research would more clearly specify this association. Either way, our qualitative investigation found several women who placed their own dietary needs second to their spouses and seemed unable to counter household norms when it came to food preparation and consumption; others living alone encountered no such pressure, but nonetheless compromised healthy eating by indulging unhealthy cravings [11]. In contrast, maintaining harmony within the household was less important for several men who showed willingness "go it alone" with regard to food consumption and other facets of their lives. It would be worthwhile to examine subsamples of males and females to determine if certain variables influenced DSE for either, but not both. In the current study, sample size precluded a meaningful analysis along these lines.

Consequence and Cause: DSE, SR A1C, and SR Health

Most striking from the table is the strong connection between SR A1C, SR Health, and DSE: those who report lower A1C also report higher DSE; those reported to be healthier also show a higher DSE. This association persists even though 16 respondents in our sample indicated that they did not know what their A1C levels were. Typically, DSE is considered to precede SR A1C and SR Health in the causal sequence – those who see themselves as self-efficacious manage their behaviour in healthier ways. Yet, more plausible is the view that a feedback process is at play that has not been explored elsewhere. While high DSE may serve to improve A1C and health, perceived improvements in A1C likely would improve SR Health and, in turn, would elevate confidence (Figure 2).

According to this model, changes in A1C at time 1 would contribute to changes in self-reported health, for better or for worse; this relationship might be moderated by other variables that impact "lived health" [21]. These changes would, in turn, contribute to similar changes in perceived diabetes self-efficacy that, in turn, would affect changes in A1C at time 2. Moderators (measured and unmeasured) would impact the dynamics in ways that should be explored, as well. As the dynamic plays out over time, vicious or virtuous patterns might emerge: lowered DSE diminishes glycemic control and health, which, in turn, lowers DSE (a vicious cycle), or improved DSE improves glycemic control and health elevates DSE to perpetuate healthy behaviours (a virtuous cycle). Low or high equilibrium points eventually would be reached to limit further change – e.g., a stable point where A1C is consistently well managed or one where it remains poorly managed or neglected. Health complications or changes in life circumstances would likely arise as well, potentially upsetting the balance that might have been reached. Either way, this feedback process deserves further investigation, inasmuch as A1C is viewed as a dependent variable in a process that involves myriad causal antecedents. We suspect that the process is not so straightforward.

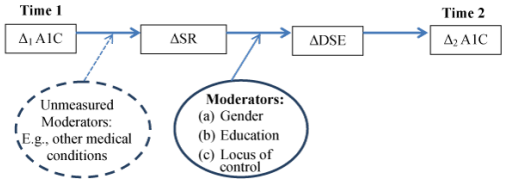

Figure 2: Feedback model – glycemic control, self-rated health, and diabetes self-efficacy

Implications

In view of the exploratory nature of this research, it would be premature to offer practical recommendations regarding advancing patients' DSE. To date, theorizing about factors that foster DSE has been limited, and the antecedents to DSE remain under-investigated. Our investigation found the relationships between DSE and self-rated health and self-reported A1C are strong and consistent, and can plausibly be accounted for through a feedback mechanism operating as the one suggested herein. If further research finds a feedback process at work, delivering information about A1C can become an even more important element of ongoing diabetes education. Relatedly, our research showed that the relationship between DSE and SR-A1C holds despite apparent deficiencies in communicating information about A1C. Many patients were uninformed about or otherwise unable to recall their recent A1C levels and it remains unclear why knowledge about this important marker was missing. It might be symptomatic of the clinician's insufficient emphasis on the marker when it falls within an acceptable range, or, alternatively, of patients' inadequate assimilation of worrisome information when it does not. Either way, how this information is conveyed to patients would become important for encouraging positive changes in DSE and self-management behaviour. Thus, refining our understanding of this dynamic would be critical for enhancing communication between clinicians and patients.

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