Debt stress, psychological distress and overall health among adults in Ontario

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A B S T R A C T

The objective of this study was to examine debt stress and its association with psychological distress and overall health. Data were derived from the 2014–2016 annual cycles of a cross-sectional telephone survey of the general population of adults 18 years of age and older within the province of Ontario, Canada. The present analyses focused on a pooled sample of 8045 adults. Results indicated that a large proportion of the sample reported experiencing debt-related stress. Those who were female, separated or divorced, and from lower income households were at higher odds of greater debt stress relative to no debt stress. Debt stress was significantly associated with psychological distress, as well as self-rated overall mental health and general health. Adults who reported greater debt stress were at higher odds of moderate to serious psychological distress, poor to fair self-rated mental health, and poor to fair self-rated general health compared to those with lower levels of debt stress. The association between debt stress and health did not vary by age, gender, employment, education, or income. The findings suggest that the stress surrounding debt is an important factor in the association between debt and health, the association is robust across various sociodemographic characteristics, and that further research is needed to better understand the nature of debt stress and its impact on health.

1. Background

Much research has identified an association between aspects of socioeconomic status (SES) and health (Adler et al., 1994; Link and Phelan, 1995; Marmot et al., 1997; Mirowsky and Ross, 2003; Wilkinson and Marmot, 2003; Wilkinson and Pickett, 2006), with findings that higher SES is often associated with better health. Such research has frequently focused on income, education and occupation, which are more traditional and objective measures of SES. There has been increasing recognition, however, that SES extends beyond these measures, with calls for greater research on other aspects of SES (Drentea and Reynolds, 2012). An aspect of SES that is often neglected in research is indebtedness. Similar to household income, education or occupation, debt should be considered a key component of socioeconomic position, and an important socioeconomic determinant of health (Drentea and Reynolds, 2012; Sweet et al., 2013). Research suggests that the stress resulting from debt may be the most important determinant of adverse effects associated with debt (Drentea, 2000; Drentea and Lavrakas, 2000). Given increasing levels of debt among the population (International Monetary Fund, 2016), research on debt stress and its association with health is particularly relevant. The

current study will examine debt stress and its association with psychological distress and self-rated health.

Household debt in countries such as Canada and the U.K. are among the highest in the world (Organisation for Economic Co-operation and Development, 2017). Recent figures in Canada indicate that for every dollar of after-tax income, Canadians owed $1.71 (Statistics Canada, 2017). In western societies, individuals frequently take on debt for reasons that range from providing the necessities of life to achieving higher social status (Chawla and Uppal, 2012; Dwyer et al., 2011). Excessive debt can become a substantial financial burden, and can lead to personal bankruptcy and contribute to national and international financial crises (International Monetary Fund, 2016). Research indicates that higher levels of debt may also contribute to negative health outcomes, including higher diastolic blood pressure (Sweet et al., 2013), obesity (Nelson et al., 2007), poor mental health (Brown et al., 2005; Drentea, 2000; Drentea and Reynolds, 2012; Meltzer et al., 2011; Selenko and Batinic, 2011) as well as poor general health (Drentea and Lavrakas, 2000; Kim et al., 2003; O'Neill et al., 2006). The associations between higher levels of debt and various mental health and substance use problems are also highlighted in systematic reviews (Richardson et al., 2013; Turunen and Hiilamo, 2014).

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Research suggests that stress and psychosocial resources are primary mechanisms through which SES affects health (Aneshensel, 2009; Matthews and Gallo, 2011; Pearlin, 1999). Socioeconomic disadvantage contributes to elevated psychological distress because it exposes individuals to greater stress, and limits access to psychosocial resources, such as social support and coping, that may moderate stress (Aneshensel, 2009; Pearlin, 1999). Physiological changes linked to stressful experiences also have a key role in the development of specific diseases (Hinkle, 1987; McEwen, 2004; Seeman et al., 2001). In addition, stress may also have an indirect effect on health through its influence on health behaviours such as diet and physical activity (McEwen and Seeman, 1999).

The important role of debt-related stress has been illustrated in various studies. Such research has suggested that perceptions of debt stress are more important than objective measures of debt (Bridges and Disney, 2010), or debt status (Drentea, 2000; Drentea and Lavrakas, 2000; Drentea and Reynolds, 2012) on aspects of mental health such as depression and anxiety, as well as self-reported health. Less attention has focused on the subpopulations that may be most impacted by debt stress. Research has found that debt tends to be higher among families with children, younger homeowners, higher income adults, and those who are better educated (Chawla and Uppal, 2012). It is not clear, however, whether debt stress is distributed similarly to debt within these subpopulations. Although debt may be higher among higher income households (Chawla and Uppal, 2012), the burden of debt or the stress related to debt may be higher among lower income households. Such stress among lower income households may be enhanced by lower job security, lower supports, and other disadvantages that may have accumulated through earlier life experiences (Dannefer, 2003).

Less research attention has also focused on potential moderators of the association between debt stress and health. Gender is significantly related to mental health, with women at greater risk of internalizing disorders such as depression and anxiety than men (Kessler, 2003; Rosenfield and Mouzon, 2013); thus, the effect of debt stress on mental health may be greater for women. Employment may also buffer the negative effects of debt stress on health. Employment has a positive effect on health (McKee-Ryan et al., 2005), and provides a source of income that may not only offset debt, but also may provide social status and social interactions (Selenko and Batinic, 2011).

The objectives of the current research study were to: (1) characterize adults experiencing debt stress, (2) examine the association between debt stress and aspects of health, and (3) examine the moderating influence of sociodemographic factors, specifically gender, age, employment status, education, and income on this association in a large sample of adults in Ontario, Canada. We focus on moderate to serious psychological distress as well as self-reported mental and general health measures.

2. Methods

Data were derived from the 2014 to 2016 cycles of the CAMH Monitor, an annual survey of the general population of adults 18 years of age and older within Ontario, Canada (Ialomiteanu et al., 2015, 2017; Ialomiteanu et al., 2016). Each cycle of this cross-sectional survey employs a regionally stratified design with the sample equally allocated within each of six regions in Ontario. The survey utilizes computer-assisted telephone interviewing and a two-stage (telephone number, household respondent) probability selection of telephone numbers using list-assisted random digit dialing of landline and mobile numbers. Each annual cycle reflects accumulated data from four quarterly non-overlapping continuous or rolling samples from January to December. Such annual accumulation of rolling samples contributes to better statistical estimation as well as other advantages (Kish, 1999). Of the households contacted during the three cycles, 46%–53% agreed to participate. These numbers reflect declining response rates for telephone surveys and tend to be similar to those of other telephone

surveys within Canada (Health Canada, 2014) and the U.S. (Centers for Disease Control and Prevention, 2014). To maximize survey content without increasing respondent burden, each survey cycle consisted of multiple panels, with each panel asked various modules of questions in addition to the core items asked across all panels. The questionnaire items on debt stress were asked only of one of two, or two of three panels, at each survey cycle, which resulted in a total pooled sample of 8045 for analysis purposes across the three years. The current analyses focus on this three-year sample. The survey design and methods are described in more detail elsewhere (Ialomiteanu et al., 2015, 2016, 2017). The 2014 to 2016 CAMH Monitor surveys were approved by the Research Ethics Boards of the Centre for Addiction and Mental Health, and York University.

2.1. Measures

Debt stress measured financial stress from all debt in the household, including mortgages, credit cards, home equity loans, car loans, and other debts. A measure of debt stress was constructed from a question that asked: "In the past 12 months, how much stress did you feel because of your total debt, if any? Would you say a great deal of stress, quite a bit of stress, some stress, very little stress or no stress at all?" Response categories included an additional option for "don't have any debt". A 6-category measure was constructed to reflect reports of no debt, debt with no stress, debt with little stress, debt with some stress, debt with quite a bit of stress, and debt with a great deal of stress.

Psychological distress was measured using the validated Kessler-6 (K6) psychological distress scale, a 6-item screener for detecting non-specific psychological distress or anxiety-mood disorders (Kessler et al., 2003a,b). Respondents were asked how often during the preceding 30 days they felt nervous, hopeless, restless, depressed, worthless, or that "everything was an effort". Responses were scored from 0 (none of the time) to 4 (all of the time) and summed to construct a scale with total scores ranging from 0 to 24, with higher scores indicating higher psychological distress. In some previous research, scores of 0–7 were categorized as noncases, scores of 8–12 were categorized as mild to moderate mental illness (which has been associated with DSM-IV anxiety-mood disorder, but not serious mental illness) and scores of 13–24 were categorized as serious mental illness (which has been associated with clinically diagnosed mental illness) (Galea et al., 2007). We focus here on a cut-off score of eight or above to reflect mild/moderate to serious psychological distress because of its high prevalence within community samples and its relevance to public health (Galea et al., 2007; Kessler et al., 2003a,b).

Self-reported overall mental health was assessed using a question and response choices similar to that for overall health. The question was: "In general, would you say your overall MENTAL HEALTH is excellent, very good, good, fair, or poor?" For analysis purposes, the measure was coded so that higher numbers reflected better overall mental health. An additional binary measure was also created to reflect poor or fair mental health (1) vs. other mental health status (good, very good, or excellent).

Self-reported overall general health was based on responses to a question that asked: "In general, would you say your overall HEALTH is excellent, very good, good, fair, or poor?" For analysis purposes, the measure was coded so that higher numbers reflected better overall health. As was done for self-reported overall mental health, an additional binary measure reflecting poor or fair health vs. other health categories was also created.

Several covariates were included within regression models. Sex was measured as male or female; age was measured using five age groups (18–29, 30–39, 40–49, 50–64, and 65 or older); education reflected the highest level of education achieved as high school or less, some college or university, or university degree; employment status was measured as full-time, part-time, retired, or other; racial background was a dichotomous measure of white or nonwhite; marital status was a 3-category

measure of married/common-law, separated/divorced, or never married; immigration status was a dichotomous measure of foreign-born or not; household size reflected the number of individuals residing in the household including the respondent; and children in the household was a reflection of whether or not there were children under the age of 18 residing in the household. Household income was measured as 10 ranges of income from less than $20,000 to greater than $100,000. Analyses also included the year of the survey as a control variable given that the data were pooled across multiple years.

2.2. Statistical analysis

In the first stage of analyses, multinomial logistic regression was used to examine the sociodemographic characteristics associated with debt stress. In the second stage of analyses, binary logistic regression was used to examine the association between debt stress and three binary measures of health status. Multinomial logistic regression was used to examine the different associations of debt stress with self-rated overall health and overall mental health across multiple categories. Ordered logistic regression was deemed inappropriate after tests indicated that the proportional odds assumption was violated (Williams, 2006). The moderating influence of gender, age, employment status, education, and household income were each examined in separate models using two-way interactions with debt stress. Weights were used within the analyses to adjust for the unequal probability of selection. Taylor series methods within Stata 14 were used to compute unbiased variances, standard errors, and point estimates given a complex sample design (StataCorp, 1985–2015). Missing cases represented less than 2% of the sample for all variables except for household income which had 23.8% missing cases. Missing cases were handled through multiple imputation (Schafer, 1999) using chained equations within Stata 14. The imputation model included the survey design variables in addition to the variables to be imputed. A total of 45 datasets were imputed with high relative efficiencies. Imputed values for dependent variables within these analyses were deleted from regression models (von Hippel, 2007).

3. Results

Weighted descriptive statistics for the sample are presented in Table 1. Among the sample, 51.8% were female, 53.3% were employed, 37.2% had a university degree, 81.7% reported being of white racial background, and 23.5% reported being foreign-born. Overall, 14.1% had no debt, 27.1% reported not being stressed by their debt (no debt stress), 29.4% reported being a little stressed by their debt (little debt stress), 20.4% reported some stress because of their debt (some debt stress), 5.7% reported quite a bit of stress because of their debt (quite a bit of debt stress), and 3.3% reported experiencing a great deal of stress because of their debt (great debt stress).

Debt stress was found to be associated with several sociodemographic characteristics (Table 2). The relative risks of some to great debt stress rather than no debt stress were higher among females than males (adjusted relative risks ranged from 1.50 to 1.90), higher among those with some college/university than those with less education (adjusted relative risks ranged from 1.33 to 1.72), and lower among those with higher household income (adjusted relative risks ranged from 0.94 to 0.78). There were no significant differences between those with a university degree and those with high school or less education. The relative risks of any debt stress (little to great) rather than none were higher among those who were separated/divorced than among the married/cohabiting (adjusted relative risks ranged from 1.47 to 3.19), lower among retired than full-time workers (adjusted relative risks ranged from 0.53 to 0.17), and lower among those aged 50 years or older than those aged 40–49 years.

The associations between debt stress and binary measures of psychological distress, poor or fair mental health, and poor or fair general

Table 1
Description of sample.

	Percent (or mean where indicated)	95% CI	N
Sex			
Male	48.2	46.8–49.7	3130
Female	51.8	50.3–53.2	4915
Employment status			
Full-time/self-employed	53.3	51.8–54.7	3523
Part-time	9.2	8.3–10.1	644
Retired	20.5	19.7–21.4	2843
Other	17.0	15.8–18.3	992
Education			
High school or less	27.0	25.7–28.2	2473
Some college/university	35.8	34.4–37.2	2751
University degree	37.2	35.8–38.6	2748
Age			
18-29	18.4	17.0–19.9	586
30-39	16.3	15.2–17.6	752
40-49	18.2	17.1–19.3	1242
50-64	28.6	27.5–29.8	2727
65+	18.5	17.6–19.3	2649
Racial background			
Non-white	18.3	17.1–19.7	892
White	81.7	80.3–82.9	7049
Marital status			
Married/cohabit/widow	70.9	69.4–72.3	6008
Separated/divorced	5.9	5.5–6.5	880
Never married	23.2	21.7–24.7	1088
Children under age 18 in household			
No	65.4	64.0–66.8	5946
Yes	34.6	33.2–36.0	2031
Born outside Canada			
Canadian-born	76.5	75.2–77.7	6350
Foreign-born	23.5	22.3–24.8	1638
Number of residents in household	Mean = 3.30	3.25–3.35	7989
Household income			
< $20,000	2.4	2.2–2.8	330
$20,000–29,999	3.4	3.0–3.8	461
$30,000–39,999	3.9	3.4–4.4	447
$40,000–49,999	4.2	3.7–4.8	447
$50,000–59,999	4.9	4.4–5.5	474
$60,000–69,999	4.5	4.0–5.0	420
$70,000–79,999	5.2	4.6–5.9	424
$80,000–89,999	5.1	4.5–5.7	381
$90,000 to 99,999	4.2	3.6–4.8	280
> $100,000	38.5	37.05–39.9	2494
Missing	23.8	22.5–25.1	1887
Year of interview			
2014	25.2	24.4–25.9	2004
2015	49.9	49.1–50.8	4007
2016	24.9	24.2–25.7	2034
Debt stress			
No debt	14.1	13.2–15.0	1495
Debt, but no stress	27.1	25.9–28.4	2343
Debt & a little stress	29.4	28.1–30.8	2099
Debt & some stress	20.4	19.2–21.6	1396
Debt & quite a bit of stress	5.7	5.0–6.5	376
Debt & a great deal of stress	3.3	2.7–3.9	212
Moderate to serious psychological distress (K6)			
No	90.2	89.2–91.1	7300
Yes	9.8	8.9–10.8	743
Self-rated overall mental health			

Table 1 (*continued*)

	Percent (or mean where indicated)	95% CI	N
Poor	1.3	1.0–1.7	98
Fair	5.2	4.6–5.9	460
Good	24.4	23.2–25.7	2001
Very good	36.9	35.5–38.3	2920
Excellent	32.1	30.8–33.5	2534
Self-rated overall general health			
Poor	2.4	2.0–2.8	275
Fair	7.4	6.7–8.1	731
Good	27.4	26.1–28.7	2227
Very good	39.6	38.2–41.0	3070
Excellent	23.3	22.0–24.5	1723

health are presented in Table 3 and include controls for socio-demographic factors and other covariates. Higher debt stress was associated with greater odds of moderate to serious psychological distress (OR = 1.64, 95% CI = 1.49–1.80). Higher income (OR = 0.90, 95% CI = 0.86–0.95) was associated with lower odds of moderate to serious psychological distress. Findings for education indicated lower odds of distress among adults with university degrees than those with high

school or less education (OR = 0.62, 95% CI = 0.46–0.83), but no statistically significant differences between other categories of education.

With regard to overall poor to fair mental health, results indicated that the odds of poor to fair mental health were greater at higher levels of debt stress (OR = 1.51, 95%CI = 1.35–1.70). Higher income (OR = 0.88, 95%CI = 0.84–0.93) and a university degree relative to high school or less (OR = 0.60, 95%CI = 0.43–0.84) or some college (F (1,7836) = 6.5, p = 0.01) were also associated with lower odds of self-rated poor to fair mental health. Results for self-rated poor to fair general health are also presented in Table 3, and are similar to those for self-rated mental health. Greater levels of debt stress were associated with greater odds of self-rated poor to fair general health (OR = 1.29, 95%CI = 1.19–1.40). Higher income and a university degree were also associated with lower odds of poor to fair general health.

The moderating effects of gender, age, employment status, house-hold income, and education on the association between debt stress and the three measures of health were examined in separate models for each two-way interaction. Results indicated that none of the interactions were significant (Table 4), thus the associations between debt stress and psychological distress, overall mental health, and overall general health did not vary by gender, age, employment status, income, or education.

Supplementary analysis with levels of debt stress as categorical

Table 2
Multinomial logistic regression models of association between sociodemographic characteristics and debt stress.

	Little debt stress vs. no debt/stress		Some debt stress vs. no debt/stress		Quite a bit of debt stress vs. no debt/stress		Great debt stress vs. no debt/stress	
	RRR	95% CI	RRR	95% CI	RRR	95% CI	RRR	95% CI
Sex								
Male	1.00		1.00		1.00		1.00	
Female	1.09	[0.94,1.27]	1.50***	[1.26,1.80]	1.64**	[1.20,2.25]	1.90**	[1.21,2.98]
Employment status								
Full-time/self-empl	1.00		1.00		1.00		1.00	
Part-time	1.11	[0.84,1.47]	1.00	[0.73,1.37]	1.30	[0.82,2.05]	1.67	[0.89,3.14]
Retired	0.53***	[0.42,0.65]	0.38***	[0.29,0.50]	0.27***	[0.17,0.45]	0.17***	[0.08,0.38]
Other	0.90	[0.70,1.17]	0.69*	[0.51,0.93]	1.25	[0.83,1.88]	1.01	[0.57,1.79]
Education								
H.S. or less	1.00		1.00		1.00		1.00	
Some coll/univ	1.03	[0.85,1.25]	1.33*	[1.05,1.69]	1.56*	[1.07,2.28]	1.72*	[1.09,2.73]
Univ degree	0.98	[0.80,1.20]	1.19	[0.92,1.52]	1.03	[0.68,1.55]	1.12	[0.59,2.14]
Age								
18-29	0.98	[0.67,1.44]	1.09	[0.71,1.66]	0.77	[0.41,1.45]	0.78	[0.37,1.65]
30-39	1.10	[0.83,1.47]	1.31	[0.98,1.76]	1.48	[0.94,2.33]	1.11	[0.65,1.92]
40-49	1.00		1.00		1.00		1.00	
50-64	0.63***	[0.50,0.80]	0.67**	[0.51,0.87]	0.58**	[0.39,0.88]	0.55*	[0.33,0.93]
65 +	0.34***	[0.26,0.46]	0.25***	[0.17,0.35]	0.24***	[0.13,0.42]	0.10***	[0.04,0.25]
Racial background								
Non-white	1.00		1.00		1.00		1.00	
White	1.16	[0.89,1.52]	0.89	[0.66,1.20]	1.06	[0.65,1.74]	0.60	[0.32,1.10]
Marital status								
Married/cohabit/ widow	1.00		1.00		1.00		1.00	
Sep/divorced	1.47**	[1.14,1.89]	2.10***	[1.60,2.75]	2.48***	[1.61,3.82]	3.19***	[1.85,5.50]
Never married	0.76	[0.56,1.03]	0.75	[0.53,1.07]	0.92	[0.55,1.55]	0.84	[0.44,1.59]
No. of residents in home	1.06	[0.98,1.15]	1.10*	[1.00,1.20]	1.16*	[1.00,1.34]	1.15	[0.96,1.39]
Children < 18 in household								
No	1.00		1.00		1.00		1.00	
Yes	1.25	[0.98,1.59]	1.43**	[1.09,1.86]	1.31	[0.86,2.00]	1.17	[0.66,2.08]
Household income	0.98	[0.94,1.02]	0.94**	[0.90,0.98]	0.88***	[0.83,0.94]	0.78***	[0.72,0.85]
Born outside Canada								
No	1.00		1.00		1.00		1.00	
Yes	1.05	[0.86,1.28]	0.82	[0.64,1.04]	1.03	[0.71,1.50]	0.62	[0.34,1.11]
Year of interview								
2014	1.00		1.00		1.00		1.00	
2015	1.05	[0.87,1.26]	1.25*	[1.02,1.55]	0.97	[0.69,1.37]	1.00	[0.63,1.60]
2016	1.09	[0.88,1.35]	1.12	[0.87,1.43]	1.19	[0.82,1.75]	0.94	[0.53,1.66]

Adjusted relative risks ratios; 95% confidence intervals in brackets.
*p < 0.05, **p < 0.01, ***p < 0.001.
N = 7921.

Table 3
Binary logistic regression of the association between debt stress and health measures.

	Moderate to serious psychological distress vs. less distress[a]	Poor or fair mental health vs. better[b]	Poor or fair general health vs. better[c]
Debt stress	1.637*** [1.49,1.80]	1.514*** [1.35,1.70]	1.290*** [1.19,1.40]
Male (reference)	1.00	1.00	1.00
Female	1.105 [0.87,1.40]	0.918 [0.71,1.18]	0.800* [0.66,0.97]
Employment			
Full-time (ref)	1.00	1.00	1.00
Part-time	1.600* [1.10,2.33]	1.481 [0.94,2.33]	1.828** [1.22,2.73]
Retired	1.321 [0.92,1.90]	2.041*** [1.42,2.94]	2.437*** [1.86,3.19]
Other	2.191*** [1.61,2.98]	1.944*** [1.39,2.71]	2.229*** [1.64,3.03]
Education			
High school or less (ref)	1.00	1.00	1.00
Some college/ university	0.807 [0.62,1.05]	0.923 [0.70,1.22]	0.992 [0.80,1.23]
University degree	0.617** [0.46,0.83]	0.603** [0.43,0.84]	0.484*** [0.37,0.63]
Age Group			
18-29	1.480 [0.92,2.38]	1.868* [1.14,3.07]	0.528* [0.30,0.93]
30-39	1.093 [0.75,1.60]	1.449 [0.94,2.25]	0.928 [0.60,1.44]
40–49 (ref)	1.00	1.00	1.00
50-64	1.015 [0.71,1.44]	1.155 [0.77,1.74]	1.510* [1.06,2.15]
65+	0.771 [0.44,1.34]	0.612 [0.36,1.03]	1.443 [0.96,2.17]
Racial background			
Non-white (ref)	1.00	1.00	1.00
White background	0.908 [0.63,1.31]	1.489 [0.96,2.31]	0.843 [0.59,1.21]
Marital status			
Married/cohab/ widow (ref)	1.00	1.00	1.00
Separated/ divorced	1.365* [1.01,1.84]	1.114 [0.78,1.58]	1.102 [0.83,1.46]
Never married	1.209 [0.82,1.79]	1.197 [0.79,1.82]	1.122 [0.78,1.62]
Household size	0.981 [0.85,1.13]	0.830** [0.73,0.94]	0.976 [0.89,1.08]
Child under 18 in household			
No (ref)	1.00	1.00	1.00
Yes	0.803 [0.56,1.15]	1.091 [0.73,1.62]	0.770 [0.54,1.10]
Household income	0.902*** [0.86,0.95]	0.884*** [0.84,0.93]	0.911*** [0.87,0.95]
Born in Canada			
No (ref)	1.00	1.00	1.00
Yes	1.165 [0.87,1.57]	1.005 [0.73,1.38]	0.808 [0.64,1.03]

Table 3 (*continued*)

	Moderate to serious psychological distress vs. less distress[a]	Poor or fair mental health vs. better[b]	Poor or fair general health vs. better[c]
Year of survey			
2014 (ref)	1.00	1.00	1.00
2015	2.044*** [1.52,2.74]	1.081 [0.80,1.47]	0.974 [0.77,1.23]
2016	1.797*** [1.28,2.52]	1.092 [0.76,1.56]	0.929 [0.72,1.20]
Constant	0.0252*** [0.01,0.06]	0.0379*** [0.01,0.10]	0.106*** [0.05,0.21]
N	8043	8013	8026

*p < 0.05, **p < 0.01, ***p < 0.001.
Exponentiated coefficients; 95% confidence intervals in square brackets.
  [a] Adjusted odds ratios for binary measure of moderate to serious psychological distress vs. mild to none.
  [b] Adjusted odds ratios for binary measure of poor or fair mental health vs. better mental health (i.e., good, very good or excellent).
  [c] Adjusted odds ratios for binary measure of poor or fair physical health vs. better physical health (i.e., good, very good or excellent).

variables examined differences between individuals with no debt and those who reported not being stressed by their debt with regard to psychological distress and self-rated health. Results indicated no statistically significant differences between adults with no debt and those not stressed by their debt in the odds of moderate to serious psychological distress, poor to fair overall mental health, and poor to fair general health.

Table 5 presents the relative risk ratios associated with debt stress on the risks of poor mental health relative to fair, good, very good, and excellent mental health. The results indicated that, controlling for individual and household sociodemographic factors, adults with greater levels of debt stress were at greater odds of poor relative to excellent self-rated mental health (relative risk ratio = 1.94, 95% CI = 1.50–2.51). Greater levels of debt stress were also associated with greater risk of fair, good, and very good relative to excellent mental health. Higher odds were associated with reports of worse relative to excellent health. Findings for self-rated general health were similar to those for mental health. Greater levels of debt stress were associated with worse relative to excellent overall health, with higher odds linked with worse health.

4. Discussion

Concerns about increasing levels of household debt are often expressed in terms of the potential risks to the economy (International Monetary Fund, 2016; Organisation for Economic Co-operation and Development, 2017). The potential impact of debt and any related stress on aspects of health are not often considered at a broader level. Debt is also not often considered as an aspect of socioeconomic disadvantage in health studies, which tend to focus more on income and education. Results of the current study suggest that debt-related stress is an important factor in the association between debt and health. Adults who reported greater levels of debt stress were at higher odds of moderate to serious psychological distress, poor to fair mental health, and poor to fair general health than were adults who reported lower levels of debt stress or no debt. Thus, the current findings suggest a dose-response relationship, wherein greater stress about debt is associated with poorer health. These findings linking greater debt stress with worse mental health and general health are consistent with those of other studies (Drentea, 2000; Drentea and Reynolds, 2012; Meltzer

Table 4

Design-adjusted Wald tests of the moderating effects of sex, age, education, employment and income on the association between debt stress and health outcomes in logistic regression models.

	Moderate to serious psychological distress	Poor or fair mental health	Poor or fair general health
Sex x Debt stress	$F_{(1,7708.9)} = 1.71$ (p = 0.191)	$F_{(1,7793.3)} = 2.31$ (p = 0.129)	$F_{(1,7590.2)} = 0.33$ (p = 0.568)
Employment x Debt stress	$F_{(4,7684.3)} = 1.50$ (p = 0.214)	$F_{(3,7809.2)} = 0.26$ (p = 0.857)	$F_{(3,7688.7)} = 1.11$ (p = 0.343)
Education x Debt stress	$F_{(2,7704.1)} = 0.16$ (p = 0.852)	$F_{(2,7781.7)} = 0.91$ (p = 0.404)	$F_{(2,7557.7)} = 0.22$, (p = 0.800)
Age group x Debt stress	$F_{(3,7757.2)} = 1.45$ (p = 0.212)	$F_{(4,7815.6)} = 0.82$ (p = 0.509)	$F_{(4,7781.5)} = 1.25$ (p = 0.286)
Household income x Debt stress	$F_{(1,843.2)} = 0.89$ (p = 0.347)	$F_{(1,891.5)} = 0.02$ (p = 0.890)	$F_{(1,869.3)} = 0.28$ (p = 0.595)
N	8043	8013	8026

Note: Estimates are F-test statistic and associated p-values.

Models controlled for sex, employment, education, age group, household income, racial background, marital status, immigrant generation, any children under 18 in household, household size, and year of interview. The two-way interactions between debt stress and each of sex, age, employment status, education, and household income were examined in separate models. Wald F-test results of each interaction are provided in the table, and indicate that all are nonsignificant.

Table 5

Multinomial logistic regression models of association between debt stress and self-rated mental and general health.

	Debt stress & overall mental health		Debt stress & overall general health	
	RRR	95% CI	RRR	95% CI
Poor vs. excellent	1.94***	(1.50, 2.51)	1.76***	(1.49, 2.08)
Fair vs. excellent	1.75***	(1.54, 2.00)	1.39***	(1.25, 1.55)
Good vs. excellent	1.31***	(1.21, 1.41)	1.26***	(1.16, 1.37)
Very good vs. excellent	1.20***	(1.13, 1.29)	1.12***	(1.04, 1.21))

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$. n = 8013.

Note: Relative risk ratios (RRR) are shown. 95% confidence intervals are indicated in brackets. All covariates were included in statistical models, but not reported in table.

et al., 2011; Selenko and Batinic, 2011; Sweet et al., 2013).

It is noteworthy that the significance of debt stress occurred while controlling for education and income, variables which themselves remained significantly associated with the three health measures examined. Thus, each was independently associated with the aspects of health examined. Findings that the association between debt stress and psychological distress, self-rated mental health, and self-rated general health did not vary with age, gender, employment status, education or income also indicate the robustness of debt stress. Findings that the SES factors examined here may not be strong moderators of the association between debt stress and health were somewhat consistent with previous research findings that debt was not less stressful for individuals with higher SES (Drentea and Reynolds, 2012). These findings suggest that future research should consider other areas of vulnerabilities as potential moderating factors that relate to stress. Psychosocial resources such as coping and social support are potential areas for such future research given existing research on their role in moderating stress and as mechanisms in the link between SES and health (Aneshensel, 2009; Matthews and Gallo, 2011; Pearlin, 1999).

No significant difference was found between no debt and no debt stress on the health measures examined. This suggests that not being stressed by existing debt may have similar benefits, with regard to psychological distress, and self-rated mental and general health, as having no debt. This finding aligns with research suggesting that the stress resulting from debt, rather than debt itself, may be an important source of negative effects associated with debt (Drentea, 2000; Drentea and Lavrakas, 2000).

Despite concerns about debt and its link to health, it is important to note that not all debt can be construed negatively. Debt is an accepted feature of household finances that is often utilized during the process of accumulating assets and wealth. The financing of new homes and post-secondary education, for example, may be viewed as investments and means to achieving higher status (Dwyer et al., 2011). However, concerns arise from recent reports on household debt indicating that among the lowest income households in Canada, the amount owed was $3.33 for every after tax dollar of income, compared to $1.28 owed among the highest income households (Statistics Canada, 2017). This indicates that the burden was highest among lower income households, which will place them at higher risk of experiencing more debt-related stress. This was confirmed by findings from the current study, which indicated that the odds of some to great debt stress relative to no debt stress were higher among adults with lower household income. Such stressors may further contribute to cumulative disadvantages, thus increasing their negative effects over the long-term (Dannefer, 2003).

In addition to those with lower household income, other demographic groups at higher risk of some to great debt stress relative to no debt stress included women and the separated or divorced. Those at lower risk were the retired relative to those who worked full-time, which is consistent with findings from other research (Drentea and Reynolds, 2012). Findings also indicated that being 50 years of age or older was also protective against debt stress, which is not surprising given that such individuals would be closer to paying off debts and closer to retirement, which should have protective effects.

Several limitations of the study are worth noting. The data were based on a cross-sectional study and as such the temporal association between debt stress and health measures cannot be determined. Debt stress may lead to negative health experiences given evidence that low SES exposes individuals to greater stress and contributes to health concerns such as elevated psychological distress (Aneshensel, 2009; Pearlin, 1999). Similar results have been found with regard to high debt (Drentea and Reynolds, 2012). Poor health, however, may also contribute to debt and related stress, with some evidence that specific mental disorders may lead to declines in economic resources (Dohrenwend et al., 1992). Additional research is needed to address the direction of the relationship between debt stress and aspects of health, and the primary mechanisms through which such relationships occur. Another limitation of the study is that debt stress was measured with a single question, rather than an index and thus there may be some associated bias. An additional limitation is that specific components of debt, such as credit card debt or mortgage debt, could not be specifically examined. Research suggests that mortgage debt may be less stressful than credit card debt (Brown et al., 2005), thus type of debt may be an explanatory factor in some associations between debt stress and health, or lack thereof. The amount of household or personal debt and the nature of assets were also not available and thus could not be

considered within analyses. Household income within the sample was also relatively high, which may have implications for debt and the stress experienced by it. Finally, the proportion of missing data on household income was relatively high at 23.8%; however, multiple imputation methods were utilized with high relative efficiencies to reduce potential bias from missingness.

Increasing evidence suggests that debt is an important component of socioeconomic disadvantage that may impact health (e.g., Drentea and Reynolds, 2012; Sweet et al., 2013). As such, broader efforts to understand the nature of stress that may accompany debt and devise ways to relieve such stress are essential. Increased education with regard to household finances and borrowing, and options for debt relief are needed to prevent and reduce stress. Debt stress is also an important consideration for mental health professionals who may contribute towards improved health by working with individuals to reduce experiences of stress and enhance psychosocial resources such as coping and support.

Further research is needed to investigate whether the association between debt stress and health varies for different types of debt. This is an important area of future research given that certain types of debt, such as mortgages, are accepted methods toward accumulating future assets, whereas other debts, such as payday loans or credit card debt, are more stigmatized (Sweet et al., 2013). Longitudinal research is also needed to address temporal associations as well as the mechanisms through which debt stress impacts health. Understanding the varying impacts of different types of debt and the mechanisms through which debt impacts health would greatly contribute to knowledge and efforts to reduce negative impacts on health.

Conflicts of interest

None.

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