

CUMULATIVE LIFETIME VIOLENCE SEVERITY: DOES IT MAKE A DIFFERENCE TO THE HEALTH OF CANADIAN MEN?

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ABSTRACT

Background and Objective

Interpersonal violence is a major public health problem that is among the top 25 causes of years of life lost worldwide. But how cumulative lifetime violence affects the health of men has received little attention. Our objective was to explore differences in men's health and health behaviours according to *cumulative* lifetime violence severity as target and/or perpetrator in a community sample of Canadian men.

Materials and Methods

Data are from a convenience community sample of 590 men, ages 19 to 65, who completed an online survey for the *Men's Violence, Gender and Health Study* (MVGHS). The survey included questions about social location, health behaviours, and health status. Validated measures of depression, anxiety, chronic pain, post-traumatic stress disorder and alcohol use also were included. Perceived cumulative lifetime violence severity (CLVS) was measured with 64 study-specific items. Based on the median CLVS score, the sample was divided into two groups, lower and higher CLVS, and compared for significant differences on social location, health behaviour, and health variables. Using logistic regression, odds ratios for higher CLVS and three selected health outcomes (depression, chronic pain, daily cannabis use) were calculated and adjusted for potential confounders.

Results

On most measures, men with higher CLVS had significantly poorer health than those with lower CLVS. Alcohol use was not significantly different between groups but was higher than expected for all men. Those with higher CLVS had significant odds ratios for depression ($OR = 3.71$; $CI = 2.59, 5.31$), daily cannabis use

($OR = 3.20$; $CI = 2.07, 4.92$) and chronic pain ($OR = 3.19$; $CI = 1.98, 5.14$). In odds ratio models adjusted for confounders, higher CLVS remained significant only for daily cannabis use ($aOR = 2.07$; $CI = 1.23, 3.43$) and other significant $aORs$ included current smoking, unemployment and difficulty living on current income. In the depression and chronic pain models, common indicators of dysregulation of the body's natural stress response by violence severity, post-traumatic stress disorder and anxiety respectively, were significant predictors. Number of chronic health problems and being overwhelmed by daily stress frequently were also significant in the depression model. For chronic pain, number of chronic health problems and injury with permanent disability were both significant predictors.

Conclusions

These findings provide some of the first comparative evidence from a community sample that men with higher *cumulative* lifetime violence severity are more likely to have poorer health than men with lower CLVS. The adjusted models suggest more complex relationships among higher CLVS and health outcomes that indicate the need for further exploration of how biophysical consequences of violence, social location and/or comorbidities may moderate or mediate how cumulative violence severity affects men's health.

Key Words: Cumulative Lifetime Violence, Men's Health, Perpetrator, Mental Health, Substance Use, Chronic Pain

Despite being among the top 25 causes of years of life lost worldwide, violence* is a major public health and social problem that has not been well-scrutinized in the study of men's health.^{1,2} Nonetheless, a body of knowledge supporting the negative health effects for men who are targets** and/or perpetrators of specific types*** of violence is accumulating.³ However, there are important threats to the integrity of this evidence. Gender, the lens through which violence is perceived, evaluated, and expressed, is often ignored in studies of men's health, first by the use of tools designed to measure women's experiences of violence and second, by employment of comparison groups of women targets of violence rather than men who have little experience of violence.^{4, 5, 6, 7} Another threat is the propensity to attribute health outcomes to single types of violence without considering cumulative lifetime violence.⁸ To address these limitations, we carried out the New Brunswick (NB) *Men's Violence, Gender and Health Study (MVGHS)* using an exploratory mixed method

*Some forms of interpersonal violence are called abuse (e.g., child abuse). In this article, the term 'violence' is used to denote interpersonal violence or abuse.

**The term 'target' is used to refer to someone who is the object of violence.

***The term 'type' refers to physical, sexual or psychological violence.

design, including an online survey, biophysical measures, and qualitative interviews.

A major objective of the MVGHS was to explore differences in men's health and health behaviours according to *cumulative* lifetime violence severity. We addressed two research questions using survey data: (1) How does the health of men with perceived higher cumulative lifetime violence severity (CLVS) compare to that of men with lower CLVS? (2) What are the adjusted odds ratios (aOR) of selected health outcomes for men with perceived higher CLVS as compared to men with lower CLVS after adjustment for confounders (e.g., demographics, comorbidities)?

BACKGROUND

As target or perpetrator, men's experiences of violence within families, schools, workplaces, social networks and public spaces are pervasive across the lifespan.³ Research studies show targeted exposure to specific types of violence is associated with physical and/or mental health problems in men; for example, physical injuries, post-traumatic stress disorder (PTSD), mood disorders and self-harm with a history of child maltreatment,⁹ depression with adolescent verbal bullying,¹⁰ stroke, joint disease, asthma, smoking and binge drinking with intimate partner violence (IPV),¹¹ mental health problems, fatigue, insomnia and

muscular-skeletal pain with physical violence in public places,¹² psychological problems with sexual assault,¹³ headaches, mental health problems, gastrointestinal problems, chronic pain, and sleep disturbances with workplace violence^{7,14,15} and PTSD, depression and anxiety with military service violence.¹⁶ Child abuse also is linked to health problems that (a) may persist into adulthood such as depression, anxiety and suicide ideation,¹⁷ or (b) develop in adulthood such as metabolic syndrome.¹⁸ Perpetration of violence also is associated with poor health including chronic disease in youth,¹⁹ psychosis, anxiety and substance use in violent men and gang members,²⁰ PTSD in police officers who injure or kill someone,²¹ and depression, PTSD and substance use among men who are both perpetrators and targets of IPV.²²

Beyond physical injury, violence affects health by triggering chronic *toxic* stress that can lead to dysregulation of the natural stress response system, causing significant and long-term neuroendocrine, metabolic, hemostatic, immunologic, and inflammatory changes to the body and brain.²³ This compromised state has been implicated in the development and progression of chronic diseases including depression, PTSD, cardiovascular disease, chronic pain and diabetes.²⁴ As well, health behaviours such as substance use initiated or escalated to manage violence-related stress can negatively affect health.²⁵ Importantly, the differential health outcomes of violence for individuals stem from interactions among the number, duration, types and timing of violent incidents.⁸ Experiences of violence often co-occur and reoccur across the lifespan and may be chronic. Thus, health outcomes cannot be fully attributed to a single type of violence or to violence that occurs at a particular point in time; rather they must be examined and understood in the context of the nature and timing of cumulative violence experiences across the lifespan.⁸

Some researchers have begun to incorporate this expanded understanding in studies of men's health outcomes by conceptualizing lifetime violence as an experience of one type in both childhood and adulthood, or of one type in childhood and another in adulthood; for example, men's chronic pain and sexual abuse in childhood and adulthood,²⁶ mental health in homeless youth and multiple childhood

abuses and youth street physical and sexual assault,²⁷ and PTSD in men related to military deployment and childhood physical neglect.²⁸ Although a step forward from considering only single types of violence, this conceptualization still fails to capture the complexity of cumulative lifetime violence. The associations between *cumulative lifetime* violence severity as target and perpetrator and men's health have not been studied in a comprehensive way. Measures of *cumulative lifetime* violence used in studies of men's health have neglected many violence experiences relevant for men and the ways in which gender affects how men interpret and respond to those experiences.⁵

METHODS

This study received approval from the Research Ethics Board of the affiliated university. Between April 2016 and September 2017 using posters, community champions in workplaces and, most fruitfully, online classified advertisements, we recruited a community convenience sample of individuals who identified as men and met the inclusion criteria of being English-speaking, age 19 to 65 years, and a resident of the province of New Brunswick (NB) in Eastern Canada. Self-identification of violence experience was not a criterion for inclusion because we sought a sample with variability (from none to a lot) in the extent of lifetime violence exposure as target and/or perpetrator. Interested men contacted the research coordinator by phone or email and were sent the letter of information and an online link for eligibility and consent. Following consent, participants were directed to the online survey. Of 825 men who were eligible and gave informed consent, 611 (74%) completed the survey and received a monetary honorarium of 20 Canadian dollars to acknowledge their time. Of those, 590 had 20% or less missing data on the violence scales and were included in this analysis.

The survey included self-report questions about (a) demographics, (b) health behaviours (e.g., health care provider (HCP) visits, exercise, substance use), (c) general health (e.g., current health status, chronic health problems), d) validated measures of common health problems (see Table 1) and (e) lifetime violence. Cumulative lifetime violence was measured using 64 study-specific items about men's physical, psychological

TABLE 1 Health Measures Used in Survey

Measure	Description & Scoring	Reliability & Validity	Cronbach's Alpha
Center for Epidemiologic Studies-Depression Revised (CESD-R) ⁴¹	A 20-item 4-point self-report scale (rarely to most of the time) to assess depressive symptom frequency in past 2 weeks. Summative scores range from 0 to 60; scores greater than 16 indicate possible clinical depression.	The CESD-R correlates highly with the original scale, and demonstrates good to excellent face and construct validity, as well as excellent internal consistency. ⁴²	Higher Lifetime Violence Severity (CLVS) alpha = 0.95; Lower CLVS alpha = 0.93
Post-traumatic Stress Disorder Checklist, Civilian Version (PCL-C) ⁴³	A 17-item self-report scale 5-point (not at all to extremely) to assess how bothered by symptoms of PTSD in past month. Summative scores range from 17 to 85 with higher scores indicating greater symptomology. Scores of 35 or higher indicate possible PTSD	The PCL-C has good internal consistency, test-retest reliability and favourable convergent and discriminant validity in non-clinical samples. ⁴⁴	Higher CLVS alpha = 0.94; Lower CLVS alpha = 0.92
Chronic Pain Grade (CPG) ⁴⁵	A 7-item self-report measure of pain intensity (3 item, 11-point), pain interference (3 item, 11-point) and number of days lost over past 6 months. Summated interference scores and days lost are used to calculate disability points. The CPG is derived from summated pain intensity scores and the number of disability points: Grade 0 = pain free; Grade I = low disability, low intensity; Grade II = low disability, high intensity; Grade III = high disability, moderately limiting; Grade IV = high disability, severely limiting. Grades 0 to II are considered low disability pain with Grades III and IV as high disability.	The CPG Scale has demonstrated adequate reliability and validity in community samples of adults. ⁴⁶	Pain Intensity: Higher CLVS alpha = 0.84; Lower CLVS alpha = 0.86 Pain Interference: Higher CLVS alpha = 0.85; Lower CLVS alpha = 0.80
Generalized Anxiety Disorder Scale (GAD-7) ⁴⁷	A 7-item 4-point summative self-report scale that measures degree of bother from symptoms of anxiety over past 2 weeks. Scores range from 0 to 21 with a cutoff score of 10 ≥ used to identify generalized anxiety disorder.	Internal validity, reliability, and construct validity have been established in the general population. ⁴⁸	Higher CLVS alpha = 0.92; Lower CLVS alpha = 0.92
The Audit Alcohol Consumption questions (AUDIT-C) ⁴⁹	3-item 5-point alcohol screen. Scores range from 0 to 12 with scores 4 ≥ indicative of possible hazardous drinking or active alcohol use disorders provided all points did not come from question 1.	AUDIT-C screening thresholds for men at ≥ 4 maximize sensitivity at 0.86 and specificity at 0.89 and perform as well as the full AUDIT. ⁵⁰	

and sexual violence experiences from childhood through adulthood, as target and/or perpetrator, and in the context of gender, families, intimate relationships, schools, communities, and workplaces. Based on our substantive experience in gender and violence research, a review of the literature, and consultation with local experts including persons who identified as men, initial lifetime violence items were developed and piloted with a sample of 50 NB men, and then revised to the 64-items used in the current survey (see Table 2 for examples of items). Each of the 64 items was rated for frequency (*never* to *often*) and distress

(*not at all* to *very distressing*) on a 4-point scale and responses were summed and averaged for a CLVS score from 1 to 4. Additionally, we collected data on 4 global measures of the frequency and distress of lifetime experiences of violence as perpetrator and target, using a 10-point numerical rating scale because no measure of lifetime violence reflecting a gold standard for establishing criterion validity was found.²⁹ Lifetime global severity scores were calculated by averaging the frequency and distress scores for global measures of violence perpetration and severity for a score from 0 to 10.

TABLE 2 Examples of Items in the Cumulative Lifetime Violence Scale

Child ^a Target Physical Team/Group	As part of a team or group, I was physically threatened or physically hurt by another child/peer in a way that ‘crossed the line.’
Child Target Psychological Power Over	I was yelled at, taunted, put down, picked on, isolated or scared by someone with power over me such as, a parent, caregiver, teacher, coach, or someone older.
Child Target Sexual Dating	I was touched against my will in a sexual way or forced/pressured into sexual activity by someone I dated.
Child Perpetrator Physical	At school, home or in the community (other than in a dating relationship or within a team/group), I physically threatened or was physically violent toward someone.
Child Perpetrator Psychological Messaging	I sent written notes, texts, or messages or photos by social media to hurt, put down, scare, or control another person.
Child Perpetrator Sexual Team/Group	As part of a team or group, I touched someone against their will in a sexual way or forced/pressured someone into sexual activity by using threats, physical force, pressure or drugs/alcohol.
Adult ^b Target Physical Family	I have been hit, kicked, slapped, burned choked, or otherwise physically hurt by a caregiver or family member (other than a partner).
Adult Target Psychological Workplace	At work I have been taunted, called names or treated meanly based on my gender, sexual orientation, or other qualities.
Adult Target Sexual Team/Group	As part of a team or group, I was touched against my will in a sexual way or forced/pressured into sexual activity.
Adult Perpetrator Physical Nature of Work	My job (for example, military, police, health care) has required me to use physical violence to control a situation.
Adult Perpetrator Psychological Team/Group	As part of a team or group, I have criticized, or made comments that made someone feel uncomfortable or that ‘crossed the line.’
Adult Perpetrator Sexual Dating/Partner	In a dating or partner relationship, I touched someone against their will in a sexual way or forced/pressured someone into sexual activity by using threats, physical force, pressure or drugs/alcohol.

^achild refers to under 18 years of age

^badult refers to 18 years of age or older

ANALYSIS

Missing data were minimal (i.e., 5%). Missing values were replaced by case mean substitution if case missing values were fewer than 30% in validated health scales and 20% in survey-specific violence scale items.²⁹ The severity scores on the 64 violence items were summed and averaged for an CLVS score, with a possible range of 1 to 4. Convergent validity was calculated by correlating the CLVS scores with the Lifetime Global Severity scores. Additionally, the CESD-R, PCL-C and GAD-7 were used to assess concurrent validity. Internal consistency was calculated for the CLVS. Based on the median CLVS, cases were divided into equal groups representing higher and lower CLVS.

Summative health scale scores were calculated and cases classified according to established cutoff scores for meaningful clinical symptoms. Descriptive statistics were calculated for selected demographic and health indicators for the total sample and for higher and lower lifetime violence groups. Using chi-square for categorical variables and independent *t*-tests for continuous variables, differences between higher and lower lifetime violence groups were compared for each indicator.

Based on our theoretical and empirical understanding of how violence affects physical and mental health and health behaviours, we conducted binomial logistic regressions to calculate odds ratios (*OR*) for the effects of higher as compared to lower CLVS on three categorical outcomes commonly associated with violence experience, specifically, possible clinical depression, high disability chronic pain and daily or almost daily cannabis use. For ease of interpretation, bivariate categorical predictors were used when possible. First, we generated a model with lifetime violence as the sole predictor for each outcome. Using simultaneous entry, we then adjusted each model for potential confounders including characteristics of social location (age, employment status, marital status, and difficulty living on accessible income), comorbidities (number of chronic health problems, anxiety, chronic pain, depression, and PTSD), and established health correlates (daily stress, minutes of weekly activity, injury with permanent disability, current smoker, alcohol use, and cannabis use). These predictors were based on current knowledge of

(a) the epidemiological indicators of each outcome and (b) the relationship between violence and each outcome.

We removed PTSD from the cannabis and chronic pain models due to multicollinearity between the predictor variables depression and PTSD. PTSD has been identified as a key mechanism by which trauma such as violence affects health,²⁵ suggesting that theoretically violence might substitute for PTSD as a predictor in the cannabis and chronic pain models. PTSD has been found to be a predictor of later depression in men who have experienced trauma including violence;³⁰ therefore, it was retained in the depression model.

RESULTS

Cronbach's Alpha for CLVS was 0.94. The mean CLVS score for the full sample (*N* = 590) was 1.40, the median was 1.31 and the range was 1.00 to 2.73. Descriptive statistics for measures used to establish validity of the CLVS are in Table 3. Convergent validity was supported by significant correlations between Lifetime Global Severity scores and Lifetime Target Severity scores ($r = .76, p = .000$). Concurrent validity of the CLVS with the CESD-R was $r = .41$ ($p < .001$), with the PCL-C was $r = .51$ ($p < .001$), and with the GAD-7 was $r = .42$ ($p < .001$). These moderate correlations with mental health problems known to be associated with experiences of violence provide support for concurrent validity of this new measure.

The higher cumulative lifetime violence severity group (*n* = 295) had a mean of 1.65 (range 1.32 to 2.73) and the lower cumulative lifetime violence severity group (*n* = 295) a mean of 1.16 (range 1.00 to 1.32). Descriptive findings for the full sample and bivariate comparisons between higher and lower CLVS groups on demographic indicators are available in Table 4.

TABLE 3 Descriptive Statistics for Measures Used to Establish Validity of the CLVS Scale

Measure	Mean	Range
Global Lifetime Severity (<i>n</i> = 582)	3.00	0 to 10
CESD-R (<i>n</i> = 590)	13.88	0 to 60
PCL-C (<i>n</i> = 589)	32.34	17 to 83
GAD-7 (<i>n</i> = 589)	5.25	0 to 21

TABLE 4 Demographic Characteristics for Full Sample and their Comparison between Higher and Lower Lifetime Violence Severity Groups

	Full Sample (N = 590) ^a	Higher CLVS (n = 295) ^a	Lower CLVS (n = 295) ^a	Test Statistic For Comparison between Groups
Age in Years: $\mu \pm$ S.D.	37.6 \pm 12.7	38.4 \pm 12.8	36.7 \pm 12.4	$t(588) = 1.66$, $p = 0.098$
Marital Status: <i>n</i> (%)		(<i>n</i> = 294)	(<i>n</i> = 293)	$\chi^2(1) = 0.39$ $p = .533$
• Single, Never Married; Divorced or Separated	237 (40.2)	122 (41.6)	115 (39.1)	
• Married or Living with Partner	350 (59.3)	171 (58.4)	179 (60.9)	
Identified as: <i>n</i> (%)				$\chi^2(3) = 3.09$ $p = .378$
• Anglophone	486 (82.4)	249 (84.4)	237 (80.3)	
• Francophone	51 (8.6)	20 (6.8)	31 (10.5)	
• Aboriginal/First Nations	10 (1.7)	4 (1.4)	6 (2.0)	
• Don't identify with any of above	43 (7.3)	22 (7.5)	21 (7.1)	
Highest Level of Education: <i>n</i> (%)	(<i>n</i> = 589)		(<i>n</i> = 294)	$\chi^2(2) = 13.73$ $p = .000^*$
• High School Diploma or less	142 (24.1)	89 (30.2)	53 (18.0)	
• Some Post-Secondary Education	165 (28.0)	83(28.1)	82 (27.9)	
• College or University Degree/ Diploma	282 (47.8)	123 (41.7)	159 (54.1)	
Community Size: <i>n</i> (%)	(<i>n</i> = 589)		(<i>n</i> = 294)	$\chi^2(3) = 29.54$ $p = .966$
• Rural (less than 1,000)	75 (12.5)	39 (13.2)	36 (12.2)	
• Small town or area (1,000 to 29,999)	125 (21.2)	64 (21.7)	61 (20.7)	
• Medium sized city or area (30,000 to 99,999)	329 (55.8)	162 (54.9)	167 (56.8)	
• Large city or area (more than 100,000)	60 (10.2)	30 (10.2)	30 (10.2)	
Currently Employed: <i>n</i> (%)	411 (69.7)	183 (62.0)	228 (77.3)	$\chi^2(1) = 16.24$, $p = .000^*$
Unemployed: <i>n</i> (%)	94 (15.9)	55 (18.6)	39 (13.2)	$\chi^2(1) = 3.24$ $p = .072$
Disabled, Unable to Work: <i>n</i> (%)	44 (7.5)	34 (11.5)	10 (3.4)	$\chi^2(1) = 14.15$ $p = .000^*$
Retired: <i>n</i> (%)	33 (5.6)	21 (7.1)	12 (4.1)	$\chi^2(1) = 2.60$ $p = .107$

TABLE 4 Demographic Characteristics for Full Sample and their Comparison between Higher and Lower Lifetime Violence Severity Groups (*Continued*)

	Full Sample (N = 590) ^a	Higher CLVS (n = 295) ^a	Lower CLVS (n = 295) ^a	Test Statistic For Comparison between Groups
Total Personal Income Past Year: n (%)	(n = 583)	(n = 292)	(n = 291)	$\chi^2 (5) = 15.73$ $p = .008^*$
• Under \$10,000	104 (17.6)	63 (21.6)	41 (14.1)	
• \$10,000 to \$24,999	139 (23.6)	79 (27.1)	60 (20.6)	
• \$25,000 to \$49,999	131 (22.2)	60 (20.5)	71 (24.4)	
• \$50,000 to \$74,999	118 (20.0)	45 (15.4)	73 (25.1)	
• \$75,000 to \$100,000	48 (8.1)	26 (8.9)	22 (7.6)	
• More than \$100,000	43 (7.3)	19 (6.5)	24 (8.2)	
Difficulty Living on Income to which he has access: n (%)	(n = 587)	(n = 294)	(n = 293)	$\chi^2 (1) = 25.04$ $p = .000^*$
• Not at all or somewhat difficult	368 (62.4)	155 (52.7)	213 (72.7)	
• Difficult, very difficult or extremely difficult	219 (37.1)	139 (47.3)	80 (27.3)	

^aUnless otherwise specified*Significant at $p < .05$

Higher and lower CLVS groups were not significantly different in age, marital status, or geographical location. However, men in the higher CLVS group were more likely to have less education than their lower CLVS counterparts, less likely to be employed, and more likely to be unable to work due to disability and to have difficulty living on their accessible income.

Table 5 shows health indicators for the full sample and their comparison between lower and higher CLVS groups. Men in the lower CLVS group were more likely to self-rate their health as excellent or very good than men in the higher CLVS group. There were no differences between groups in timing of most recent visit to an HCP or self-report of having ever been told by an HCP that they had diabetes, a heart condition or hypertension. However, men in the higher CLVS group were more likely to report having arthritis, mental health problems, and chronic pain or conditions commonly causing pain than those in the lower CLVS group. They also were more likely to have experienced an injury that caused permanent impairment and to report a significantly greater number of chronic health problems diagnosed by an HCP. Although there were

no differences between groups in minutes of weekly physical activity, men in the higher CLVS group were more likely to be overwhelmed by stress in a typical week, be current smokers, and to use cannabis daily or almost daily. They also were more likely to exceed cut scores for clinically significant symptoms on standardized measures for chronic pain, depression, PTSD and anxiety than their lower CLVS counterparts. No differences were found between groups for possible hazardous drinking on the Alcohol Use Disorder Identification Test-C (AUDIT-C) screening measure.

ORs for higher cumulative lifetime violence severity as a predictor were significant for health outcomes as follows: possible clinical depression ($OR = 3.71$; $CI = 2.59, 5.31$), high disability chronic pain ($OR = 3.19$; $CI = 1.98, 5.14$), and daily or almost daily cannabis use ($OR = 3.20$; $CI = 2.07, 4.92$) (see Table 4). However, when *aORs* were calculated (see Table 5), higher CLVS remained a significant predictor *only* for daily or almost daily cannabis use ($aOR = 2.07$; $CI = 1.23, 3.43$). The model accounted for 30% of the variance in daily cannabis use as reflected by the Nagelkerke R^2 statistic presented in Table 7. Other significant

TABLE 5 Health Scores for Full Sample and their Comparison between Higher and Lower Cumulative Lifetime Violence Severity Groups

	Full Sample (N=590) ^a	Higher CLVS (n = 295) ^a	Lower CLVS (n = 295) ^a	Test Statistic for Comparison between 2 Groups
Self-rated Health: <i>n</i> (%)				
• Excellent	77 (13.1)	30 (10.2)	47 (15.9)	$\chi^2(4) = 20.42$ $p = .000^*$
• Very Good	199 (33.7)	88 (29.8)	111 (37.6)	
• Good	218 (36.9)	112 (38.0)	106 (35.9)	
• Fair	77 (13.4)	56 (19.0)	23 (7.8)	
• Poor	17 (2.9)	9 (3.1)	8 (2.7)	
Most Recent Visit to Health Care Provider (HCP): <i>n</i> (%)				
• Within last 12 months	458 (77.6)	235 (79.7)	223 (75.6)	$\chi^2(2) = 3.08$ $p = .214$
• Between 1 & 2 years ago	80 (13.6)	40 (13.6)	40 (13.6)	
• More than 2 years ago	52 (8.8)	20 (6.8)	32 (10.8)	
Number of Chronic Health Problems Diagnosed by HCP ever: $\mu \pm$ S.D.	2.07 \pm 2.15	2.67 \pm 2.31	1.46 \pm 1.78	$t(551.63) = 7.14,$ $p = .000^*$
Chronic Health Problems Diagnosed by HCP ever: <i>n</i> (%)				
• Arthritis	(<i>n</i> = 579) 99 (16.8)	(<i>n</i> = 286) 65 (22.7)	(<i>n</i> = 293) 34 (11.6)	$\chi^2(1) = 12.63$ $p = .000^*$
• Asthma	(<i>n</i> = 580) 87 (14.7)	(<i>n</i> = 287) 45 (15.7)	(<i>n</i> = 293) 42 (14.3)	$\chi^2(1) = 0.21$ $p = .650$
• Chronic Pain	(<i>n</i> = 578) 94 (15.9)	(<i>n</i> = 286) 65 (22.7)	(<i>n</i> = 292) 29 (9.9)	$\chi^2(1) = 17.37$ $p = .000^*$
• Depression	(<i>n</i> = 579) 174 (29.5)	(<i>n</i> = 288) 128 (44.4)	(<i>n</i> = 291) 46 (15.8)	$\chi^2(1) = 56.47$ $p = .000^*$
• Anxiety	(<i>n</i> = 582) 171 (29)	(<i>n</i> = 289) 114 (39.4)	(<i>n</i> = 293) 57 (19.5)	$\chi^2(1) = 28.03$ $p = .000^*$
• PTSD	(<i>n</i> = 579) 54 (9.2)	(<i>n</i> = 287) 47 (16.4)	(<i>n</i> = 292) 7 (2.4)	$\chi^2(1) = 33.45$ $p = .000^*$
• Diabetes	(<i>n</i> = 579) 36 (6.1)	(<i>n</i> = 286) 16 (5.6)	(<i>n</i> = 292) 20 (6.8)	$\chi^2(1) = 0.38$ $p = .540$
• Heart Condition	(<i>n</i> = 581) 56 (9.5)	(<i>n</i> = 288) 30 (10.4)	(<i>n</i> = 293) 26 (8.9)	$\chi^2(1) = 0.40$ $p = .529$
• Hypertension	(<i>n</i> = 583) 96 (16.3)	(<i>n</i> = 291) 54 (18.6)	(<i>n</i> = 293) 42 (14.3)	$\chi^2(1) = 1.90$ $p = .169$

TABLE 5 Health Scores for Full Sample and their Comparison between Higher and Lower Cumulative Lifetime Violence Severity Groups (*Continued*)

	Full Sample (N=590) ^a	Higher CLVS (n = 295) ^a	Lower CLVS (n = 295) ^a	Test Statistic for Comparison between 2 Groups
Chronic Health Problems Diagnosed by HCP ever: n (%)				
• Insomnia	(n = 581) 103 (17.5)	(n = 290) 70 (24.1%)	(n = 291) 33 (11.3%)	$\chi^2(1) = 16.31$ $p = .000^*$
• Irritable Bowel Disease	(n = 579) 59 (10.0)	(n = 288) 42 (14.6)	(n = 291) 17 (5.8)	$\chi^2(1) = 12.09$ $p = .001^*$
• Chronic Headaches/Migraines	(n = 578) 47 (8.0)	(n = 288) 35 (12.2)	(n = 290) 12 (4.1)	$\chi^2(1) = 12.43$ $p = .000^*$
Physical Activity in a Typical Week: n (%)				
• Less than 150 minutes	352 (59.7)	178 (60.3)	174 (59.0)	$\chi^2(1) = 0.11$ $p = .737$
• 150 minutes or more	238 (40.3)	117 (39.7)	121 (41.0)	
Smoking: n (%)	(n = 589)		(n = 294)	
• Current Smoker	144 (24.4)	93 (31.5)	51 (17.3)	$\chi^2(2) = 28.24$ $p = .000^*$
• Quit Smoking	151 (25.6)	86 (29.2)	65 (22.1)	
• Never Smoked	294 (49.8)	116 (39.3)	178 (60.5)	
Overwhelmed by stress in a typical week: n (%)				
• Never or a few times	408 (69.2)	175 (59.3)	233 (79.0)	$\chi^2(1) = 26.73$ $p = .000^*$
• Often or most of the time	182 (30.8)	120 (40.7)	62 (21.0)	
Chronic Pain Grade: n (%)	(n = 589)		(n = 294)	
• Low Disability Pain	490 (83.2)	223 (75.6)	267 (90.8)	$\chi^2(1) = 24.40$ $p = .000^*$
• High Disability Pain	99 (16.8)	72 (24.4)	27 (9.2)	
Permanent impairments from any injuries: n (%)				
• None	490 (83.1)	225 (76.3)	265 (89.8)	$\chi^2(1) = 19.26$ $p = .000^*$
• One or more	100 (16.9)	70 (23.7)	30 (10.2)	
CESD-R Depression Indicator: n (%)				
• Yes (> 15)	211 (35.8)	148 (50.2)	63 (21.4)	$\chi^2(1) = 53.31$ $p = .000^*$
• No (<16)	379 (64.2)	147 (49.8)	232 (78.6)	
PCL-C PTSD Indicator: n (%)	(n = 589)	(n = 294)		
• Yes (≥ 35)	198 (33.6)	152 (51.7)	46 (15.6)	$\chi^2(1) = 86.03$ $p = .000^*$
• No (<35)	391 (66.4)	142 (48.3)	249 (84.4)	
GAD ≥ 10 Indicator of Moderate to Severe Anxiety: n (%)	(n = 589)	(n = 294)		
• Yes (≥ 10)	115 (19.5)	90 (30.6)	25 (8.5)	$\chi^2(1) = 45.93$ $p = .000^*$
• No (<10)	474 (80.3)	204 (69.4)	270 (91.5)	

TABLE 5 Health Scores for Full Sample and their Comparison between Higher and Lower Cumulative Lifetime Violence Severity Groups (*Continued*)

	Full Sample (N=590) ^a	Higher CLVS (n = 295) ^a	Lower CLVS (n = 295) ^a	Test Statistic for Comparison between 2 Groups
AUDIT-C Indicator of Possible Hazardous Drinking or Active Alcohol Use Disorder: n (%)	(n = 589)	(n = 294)		
• Yes	302 (51.2)	155 (52.7)	147 (49.8)	$\chi^2(1) = 0.49$ $p = .483$
• No	287 (48.6)	139 (47.3)	148 (50.2)	
Self-report Cannabis Use in Past Year: n (%)	(n = 589)		(n = 294)	
• None or less than daily or almost daily	465 (78.8)	206 (69.8)	259 (88.1)	$\chi^2(1) = 29.56$ $p = .000^*$
• Daily or almost daily	124 (21.0)	89 (30.2)	35 (11.9)	

^aUnless otherwise specified

*Significant at $p < .05$

TABLE 6 Logistic Regression ORs for Higher Cumulative Lifetime Violence Severity as a Predictor of Selected Health Outcomes

Predictor	Health Outcome: Possible Clinical Depression (n = 590)		Health Outcome: High Disability Chronic Pain (n = 589)		Health Outcome: Daily or Almost Daily Cannabis Use (n = 589)	
	B (SE)	OR (95% CI)	B (SE)	OR (95% CI)	B (SE)	OR (95% CI)
^a Higher Lifetime Violence Severity	1.31 (0.18)	3.71* (2.59, 5.31)	1.16 (0.24)	3.19* (1.98, 5.14)	1.16 (0.22)	3.20* (2.07, 4.92)
Constant	-1.30 (0.14)	0.27*	-2.29 (0.20)	0.10*	-2.00 (0.18)	0.14*
Model (Likelihood Ratio) Chi-Square	54.46, $df = 1$; $p = .000$		25.18, $df = 1$ $p = .000$		30.38, $df = 1$; $p = .000$	
^b Nagelkerke R ²	.12		.07		.08	

* $p = .000$

^aReference Category (RC) = lower violence severity

^bNagelkerke R² is an estimate of the amount of variation in the dependent variable explained by all of the independent variables.

TABLE 7 Logistic Regression Models Predicting *aORs* for Higher Cumulative Lifetime Violence Severity and Selected Health Outcomes

Predictors	Health Outcome: Possible Clinical Depression (<i>n</i> = 581)		Health Outcome: High Disability Chronic Pain (<i>n</i> = 583)		Health Outcome: Daily or Almost Daily Cannabis Use (<i>n</i> = 583)	
	<i>B</i> (<i>SE</i>)	<i>aOR</i> (95% CI)	<i>B</i> (<i>SE</i>)	<i>aOR</i> (95% CI)	<i>B</i> (<i>SE</i>)	<i>aOR</i> (95% CI)
^a Higher Lifetime Violence Severity	0.14 (0.30)	1.15 (0.63, 2.08)	0.34 (0.29)	1.40 (0.79, 2.47)	0.73 (0.26)	2.07** (1.23, 3.43)
Age in Years	-0.02 (0.01)	0.98 (0.96, 1.00)	0.01 (0.01)	1.01 (0.99, 1.03)	-0.03 (0.01)	0.97** (0.95, 0.99)
^b Employed	0.46 (0.31)	1.58 (0.86, 2.91)	0.30 (0.29)	1.36 (0.77, 2.39)	0.69 (0.25)	2.00** (1.22, 3.29)
^c Marital Status:	0.48 (0.31)	1.62 (0.89, 2.94)	0.21 (0.28)	1.24 (0.71, 2.17)	0.21 (0.25)	1.23 (0.76, 2.00)
^d Difficulty Living on Accessible Income	0.41 (0.30)	1.50 (0.83, 2.71)	0.22 (0.30)	1.24 (0.69, 2.23)	0.53 (0.26)	1.70** (1.02, 2.83)
Number of Chronic Health Problems	0.18 (0.08)	1.19** (1.03, 1.38)	0.23 (0.06)	1.26* (1.12, 1.43)	0.13 (0.06)	1.14 (1.01, 1.28)
^e Often or Most of the Time Overwhelmed by Stress in a Typical Week.	1.44 (0.30)	4.21* (2.33, 7.60)	-0.04 (0.34)	0.97 (0.50, 1.87)	0.11(0.30)	1.11 (0.62, 2.01)
^f Possible Moderate to Severe Anxiety	0.57 (0.41)	1.76 (0.80, 3.90)	1.11 (0.35)	3.04** (1.53, 6.03)	-0.32 (0.34)	0.73 (0.37, 1.41)
^f High Disability Chronic Pain	0.14 (0.39)	1.15 (0.53, 2.48)			0.32 (0.31)	1.37 (0.75, 2.50)
^f Possible Clinical Depression			0.27 (0.34)	1.31 (0.67, 2.55)	0.34 (0.30)	1.40 (0.78, 2.55)
^b 150 minutes or more weekly activity	0.30 (0.29)	1.36 (0.78, 2.37)	0.31 (0.27)	1.37 (0.80, 2.36)	-0.03 (0.24)	0.97 (0.61, 1.56)
^f Injury with Permanent Disability	0.25 (0.38)	1.218 (0.61, 2.70)	0.95 (0.29)	2.58** (1.46, 4.54)	-0.03 (0.31)	0.98 (0.54, 1.78)
^f Current Smoker	-0.28 (0.36)	0.76 (0.38, 1.52)	0.15 (0.31)	1.16 (0.63, 2.14)	1.20 (0.25)	3.31* (2.03, 5.39)

TABLE 7 Logistic Regression Models Predicting *aORs* for Higher Cumulative Lifetime Violence Severity and Selected Health Outcomes (*Continued*)

Predictors	Health Outcome: Possible Clinical Depression (<i>n</i> = 581)		Health Outcome: High Disability Chronic Pain (<i>n</i> = 583)		Health Outcome: Daily or Almost Daily Cannabis Use (<i>n</i> = 583)	
	^f Possible Hazardous Alcohol Use	0.17 (0.28)	1.19 (0.69, 2.05)	-0.08 (0.26)	0.92 (0.55, 1.55)	0.42(0.24)
^f Cannabis Use Daily or Almost Daily	0.25 (0.37)	1.29 (0.63, 2.67)	0.29 (0.31)	1.36 (0.77, 2.39)		
^f Possible PTSD	2.65 (0.32)	14.17* (7.64, 26.27)				
Constant	-2.78 (0.59)	0.06*	-4.01 (0.59)	0.02*	-2.34 (0.49)	0.10*
Model (Likelihood Ratio) Chi-square	384.57, <i>df</i> = 15; <i>p</i> = .000		124.12, <i>df</i> = 14; <i>p</i> = .000		124.95, <i>df</i> = 14; <i>p</i> = .000	
^g Nagelkerke <i>R</i> ²	.67		.32		.30	

* *p* = .000** *p* < .05^aReference Category (RC) = lower violence experience^bRC = Yes^cRC = married or living with partner^dRC = not at all or somewhat^eRC = never or a few times^fRC = No^gNagelkerke *R*² is an estimate of the amount of variation in the dependent variable explained by all of the independent variables

predictors were age in years, employment, difficulty living on accessible income and smoking, with smoking having the highest *aOR* of 3.31 (*CI* = 2.03, 5.39). In the adjusted model that accounted for 32% of the variance in high chronic pain, significant predictors included number of chronic health problems (*aOR* = 1.26; *CI* = 1.12, 1.43), possible moderate to severe anxiety (*aOR* = 3.04; *CI* = 1.53, 6.03) and injury with permanent disability (*aOR* = 2.58; *CI* = 1.46, 4.54). For possible clinical depression, the adjusted model accounted for 67% of the variance with significant predictors being number of chronic health problems (*aOR* = 1.19; *CI* = 1.03, 1.38), frequency overwhelmed by stress (*aOR* = 4.21; *CI* = 2.33, 7.60) and possible PTSD (*aOR* = 14.17; *CI* = 7.64, 26.27).

DISCUSSION

Our findings contribute new elements to the understanding of relationships between lifetime violence severity and men's health. To our knowledge, the *MVGHS* is the first study where perceived *cumulative lifetime violence severity* for men has been measured comprehensively. The survey items not only included frequency of incidents, the most common way to measure violence experience, but also the degree of distress, permitting calculation of a severity score. Additionally, we used a gendered lens in developing items that broadly included physical, psychological and sexual violence as targets and/or perpetrators and captured these experiences across the lifespan in the context of families, work environments, partner relationships,

and communities. Our finding that almost 82% (n = 482) of the participants reported experiences both as target and perpetrator demonstrates the complexity of cumulative lifetime violence severity and the importance of incorporating items focusing on both. Although the measure requires further refinement and testing, the summative score is a more inclusive indicator of CLVS than we have found in the literature and is useful for exploring relationships between cumulative lifetime violence and men's health.

A second contribution is the comparison of health between groups of men with *higher* versus *lower* CLVS. Because most previous comparative analysis has focused on differences between men and women with respect to violence experience and health,⁴ knowledge of group differences among men is limited. Uniquely we recruited men from the community, not from clinical or help-seeking environments. Participants were not required to self-identify either as targets or perpetrators of violence in order to take part, although they were aware that the survey included questions about violence. Consequently, they reported a range of violence experiences that permitted grouping participants for comparison according to higher versus lower CLVS.

The results of this study extend the substantial body of evidence that health is negatively associated with violence experience in partner relationships and/or in childhood among all individuals including men.^{11,17,31} Importantly, our findings provide bivariate evidence that, in comparison to men with lower CLVS, men with higher cumulative CLVS were more likely to have symptoms consistent with clinically significant anxiety, depression, PTSD, and chronic pain, and a greater number of chronic health problems, all conditions that commonly influence ability to interact and fulfill social roles and obligations including employment and familial responsibilities. Although self-reported rates of ever being diagnosed with common chronic mental health problems, chronic pain, headaches, and irritable bowel disease were significantly higher in men with higher CLVS, unexpectedly rates of chronic health problems such as diabetes, a heart condition, and hypertension that have been associated with chronic stress were not significantly different between groups. Given that the latter health

problems usually have an onset later in life, possibly this finding can be attributed to our sample having an average age of 37.6 years and a maximum age of 65 years. Although health behaviours such as smoking, daily or almost daily cannabis use, and injuries resulting in permanent impairment were significantly more likely in the higher CLVS group, interestingly rates of recent visits to a health professional, weekly minutes of physical activity, and hazardous drinking did not differ by group.

The lack of significant difference between groups for hazardous drinking was unexpected since heavy use of alcohol is associated with child abuse and neglect as well as aggression and partner violence both as target and perpetrator.³² Beyond this, we were surprised to find that 51.2% of all men in the *MVGHS* sample met the AUDIT-C hazardous drinking criteria, a percentage greater than the 27.8% of Canadian men living in the province of NB who reported patterns of alcohol use consistent with hazardous drinking in 2014.³² Also notable is our finding that 46.8% of NB men in the *MVGHS* sample had used cannabis in the previous year in comparison to only 15.8% of NB men in the 2012 Canadian Community Health Survey—Mental Health (CCHS-MH).³³ Additionally, 21% of NB men in the *MVGHS* reported daily or almost daily cannabis use whereas 2.4% of Canadian men in general reported daily use of cannabis in the 2012 CCHS-MH.³³ Our findings of higher cannabis use rates may be partially attributable to disclosure being more socially acceptable in the climate of shifting Canadian marijuana legislation toward legalization during our data collection in 2016-17 than it was during data collection for the 2012 CCHS-MH. Although the higher CLVS group was more likely to report daily cannabis use, the lower CLVS group still reported a rate more than four times greater than Canadian men in general. These findings suggest that hazardous alcohol and daily cannabis use among *all* men in the *MVGHS* sample is cause for concern and for further exploration irrespective of their CLVS.

The results of our adjusted *OR* models for depression, chronic pain, and daily or almost daily cannabis use suggest that the magnitude of association between violence and health variables is affected by other variables including health and social location. In each

of the three models, a significant *aOR* was lifetime violence severity or its consequent dysregulation of the body's natural stress response manifested in PTSD or anxiety.²⁵ Thus, in the depression model, higher CLVS may not be significant as a predictor because the biophysical response to violence captured in PTSD is stronger. The comorbidity of PTSD and depression symptoms is well-established in survivors of trauma such as violence, and for men, PTSD has been uniquely found to be a predictor of subsequent development of depression.³⁰ Our finding that frequently feeling overwhelmed by stress also significantly increases the likelihood of depression further suggests that stress from day-to-day demands differs from post-traumatic stress but is detrimental. Future research which examines mediators and moderators between lifetime violence severity and depressive symptoms in men is necessary to understand these complex mechanisms.

Similarly, in the chronic pain model, anxiety was the dominant predictor. Anxiety has been identified as a determinant of chronic pain³⁴ and among Canadian public service workers being regularly exposed to traumatic or injurious events, anxiety-related psychopathology (PTSD, depression, and/or generalized anxiety) was a predictor of chronic pain.³⁵ Anxiety appears to be a more persistent predictor of high disability pain than the cumulative trauma/violence severity in the *MVGH*S sample. However, permanent disability was also a significant predictor of chronic pain in our *aOR* model. Further investigation with multivariate methods are necessary to understand the interrelationships among CLVS, moderate to severe anxiety, and permanent disability.

Only in the cannabis *aOR* model was higher CLVS a significant predictor of daily or almost daily cannabis use. Additionally, younger age was also a significant predictor in the cannabis model. Because over half of the men in our sample were under 36 years of age, these findings may suggest cannabis is used daily or almost daily as a coping strategy for CLVS. Being a daily smoker, also a potential coping mechanism, was the strongest predictor of daily or almost daily cannabis use. These findings are consistent with those of Bonner et al.,³⁶ who using annual Canadian Alcohol and Drug Use Monitoring Survey data 2011 to 2013,

found that higher marijuana use was more likely in smokers and among younger men.

Beyond the effects of violence severity or its biophysical consequences, other important relationships between violence severity and health were suggested by our *aOR* models. For each additional chronic health problem, the *aOR* significantly increased in both the depression and chronic pain models but not the cannabis model. Patten et al.,³⁷ in their study of epidemiologic factors in depression, also found number of chronic health problems to be a significant predictor. Given that daily cannabis users may be more likely to be younger men than non-daily cannabis users, it follows that number of chronic health problems was not a significant predictor. Within the cannabis model, both unemployment and difficulty living on accessible income were significant predictors of daily cannabis use. Importantly, only 50–80% of frequent users of cannabis have been found to be dependent users, that is, to have significant psychosocial impairments with respect to control of cannabis use.³⁸ The relationship between unemployment of at least 3 months and cannabis dependence has been found to be reciprocal.³⁹ Because we know that only daily cannabis use, not cannabis dependence, was predicted by higher CLVS, further study is needed to understand relationships among cannabis use, cannabis dependence, unemployment, difficulty managing on income and higher CLVS.

Much current knowledge of men's health comes from studies conducted in large metropolitan areas. Because NB has a widely-dispersed population of men living in medium cities, towns and rural communities, our findings shed light on the health of Canadian men living outside of densely populated areas. With respect to social environment, NB is a bilingual (English/French) province where many men are experiencing shifting roles in their work, families and leisure related to uncertainty in economic development in agricultural, resource, and high-tech industries. Importantly, our findings are based on a convenience sample of English-speaking NB men, ages 19 to 65, half of whom were under 36 years of age. However, only 26% of NB men age 15 or older are under 36 and 22% are over 65.⁴⁰ Our sample, therefore, is considerably younger than the population of men in NB and this age discrepancy

may account for differences between some rates of health problems reported in the present study and in national community health surveys.

CONCLUSION

In sum, our findings suggest that, in a community sample, men with a history of higher cumulative CLVS are more likely to have poorer health than men with cumulative lower CLVS. Our use of a binary indicator of violence severity limited the range of analytic approaches used in this study. However, the findings of our exploratory *aORs* for selected health outcomes provide support for more focused multivariate studies using continuous scores of lifetime violence severity to understand the mediating and moderating effects of other health and social factors on specific health outcomes. An important clinical implication of our findings is the critical need to consider *cumulative lifetime violence* history in the general population of men who present with mental health problems, chronic pain, injury with permanent disability, multiple chronic health problems, and/or substance use. Although the practice of assessing women for violence history, particularly in childhood and partner relationships, is gradually gaining traction in the health care community, less attention has been given violence history among men, and almost none to cumulative lifetime violence history.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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