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A population-based study on ways of dealing with daily stress: comparisons among individuals with mental disorders, with long-term general medical conditions and healthy people

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Abstract *Objective* Stress plays an important role in the etiology of mental and physical disorders. The effect of stress on health may be moderated by how people deal with stress. The objectives of this analysis were to (1) estimate the population proportions using various ways of dealing with stress in healthy people, in people with mental disorders and substance dependence and in individuals with general medical conditions only, and (2) identify factors associated with ways of dealing with stress. *Methods* Data from the Canadian Community Health Survey, Mental Health and Well-being (CCHS-1.2) were used (n = 36,984). This was a national mental health survey which used a probability sample and incorporated a version of the Composite International Diagnostic Interview. *Results* Participants with mental disorders differed from healthy people in ways of dealing with stress. Among participants with mental disorders, women were more likely to report that they "talk to others" and "eat more/less" to deal with stress. Men were more likely to use "avoid people" and "drink alcohol" to deal with stress than women. Age differences within groups in ways of dealing with stress were found and having a history of mental disorders was also associated with reported ways of dealing with stress. *Conclusions* Ways of dealing with stress differ by gender and age, but there is no over-arching pattern of maladaptive coping associated with mental disorders that applies across illness, age and gender categories. Healthy behaviors should be promoted as ways to relieve stress, leading to better self-care skills.

Key words coping – mental disorders – general population – healthy people – physical illness

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Introduction

Stress is a pervasive feature of human development throughout the lifespan. Studies show that stress plays an important role in the etiology of mental [14, 15] and physical disorders [5, 21, 25, 31, 37]. Although it may not be feasible to eliminate exposure to stress, the effect of stress on health may be moderated by the ways in which people deal with stress [1, 6, 13, 38]. Individuals may deal with stress through various thoughts and actions. Previous research has shown that the ways of dealing with stress may not only affect the onset and prognosis of mental illnesses [20, 27, 33] but also functioning of individuals with mental disorders [7]. Thus, understanding how individuals with and without a mental disorder differ in their ways of dealing with stress may contribute to

psychiatric care and to promoting mental health at the population level. For example, if specific patterns of maladaptive coping can be identified, this knowledge may assist with the design of disease management and psycho-educational interventions for physical and mental disorders.

The feasibility of broad-based public health initiatives aiming at promoting healthy ways of dealing with stress can be implemented only to the extent that patterns of coping are characteristic of identifiable clinical and demographic groups. Unfortunately, relevant descriptive data are not available. Most published studies have been conducted in clinical samples, where selection bias may distort the observed patterns of coping. Ways of dealing with stress may depend on many factors. Lazarus' transactional model of stress may be considered as a useful framework for this purpose. The model suggests that an event is considered stressful when a person appraises it as potentially dangerous to his/her psychological well-being [22]. Such an appraisal may be influenced by personal factors (beliefs, values and commitment) and situational factors (novelty of an event, the predictability of a situation, uncertainty surrounding an event and temporal factors) [24]. The actions taken to deal with stress may also depend on time and specific contexts [23]. Based on this model, the ways of dealing with stress may vary by gender, age and specific health problems. According to Lazarus' theory of coping as a process [23], there are at least two major functions of coping, problem-focused (i.e., attempts to act on a stressor) and emotion-focused (i.e., attempts to manage one's emotions associated with a stressor). Emotion-focused coping strategies or responses to depressed mood with a high level of attention to one's emotional experience can be considered rumination [26]. Previous studies showed that depressed people are more likely to engage in coping strategies that have the potential to be maladaptive, such as emotional discharge, escape–avoidance, and rumination [7, 28]. Individuals with physical disorders seem to be different from those with mental disorders in how they cope with stress. In a study of 362 patients with congenital heart disease, it was found that styles of coping in this sample were comparable to those of the general population, except for lower active problem-solving, which was more likely to be found in female patients [34]. Males with congenital heart disease showed more favorable styles of coping compared to the normative data, such as higher seeking of social support, lower passive reaction patterns, and lower expression of negative emotions [34]. In patients with myocardial infarction, self-reliant and confrontational coping were the most frequently used by both women and men [19]. However, women used more avoidance coping than men [19]. In spite of this, it is not clear if individuals with physical illnesses differ from healthy people and from those with mental disorders in coping behaviors if direct comparisons are made in the same population.

Although there have been numerous studies related to the coping behaviors of those with physical and mental health problems, studies in this area are mainly clinical-based or are population-based, but with relatively small samples [30]. In a meta-analytic review of studies investigating coping strategies and physical and psychological health, Penley and colleagues found that most coping strategies demonstrated significant correlations with health, but the direction of the associations varied across the coping strategies [30]. Confrontive coping, avoidance and wishful thinking were negatively correlated with psychological health [30]; problem-focused coping was positively correlated with psychological health [30]. These coping strategies were not found to be significantly correlated with physical health [30]. The studies included in the meta-analytic review measured depressive or psychological symptoms. Most of included studies were cross-sectional studies [30]. In the interest of improved coping, it may be possible to develop effective interventions. However, planning for such interventions requires descriptive epidemiologic data. Such data are important for deciding the extent to which interventions may be applicable in different clinical and demographic groups. There have been no large community-based studies examining ways of dealing with stress in individuals with and without mental disorders. Furthermore, fundamental questions remain unanswered, including how people with and without mental disorders differ in the ways of dealing with stress in relation to gender and age. Such information is important not only for improving clinical practice, but also for promoting self-management, education, prevention and improving people's quality of life from a broad population mental health perspective.

In the current study, we analyzed the data from the Canadian Community Health Survey, Mental Health and Well-being (CCHS-1.2), which is the first Canadian national mental health survey. The objectives of this study were to (1) estimate proportions using various ways of dealing with daily stress in healthy people, in people with a mental disorder, individuals with substance dependence and in individuals with physical illnesses only, (2) examine how ways of dealing with stress differ by gender and by age in these four groups, and (3) identify demographic, socioeconomic and clinical factors associated with ways of dealing with stress.

Methods

Data source and population

The methodology of the CCHS 1.2 is described in detail by Gravel and Beland [12]. Briefly, the CCHS 1.2 was a cross-sectional

survey of a nationally representative sample of individuals aged 15 and older. It was initiated and conducted by Statistics Canada (Canadian federal statistics agency) between May and December 2002 (n = 36,984). The participants were selected using multi-stage, stratified random sampling procedures. The survey content included measures of a number of mental disorders, including major depression, mania, three anxiety disorders (panic disorder, agoraphobia, and social phobia) and alcohol and illicit drug dependence. The interviews were conducted face-to-face by interviewers trained by Statistics Canada. Informed consent was obtained prior to the interview. The response rate at the national level was 77%.

Measures: ways of dealing with daily stress

The CCHS-1.2 participants were asked "People have different ways of dealing with stress. Thinking about the ways you deal with stress, please tell me how often you do each of the following." The following questions were asked.

1. How often do you try to solve the problem?
2. To deal with stress, how often do you talk to others?
3. When dealing with stress, how often do you avoid being with people?
4. How often do you sleep more than usual to deal with stress?
5. When dealing with stress, how often do you try to feel better by eating more, or less, than usual?
6. When dealing with stress, how often do you try to feel better by smoking more cigarettes than usual?
7. When dealing with stress, how often do you try to feel better by drinking alcohol?
8. When dealing with stress, how often do you try to feel better by using drugs or medication?
9. How often do you jog or do other exercise to deal with stress?
10. How often do you pray or seek spiritual help to deal with stress?
11. To deal with stress, how often do you try to relax by doing something enjoyable?
12. To deal with stress, how often do you try to look on the bright side of things?
13. How often do you blame yourself?
14. To deal with stress, how often do you wish the situation would go away or somehow be finished?

Possible answers to each question include "often" "sometimes" "rarely" and "never." The CCHS-1.2 adopted these questions from the Way of Coping Questionnaire [36], the Coping Strategy Indicator [3] and the COPE scale [9]. To facilitate the analysis, we dichotomized the answer to each question. Due to the complex nature of the questions, it was not possible to use the same coding for each question. In this analysis, we intended to estimate the proportions of "unfavorable" ways of dealing with stress in different populations. Therefore, for answers to question #1, #2, and #9 to #12, we combined the answers "often" and "sometimes" (0) and the answers "rarely" and "never" (1). For question #3 to #8 and #13 and #14, we combined the answers "sometimes" "rarely" and "never" (0).

Because Statistics Canada adopted the questions from three different scales, we conducted a factor analysis to identify the dimensions of the ways of dealing with stress based on these questions. Three factors were found: Factor 1, avoidance; Factor 2, problem-solving, Factor 3, health behaviors. Specific items in each factor are in Table 1. The internal consistency (alpha value) of all 14 items and of the three factors in the CCHS-1.2 was 0.50, 0.62, 0.34 and 0.39, respectively. The relatively low alpha values associated with Factors 2 and 3 may be partly due the small number of items of each factor.

Diagnostic groupings

In the CCHS-1.2, mental disorders (mania, major depression panic disorder, social phobia, agoraphobia and illicit drug dependence) were assessed using a modified version of the World Mental Health–Composite International Diagnostic Interview (WMH–CIDI) [16], based on DSM-IV-TR criteria [4]. Alcohol dependence and illicit drug dependence were assessed by a short form of the CIDI [17], based upon DSM-III-R criteria. The sensitivity and the specificity of the CIDI-SF for alcohol dependence was 93.6 and 96.2%, respectively [16]. Previous versions of the CIDI have demonstrated reliability and validity [39], and a "clinical calibration" of the WMH-CIDI is under way, assessing its diagnostic consistency relative to the Structured Clinical Interview for DSM-IV [18].

In this analysis, we defined four diagnostic groups based on the past year status of the respondent's health status: (1) any mood or anxiety disorder; (2) any substance dependence, (3) long-term

Table 1 Proportions of various ways dealing with stress in individuals with mood/anxiety disorders, with substance use related disorders, with chronic illness only and healthy people

Variables	Healthy people % (95% CI) n = 8,980	Physical illness[b] % (95% CI) n = 8749	Mood/anxiety % (95% CI) n = 3,148	Alcohol/drug dependence % (95% CI) n = 1,215
Factor 1: avoidance				
Avoid people (often)	5.0 (4.2–5.7)	8.1 (7.4–8.9)	21.6 (19.6–23.6)	13.1 (10.7–15.4)
Sleep more (often)	3.3 (2.8–3.9)	4.5 (3.9–5.1)	17.0 (15.0–19.0)	11.1 (8.8–13.4)
Eat more/less (often)	4.5 (3.9–5.1)	9.3 (8.3–10.3)	23.4 (18.4–22.4)	12.3 (10.0–14.6)
Blame yourself (often)	7.1 (6.3–7.8)	11.3 (10.4–12.3)	33.3 (31.0–35.7)	22.0 (19.0–24.9)
Wishful thinking (often)	35.8 (34.3–37.3)	43.2 (41.6–44.8)	68.8 (66.5–71.2)	56.6 (52.7–60.6)
Factor 2: problem-solving				
Solve problems (rarely/never)	3.3 (2.8–3.9)	5.4 (4.7–6.1)	5.1 (4.1–6.0)	5.5 (4.1–6.9)
Talk to others (rarely/never)	17.6 (16.4–18.8)	24.4 (23.1–25.7)	27.4 (25.2–29.5)	27.4 (24.0–30.8)
Do something enjoyable (rarely/never)	12.1 (11.1–13.1)	17.0 (15.7–18.2)	19.5 (17.3–21.6)	16.0 (12.9–19.1)
See the bright side (rarely/never)	5.1 (4.4–5.8)	6.2 (5.4–6.9)	14.6 (12.9–16.3)	11.3 (8.6–13.9)
Factor 3: behaviors				
Smoke more (often)	5.5 (4.8–6.2)	7.3 (6.5–8.2)	22.4 (20.1–24.6)	30.1 (26.6–33.6)
Drink alcohol (often)	0.8 (0.4–1.3)[a]	1.2 (0.9–1.5)	5.5 (4.2–6.9)	19.2 (16.1–22.2)
Use drug (often)	0.3 (0.1–0.4)[a]	2.4 (2.0–2.8)	10.0 (8.6–11.3)	9.1 (6.7–11.5)
Additional items				
Exercise (rarely/never)	59.0 (57.5–60.5)	69.6 (68.1–61.0)	60.1 (57.7–62.4)	60.0 (56.2–63.8)
Spiritual help (rarely/never)	60.8 (59.4–62.3)	45.9 (44.3–47.4)	48.5 (45.9–51.1)	74.6 (71.6–77.6)

[a]Bootstrap variance coefficient was between 16.6 and 33.3%
[b]Any one or more of the following conditions: high blood pressure heart disease or diabetes

medical condition only, and (4) no mental disorder, substance dependence, or long-term medical conditions covered by the CCHS-1.2. Regarding long-term medical conditions, we selected and combined those with high blood pressure, heart disease or diabetes because these three health problems represent chronic and severe health conditions and our preliminary analysis showed that the ways of dealing with stress were similar in the three sub-populations. In order to maintain the representativeness of the groups with mental and substance related disorders, we did not exclude subjects with long-term general medical conditions from these groups. In certain analyses, we also classified respondents on the basis of having a history of mental disorders. This was defined as having had a lifetime mood or anxiety disorder, excluding the cases in the past 12 months.

Analysis

Proportions reporting different ways of dealing with stress and associated 95% confidence intervals (95% CI) were estimated for the four groups: mood/anxiety disorders, substance dependence, long-term medical condition only, and persons with no reported mental or physical illnesses. For ease of reference, the latter group is subsequently referred to as a "healthy" group. The differences between groups were compared by visually examining the 95% CIs. The decision to combine mood and anxiety disorders into a single group followed preliminary analyses, which found that the patterns of coping reported in the two groups were very similar. In addition to overall group comparisons, we stratified the samples by gender and by age group (aged 15–24 years, 25–44 years, 45–60 years and 61 years or older). Comparisons between groups were made by visually examining the 95% CI. An approach based on estimation rather than statistical testing was chosen since *P* values from statistical tests confound the size of an effect with the associated sample size. An approach based on estimation was judged to be superior since it provides information both size and precision of an association. Logistic regression was used to investigate demographic and clinical variables associated with the factors identified in the factor analysis. Demographic variables included in the models were age (continuous variable), marital status (married vs. non-married), educational levels (<13 years education, less than high school graduation vs. 13+ years education, high school graduation and over), family income (low family income vs. middle/high family income) and ethnicity (white vs. non-white). The CCHS-1.2 categorized family income into five levels based on total family income and the number of people in the household. In this analysis, the five levels were grouped into two categories: low family income (<$15,000 year for one or two people; $10,000–$14,999 for three or four people; $15,000–$29,999 for five or more people) and middle and high family income ($15,000–$29,999 for one or two people; $20,000–$39,999 for three or four people; $30,000–$59,999 for five or more people; $30,000–$59,999 for one or two people; $40,000–$79,999 for three or four people; $60,000 for five or more people). The modeling was performance in men and in women separately. Because the CCHS-1.2 used a complex sampling design, sampling weights and bootstrap macros provided by Statistics Canada were used to account for the sampling and design effects. The analysis was conducted using SAS 8.0 [32].

Results

Participants with physical illnesses (high blood pressure, heart disease or diabetes) differed from the healthy participants in ways of dealing with stress, except that the two groups were not different in using "see the bright side" and "drink alcohol" to deal with stress (Table 1). Similarly, participants with mood or anxiety disorders and those with substance use related disorders were different from the healthy participants in ways of dealing with stress, except that the proportions of rarely or never using "exercise" as a way of coping in the three groups resembled each other. Compared to those with a physical illness, participants with mood and anxiety disorder or substance use related disorders were more likely to use undesirable ways of coping under Factors 1 and 3.

Gender differences

Men and women differed in many ways within the four study groups in ways of dealing with stress. Due to the scope of this analysis, we focused on examining whether the gender specific patterns were consistent with the overall patterns observed in Table 1 and if there were gender differences within the groups having mental and substance dependence. As seen from Table 2, the proportion reporting "rarely/never" using "solve problems" was higher in men with mood/anxiety disorders than that in healthy male participants. The same was observed in women with a physical illness in comparison with healthy women.

Participants with a mental and physical illness were less likely to have "talked to others" and were more likely to "avoid people", "eat more or less" and have used "wishful thinking" than the healthy participants in both gender. Women were more likely to report having used "eat more or less" as a way of dealing with stress than men, regardless of health status; men were more likely to report having used "drink alcohol" as a way of dealing with stress than women, except in the group having substance use related disorder. Compared to participants with a physical illness, those with a mood or anxiety disorder were more likely to have used "avoid people", "eat more or less", "drink alcohol" and "wishful thinking" as a way of coping with stress, regardless of gender.

Age differences

In the group of healthy people, the youngest participants were more likely to have used exercise as a way of coping (Table 3); the elderly participants were more likely to have used "spiritual help" and were less likely to have used "wishful thinking" as ways of coping than the younger participants. The same was found in participants with a physical illness. Among participants with a mood or anxiety disorder, the youngest participants were more likely to have used exercise and the elderly participants were more likely to have used "spiritual help" as a way of coping; those aged 15–25 were less likely to have used drugs to deal with stress and were more likely to have used "see the bright side" to cope with stress than older participants. Older participants with mood/anxiety disor-

Table 2 Proportions of various ways dealing with stress in individuals with mood/anxiety disorders, with substance use related disorders, with chronic illness only and healthy people, by gender

Variables	Healthy people % (95% CI)	Physical illness[b] % (95% CI)	Mood/anxiety % (95% CI)	Alcohol/drug dependence % (95% CI)
Solve problems (rarely/never)				
Men	3.5 (2.8–4.3)	5.4 (4.3 –6.59)	6.5 (4.7–8.4)	5.4 (3.7–7.0)
Women	3.0 (2.3–3.8)	5.4 (4.5–6.3)	4.1 (3.1–5.2)	5.9 (3.1–8.6)
Talk to others (rarely/never)				
Men	23.0 (21.3–24.8)	27.5 (25.6–29.5)	38.6 (34.6–42.7)	31.7 (27.5–35.9)
Women	10.7 (9.4–12.1)	21.4 (19.8–23.0)	20.5 (18.0–23.1)	16.0 (10.9–21.1)
Avoid people (often)				
Men	4.9 (4.0–5.8)	7.9 (6.8–9.0)	26.4 (22.9–29.9)	13.6 (10.6–16.6)
Women	5.1 (3.8–6.5)	8.3 (7.2–9.4)	18.7 (16.5–21.0)	11.8 (8.1–15.4)
Eat more/less (often)				
Men	2.2 (1.7–2.7)	5.7 (4.3–7.1)	15.3 (12.6–18.1)	9.0 (6.7–11.3)
Women	7.4 (6.2–8.6)	12.6 (11.3–14.0)	23.5 (20.9–26.0)	21.0 (15.5–26.5)
Drink alcohol (often)				
Men	1.3 (0.6–2.0)[a]	1.7 (1.2–2.2)[a]	9.5 (6.3–12.6)	20.1 (16.3–23.8)
Women	0.3 (0.1–0.4)	0.8 (0.4–1.1)	3.1 (2.3–4.0)	16.9 (12.2–21.5)
Wishful thinking (often)				
Men	33.2 (31.2–35.1)	39.4 (37.2–41.7)	68.8 (65.0–72.6)	52.0 (47.1–56.9)
Women	39.1 (36.8–41.4)	46.8 (44.7–49.0)	68.8 (66.0–71.7)	68.9 (62.9–75.0)

[a]Bootstrap variance coefficient was between 16.6% and 33.3%
[b]Any one or more of the following conditions: high blood pressure, heart disease or diabetes

ders and those with physical illnesses (aged 61 years and older) were less likely to use "smoke more" to deal with stress than younger participants in the same health status group. Among participants with substance dependence, participants aged 26–45 years appeared to be different from others in ways of coping. They were more likely to avoid being with people and were more likely to blame themselves than those in other age groups.

Logistic regression

We fitted three logistic regression models with each factor as a dependent variable (Factor 1, avoidance; Factor 2, problem-solving; Factor 3, health behaviors) in men and in women separately. Only significant factors are retained in the models (Table 4).

The multivariate logistic regression models showed that with the increasing age, participants were less likely to have used avoidant behaviors to cope with stress. In women, non-white participants were less likely to have used avoidant behaviors to deal with stress. Those who were at the low educational level and participants with a mental and/or a physical illness were more likely to have used avoidant behaviors to cope with stress.

In the models for Factor 2, the dependent variable was "rarely/never" using any of the problem-solving strategies to deal with stress. The models showed that older age, low education, low family income (in men only), non-white ethnicity (in women only), having a mental or substance use related disorders in the past year were associated with not using problem-solving as a way of dealing with stress. In men, those who lived in urban areas were more likely to have used problem-solving than those who were living in rural area. In women, there was an interaction between age and having a mental disorder in the past year, indicating that older participants were more likely to have used problem-solving with the presence of a mood/anxiety disorder in the past year.

In the models for Factor 3, the dependent variable was "often" use of smoking more, drinking more or using drug as ways of dealing with stress. The models showed that those who had a mental and substance use related disorder in the past year or lifetime were more likely use these strategies than others, regardless of gender. In men, participants who were at a low income level were more likely to report these behaviors as ways of coping. With an increase of age, women were less likely to use these strategies.

Discussion

Using the data from a large, representative population-based sample, our analysis compared individuals of four different groups in their ways of dealing with stress. The results of this study were consistent with Lazarus's model in a broad sense in that ways of dealing with stress varied by the types of health problems, gender and age. Participants with a mental or a substance use related disorder and those with a physical illness (high blood pressure, heart disease or diabetes) differed from healthy individuals in ways of dealing with stress. Participants with a mental/substance use related disorder reported more undesirable ways of dealing with stress than those with a physical illness. Regardless of health status, men were more likely to drink or use medication to deal with stress than women. Compared to men, women were more likely to eat more or less or talk to others about the

Table 3 Proportions of various ways dealing with stress in individuals with mood/anxiety disorders, with substance use related disorders, with chronic illness only and healthy people, by age groups

Variables	Healthy people % (95% CI)	Physical illness[b] % (95% CI)	Mood/anxiety % (95% CI)	Alcohol/drug dependence % (95% CI)
Avoid people (often)				
Age 15–25	5.5 (4.8–6.2)	12.5 (6.8–18.1)[a]	19.5 (16.5–22.4)	10.2 (6.9–13.5)
Age 26–45	4.4 (3.2–5.5)	9.1 (7.1–11.1)	21.6 (19.2–24.1)	16.8 (13.8–19.7)
Age 46–60	5.1 (3.1–7.2)[a]	9.1 (7.6–10.6)	23.3 (18.7–27.9)	10.7 (4.8–16.6)[a]
Age 61+	6.6 (4.3–9.0)[a]	7.1 (6.1–8.0)	23.8 (15.8–31.8)[a]	
Smoke more (often)				
Age 15–25	5.6 (4.2–7.1)	13.9 (8.5–19.3)[a]	22.6 (19.9–25.3)	28.4 (24.0–32.8)
Age 26–45	5.8 (4.8–6.9)	14.4 (11.3–17.4)	24.7 (21.7–27.8)	30.1 (27.0–33.2)
Age 46–60	5.3 (3.4–7.2)[a]	10.0 (8.2–11.9)	21.4 (16.1–26.6)	37.6 (20.8–54.4)[a]
Age 61+	3.4 (0.7–6.1)	3.2 (2.5–4.0)	11.3 (5.8–16.7)[a]	48.5 (17.5–79.4)[a]
Use drugs (often)				
Age 15–25	0.2 (0.1–0.3)[a]		5.5 (4.1–7.0)	7.1 (3.9–10.3)[a]
Age 26–45	0.4 (0.2–0.5)[a]	3.1 (1.9–4.3)[a]	10.2 (9.0–11.4)[a]	10.4 (6.9–13.9)[a]
Age 46–60		2.8 (2.0–3.6)[a]	12.9 (9.5–16.2)	
Age 61+		2.0 (1.5–2.5)	15.1 (10.2–20.0)	
Exercise (rarely/never)				
Age 15–25	54.3 (52.4–56.2)	8.9 (39.3–58.5)	53.3 (49.6–57.1)	53.3 (51.3–59.3)
Age 26–45	58.5 (56.3–60.7)	65.9 (62.2–69.6)	59.8 (58.2–61.3)	63.4 (58.5–68.2)
Age 46–60	60.6 (57.0–64.2)	62.3 (59.2–65.4)	66.3 (61.5–71.0)	68.6 (54.8–82.5)
Age 61+	72.2 (68.0–76.3)	76.0 (74.3–77.7)	65.6 (57.2–73.9)	77.9 (51.2–104.6)[a]
Spiritual help (rarely/never)				
Age 15–25	71.3 (69.4–73.1)	57.8 (47.7–67.9)	63.2 (59.3–68.0)	80.6 (75.9–85.2)
Age 26–45	61.3 (60.3–62.2)	55.7 (51.7–59.8)	50.9 (49.1–52.7)	68.6 (65.9–71.4)
Age 46–60	51.5 (47.8–55.3)	49.5 (46.3–52.6)	32.1 (27.3–37.0)	72.4 (60.5–84.4)
Age 61+	50.3 (45.9–54.8)	40.1 (38.1–42.1)	33.9 (25.7–42.2)	
See the bright side (rarely/never)				
Age 15–25	6.7 (4.8–8.7)	16.6 (8.4–24.8)	20.2 (16.3–24.1)	12.6 (11.4–13.8)
Age 26–45	4.3 (3.3–5.4)	6.1 (4.5–7.7)	12.9 (9.7–16.1)	8.3 (7.4–9.1)
Age 46–60	3.8 (2.5–5.2)[a]	5.8 (4.2–7.3)[a]	10.2 (7.3–13.1)[a]	
Age 61+	7.1 (4.8–9.4)	6.0 (5.1–7.0)	18.0 (11.1–24.9)[a]	
Blame yourself (often)				
Age 15–25	7.3 (4.8–8.7)	18.8 (11.7 –26.0)	30.7 (27.1–34.2)	17.1 (15.2–19.0)
Age 26–45	7.9 (6.8–8.1)	16.3 (13.3–19.3)	35.5 (31.9–39.1)	29.7 (27.3–32.0)
Age 46–60	5.3 (3.8–6.8)[a]	13.4 (11.4–15.5)	34.8 (29.9–39.7)	14.8 (7.0–22.7)[a]
Age 61+	5.9 (4.0–7.8)[a]	8.2 (7.2–9.1)	25.9 (18.5–33.2)[a]	
Wishful thinking (often)				
Age 15–25	38.6 (35.7–41.4)	53.1 (42.9–63.3)	71.0 (62.2–75.9)	59.2 (54.9–63.5)
Age 26–45	36.0 (34.6–37.4)	50.3 (46.2–54.4)	68.5 (64.1–72.9)	56.7 (53.6–59.8)
Age 46–60	34.2 (30.6–37.8)	45.4 (42.2–48.5)	68.6 (63.6–73.6)	44.9 (29.0–60.9)[a]
Age 61+	30.4 (26.2–34.6)	39.3 (37.3–41.3)	64.3 (56.8–71.9)	

[a]Bbootstrap variance coefficient was between 16.6 and 33.3% blank: estimates too imprecise to report, in keeping with Statistics Canada data release guidelines
[b]Any one or more of the following conditions: high blood pressure, diabetes or heart disease

Table 4 Results of logistic regression—variables associated with coping factors

Variables	Avoidance OR (95% CI)	Problem-solving OR (95% CI)	Health behaviors OR (95% CI)
Men			
Age	0.993 (0.990–0.996)	1.012 (1.008–1.015)	
Educational levels (low education)	1.2 (1.1–1.3)	1.4 (1.2–1.5)	
Family income levels (low income)		1.2 (1.0–1.3)	1.4 (1.2–1.7)
Urban vs. rural areas (urban)		0.8 (0.7–0.9)	
Mental disorder history (yes)	1.9 (1.6–2.3)		2.3 (1.7–3.1)
Past year mood/anxiety disorders (yes)	3.3 (2.6–4.3)	1.9 (1.6–2.3)	2.0 (1.4–3.0)
Past year substance use disorders (yes)	1.4 (1.1–1.7)	1.5 (1.2–1.9)	3.1 (2.3–4.3)
Chronic medical illnesses (yes)	1.3 (1.1–1.5)		
Women			
Age	0.993 (0.991–0.996)	1.016 (1.013–1.018)	0.991 (0.985–0.997)
Educational levels (low education)	1.1 (1.0–1.2)	1.5 (1.3–1.6)	
Ethnicity (non-white)	0.7 (0.6–0.9)	1.4 (1.2–1.6)	
Mental disorder history (yes)	1.9 (1.7–2.2)		1.8 (1.4–2.2)
Past year mood/anxiety disorders (yes)	2.5 (2.0–3.1)	4.7 (3.2–6.8)	1.6 (1.2–2.2)
Past year substance use disorders (yes)	2.0 (1.4–2.8)	1.2 (0.8–1.8)	2.2 (1.5–3.3)
Chronic medical illnesses (yes)	1.1 (1.0–1.3)		1.6 (1.2–2.0)
Past year mood/anxiety disorders × age		0.98 (0.97–0.99)	

problem as ways of dealing with stress. Participants aged 15–25 years were more likely to use exercise than older participants, while older participants (aged 46+ years) were more likely to seek spiritual help as a way of dealing with stress than younger participants.

In this analysis, we combined participants with high blood pressure, heart disease or diabetes into one group and found that they were different from the healthy participants and those with a mental or substance use related disorder in ways of dealing with stress. These were different from the results of the meta-analytic review that avoidance, problem-focused coping and wishful thinking were only significantly correlated with psychological health outcomes, but not with physical health outcomes [30]. This was different from van Rijen and colleagues' [34] study which reported that the styles of coping in patients with congenital heart disease are comparable to normative data of the general population. The difference may be due to the fact that our definition of physical illness in this analysis referred to three different chronic conditions. The comparisons between participants with a physical illness and healthy people were made using the data from the same survey, rather than using normative data.

Previous studies suggested that men use more problem-focused, direct and presumably effective coping strategies than women [11, 29], whereas women are more likely to use more emotion-focused coping strategies than men, such as avoiding confrontation, and relying on social support [29, 35]. Our results expanded upon these findings by providing evidence that men and women with mood/anxiety disorders were similar in using "solve problem" to deal with stress. We found that men were less likely to "talk to others" than women, regardless of health status. In participants with mood/anxiety disorders, men were more likely to use "avoid being with people" than women, which was different from men with a physical illness or men who were healthy. This may be an indication that women are generally more likely than men to rely on social support to cope with stress and to solve problems they encounter. Provision of social support may be a potential secondary preventive strategy. A study using the longitudinal data of the Canadian National Population Health Survey found that, among men who were exposed to negative life events, using "talk to others" as a coping strategy significantly reduced the risk of a later episode of major depression [38]. However, social support may be difficult to promote in men.

The CCHS-1.2 data revealed interesting findings about certain health behaviors as ways of dealing with stress. Previous studies suggest that exercise is an effective treatment for depression of mild to moderate severity [8, 10]. Thus, exercise may be a useful self-care strategy for depressive symptoms. However, people with mental disorders may isolate themselves and thus avoid opportunities for physical activity. They may be less likely to engage in exercise to alleviate stress, compared to healthy people. In this analysis, we found age differences in using exercise and spiritual help as ways of dealing with stress. Such differences existed in healthy people, participants with a physical illness and those with a mood/anxiety disorder. The age difference may be due to that people of different ages may face different types of stressors and people whose events occurred in young adulthood were more likely to derive advantages from coping with stress than were old adults—especially in changing their attitudes or philosophy toward life [2]. Physical inactivity may lead to various health problems including obesity. We found that participants with mental and substance related disorders were about 3–5 times more likely to report "eat more or less" to deal with stress than healthy people. Particularly, women were about 2–3 times more likely to use "eat more or less" to deal with stress than men, irrespective of health status. Although "eat more or less" might make women feel emotionally more comfortable, there is no evidence that "eat more or less" may reduce the risk of mental disorders. On the other hand, men were more likely to use "drink alcohol" as a way to deal with stress than women, regardless of health status. Older participants with a mood/anxiety disorder were more likely to "use drugs or medication" to deal with stress than younger participants. This is worrisome because such behaviors may lead to substance dependence or abuse in this population or increase the risk of other adverse outcomes, such as falls. On the other hand, they were less likely to "exercise" than younger participants, irrespective of health status. Participants aged 15–45 years who had a physical illness or a mental disorder were more likely to use "smoking more" to relieve stress than older participants. There may be an opportunity for public health education and promotion efforts promoting increased use of more physical exercise, rather than using unhealthy behaviors (taking drug or medication, smoking, eating and drinking) as ways of dealing with stress.

The results of our analysis showed that ways dealing with stress were related to individuals' mental and physical health status. Due to the cross-sectional nature of the CCHS-1.2 data, it is not clear if existing mental and physical illnesses caused the use of certain coping behaviors. The results of multivariate logistic regression models indicated that a history of mental health problems was related to the ways in which people dealt with stress. This is consistent with Ilgen and Hutchison's findings [14]. Nevertheless, the result presented here extend these findings by showing that the pattern of altered coping associated with mentally ill health is not a simple one, and is also affected by age and sex.

This analysis had several limitations. First, the CCHS-1.2 was a cross-sectional mental health survey. We could not delineate the temporal sequence be-

tween ways of dealing with stress and mental/physical disorders. Second, it is unknown if people with mental and substance related disorders are more likely to use emotion-focused strategies as pertinent questions were not asked in the CCHS-1.2. Third, the CCHS-1.2 relied on self-report. Thus, reporting bias is possible, particularly since several of the coping strategies might be perceived as socially desirable or undesirable. Nevertheless, the CCHS-1.2 used a large representative sample from the general population. We specifically compared individuals with mental and physical illnesses with healthy people in their ways dealing with stress.

Conclusions

The results of this analysis are useful for treatment, rehabilitation, public health education and promotion. More importantly, the observed differences may help the public in enhancing their coping styles, leading to a better self-care management. Given the observed differences in ways of dealing with stress by gender, age and health status, strategies that are effective for certain populations may not be effective for others. This needs to be further studied at the individual level, which would have clinical implications. However, some types of coping, such as being physically inactive, eating more, smoking more or drinking alcohol seem to be overtly maladaptive. The use of these types of coping depends on gender, age and health status. This should be considered in future population-based interventions.

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