



Descriptive Analyses of the Recruit Health Questionnaire

2003 – 2004

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Defence R&D Canada
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Abstract

One of the key challenges to arriving at an understanding of post-deployment illnesses is a lack of baseline information on exposure to potential risk factors and health characteristics in military personnel. The Recruit Health Questionnaire (RHQ) is a paper and pencil measure that was developed to address this concern by gathering general background information and assessing current health status and practices among Canadian Forces (CF) recruits. Collection of data using the RHQ is ongoing and will continue indefinitely. As the first among a series of reports presenting results of the RHQ, the current report provides a comprehensive look at some of the health and health-related factors assessed by this tool. The study sample consisted of 3852 Canadian Forces (CF) recruits (72.6% Non-Commissioned Member [NCM] Candidates and 27.4% Officer candidates), who were primarily male (84.1%) and under the age of 25 years (66.6%). Overall figures on health status, lifestyle, as well as dispositional and social environmental variables influencing health were examined in addition to age, income, rank (NCM or Officer candidate), and sex differences. Results suggested that CF recruits represent a generally healthy population, with low prevalences of physical and psychological health problems. Moreover, recruits obtained favourable scores on measures of dispositional factors related to health, such as agreeableness and self-esteem. However, results pointed to a potentially greater prevalence of binge drinking as well as important differences in social environmental factors (e.g., lower social support) among recruits compared to the Canadian population, thus warranting additional research in these areas. Finally, analyses revealed recurring demographic differences in health, with a general tendency for more favourable health and lifestyle among Officer compared to NCM candidates. Important differences in health status may have occurred since the time frame on which the present report focuses. Trends over time on a smaller number of key health and health-related factors will be explored in future reports.

Résumé

L'un des principaux problèmes qui nuisent à la compréhension des maladies post-déploiement est l'absence de données de base sur l'exposition aux facteurs de risque et sur l'état de santé du personnel militaire. Le Questionnaire sur la santé des recrues (QSR) est une mesure crayon-papier élaborée pour recueillir des renseignements généraux sur les pratiques et l'état de santé actuels des recrues des Forces canadiennes (FC), et pour évaluer ces données. La collecte des données au moyen du QSR est continue et se poursuivra indéfiniment. Premier d'une série de rapports faisant état des résultats du QSR, le rapport actuel fournit des renseignements détaillés sur certains des éléments et des facteurs liés à la santé qui ont été évalués grâce à cet outil.

L'échantillon comprenait 3 852 recrues des FC (72,6 % de candidats militaires du rang [MR] et 27,4 % de candidats officiers), principalement des hommes (84,1 %) âgés de moins de 25 ans (66,6 %). Les données générales sur l'état de santé, le mode de vie, les variables de disposition et les variables environnementales d'ordre social ayant une incidence sur la santé ont été examinées, en plus des différences sur le plan de l'âge, du revenu, du grade (candidat MR ou officier) et du sexe. Les résultats semblent indiquer que les recrues des FC sont généralement en bonne santé, et qu'ils présentent une faible prévalence de problèmes de santé physique et psychologique. De plus, les recrues semblent obtenir des notes favorables lorsqu'on mesure les facteurs de disposition liés à la santé, comme une personnalité agréable et l'estime de soi. Les résultats montrent toutefois une prévalence potentiellement plus forte de la consommation occasionnelle excessive d'alcool, ainsi que d'importantes variations pour ce qui est des facteurs environnementaux d'ordre social (p. ex. un soutien social plus faible) par rapport à la population canadienne, d'où la nécessité de faire des recherches plus poussées dans ces domaines. Enfin, les analyses ont révélé des différences démographiques récurrentes sur le plan de la santé, soit une tendance générale vers une santé et un mode de vie plus favorables chez les candidats officiers, par opposition aux candidats MR. Des différences importantes sur le plan de l'état de santé peuvent être survenues depuis la période visée par le présent rapport. Les tendances au fil du temps pour un plus petit nombre d'éléments et de facteurs clés liés à la santé seront examinées dans des rapports ultérieurs.

Executive summary

Descriptive Analyses of the Recruit Health Questionnaire: 2003-2004

Jennifer E.C. Lee; Jeff Whitehead; Christine Dubiniecki; DGMPPRA TM 2010-010; Defence R&D Canada – DGMPPRA; March 2010.

Aim: One of the key challenges to arriving at an understanding of post-deployment illnesses is a lack of baseline information on exposure to potential risk factors and health characteristics in military personnel. The Recruit Health Questionnaire (RHQ) is a paper and pencil measure that was developed to address this concern by gathering general background information and assessing current health status and practices among Canadian Forces (CF) recruits. The current report is the first among a series of reports presenting results of the RHQ and focuses on data collected between 2003 and 2004. The aim is to provide a comprehensive look at some of the health and health-related factors assessed in the RHQ, and provide the basis from which to examine health trends in different cohorts of recruits over time for future reports.

Method: The study sample consisted of 3852 Canadian Forces (CF) recruits (72.6% Non-Commissioned Member [NCM] Candidates and 27.4% Officer candidates), who were primarily male (84.1%) and under the age of 25 years (66.6%). Factors examined included:

- a. health status, (e.g., previous injuries, self-rated health, weight);
- b. health behaviour (e.g., alcohol use, physical activity, smoking), in addition to;
- c. dispositional (or personality) (e.g., hardiness, neuroticism, self-esteem); and
- d. social environmental characteristics (e.g., adverse childhood events, negative life events, social support) which have been linked with health outcomes in previous research.

Overall crude prevalences were examined, and analyses were carried out to examine age, income, rank, and sex differences in health. For some health variables on which equivalent data were available for the general Canadian population, prevalences were computed that adjusted for age and sex differences (between recruits and Canadians) in order to roughly compare recruits to the Canadian population of an equivalent age range (i.e., 15-49 years). National estimates were obtained based on results of the Canadian Community Health Survey (CCHS; Statistics Canada [2009])—a survey that is administered every two years to a representative cross-sectional sample of the Canadian general population.

Findings: Results suggested that CF recruits represent a generally healthy population, with low prevalences of physical and psychological health problems. The prevalences of injuries in the previous year as well as obesity were slightly lower than estimates for the general Canadian population, and a higher proportion of recruits perceived their health as good to excellent.

With regards to health-related behaviour, eating habits and levels of physical activity appeared to be more favourable in recruits compared to the general Canadian population. The prevalence of smoking was also low, although there was evidence of a relatively high prevalence of binge drinking.

Recruits obtained favourable scores on measures of dispositional factors related to health, such as agreeableness and self-esteem. However, some characteristics of the social environments of recruits were less favourable. For example, recruits reported somewhat lower levels of social support relative to respondents of the CCHS, cycle 2.1. Nevertheless, their levels of social support were high.

Finally, recurring demographic differences in health were observed, with a general tendency for more favourable health and lifestyle among Officer compared to NCM candidates. This finding could be a function of underlying socioeconomic differences between Officer and NCM candidates, such as a higher level of education among the former group, although this remains to be explored.

Conclusion: Results presented in the current report relate to recruits who began basic military training from July 2003 to December 2004 and may not generalize to later cohorts (i.e., recruits who did their training in subsequent years). An examination of health trends in different cohorts of recruits over time on a smaller number of key health and health-related factors, such as body mass index, injuries, and physical activity, will be the subject of future reports, and will help to shed more light onto areas on which to focus in health promotion efforts aimed at the CF recruit population.

Sommaire

Descriptive Analyses of the Recruit Health Questionnaire: 2003-2004

Jennifer E.C. Lee; Jeff Whitehead; Christine Dubiniecki; DGMPPRA TM 2010-010; R & D pour la défense Canada – DRASPM; Mars 2010.

Objectif : L'un des principaux problèmes qui nuisent à la compréhension des maladies post-déploiement est l'absence de données de base sur l'exposition aux facteurs de risque et sur l'état de santé du personnel militaire. Le Questionnaire sur la santé des recrues (QSR) est une mesure crayon-papier élaborée pour recueillir des renseignements généraux sur les pratiques et l'état de santé actuels des recrues des Forces canadiennes (FC), et pour évaluer ces données. Le rapport actuel, qui est le premier d'une série de rapports faisant état des résultats du QSR, met l'accent sur les données recueillies entre 2003 et 2004. Il vise à fournir des renseignements détaillés sur certains des éléments et des facteurs liés à la santé qui ont été évalués dans le QSR, ainsi qu'à jeter les bases d'un examen des tendances en matière de santé dans différentes cohortes de recrues, au fil du temps, pour des rapports ultérieurs.

Méthode : L'échantillon comprenait 3 852 recrues des FC (72,6 % de candidats militaires du rang [MR] et 27,4 % de candidats officiers), principalement des hommes (84,1 %) âgés de moins de 25 ans (66,6 %). Les facteurs qui ont été examinés sont les suivants :

- a. l'état de santé (ex. : blessures subies, auto-évaluation de l'état de santé, poids);
- b. les comportements liés à la santé (ex. : consommation d'alcool, activité physique, tabagisme);
- c. les facteurs de disposition (ou personnalité) (ex. : robustesse, tendances névrotiques, estime de soi);
- d. les facteurs environnementaux d'ordre social (ex. : enfance difficile, événements douloureux, soutien social) qui ont été liés à des problèmes de santé dans de précédentes recherches.

Des prévalences brutes générales ont été examinées, et des analyses ont été réalisées pour examiner l'état de santé en fonction de l'âge, du revenu, du grade et du sexe. Pour certaines des variables sur lesquelles des données équivalentes étaient disponibles pour la population générale du Canada, les prévalences normalisées liées à l'âge et au sexe ont été calculées de manière à obtenir une comparaison grossière avec les estimations nationales pour les Canadiens d'une fourchette d'âge équivalente (c.-à-d. de 15 à 49 ans). Les estimations nationales ont été basées sur les résultats de l'Enquête sur la santé dans les collectivités canadiennes (ESCC; Statistique Canada, 2009)—une enquête menée à chaque deux ans à laquelle participe un échantillon transversal représentatif de la population générale du Canada.

Résultats : Les résultats semblent indiquer que les recrues des FC sont généralement en bonne santé, et qu'ils présentent une faible prévalence de problèmes de santé physique et psychologique. La prévalence des blessures au cours de l'année précédente ainsi que l'obésité sont légèrement inférieures aux estimations pour la population générale du Canada, et une plus forte proportion de recrues jugent leur santé bonne ou excellente.

En ce qui concerne les comportements liés à la santé, les habitudes alimentaires et les niveaux d'activité physique semblent plus favorables chez les recrues, comparativement à la population générale du Canada. La prévalence du tabagisme est également faible, quoique certaines données indiquent une prévalence relativement élevée de consommation occasionnelle excessive d'alcool.

Les recrues ont obtenu des notes favorables lorsqu'on mesure les facteurs de disposition liés à la santé, comme une personnalité agréable et l'estime de soi. Cependant, certains facteurs environnementaux d'ordre social sont moins favorables. Par exemple, les recrues font état d'un niveau de soutien social plus faible que celui des participants à l'Enquête sur la santé dans les collectivités canadiennes, cycle 2.1. Néanmoins, leur niveau de soutien social demeure très élevé.

Enfin, les analyses ont révélé des différences démographiques récurrentes sur le plan de la santé, soit une tendance générale vers une santé et un mode de vie plus favorables chez les candidats officiers, par opposition aux candidats MR. Ce résultat pourrait être attribuable à des différences socioéconomiques entre les candidats officiers et les candidats MR, comme un niveau de scolarité plus élevé chez les premiers, bien que cela reste à déterminer.

Conclusion : Les résultats présentés dans le rapport s'appliquent aux recrues qui ont entrepris leur formation militaire de base entre juillet 2003 et décembre 2004, et ils ne doivent pas être généralisés (c'est-à-dire appliqués aux recrues qui ont été formées pendant les années subséquentes). Un examen des tendances en matière de santé dans différentes cohortes de recrues, pour un nombre limité de facteurs clés comme l'indice de masse corporelle, les blessures et l'activité physique, fera l'objet de rapports ultérieurs, et nous aidera à déterminer dans quels secteurs il faudrait concentrer les efforts de promotion de la santé chez les recrues des FC.

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1 Introduction

1.1 Background

Lessons learned from research on post-deployment illness following the Gulf War emphasize the need for adequate monitoring of health and risk factors among military populations (Goss Gilroy Inc., 1998; Young, Gibson, & Ryan, 2006). One concern with the adequacy of health surveillance is a lack of baseline data on health and exposure to risk factors (Young *et al.*, 2006). It is widely recognized that health is not only a question of genetic endowment and the physical environment, but also a question of the health behaviours and social environments that characterize individuals (Evans, Barer & Marmor, 1994). In addition, there is increased recognition that these broad determinants of health can be influenced by personality (Adler & Matthews, 1994; Friedman, 2000). Adequate health surveillance therefore also calls for a wide range of factors to be assessed. To address this gap, the Recruit Health Questionnaire (RHQ) was implemented with the aim of establishing a baseline health database that might be linked with other Canadian Forces (CF) health databases to examine medical outcomes prospectively.

The RHQ has been administered to CF recruits during their first week of basic military training since July 2003. Since more time must elapse to sufficiently examine health and occupational status outcomes, its current potential to shed light on some determinants of post-deployment illness remains somewhat limited. Nevertheless, important psychosocial aspects of the health and lifestyle of CF recruits can be observed, which could help identify key issues for recruitment and public health policies in the CF. For instance, this information could help determine the health promotion as well as educational and training needs of recruits.

1.2 Aim

The current report is the first among a series presenting descriptive analyses performed on data collected using the RHQ. Reflecting a broad perspective on health, results are presented in four main sections relating to:

- a. health status and prevalence of health conditions;
- b. psychological disposition;
- c. health behaviour; and
- d. the social environment.

General descriptive results are presented and, where possible, comparisons are made with findings in the general Canadian population. Differences are also examined on some key demographic factors including age group (17-19 year olds, 20-24 year olds, and 25-49 year olds), reported household income (less than \$49,999 or \$50,000 or more), rank (non-commissioned member [NCM] candidate or Officer candidate), and sex.

2 Method

2.1 Procedure

The RHQ is administered on an ongoing basis to CF recruits in group sessions by representatives of the CF Leadership and Recruit School (CFLRS) during the first week of basic military training. At every session, the nature and purpose of the RHQ are briefly discussed, along with information that participation in the study is completely voluntary. Recruits are asked to provide informed consent by completing and signing a consent form. They are also provided a duplicate copy of the consent form for their records. This form includes the contact information of researchers from the Directorate of Force Health Protection (DFHP) to whom they can address questions or requests to leave the study at any future point in time. In addition, instructions are provided on how to complete the questionnaire. Recruits are encouraged to ask any questions they might have about the study throughout the process.

Questionnaire administration requires approximately one hour. Completed questionnaires are collected by representatives at the end of the sessions and mailed to the principal investigator at the DFHP, where they are stored in a secured room to be scanned and entered into a database.

2.2 Measures

Items of the RHQ were drawn from a variety of sources, including the Canadian Community Health Survey (CCHS; Statistics Canada, 2001), the Health and Lifestyle Information Survey (HLIS; Department of National Defence, 2000), the Medical Outcomes Study survey tool (MOS; Ware & Sherbourne, 1992), the National Population Health Survey (NPHS; Statistics Canada, 1999), the Patient Health Questionnaire (PHQ; Spitzer, Kroenke, Williams and the Patient Health Questionnaire Primary Care Study Group, 1999), the Peace Support Operations Predeployment Survey (PSOPS; Thompson & Smith, 2002), the Recruit Assessment Program (RAP) (Hyams, Barret, Duque, Engel, Friedl, Gray *et al.*, 2002), as well as various measures of personality and individual differences.

Table 1 presents a summary of the key variables assessed in the RHQ on which this report focuses, along with a description of the items and/or scales that are used to assess each of them. As shown, the RHQ assesses a comprehensive array of health-related factors that extends beyond indicators of health and illness toward psychosocial predictors of health and illness. Measures of health, psychological disposition, and social environment have generally demonstrated adequate internal consistency among the CF recruit population (Lee, 2008).

Table 1: Summary of Variables and Corresponding Measures Examined in the Recruit Health Questionnaire

Variable	Measure/Source	Description
Health Status		
Self-perceived health	CCHS (2001)	1 item rated on a 5-point scale (1=excellent, 2=very good, 3=good, 4=fair, 5=poor)
Somatic symptoms	PHQ-15 (Kroenke, Spitzer, & Williams, 2002)	15 symptom checklist from the PHQ rated on a 3-point scale (1=not bothered, 2=bothered a little, 3=bothered a lot)
Injuries in the past year	CCHS (2001)	Items assess repetitive strain injuries and acute injuries sustained in the past year
Body Mass Index (BMI)	CCHS (2001)	BMI computed using self-reported height and weight
Depression	PHQ-9 (Kroenke, Spitzer, & Williams, 2001)	9 symptom checklist from the PHQ rated on a 4-point scale (1=not at all, 2=several days, 3=more than half the days, 4=nearly every day)
Other anxiety disorder	PHQ other anxiety disorder scale (Spitzer, Williams, Kroenke, Hornyak, & McMurray, 2000)	7 symptom checklist from the PHQ rated on a 3-point scale (1=not at all, 2=several days, 3=more than half the days)
Panic disorder	PHQ panic disorder scale (Spitzer <i>et al.</i> , 1999)	15 symptom checklist from the PHQ rated on 2-point scale (1=yes, 2=no)
Posttraumatic stress disorder	Posttraumatic Stress Disorder Checklist – Civilian Version (PCL-C; Weathers, Litz, Herman, Huska, & Keane, 1993)	17 symptom checklist rated on a 5-point scale (1=not at all, 2=a little bit, 3=moderately, 4=quite a bit, 5=extremely)
Psychological Disposition		
Alexithymia	20-item Toronto Alexithymia Scale (TAS-20; Bagby, Parker, & Taylor, 1994)	20 statements rated on a 5-point scale (1=strongly agree, 2=moderately agree, 3=neither agree nor disagree, 4=moderately disagree, 5=strongly disagree) to assess difficulty describing feelings (5 items), difficulty identifying feelings (7 items), and externally-oriented thinking (8 items)

Variable	Measure/Source	Description
Big Five personality dimensions	Adapted Big Five Inventory (BFI; John & Srivastava, 1999; Thompson & Smith, 2002)	40 self-descriptive adjectives rated on a 5-point scale (1=strongly agree, 2=agree, 3=neither agree nor disagree, 4=disagree, 5=strongly disagree) to assess agreeableness (9 items), conscientiousness (9 items), extroversion (8 items), neuroticism (8 items), and openness (6 items)
Dispositional optimism	Revised Life Orientation Test (LOT-R; Scheier & Carver, 1985)	6 statements rated on a 5-point scale (1=strongly agree, 2=agree, 3=neither agree nor disagree, 4=disagree, 5=strongly disagree) to assess the generalized tendency to expect positive outcomes
Hardiness	Adapted Bartone's Hardiness Scale (Bartone, 1999; Thompson & Smith, 2002)	11 statements rated on a 4-point scale (1=not at all true, 2=a little true, 3=quite true, 4=completely true) to assess one's tendency to have a high sense of commitment, strong sense of control, and to be open to change
Mastery	CCHS (2001)	7 statements rated on a 5-point scale (0=strongly agree, 1=agree, 2=neither agree nor disagree, 3=disagree, 4=strongly disagree) to assess one's tendency to view life as being under his or her control
Personal need for structure	Personal Need for Structure Scale (Thompson, Naccarato & Parker, 1992; Thompson & Smith, 2002)	12 statements rated on a 5-point scale (1=strongly agree, 2=agree, 3=neither agree nor disagree, 4=disagree, 5=strongly disagree) to assess one's cognitive style characterized by a preference for structure and clarity
Positive and negative affect	Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988)	20 emotional states rated on a 5-point scale in terms of level experienced, on average (1=strongly agree, 2=agree, 3=neither agree nor disagree, 4=disagree, 5=strongly disagree) to assess one's general tendency to experience positive (10 items) and negative (10 items) emotional states

Variable	Measure/Source	Description
Self-esteem	CCHS (2001)	7 statements rated on a 5-point scale (0=strongly agree, 1=agree, 2=neither agree nor disagree, 3=disagree, 4=strongly disagree)
Health Behaviour		
Frequency of alcohol use	CCHS (2001)	1 item assessing frequency of alcohol use in the past year and self-reported number of drinks typically consumed each day of the week
Binge drinking	CCHS (2001)	1 item assessing number of times more than 5 drinks consumed in one occasion in past year
Condom use	1 item	1 item assessing number of times condom used in the past year by individuals not in an exclusive relationship
Eating habits	CCHS (2001)	1 item rated on a 5-point scale to assess self-reported eating habits (1=excellent, 2=very good, 3=good, 4=fair, 5=poor) and 6-item checklist assessing frequency that various fruits and vegetables are consumed
Physical activity	CCHS (2001)	21-item checklist assessing frequency and duration of engagement in various types of physical activity used to compute index of level of physical activity
Sedentary behaviours	CCHS (2001)	4-item checklist assessing number of hours spent engaging in various types of sedentary activities per week in the past 3 months
Smoking	1 item	1 item determining status as current, ex-, or never smoker
Traffic safety practices	CCHS (2001)	6 items to assess frequency of bicycle helmet use, seatbelt use, insistence on passenger seatbelt use, being the passenger of a driver under the influence of alcohol, driving while under the influence of alcohol, and number of traffic violations

Variable	Measure/Source	Description
Social Environment		
Adverse childhood experiences	RAP (Hyams <i>et al.</i> 2002)	4 items on abuse and 2 items on neglect rated in terms of exposure prior to the age of 17 years (1=never true, 2=rarely true, 3=sometimes true, 4=often true, 5=very often true). Items on abuse are recoded (0=yes or 1=no) and used with an additional 2 items on the presence of persons with psychological problems in the household prior to the age of 17 to compute an index of adverse childhood experiences (Hoge, Bliese, Castro, and Messer, 2007; Gahm, Lucenko, Retzlaff, and Fukada, 2007).
Exposure to violence	RAP (Hyams <i>et al.</i> 2002)	7 violent events rated on a 2-point scale in terms of whether they were ever experienced (0=no, 1=yes)
Negative life events	Adapted Life Events Survey (Lee, 2008; McCreary & Sadava, 1998)	50 negative events to be checked off if experienced in the past year
Social support	MOS Social Support Survey (CCHS, 2001; Sherbourne & Stewart, 1991)	Different types of social support rated on a 5-point scale (1=none of the time, 2=a little of the time, 3=some of the time, 4=most of the time, 5=all of the time) to assess the amount of affectionate support (3 items), emotional and informational support (9 items), positive social interaction (3 items), and tangible support (4 items) that one receives

2.3 Analyses

The current report presents overall figures pertaining to physical and psychological health status, psychological disposition, health behaviour, and social environmental characteristics of recruits who completed the survey in 2003 and 2004. Since the data do not cover all of 2003, data collected in 2003 and 2004 were combined in this report.

For some questions drawn from the CCHS, age- and sex-standardized prevalence proportions were additionally computed to obtain a rough comparison with estimates for the general Canadian population of equivalent age range (i.e., 15-49 years) based on the CCHS, cycle 2.1. More specifically, a direct method of standardization was used to estimate prevalences for CF recruits

were they to have a similar age group and sex profile as the general Canadian population. As such, variations that might be observed in a particular variable as a function of age and sex differences across these populations have been accounted for. However, it is very important to note that observed discrepancies between standardized RHQ prevalence proportions and Canadian estimates based on the CCHS are only approximate, since varying survey administration modes and other factors may limit comparability.

Some questions drawn from the CCHS were only included as optional modules (e.g., sedentary behaviour, bicycle helmet use, seatbelt use, self-esteem, social support), and were thus not administered in all regions of Canada. For such variables, age- and sex-standardized prevalence proportions were computed for both the CF recruit population and the CCHS 2.1 subsample who was administered the question. However, it is important to acknowledge that estimates based on the CCHS for these variables may not be taken to necessarily reflect those of the general Canadian population. Likewise, it should be acknowledged that observed discrepancies between standardized prevalence proportions for RHQ respondents and those for these CCHS subsamples are also only approximate, since varying survey administration modes and other factors may limit comparability.

Also presented in the report are results of analyses of differences by the key demographic factors of:

- a. age group (17-19 year olds, 20-24 year olds, and 25-49 year olds);
- b. income group (\$49,999 or less, \$50,000 or more);
- c. rank (NCM candidate or Officer candidate); and
- d. sex.

Demographic differences were examined using chi-square analyses for categorical indicators, and a series of one-factor analyses of variance (ANOVAs) for continuous indicators. These differences were examined for every health-related variable of interest.

In order to emphasize results, significant demographic differences are presented in bullets following general findings in each area of investigation throughout the report. When no bullet is presented for a given demographic factor, the difference did not achieve statistical significance. A more stringent alpha level of .01 was used as a criterion for all tests of significance in order to adjust for an inflated family-wise error rate due to multiple comparisons.

2.4 Respondents

Participants were 3852 CF recruits who completed the RHQ in their first week of basic military training (representing 92% of the recruit population from July 2003 to December 2004). This sample consisted of NCM (72.6%) as well as Officer candidates (27.4%). Throughout this report, the term CF recruits will be used to refer to the full sample of NCM and Officer candidates. Participants were primarily male (84.1%) and under the age of 25 years (66.6%). A complete breakdown of participants by demographic groupings is presented in Table 2.

Table 2: Demographic Profile of 2003-2004 Respondents of the Recruit Health Questionnaire

Demographic Variable	Frequency	Percent
Age		
17 – 19 years	1134	30.2
20 – 24 years	1366	36.4
25 – 29 years	706	18.8
30 – 34 years	315	8.4
35 – 39 years	142	3.8
40 – 44 years	69	1.8
45 – 50 years	22	0.6
Childhood Living Environment		
Moved around a lot to different communities	637	17.4
On a farm, ranch, or in the country	326	8.9
In a small town with less than 10,000 people	920	25.2
In a small city with about 10,000 to 100,000 people	857	23.5
In a large city or suburb with over 100,000 people	873	23.9
Not sure	39	1.1
Dependents Living in Household after Recruit Training		
No	2802	78.8
Yes	755	21.2
Education		
Some secondary	397	11.0
Completed secondary	1349	37.3
Some community college/CEGEP	453	12.5
Completed community college/CEGEP	619	17.1
Some university courses	303	8.4
Completed university degree	427	11.8
Postgraduate studies	73	2.0
Household Income		
Less than 20,000\$	643	21.3
20,000\$ to 49,999\$	978	32.4
50,000\$ to 99,999\$	955	31.7
More than 100,000\$	439	14.6

Demographic Variable	Frequency	Percent
Language		
English	2212	73.4
French	800	26.6
Marital Status		
Married/Living with partner	882	24.1
Single/Never married	2685	73.4
Other (divorced, separated, widowed)	89	2.4
Rank		
NCM candidates	2617	72.6
Officer candidates	989	27.4
Sex		
Males	3206	84.1
Females	604	15.9

Note. Percentages presented for each demographic factor are based on the sample of cases for which the corresponding demographic information was available.

In considering observations on household income, it is important to acknowledge that many of the CF recruits may have still been residing with their parents or guardians prior to enrolling in basic military training. It is unclear whether such recruits had accurate knowledge of the income of their parents or guardians. Moreover, the number of individuals living in the household who rely on this income was not specified.

3 Results

3.1 Health Status

Reflecting a broader perspective on health, the RHQ assesses recruits' self-perceived overall health status in addition to examining the prevalence of various physical and psychological conditions.

3.1.1 Self-Perceived Health

General health status was first assessed by asking respondents to rate their overall health. This strategy has been found to be as reliable as established objective measures of functional ability, chronic diseases and psychological well-being (Shields & Shoostari, 2001).

Respondents of the RHQ rated their overall health quite favourably, with excellent, very good, or good health reported by 97.6% of respondents. The age and sex standardized prevalence proportion fell slightly above estimates for the Canadian population (Table 3).

Table 3: Prevalence of Good to Excellent Health among Recruits and Canadians

	Recruits – Crude Proportion	Recruits – Standardized Proportion	Canadian Proportion
Good to excellent self-rated health	97.6	98.2	93.3

Analyses comparing different demographic groups of CF recruits on self-rated health revealed no statistically significant differences by age, income, rank, or sex.

3.1.2 Physical Health

As more specific indicators of health status, the RHQ assessed a number of physical health conditions expected to be of importance to deployability and readiness of the military population, including somatic symptoms, injuries, and obesity.

3.1.2.1 Somatic Symptoms

Somatic symptoms (e.g., stomach pain, back pain, headaches) have been found to be associated with post-deployment illnesses such as posttraumatic stress disorder (PTSD) (Hoge, Terhakopian, Castro, Messer, & Engel, 2007). Based on recommended cutoff scores for the Patient Health Questionnaire (PHQ) 15-item somatic symptom scale (PHQ-15) (i.e., scores of 4 or less, 5 to 9, 10 to 14, and 15 or over for minimal, low, medium, and severe somatic symptoms, respectively; Kroenke *et al.*, 2002), the majority of respondents reported experiencing minimal severity of somatic symptoms (70.8%), followed by low (25.0%), medium (3.8%), and high severity of somatic symptoms (0.4%).

Further analyses revealed that:

- a. the severity of somatic symptoms differed by sex, with a higher proportion of females than males reporting medium to high severity levels of somatic symptoms, $\chi^2(1) = 68.92, p < .001$ (10.5% versus 3.0%).

3.1.2.2 Injuries in the Past Year

Also a key factor affecting operational readiness (Kaufman, Brodine, & Shaffer, 2000), injuries have been found to be associated with deployment-limiting health conditions in CF members (Dubiniecki, 2008). The RHQ examined repetitive strain injuries (RSIs) in addition to acute injuries sustained by CF recruits in the past year. RSIs refer to the group of injuries resulting from overuse of a tool or activity requiring repeated movement. Examples include carpal tunnel syndrome, tennis elbow, or tendonitis. By contrast, acute injuries have rapid onset and typically result from a particular accident (e.g., getting hit or falling). These include sprains or strains, broken bones, or cuts.

As shown in Table 4, at least one injury due to repetitive strain was reported by 7.7% of CF recruits. Acute injuries were more common, as 15.2% of CF recruits reported having sustained an injury that was serious enough to limit normal activity in the past year. For both types of injuries, age and sex standardized prevalence proportions were lower than estimates for the Canadian population.

Table 4: Prevalence of Single/Multiple Injuries Sustained in Year prior to Basic Training among Recruits and Canadians

Type of Injury	Recruits – Crude Proportion	Recruits – Standardized Proportion	Canadian Proportion
RSI	7.7	6.8	12.3
Acute injury	15.2	11.7	14.7

The types of activities in which CF recruits were engaging when they sustained their RSIs are presented in Table 5 in decreasing order of importance. The most common activity resulting in an RSI was sport or other types of physical exercise, followed by work. The age and sex standardized prevalence proportion of RSIs resulting from sports activities was higher among recruits compared to estimates for the Canadian population, while it was lower for RSIs resulting from work (Table 5).

Table 5: Types of Activities causing RSIs Sustained in Year prior to Basic Training

Type of Activity	Recruits – Crude Proportion	Recruits – Standardized Proportion	Canadian Proportion
Sport or physical exercise	66.6	54.2	27.3
Working at my job	27.2	18.8	50.7
Leisure or hobby	5.9	—	—
Household chores/ unpaid work/education	2.1	—	—
Sleeping/eating/ personal care	1.4	—	—
Other	7.7	—	—
Not sure	1.7	—	—

Note. The sum of percentages exceeds 100 because respondents could report more than one activity.

The types of acute injuries reported by respondents are presented in Table 6 in decreasing order of importance. The most common types of injuries were sprains or strains, broken or fractured bones, as well as cuts, punctures and animals bites.

Table 6: Types of Acute Injuries Sustained in Year Prior to Basic Training

Injury	Recruits – Crude Proportion
Sprain or strain	51.1
Broken or fractured bones	19.7
Cut, puncture, animal bite	14.7
Blister	14.4
Dislocation	4.6
Burn, scald, chemical burn	4.6
Multiple injuries	3.2
Concussion or other brain injury	2.0
Injury to internal organ	0.9
Other	14.7

Note. The sum of percentages exceeds 100 because respondents could report more than one injury.

Further analyses revealed:

- a. a significant difference according to age, $\chi^2(2) = 23.12, p < .001$, with a greater proportion of younger CF recruits reporting acute injuries compared to their older counterparts, as shown in Figure 1;

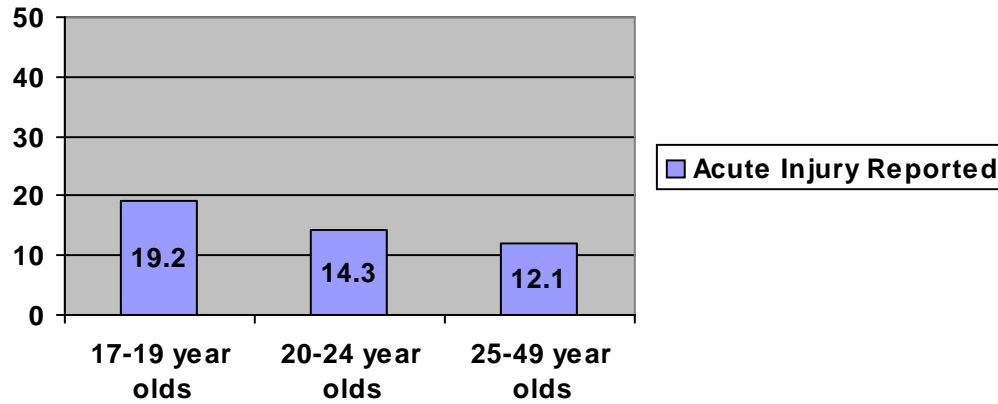


Figure 1: Prevalence of Single/Multiple Acute Injuries Sustained in Year prior to Basic Training by Age Group

- b. and a significant difference according to rank, $\chi^2(1) = 10.44, p < .001$, with a higher proportion RSIs among Officer candidates compared to NCM candidates (10.1% versus 6.8%).

3.1.2.3 Weight

The increasing prevalence of overweight and obesity has emerged as a key health concern in Canada and in the CF (HLIS, 2004), given its link to conditions such as Type 2 diabetes and cardiovascular disease (Orpana, Tremblay, & Finès, 2007). Thus, Body Mass Index (BMI) was computed to examine the prevalence of underweight (BMI less than 18.5), normal (BMI of 18.5 to 24.9), overweight (BMI of 25 to 29.9), and obesity (BMI of 30 or more) in CF recruits. One of the problems with using BMI to assess obesity is that it is not sensitive to excess muscle mass (Prentice & Jebb, 2001). In light of sex differences in muscle mass, weight status was examined separately for male and female CF recruits.

Among male CF recruits, 1.7% were categorized as underweight, 54.5% were of normal weight, 35.3% were overweight, and 8.4% were obese. As shown in Table 7, age standardized prevalence proportions slightly differed from estimates for the male Canadian population¹. The prevalence proportions of underweight and normal weight were comparable to estimates for the male Canadian population. The proportion of obese male CF recruits was lower. However, the

¹ Age and sex standardized prevalence proportions of different BMI categories were only computed for CF recruits between the ages of 20 and 49 years, as no data is available on BMI for individuals of less than 20 years of age in the public use microdata file of the CCHS, cycle 2.1 (Statistics Canada, 2005).

proportion of overweight was higher. This last finding could relate to the limited capacity of the BMI to account for muscle mass, which tends to be high among males who are more physically active, such as recruits².

Table 7: Prevalence of BMI Categories among Male Recruits and Canadians

BMI Category	Recruits – Crude Proportion	Recruits – Standardized Proportion	Canadian Proportion
Underweight	1.7	1.0	0.8
Normal Weight	54.5	39.3	40.4
Overweight	35.3	49.8	42.2
Obese	8.4	10.0	16.6

- a. As shown in Figure 2, the BMI profile of male CF recruits significantly differed according to age group, $\chi^2(6) = 174.99$, $p < .001$, with a higher proportion of older male recruits identified as overweight or obese.

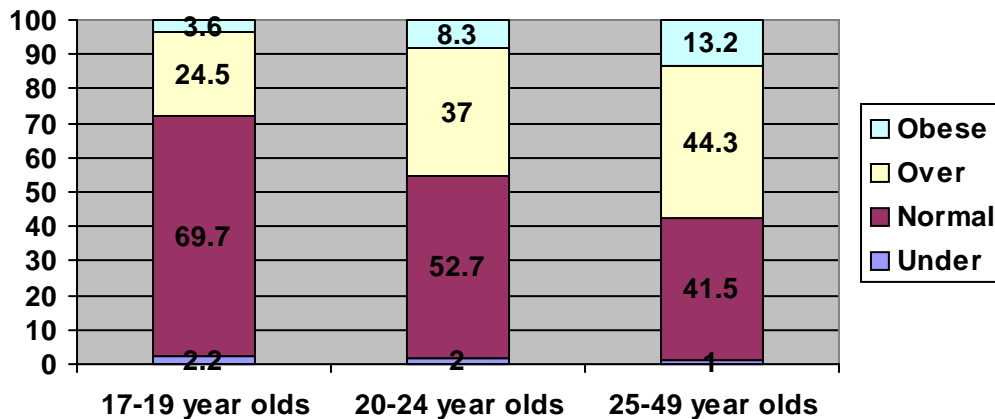


Figure 2: Prevalence of BMI Categories by Age Group

Among female CF recruits, 2.8% were underweight, 70.0% were of normal weight, 23.4% were overweight, and 3.8% were obese (Table 8). Age standardized prevalence proportions³ of underweight status were lower compared to the female Canadian population, while prevalence proportions of normal weight were higher. Also, a lower proportion of female CF recruits were overweight or obese.

² As indicated in the section on health behaviour, results point to a higher proportion of physically active recruits compared to the general Canadian population.

³ As indicated in the section on health behaviour, results point to a higher proportion of physically active recruits compared to the general Canadian population.

Table 8: Prevalence of BMI Categories among Female Recruits and Canadians

BMI Category	Recruits – Crude Proportion	Recruits – Standardized Proportion	Canadian Proportion
Underweight	2.8	1.9	4.3
Normal Weight	70.0	73.5	56.7
Overweight	23.4	21.4	23.1
Obese	3.8	3.2	15.8

No demographic differences in BMI profile were observed among female CF recruits.

3.1.3 Psychological Health

In addition to physical health, psychological health is of great importance to operational readiness (Hoge, Messer, Engel, Krauss, Amoroso, Ryan *et al.*, 2003). Moreover, there is evidence of a higher prevalence of some psychological disorders among CF members compared to the general Canadian population (i.e., major depression and panic disorder) (*The Daily*, 2005). Given that a previous episode of psychopathology is an important risk factor for mental health disorders (Health Canada, 2002) the prevalence of depression, panic disorder and other anxiety disorders, as well as posttraumatic stress disorder (PTSD) was assessed.

3.1.3.1 Depression

Of the possible range of between 0 and 27 on the PHQ 9-item depression screening tool (i.e., the PHQ-9), recruits obtained a mean score of 2.34 ($SD = 3.25$). According to recommendations of Kroenke, Spitzer, and Williams (2001), a score of 15 or more is considered a reliable indicator of both satisfaction of *DSM-IV* criteria for depression and a moderate to severe level of impairment. However, scores between 10 and 14 would also meet the diagnostic criteria for depression, at a lower level of severity (Nease & Malouin, 2003). Based on a cutoff point of 10, 4.1% of respondents were identified as probable cases of depression. However, only 1.2% were identified as probable cases of depression with moderate to severe impairment.

Depression differed as a function of:

- a. income, $\chi^2(1) = 10.56, p < .001$, with a higher prevalence proportion of probable depression observed among respondents of lower compared to higher income (4.9% versus 2.6%); and
- b. and rank, $\chi^2(1) = 19.99, p < .001$, with a higher prevalence proportion in NCM candidates compared to Officer candidates (5.1% versus 1.7%).

3.1.3.2 Other Anxiety Disorders

The likely presence of Other Anxiety Disorders (OAD) was assessed with a 7-item scale from the PHQ. Examples of OAD include generalized anxiety disorder, phobias, stress disorders, and obsessive-compulsive disorder. Based on the algorithm established by Spitzer, Williams, Kroenke, Hornyak, and McMurray (2000), 0.7% of CF recruits were identified as probable cases of OAD.

- a. A slightly higher proportion of NCM than Officer candidates were identified as probable cases of OAD (0.1% versus 1.0%), $\chi^2(1) = 7.51, p < .01$.

3.1.3.3 Panic Disorder

As a more specific example of anxiety disorder, the PHQ scale also assesses panic disorder. Using the algorithm of Spitzer, Kroenke, and Williams (1999), 0.9% of respondents were identified as probable cases of panic disorder. No demographic differences were observed in the number of identified probable cases of panic disorder.

3.1.3.4 Posttraumatic Stress Disorder

Having a range of 17 to 85, the mean total score of the PTSD Checklist—Civilian Version (i.e., the PCL-C) in recruits was 23.69 ($SD = 8.31$). According to Blanchard, Jones-Alexander, Buckley, and Forneris' (1996) recommended score of 50 as a criterion for the presence of PTSD, 1.8% of respondents were identified as probable cases of PTSD.

- a. The number of identified probable cases of PTSD significantly differed by age, with the highest prevalence proportion among 20-24 year old CF recruits (Figure 3), $\chi^2(2) = 9.86, p < .01$;

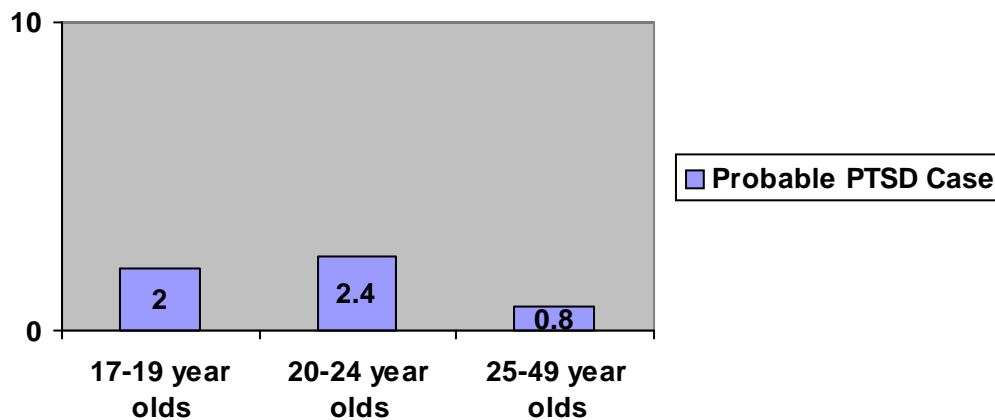


Figure 3: Prevalence of Probable PTSD by Age Group

- b. Also, a higher proportion of NCM candidates than Officer candidates were identified as probable cases of PTSD (2.2% versus 0.9%), $\chi^2(1) = 6.71, p < .01$.

3.2 Health Behaviour

The link between health behaviours and physical health outcomes has received widespread attention, having been confirmed in a wide range of settings (e.g., Mokdad, Marks, Stroup, & Gerberding, 2004; Ezzati, Lopez, Rodgers, Hoon, Murray, & Comparative Risk Assessment Group, 2003; Pomerleau, Pederson, Østbye, Speechley, & Speechley, 1997). In addition, there has been increased emphasis on the importance of lifestyle to psychological health in recent years (Martinsen & Raglin, 2007). Notwithstanding their important implications for health, health behaviours such as alcohol use, cigarette smoking, and physical activity have also been found to be linked to recruit training outcomes (Canada, 2007; Canada, Canham-Chervak, Jones, Strauss, Nagaraja, Slone *et al.*, 2007; Reis, Trone, Macera, & Rauh, 2007). Health behaviours assessed in the RHQ included eating habits, condom use, and traffic safety behaviour as well as alcohol use, smoking, and physical activity.

3.2.1 Alcohol Consumption

Two aspects of alcohol consumption were investigated: the frequency of alcohol consumption, followed by drinking style among those who reported consuming alcohol in the past year.

3.2.1.1 Frequency of Alcohol Consumption

A crude prevalence proportion of 92.5% of recruits reported having consumed alcohol in the past year. Among those who reported drinking alcohol in the past year, 53.7% of them did so less than once a week (i.e., less than once a month, monthly, or 2 to 3 times per month), 45.4% did so one to six times per week, and 0.9% did so daily (Table 8).

The age and sex standardized proportion of CF recruits who consumed alcohol in the past year was slightly greater than that of the Canadian population. On the other hand, the age and sex standardized proportions of CF recruits who consumed alcohol one to six times per week or daily were lower, as indicated in Table 9.

Table 9: Prevalence of Alcohol Use among Recruits and Canadians

Frequency of Alcohol Use	Recruits – Crude Proportion	Recruits – Standardized Proportion	Canadian Proportion
Overall use in past year	92.5	91.0	83.8
Frequency (users only)			
Less than weekly	53.7	58.1	50.5
1-6 times weekly	45.4	41.0	44.9
Daily	0.9	0.9	4.6

3.2.1.2 Drinking Style

Among recruits who reported drinking in the past year, the number of drinks typically consumed on each day of the week was examined. The Centre for Addictions and Mental Health publishes Low-Risk Drinking Guidelines, recommending the consumption of no more than two standard drinks on any one day (daily guideline), up to nine drinks per week for females, and up to 14 drinks per week for males (weekly guideline). Less than half of the recruits reported drinking no more than two alcoholic drinks on any one day of a typical week, while the vast majority reported drinking less than the recommended number of alcoholic drinks per week (Table 10).

Table 10: Prevalence of Low-Risk Drinking Guidelines Compliance among Recruits and Canadians

Low-Risk Drinking Criterion	Recruits – Crude Proportion	Recruits – Standardized Proportion	Canadian Proportion
Follows daily guideline	46.1	59.5	64.5
Follows weekly guideline	81.2	87.6	85.6

As shown above in Table 10, age and sex standardized prevalence proportions for following the daily guideline were lower among recruits compared to estimates for the Canadian population, while those for following the weekly guideline were slightly higher.

- a. The tendency to follow low-risk daily drinking guidelines differed by age, $\chi^2(2) = 100.73, p < .001$, as did the tendency to follow low-risk weekly drinking guidelines, $\chi^2(2) = 94.92, p < .001$. More specifically, a higher proportion of 25-49 year olds followed the guidelines (Figure 4);

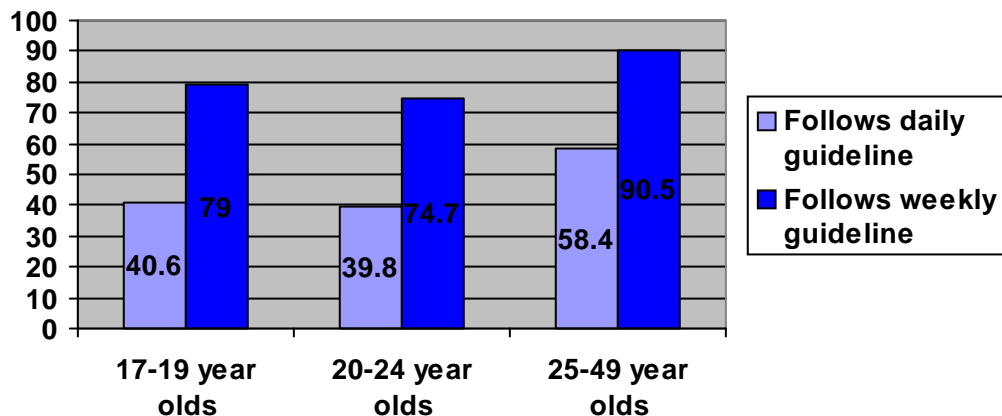


Figure 4: Prevalence of Low-Risk Drinking Guidelines Compliance by Age Group

- b. This was also the case for rank: a higher proportion of Officer candidates than NCM candidates followed low-risk daily drinking guidelines (56.9% versus 41.7%), $\chi^2(1) = 58.74, p < .001$, and low-risk weekly guidelines (91.1% versus 77.3%), $\chi^2(1) = 73.77, p < .001$; and

- c. Last, the tendency to follow low-risk drinking guidelines differed by sex, with a higher proportion of females following daily guidelines than males (64.1% versus 42.7%), $\chi^2(1) = 83.20, p < .001$, and weekly guidelines (87.3% versus 80.1%), $\chi^2(1) = 14.43, p < .001$.

Binge drinking was examined as another aspect of drinking style. In line with the approach taken in the CCHS, binge drinking was defined as the consumption of five drinks or more per occasion. Only 16.7% of recruits who reported drinking alcohol in the past year had never engaged in binge drinking. On the other hand, 29.5% of CF recruits reported having engaged in binge drinking less than once a month, while 53.9% reported having done so monthly or more. Age and sex standardized proportions were slightly lower for never having engaged in binge drinking compared to estimates for the Canadian population. Prevalence proportions were greater for binge drinking less than once a month as well as binge drinking monthly or more (Table 11).

Table 11: Prevalence of Binge Drinking among Recruits and Canadians

Frequency of Binge Drinking	Recruits – Crude Proportion	Recruits – Standardized Proportion	Canadian Proportion
Never	16.7	30.0	43.4
Less than monthly	29.5	34.7	30.3
Monthly or more	53.9	35.3	26.4

- a. Additional analyses revealed that frequency of binge drinking differed by age group, $\chi^2(4) = 151.52, p < .001$. As shown in Figure 5 a higher proportion of the lower age groups engaged in binge drinking more than once a month compared to CF recruits of between 25 and 49 years of age. These observations are in line with previously observed North American trends in alcohol consumption (Maggs & Schulenberg, 2004);

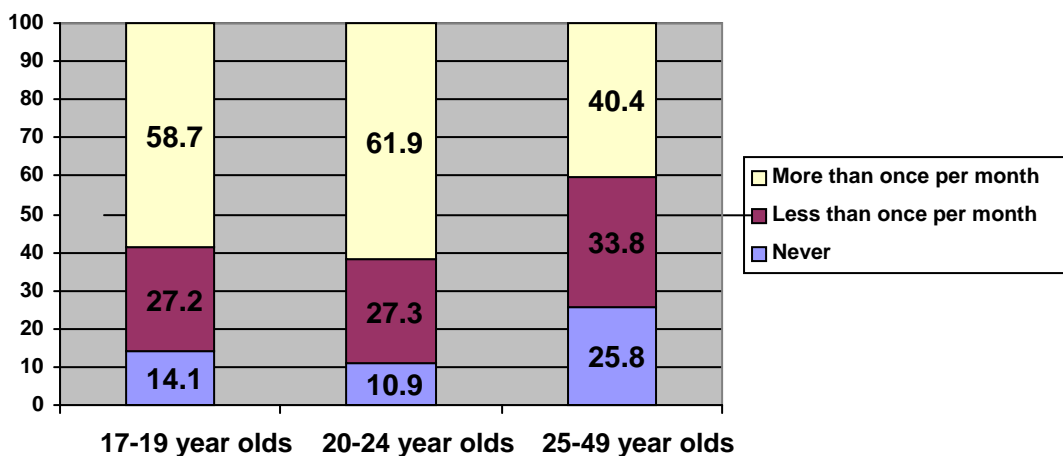


Figure 5: Prevalence of Binge Drinking by Age Group

- b. Binge drinking profiles also differed by rank, $\chi^2(2) = 68.06, p < .001$. As Figure 6 demonstrates, proportionally more NCM than Officer candidates reported having engaged in binge drinking more than once per month; and

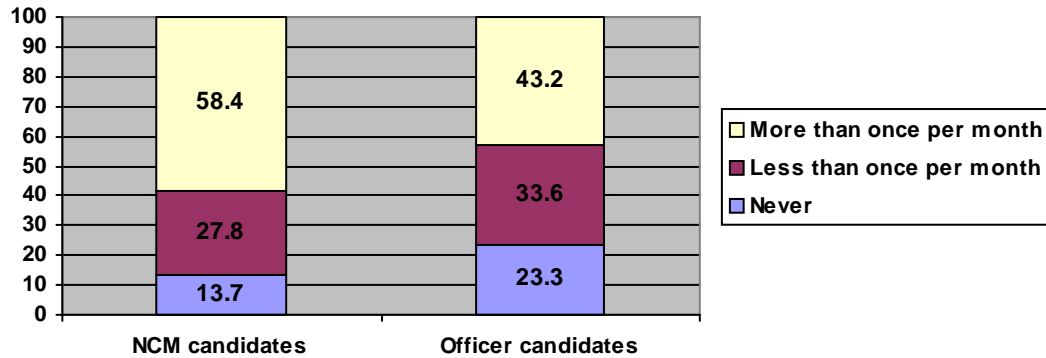


Figure 6: Prevalence of Binge Drinking by Rank

- c. Last, Figure 7 outlines significant differences in binge drinking profiles by sex, $\chi^2(2) = 125.65, p < .001$. In particular, a higher proportion of male than female recruits reported having engaged in binge drinking more than once per month in the past year.

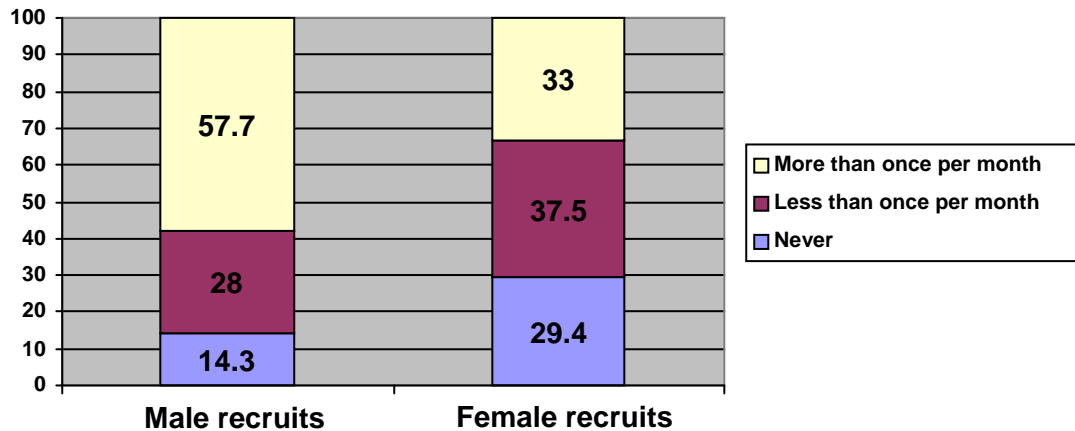


Figure 7: Prevalence of Binge Drinking by Sex

3.2.2 Condom Use

Sexual health practices emerged as a concern based on results of 2000 HLIS (Decima Research Inc, 2002; DFHP, 2005), in that less than 50% of CF members with multiple sexual partners reported always using condoms in the 2000 HLIS. Unfortunately, a similar trend was observed in CF recruits. More specifically, only 46.8% of respondents who were not in an exclusive relationship reported always using a condom while engaging in sexual intercourse in the past 12 months, compared to those who reported usually (20.9%), occasionally (14.9%), or never (17.3%) using one. No significant differences were observed between demographic groups in condom use.

3.2.3 Eating Habits

An examination of self-reported general eating habits revealed that 89.4% of respondents perceived their eating habits to be excellent (9.1%), very good (35.4%), or good (44.8%), while the remaining perceived their eating habits as fair (9.8%) or poor (0.9%).

These observations were somewhat consistent with Canadian estimates for adequate fruit and vegetable consumption, as shown in Table 12. In 2003 and 2004, the recommended number of daily servings of fruits and vegetables was between 5 and 10 (Health Canada, 2009). Based on these recommendations, results suggested that a total of 72.5% of recruits reported eating more than the recommended minimum of 5 daily servings of fruits and vegetables⁴.

Table 12: Prevalence of Fruit and Vegetable Consumption among Recruits and Canadians

Frequency of Fruit and Vegetable Consumption	Recruits – Crude Proportion	Recruits – Standardized Proportion	Canadian Proportion
Less than 5 times per day	27.5	26.4	60.8
5 to 9 times per day	47.9	55.1	35.0
10 or more times per day	24.6	18.5	4.2

Age and sex adjusted prevalence proportions suggested better fruit and vegetable consumption among CF recruits relative to the Canadian population (Table 12).

- a. As shown in Figure 8, fruit and vegetable consumption differed by age, $\chi^2(4) = 41.29$, $p < .001$. In particular, results show that a slightly higher proportion of younger recruits consumed fruits and vegetables 5 times or more per day;

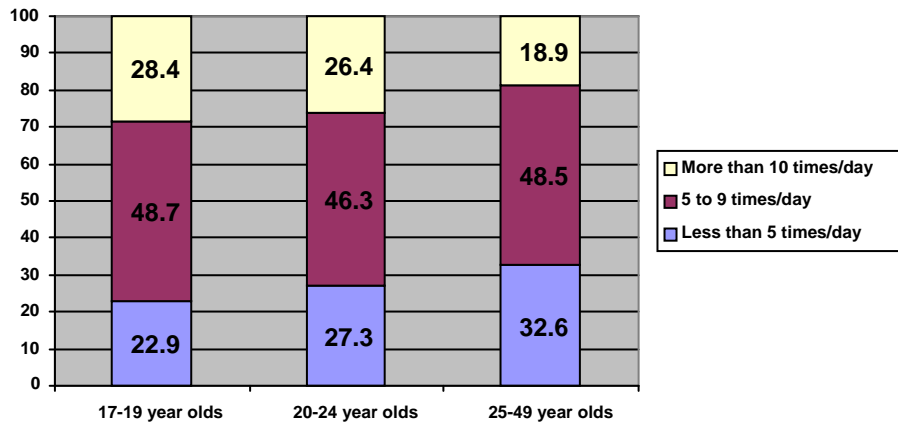


Figure 8: Prevalence of Fruit and Vegetable Consumption by Age Group

⁴ The index of fruit and vegetable consumption is based on items that assess the daily frequency of fruit and vegetable consumption without accounting for serving size. The index may thus only be taken as a proxy measure of number of servings.

- b. Fruit and vegetable consumption also differed by rank, $\chi^2(2) = 9.65, p < .01$. Compared to NCM candidates, a higher proportion of Officer candidates reported consuming the recommended 5 to 9 servings of fruits and vegetables, while fewer reported consuming 10 or more or less than 5 servings (Figure 9); and

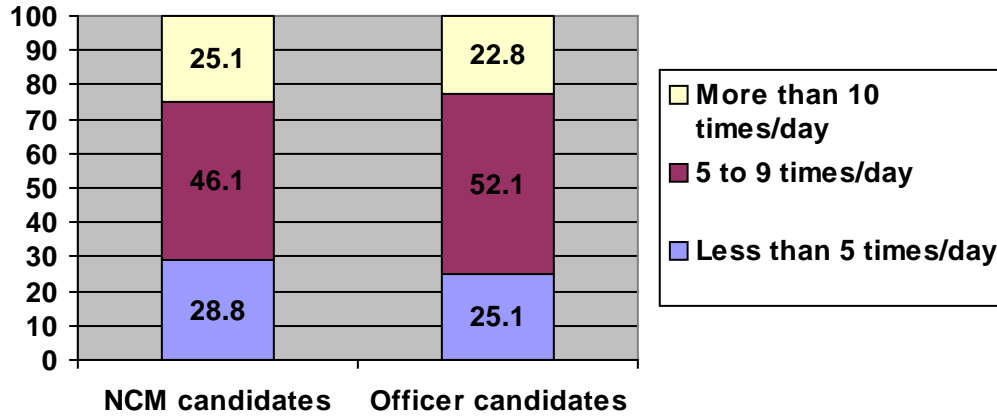


Figure 9: Prevalence of Fruit and Vegetable Consumption by Rank

- c. Finally, fruit and vegetable consumption differed by sex, $\chi^2(2) = 12.24, p < .01$. Compared to males, a slightly higher proportion of females consumed the recommended 5 to 9 servings, and a slightly lower proportion consumed 10 or more servings or fewer than 5 servings (Figure 10).

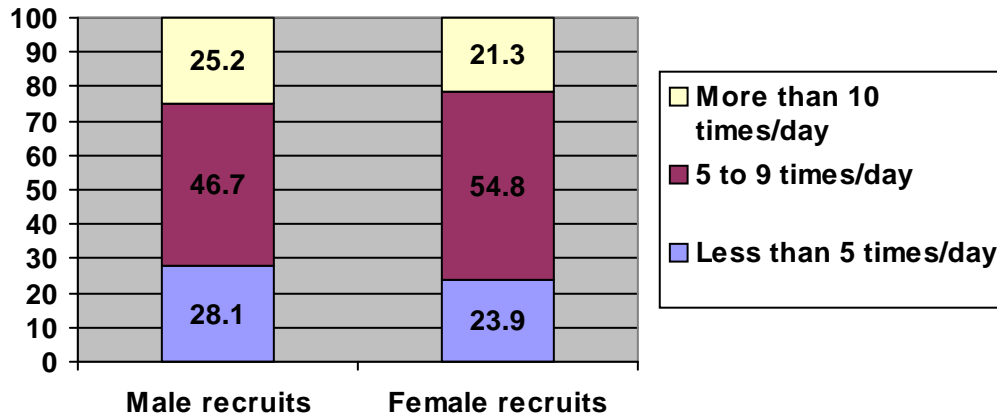


Figure 10: Prevalence of Fruit and Vegetable Consumption by Sex

3.2.4 Physical Activity

Physical activity was assessed with an index of total energy expenditure (EE) drawn from the CCHS (Statistics Canada, 2001), which is calculated based on the frequency and duration of one's engagement in various types of physical activity (e.g., ice skating, jogging, weight-training) and corresponding values of metabolic energy cost. As shown in Table 13, a total of 62.1% of recruits were identified as active, 19.5% were moderately active, and 18.5% were inactive.

Table 13: Prevalence of Physical Activity among Recruits and Canadians

Level of Physical Activity	Recruits – Crude Proportion	Recruits – Standardized Proportion	Canadian Proportion
Inactive	18.5	16.7	28.6
Moderately active	19.5	20.3	25.2
Active	62.1	63.1	46.2

Also shown in Table 13, age and sex standardized prevalence proportions pointed to a relatively greater proportion of active recruits compared to the Canadian population, consistent with observations made of CF members in the 2004 HLIS (DFHP, 2005).

Further analyses revealed that level of physical activity significantly, albeit only slightly differed by income and rank:

- a. Compared to recruits with lower income prior to basic military training, a slightly higher proportion of recruits with greater income reported being moderately active and active, while fewer reported being inactive, $\chi^2(2) = 11.83, p < .01$ (Figure 11); and

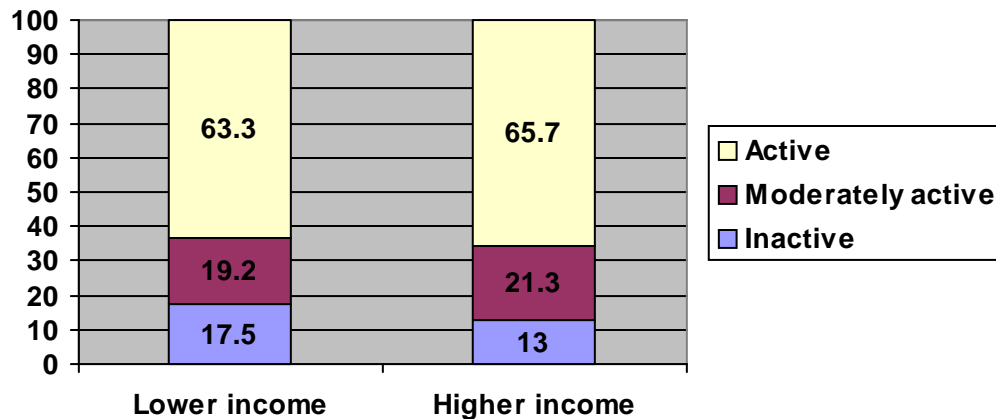


Figure 11: Prevalence of Physical Activity by Income Group

- b. Similarly, a higher proportion of Officer candidates than NCM candidates were identified as moderately active and active, while a lower proportion of them were identified as inactive, $\chi^2(2) = 18.87, p < .001$ (Figure 12).

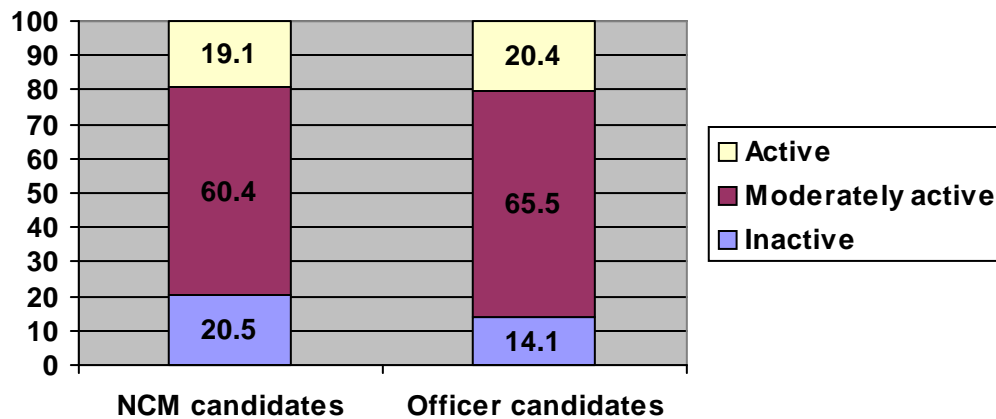


Figure 12: Prevalence of Physical Activity by Rank

3.2.5 Sedentary Behaviours

In addition to physical activity, engagement in sedentary behaviours was examined. The total number of hours spent on the computer, playing video games, watching television or videos, and reading in the past three weeks was computed⁵.

In line with the findings of the 2004 HLIS, which indicated that CF members spent an average of 24 hours per week in some form of sedentary activity, CF recruits reported spending an average of 24.71 ($SD = 18.00$) hours per week engaging in such activities. As indicated in Table 14, a total of 36.9% of recruits reported engaging in less than 15 hours of sedentary behaviours per week compared to 31.5% who reported engaging between 15 and 29 hours and 31.6% who reported engaging in 30 hours or more in such behaviours.

Age and sex standardized prevalence proportions were higher for engaging in less than 15 hours and lower for engaging in 15 to 29 hours of sedentary activities per week compared to the Canadian population. However, their prevalence of engaging in 30 hours a week or more in such activities was higher (Table 14).

⁵ The algorithm used to compute scores for the weekly total number of hours spent in sedentary activity on which age and sex standardized prevalence proportions of different levels of sedentary behaviour were based was slightly different than the one that was used to compute scores on which equivalent crude prevalence proportions were based. Crude prevalence proportions were derived from scores that were computed from all sedentary activities examined (i.e., time spent on the computer, playing video games, watching television or videos, and reading). To be in line with the algorithm used in the CCHS and to improve comparability, age and sex standardized prevalence proportions were derived from scores that excluded time spent playing video games for respondents of 20 years of age or more (Statistics Canada, 2005).

Table 14. Prevalence of Sedentary Behaviour among Recruits and Canadians

Level of Sedentary Behaviour	Recruits – Crude Proportion	Recruits – Standardized Proportion	Canadian Proportion
Less than 15 hours weekly	36.9	44.4	38.9
15 to 29 hours weekly	31.5	27.6	47.6
30 or more hours weekly	31.6	28.0	13.6

- As shown in Table 15, sedentary behaviour significantly differed across age groups, with 20-24 year olds spending the most amount of time engaging in such activities, $F(2, 3540) = 4.78, p < .01$;
- In addition, NCM candidates spent significantly more time engaging in sedentary behaviour compared to Officer candidates, $F(1, 3396) = 8.96, p < .01$ (Table 15); and
- as did males compared to females, $F(1, 3601) = 12.45, p < .001$ (Table 15).

Table 15: Mean Number of Weekly Hours and Standard Deviations Spent Engaging in Sedentary Behaviours by Demographic Groupings

Demographic Variable	Total Number of Hours/Week
	<i>M (SD)</i>
Overall	24.71 (18.00)
Age Group	
17 – 19 years	23.39 (17.57)
20 – 24 years	25.65 (18.44)
25 – 49 years	24.93 (17.88)
Rank	
NCM candidates	25.47 (18.85)
Officer candidates	23.41 (15.71)
Sex	
Males	25.18 (18.33)
Females	22.31 (16.02)

Note. M = mean; SD = standard deviation.

Partial η^2 was computed to determine the size of these effects. The partial η^2 value describes the proportion of variance accounted for in the sample. Partial η^2 was computed at .003 for each of the above analyses, indicating that age, rank, and sex each accounted for only 0.3% of the sample variance in sedentary behaviour. Therefore, although these demographic differences achieved statistical significance, they were very small.

3.2.6 Smoking

The majority of respondents identified themselves as never-smokers (61.0%), while 17.7% were ex-smokers and 21.4% were current smokers. Results presented in Table 16 suggest a lower prevalence proportion of current smokers⁶ and ex-smokers and a higher prevalence proportion of never smokers compared to estimates for the Canadian population.

Table 16: Prevalence of Smoking among Recruits and Canadians

Smoking Status	Recruits – Crude Proportion	Recruits – Standardized Proportion	Canadian Proportion
Never smoker	61.0	51.3	37.5
Ex-smoker	17.7	27.9	34.6
Current smoker	21.4	20.8	27.9

- a. As shown in Figure 13, there were significant differences in smoking status by age, $\chi^2(4) = 188.27$, $p < .001$. Most notably, a greater proportion of 17-19 year olds reported never having smoked compared to older age groups;

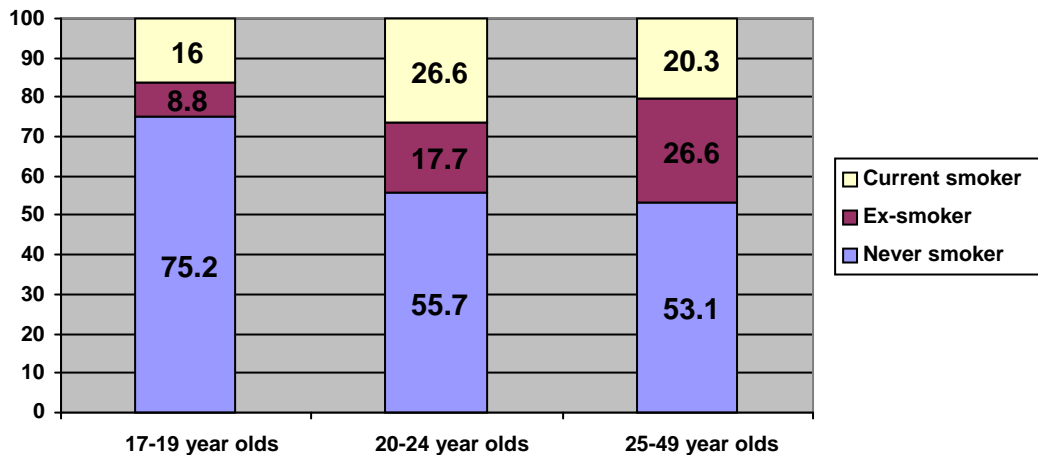


Figure 13: Prevalence of Smoking by Age Group

- b. Also, Figure 14 demonstrates differences in smoking status by income, $\chi^2(2) = 13.03$, $p < .01$. A slightly lower proportion of respondents of lower income identified themselves as never smokers;

⁶ The fact that the question used to examine smoking status in the CCHS, cycle 2.1 is slightly different than the one used in the RHQ should additionally be noted when comparing age and sex standardized prevalence proportions of smoking in recruits and estimates for the Canadian population.

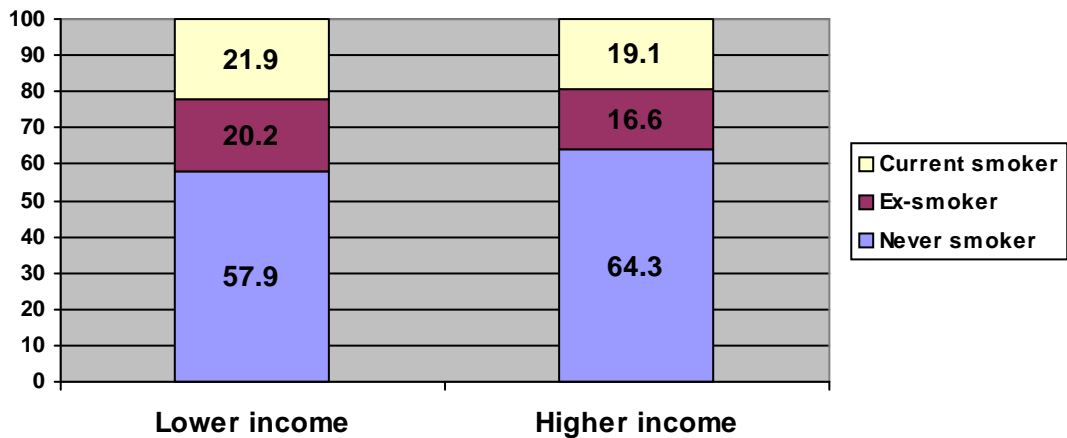


Figure 14: Prevalence of Smoking by Income Group

- c. Although to a much greater extent, smoking status significantly differed by rank in a similar pattern as it did by income, $\chi^2(2) = 247.37, p < .001$. As shown in Figure 15, a lower proportion of NCM candidates identified themselves as never smokers; and

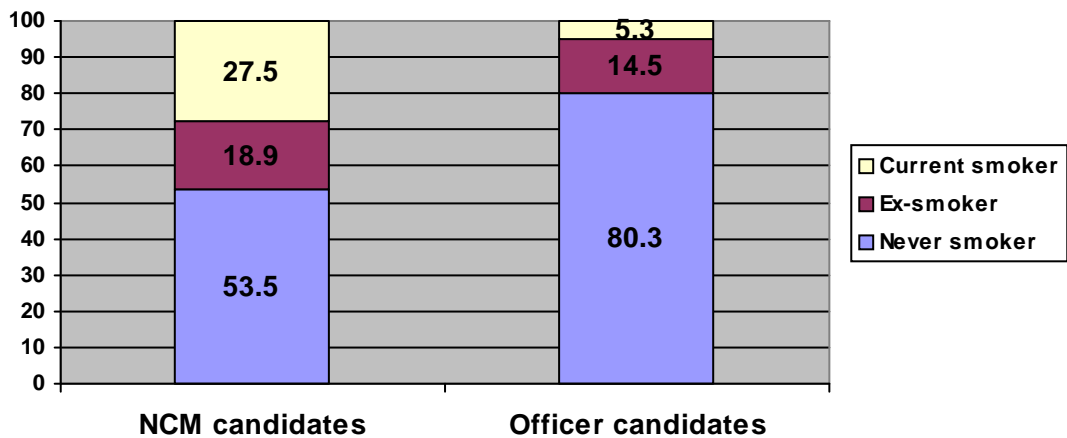


Figure 15: Prevalence of Smoking by Rank

- d. Last, smoking status differed by sex (see Figure 16), $\chi^2(2) = 18.38, p < .001$: A relatively equal proportion of males and females reported never having smoked. However, there was a slight tendency for more males to report being current smokers compared to females, and for more females to report being ex-smokers compared to males.

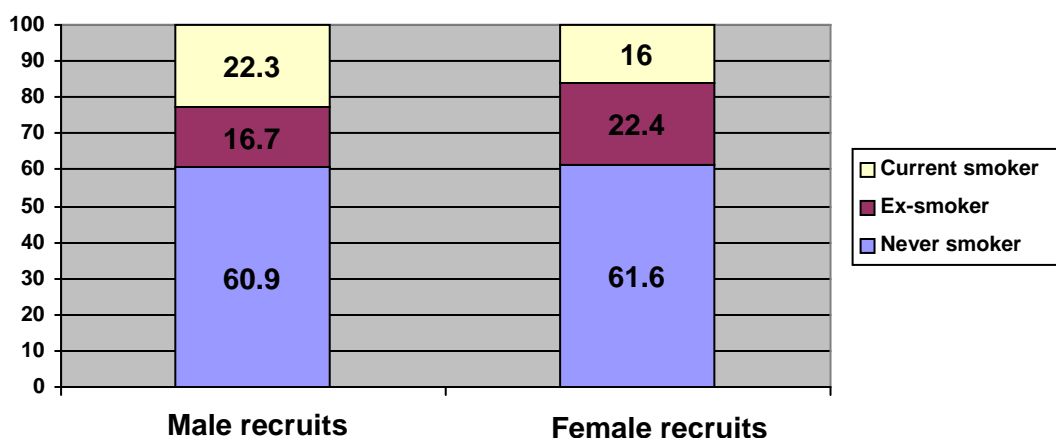


Figure 16: Prevalence of Smoking by Sex

3.2.7 Traffic Safety Practices

Respondents' participation in various traffic safety practices was examined, such as helmet use, seatbelt use, driving while under the influence of alcohol (DUI), and traffic violations. Results are presented in Table 17.

Table 17: Prevalence of Traffic Safety Practices among Recruits and Canadians

Traffic Safety Practice	Recruits – Crude Proportion	Recruits – Standardized Proportion	Canadian Proportion
Bike helmet use	26.5	39.7	35.6
Personal seatbelt use	79.4	89.2	88.4
Passenger seatbelt use	66.8	—	—
Passenger in DUI instance	15.9	—	—
Driver in DUI instance	0.7	—	—
Traffic violation	51.1	—	—

Only 26.5% of respondents reported always wearing their helmet while bicycling. The age and sex standardized prevalence proportion was higher than the estimated prevalence proportion of in the Canadian population.

On the other hand, the majority of respondents reported always wearing their seatbelts while driving a car. Also, most respondents reported always insisting that passengers have their seatbelts fastened. The age and sex standardized prevalence proportion of CF recruits who reported always wearing their seatbelts while driving was similar to that of the general Canadian population.

With regards to driving and alcohol use, 15.9% of respondents reported being a passenger of a driver who had too much to drink in the past year, and 0.7% of respondents who drove in the past year reported driving at least once when they had too much to drink. Of respondents who drive, 51.1% reported receiving at least one traffic violation in the past.

- a. Figure 17 highlights age differences in some traffic safety practices. Significant age differences were observed in bike helmet use, $\chi^2(2) = 114.50, p < .001$; in seatbelt use, $\chi^2(2) = 46.88, p < .001$; in insisting on passenger seatbelt use, $\chi^2(2) = 90.81, p < .001$; in being the passenger in a DUI incident, $\chi^2(2) = 63.56, p < .001$; and in traffic violations, $\chi^2(2) = 378.35, p < .001$. As a general rule, older recruits more frequently reported safety practices;

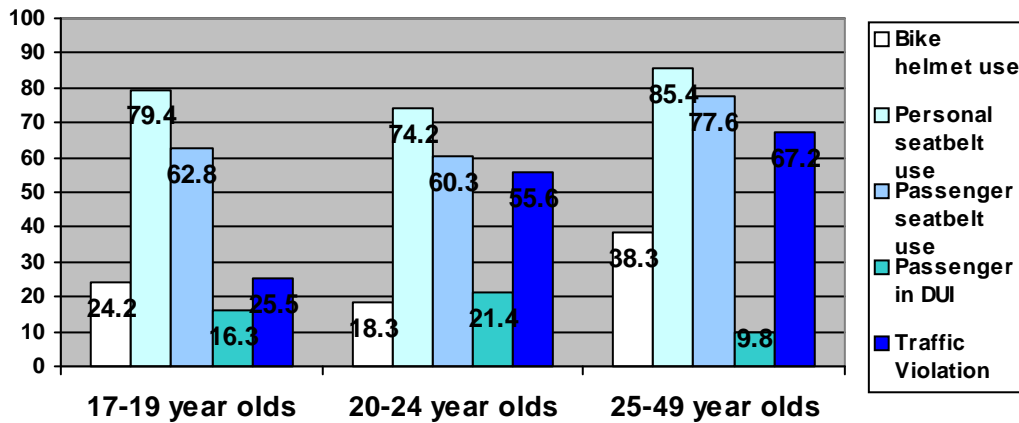


Figure 17: Prevalence of Traffic Safety Practices by Age Group

- b. Only helmet use varied by income, with a greater proportion of respondents of higher income reporting that they always use their helmets while riding their bicycle, $\chi^2(1) = 9.16, p < .01$ (Figure 18);

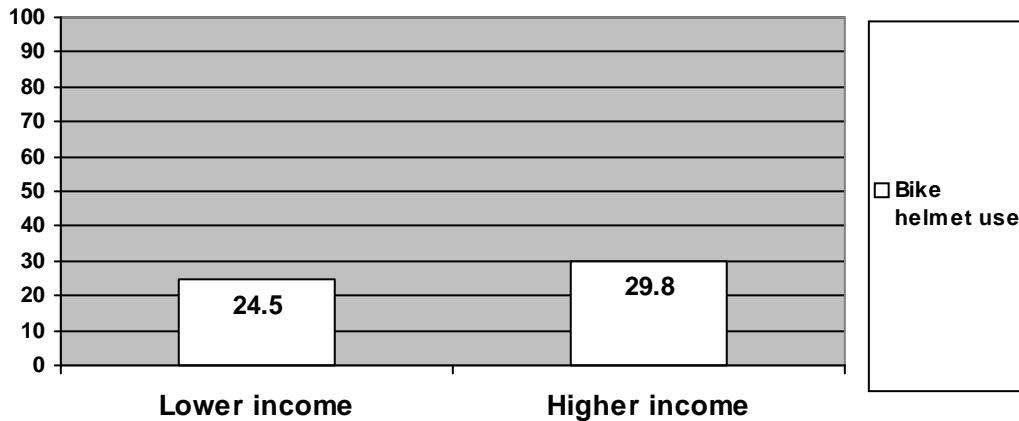


Figure 18: Prevalence of Traffic Safety Practices by Income Group

- c. Rank differences were observed in bike helmet use, $\chi^2(1) = 193.33, p < .001$; in seatbelt use, $\chi^2(1) = 56.34, p < .001$; in being the passenger in a DUI incident, $\chi^2(1) = 48.14, p < .001$; and in traffic violations, $\chi^2(1) = 31.59, p < .001$. Results are shown in Figure 19, and point to a greater frequency of safety practices among Officer candidates relative to NCM candidates; and

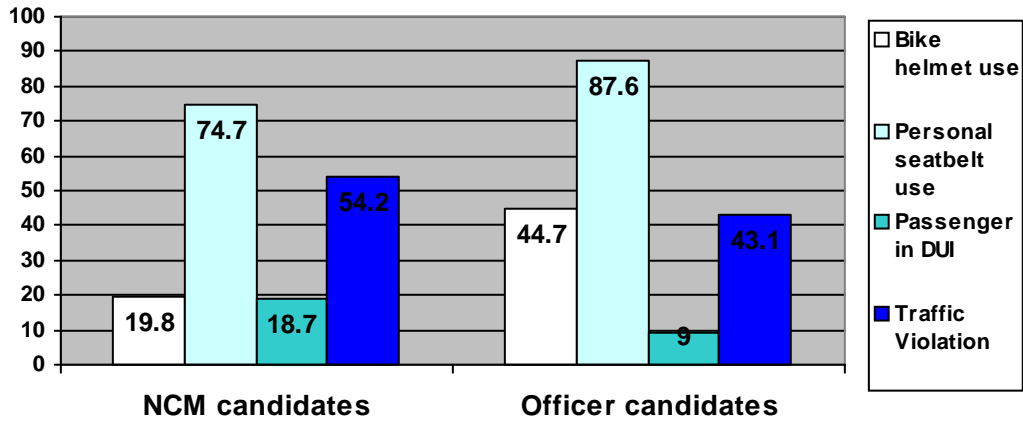


Figure 19: Prevalence of Traffic Safety Practices by Rank

- d. Sex differences were found in bike helmet use, $\chi^2(1) = 46.39, p < .001$; in seatbelt use, $\chi^2(1) = 45.41, p < .001$; in insisting on passenger seatbelt use, $\chi^2(1) = 60.97, p < .001$; in being the passenger in a DUI incident, $\chi^2(1) = 47.06, p < .001$; and in traffic violations, $\chi^2(1) = 36.35, p < .001$. As shown in Figure 20, there was a general tendency for a higher proportion of female recruits to report safety practices.

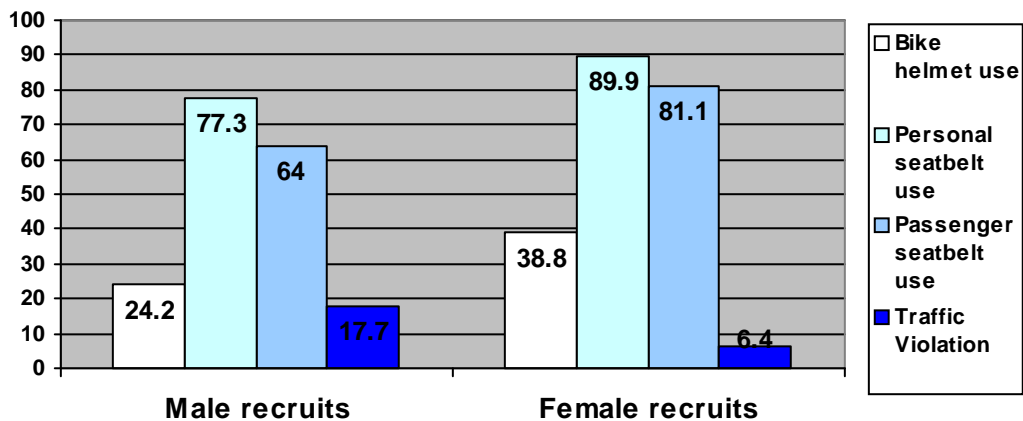


Figure 20: Prevalence of Traffic Safety Practices by Sex

3.3 Psychological Disposition

While assessing baseline health status and lifestyle is essential to health monitoring, there has been increased interest in the role of personality factors in health outcomes. Personality assessment is already widely applied in the context of military selection and training, and there is growing recognition that the same dispositional factors associated with performance in the military may also act as risk or resilience factors in the context of health (Sümer & Sümer, 2007; Thompson & Gignac, 2001). The RHQ therefore assesses several such dispositional factors. Scores on measures assessing dispositional factors were either normally distributed, or approached a normal distribution (none were bimodal). Definitions of each dispositional factor are presented, along with their theorized relationships with health outcomes.

It is acknowledged that cutoff scores to identify “at risk” personality types are not clearly established for the scales used to assess these personality factors. However, given that the semantic values corresponding to each numeric value of the ratings scales used by RHQ respondents to answer questions on personality were specified (e.g., 1=strongly agree, 2=agree, 3=neither agree nor disagree, 4=disagree, 5=strongly disagree, as specified in Table 1), the average numeric rating on a scale could be equated to a particular semantic value. Thus, if CF recruits obtained an average rating nearest to 1 on a measure of optimism for which the rating scale shown above was used, one could assume that recruits would typically “strongly agree” that they are optimistic. Examining the percentage of extreme cases—those with average ratings approaching the highest possible rating (for personality traits associated with negative health outcomes) or lowest possible rating (for personality traits associated with positive health outcomes) on each scale—may also be useful, as it is theorized that such cases would be most likely to experience related health outcomes⁷.

3.3.1 Alexithymia

Alexithymia has been linked to a number of psychiatric as well as medically unexplained physical symptoms (MUPS) (Bagby, Parker, & Taylor, 1994). Alexithymia is a psychological disposition characterized by i) a difficulty identifying feelings and characterizing emotional states and ii) a difficulty describing feelings to others. Other characteristics include iii) a limited capacity for imagination and iv) a stimulus-bound, externally-oriented way of thinking, although research suggests that these latter two facets are strongly associated (Bagby *et al.*, 1994). Thus, the TAS-20, considered as the gold-standard measure of alexithymia, assesses these last characteristics in a single subscale.

⁷ For personality traits associated with positive health outcomes, extreme cases were defined as individuals whose average item rating on a given scale corresponded to disagreement (average ratings of 2 or less on the Agreeableness, Conscientiousness, Extroversion, and Openness BFI subscales, the Hardiness Scale, the LOT-R Scale, the PANAS subscales, as well as average ratings of 1 or less on the Mastery Scale and the Self-Esteem Scale). For personality traits associated with negative health outcomes, extreme cases were defined as individuals whose average item rating on a given scale corresponded to agreement (average ratings of 4 or more on all of such scales or subscales).

Mean scores obtained by respondents on the difficulty describing feelings (DDF; possible score range of 5 to 25), difficulty identifying feelings (DIF; possible score range of 7 to 35), and externally-oriented thinking (EOT; possible score range of 8 to 40) subscales of the TAS-20 are presented in Table 18.

An examination of average item ratings on each scale reveals a tendency for respondents to remain neutral about statements describing them as having DDF or EOT, as well as a tendency for them to moderately disagree with statements describing them as having DIF.

Cutoff scores of 20 for the DDF, 28 for the DIF, and 32 for the EOT TAS-20 subscale (equivalent to average ratings reflecting moderate or stronger agreement) were used to identify extreme cases, revealing 9.1% extreme cases of high DDF, 1.7% extreme cases of high DIF, and 0.5% extreme cases of high EOT.

Mean scores and standard deviations on each subscale are shown in Table 18 by age, income, rank, and sex groups. In this table, means in the same column that do not share a subscript within a particular demographic category (such as age or income) were found to be significantly different⁸. Thus, analyses revealed that:

- a. Younger age groups reported greater DDF, $F(2, 3412) = 50.55, p < .001$, partial $\eta^2 = .029$, DIF, $F(2, 3397) = 43.76, p < .001$, partial $\eta^2 = .025$, and EOT compared to older age groups, $F(2, 3375) = 46.49, p < .001$, partial $\eta^2 = .027$;
- b. Compared to respondents of higher income, respondents of lower income reported greater DIF, $F(1, 2883) = 17.42, p < .001$, partial $\eta^2 = .006$;
- c. NCM candidates reported greater DDF, $F(1, 3267) = 8.54, p < .01$, partial $\eta^2 = .003$, DIF, $F(1, 3253) = 34.84, p < .001$, partial $\eta^2 = .011$, and EOT compared to Officer candidates $F(1, 3231) = 92.94, p < .001$, partial $\eta^2 = .028$; and
- d. Finally, male candidates demonstrated greater DDF, $F(1, 3471) = 18.00, p < .001$, partial $\eta^2 = .005$, and EOT compared to female candidates, $F(1, 3434) = 58.70, p < .001$, partial $\eta^2 = .017$.

⁸ This explanation regarding subscripts also applies to Tables 18 through 21.

Table 18: Mean Scores and Standard Deviations on Toronto Alexithymia Scale Subscales by Demographic Groupings

Demographic Variable	Difficulty Describing Feelings	Difficulty Identifying Feelings	Externally Oriented Thinking
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Overall	13.04 (4.56)	14.07 (5.73)	20.22 (4.34)
Age Group			
17 – 19 years	13.97 (4.56) _a	15.11 (5.92) _a	20.95 (4.30) _a
20 – 24 years	13.17 (4.61) _b	14.22 (5.77) _b	20.47 (4.36) _a
25 – 49 years	12.05 (4.31) _c	12.87 (5.22) _c	19.24 (4.17) _b
Income			
≤ \$49,999	13.11 (4.54) _a	14.35 (5.75) _a	20.27 (4.31) _a
≥ \$50,000	12.73 (4.55) _a	13.47 (5.51) _b	19.86 (4.36) _a
Rank			
NCM candidates	13.20 (4.58) _a	14.42 (5.88) _a	20.67 (4.23) _a
Officer candidates	12.68 (4.52) _b	13.10 (5.30) _b	19.04 (4.47) _b
Sex			
Males	13.19 (4.54) _a	14.08 (5.73) _a	20.46 (4.32) _a
Females	12.30 (4.61) _b	13.91 (5.70) _a	18.94 (4.21) _b

Note. *M* = mean; *SD* = standard deviation. Means in the same column that do not share a subscript differ at $p < .01$ within that demographic category.

3.3.2 Big Five Personality Dimensions

A pervasive view in personality theory is that five broad dimensions underlie personality – agreeableness (the tendency to be pleasant and accommodating in social situations), conscientiousness (the tendency to be careful and to act according to one’s conscience), extroversion (the tendency for enthusiasm and outgoingness), neuroticism (the tendency to experience unpleasant emotions or emotional instability), and openness (the tendency to appreciate and be openness to novel experiences and ideas), all of which have been linked to physical symptoms and lifestyle (Bruchon-Schweitzer, 2002; Smith & Williams, 1992). In particular, agreeableness, conscientiousness, extroversion, and openness are expected to be associated with more favourable health outcomes, and neuroticism is expected to be associated with poorer health outcomes (Smith & Williams, 1992). To assess these personality traits, respondents completed the 44-item Big Five Inventory (BFI) (John, Donahue, & Kentle, 1991). Mean scores reported by respondents reported mean scores on Agreeableness (possible score range of 9 to 45), Conscientiousness (possible score range of 9 to 45), Extroversion (possible score range of 8 to 40), Neuroticism (possible score range of 8 to 40), and Openness (possible score range of 6 to 30) are presented in Table 19.

Average item ratings on each subscale revealed a tendency for respondents to agree with statements about their own agreeableness, conscientiousness, extroversion, and openness, and to be neutral about statements regarding their own neuroticism.

Cutoff scores of 18 for Agreeableness and Conscientiousness, of 16 for Extroversion, of 32 for Neuroticism, and of 12 for Openness were used to identify extreme cases (i.e., low agreeableness, conscientiousness, extroversion, and openness, as well as high neuroticism). Only one extreme case of Agreeableness was identified (less than 0.01%), while 0.1% extreme cases of Conscientiousness and 1.3% extreme cases of Extroversion were observed. The prevalence of extreme cases of Neuroticism was of 1.6%, while that of extreme cases of Openness was of 0.1%.

- a. As shown in Table 19, few differences were observed by age group, although there was a tendency for agreeableness and conscientiousness to increase with age, $F(2, 3620) = 11.56, p < .001, \eta^2 = .006$, and $F(2, 3630) = 63.59, p < .001, \eta^2 = .034$, respectively;
- b. More differences were observed by rank: Officer candidates were more conscientious, $F(1, 3488) = 38.05, p < .001, \eta^2 = .011$, and open, $F(1, 3498) = 55.24, p < .001, \eta^2 = .016$, while NCM candidates were more neurotic, $F(1, 3498) = 21.93, p < .001, \eta^2 = .006$; and
- c. Finally, significant sex differences were observed in all five personality dimensions, suggesting that females were more agreeable, $F(1, 3681) = 19.81, p < .001, \eta^2 = .005$, conscientious, $F(1, 3691) = 53.24, p < .001, \eta^2 = .014$, extroverted, $F(1, 3693) = 24.71, p < .001, \eta^2 = .007$, and neurotic, $F(1, 3701) = 37.14, p < .001, \eta^2 = .010$, and that males were more open, $F(1, 3700) = 11.40, p < .001, \eta^2 = .003$.

Table 19: Means and Standard Deviations on Big Five Inventory Subscales by Demographic Groupings

Demographic Variable	Agreeableness	Conscientiousness	Extroversion	Neuroticism	Openness
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Overall	34.90 (4.27)	34.50 (4.71)	27.78 (5.11)	19.97 (5.04)	23.98 (2.97)
Age Group					
17 – 19 years	34.55 (4.27) _a	33.62 (4.61) _a	27.99 (4.97) _a	20.01 (5.27) _a	23.88 (2.94) _a
20 – 24 years	34.78 (4.35) _a	34.15 (4.71) _a	27.79 (5.16) _a	20.08 (5.07) _a	23.94 (2.99) _a
25 – 49 years	35.37 (4.13) _b	35.68 (4.51) _b	27.57 (5.17) _a	19.82 (4.76) _a	24.12 (2.96) _a
Income					
≤ \$49,999	35.12 (4.21) _a	34.73 (4.70) _a	27.77 (5.19) _a	20.09 (5.10) _a	24.13 (3.00) _a
≥ \$50,000	34.73 (4.20) _a	34.68 (4.70) _a	27.91 (5.24) _a	19.64 (4.92) _a	24.01 (2.90) _a
Rank					
NCM candidates	34.88 (4.28) _a	34.12 (4.67) _a	27.62 (5.07) _a	20.23 (5.06) _a	23.74 (2.99) _a
Officer candidates	34.82 (4.28) _a	35.21 (4.67) _b	27.97 (5.18) _a	19.33 (4.99) _b	24.57 (2.83) _b
Sex					
Males	34.77 (4.22) _a	34.25 (4.74) _a	27.59 (5.08) _a	19.75 (5.03) _a	24.06 (2.97) _a
Females	35.62 (4.38) _b	35.78 (4.36) _b	28.73 (5.18) _b	21.12 (4.99) _b	23.61 (2.99) _b

Note. *M* = mean; *SD* = standard deviation. Means in the same column that do not share a subscript differ at $p < .01$ within that demographic category.

3.3.3 Positive and Negative Affect

Affect, or the experience of feeling or emotion, can be either positive (pleasant emotional states) or negative (unpleasant emotional states), and can reflect either a temporary state (state affect) or relate to one's overall disposition (trait affect). Affect has been found to be associated with somatic symptoms in some cases, but is primarily considered to play a role in psychological well-being, with dispositional negative affect characterized as a "distress-prone personality" and dispositional positive affect associated, albeit less strongly, with positive outcomes (Bruchon-Schweitzer, 2002). Mean scores obtained by recruits on the Negative Affect and Positive Affect subscales of the PANAS are presented in Table 20 (possible range of 10 to 50 on both subscales; Watson *et al.*, 1988).

Based on average item ratings, recruits disagreed that they experienced negative affect and agreed that they experienced positive affect, on average.

Using a cutoff score of 20 on the Positive Affect subscale and of 40 on the Negative Affect subscale, only 0.2% and 0.9% of recruits were identified as extreme cases of low positive affect and high negative affect, respectively.

- a. There was a tendency for older age groups to demonstrate more positive affect, $F(2, 3426) = 6.81, p < .01, \eta^2 = .004$, and less negative affect, $F(2, 3416) = 20.58, p < .001, \eta^2 = .012$;
- b. Score differences suggested that positive affect was higher among respondents with higher income compared to those with lower income, $F(1, 2919) = 14.27, p < .001, \eta^2 = .005$, although no differences were observed in negative affect; and
- c. Last, Officer candidates demonstrated more positive affect, $F(1, 3279) = 21.22, p < .001, \eta^2 = .006$, and less negative affect, $F(1, 3270) = 19.89, p < .001, \eta^2 = .006$, compared to NCM candidates (Table 20).

Table 20: Means and Standard Deviations on Subscales of the Positive and Negative Affect Schedule by Demographic Groupings

Demographic Variable	Positive Affect	Negative Affect
	<i>M (SD)</i>	<i>M (SD)</i>
Overall	39.73 (5.06)	21.29 (6.84)
Age Group		
17 – 19 years	39.30 (5.21) _a	22.01 (6.75) _a
20 – 24 years	39.84 (5.14) _{a, b}	21.63 (6.91) _a
25 – 49 years	40.08 (4.81) _b	20.26 (6.66) _b
Income		
≤ \$49,999	39.45 (5.07) _a	21.02 (6.96) _a
≥ \$50,000	40.15 (4.87) _b	21.35 (6.70) _a
Rank		
NCM candidates	39.50 (5.22) _a	21.73 (6.99) _a
Officer candidates	40.41 (4.57) _b	20.53 (6.55) _b
Sex		
Males	39.65 (5.11) _a	21.17 (6.91) _a
Females	40.20 (4.80) _a	21.83 (6.48) _a

Note. *M* = mean; *SD* = standard deviation. Means in the same column that do not share a subscript differ at $p < .01$ within that demographic category.

3.3.4 Dispositional Optimism

Optimism has been linked to better health as well as more favourable military training outcomes, such as the completion of basic military training (Bruchon-Schweitzer, 2002; Carbone, Cigrang, Todd, & Fielder, 1999; Smith & Williams, 1992). Recruits obtained a mean score of 21.36 ($SD = 3.83$) on the LOT-R (possible score range of 6 to 30). Therefore, average item ratings revealed a tendency for recruits to agree with statements describing them as optimistic. Also, only 1.7% of recruits were identified as extreme cases of low dispositional optimism.

Dispositional optimism significantly differed as a function of all demographic factors that were examined:

- a. Greater dispositional optimism was demonstrated by the older age groups, $F(2, 3617) = 34.59, p < .001, \eta^2 = .019$;
- b. females, $F(1, 3677) = 27.60, p < .01, \eta^2 = .007$;
- c. respondents of higher income, $F(1, 2985) = 9.97, p < .01, \eta^2 = .003$; and
- d. Officer candidates, $F(1, 3476) = 89.26, p < .001, \eta^2 = .025$ (Table 21).

3.3.5 Hardiness

Hardiness is characterized by a sense of life and work commitment, a feeling of control, and an openness to change and challenges in life (Bartone, 1999). Previous work on hardiness has found this dimension to be associated with health in both the general and military populations (Bruchon-Schweitzer, 2002; Dolan & Adler, 2006; Smith & Williams, 1992; Thompson, Gignac, & McCreary, 2004). Recruits reported a mean score of 33.72 ($SD = 5.49$) on the Hardiness scale (possible score range of 11 to 44) (also shown in Table 21), demonstrating their tendency to perceive statements describing them as hardy to be quite true on average.

A total of 4.1% recruits were identified as extreme cases of low Hardiness, using a cutoff score of 22 on the Hardiness scale.

- a. Hardiness scores only significantly differed according to sex, with females demonstrating greater hardiness, $F(1, 3665) = 6.87, p < .01, \eta^2 = .002$ (Table 21).

Table 21: Means and Standard Deviations on Dispositional Optimism, Mastery, Hardiness, Personal Need for Structure and Self-Esteem by Demographic Groups

Demographic Variable	Dispositional Optimism	Hardiness	Mastery	Personal need for Structure	Self-Esteem
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Overall	21.36 (3.83)	33.72 (5.49)	20.49 (4.42)	35.81 (6.04)	20.07 (3.49)
Age Group					
17-19 years	20.91 (3.73) _a	33.44 (5.30) _a	19.93 (4.47) _a	35.51 (6.24) _a	19.77 (3.50) _a
20-24 years	21.09 (3.91) _a	33.68 (5.46) _a	20.30 (4.43) _a	35.74 (6.06) _a	19.85 (3.58) _a
25-49 years	22.11 (3.69) _b	33.99 (5.64) _a	21.20 (4.21) _b	36.18 (5.84) _a	20.58 (3.29) _b
Income					
≤ \$49,999	21.30 (3.93) _a	33.75 (5.83) _a	20.69 (4.40) _a	36.05 (5.93) _a	20.05 (3.61) _a
≥ \$50,000	21.75 (3.79) _b	33.85 (5.22) _a	20.72 (4.29) _a	35.49 (6.09) _a	20.40 (3.30) _b
Rank					
NCM candidates	20.94 (3.81) _a	34.12 (4.82) _a	20.11 (4.52) _a	36.05 (6.04) _a	19.69 (3.61) _a
Officer candidates	22.31 (3.79) _b	34.19 (4.88) _a	21.13 (4.07) _b	35.11 (5.92) _b	20.85 (3.12) _b
Sex					
Males	21.22 (3.87) _a	33.61 (5.49) _a	20.35 (4.46) _a	35.75 (6.03) _a	20.09 (3.51) _a
Females	22.12 (3.47) _b	34.26 (5.46) _b	21.18 (4.14) _b	36.01 (6.09) _a	19.94 (3.36) _a

Note. *M* = mean; *SD* = standard deviation. Means in the same column that do not share a subscript differ at $p < .01$ within that demographic category.

3.3.6 Mastery

Mastery refers to one's tendency to view life as being under his or her control (Pearlin & Schooler, 1978). Results of a number of studies on similar control-related constructs have revealed a tendency for perceived control to be associated with better health outcomes (Walker, 2001).

Recruits reported a mean score of 20.49 ($SD = 4.42$) (possible score range of 0 to 28) on the Mastery scale. An examination of the average rating revealed a tendency for respondents to agree that they had a sense of mastery. The prevalence of extreme cases of low mastery was of 0.5%, based on a cutoff score of 7.

Mastery scores significantly differed as a function of age group, rank, and sex:

- a. Greater mastery was found among older compared to younger age groups, $F(2, 3604) = 26.01, p < .001, \eta^2 = .014$;
- b. Officer candidates compared to NCM candidates, $F(1, 3462) = 37.24, p < .001, \eta^2 = .011$; and
- c. Females compared to males, $F(1, 3663) = 17.57, p < .001, \eta^2 = .005$ (Table 21).

3.3.7 Personal need for Structure

Personal need for structure (PNS) refers to a cognitive style characterized by a preference for structure and clarity and may lead to inefficient decision-making in complex situations such as those that may arise in a military context (Thompson & Smith, 2002). Computed based on the mean score (shown in Table 21), the average rating across items suggested that respondents were neutral about statements regarding their PNS. A total of 2.3% of recruits were identified as extreme cases of high PNS using a cutoff score of 48 on the scale.

- a. Scores on the PNS scale only differed according to rank. This trait was found to be more prominent among NCM candidates, $F(1, 3476) = 16.91, p < .001, \eta^2 = .005$ (Table 21).

3.3.8 Self-Esteem

Self-esteem refers to a person's sense of his or her own value or worth. Relationships between self-esteem and well-being are well-established, with some researchers suggesting that this personality trait may lead to positive health outcomes through this mechanism (Bernard, Hutchison, Lavin, & Pennington, 1996). Other researchers have argued that self-esteem helps to foster a better lifestyle, although there is less consensus on this point (Baumeister, Campbell, Kreuger, & Vohs, 2003).

The scale used to assess self-esteem in the RHQ was drawn from an optional module of the CCHS, cycle 2.1, therefore affording a unique opportunity to compare CF recruits with a larger Canadian sample on this trait.

Recruits scored an average of 20.07 ($SD = 3.49$) (possible score range of 0 to 24), and therefore demonstrated a tendency to agree with statements describing them as someone with a positive self-image. Moreover, only 0.3% of recruits were identified as extreme cases of low self-esteem, based on a cutoff score of 6.

To compare the self-esteem of recruits to that observed in a larger Canadian sample, higher and lower self-esteem groups were formed according to the median score observed in the CCHS, cycle 2.1 (lower self-esteem = scores of less than 20; higher self esteem = scores of 20 or more). As shown in Table 22, it was found that 56.9% of CF recruits obtained scores on the self-esteem scale above the median. The age and sex standardized prevalence proportion of high self-esteem among recruits was superior to that of respondents of this optional module (Table 22).

Table 22: Prevalence of Self-Esteem among Recruits and Canadians

Self-Esteem Scale Score	Recruits – Crude Proportion	Recruits – Standardized Proportion	Canadian Proportion
Score above median	56.9	59.5	44.1

Further analyses comparing demographic groups on self-esteem revealed that:

- a. Self-esteem was greatest among older age groups, $F(2, 3619) = 19.93, p < .001, \eta^2 = .011$;
- b. Respondents of higher income, $F(1, 2985) = 7.81, p < .01, \eta^2 = .003$; and
- c. Officer candidates, $F(1, 3476) = 76.84, p < .001, \eta^2 = .022$ (Table 21).

3.4 Social Environment

In addition to individual dispositional factors, there is increasing recognition of the role of the social environment as a determinant of health (Raphael, 2003). For instance, a number of studies have pointed to the implication of negative life events or psychosocial stressors in morbidity, although there is recognition that this relationship is complex (Bruchon-Schweitzer, 2002; Maddi, Bartone, & Puccetti, 1987; Orpana, Lemyre, & Kelly, 2007). At the same time, other social factors, such as the extent to which individuals have social networks in place to help them deal with psychosocial stress, may buffer these effects (Turner & Marino, 1994). In accordance, the RHQ assesses various aspects of the social environment, which may act as risk or protective factors.

3.4.1 Adverse Childhood Experiences

Adverse events experienced during childhood have been found to be associated with mental health disorders in adulthood in previous research (Dube, Anda, Felitti, Edwards, & Croft, 2002; Gahm, Lucenko, Retzlaff, & Fukuda, 2007). More recently, such experiences have been found to be important predictors of post-deployment depression and PTSD among military populations (Cabrera, Hoge, Bliese, Castro, & Messer, 2007).

Six items assessed childhood adversity (Table 23). Using criteria specified by Cabrera *et al.* (2007) as well as Gahm *et al.* (2007), an index of childhood adversity was computed using these six items. Recruits reported a mean score of 1.52 ($SD = 1.39$) on this index (possible score range of 0 to 6). Therefore, they experienced an average of between one and two of the six adverse childhood events.

Recruits were grouped according to whether or not they had ever experienced any one of the six adverse events (scores of 0 versus scores of 1 to 6). Based on this criterion, an alarming total of 69.6% of recruits reported having experienced at least one adverse childhood event. As shown in Table 23, they most frequently reported having a parent or adult living in their home swear at them, insult them, or put them down and least frequently reported having lived with an adult who touched them or asked to be touched sexually.

- a. It was found that a higher proportion of NCM candidates reported experiencing an adverse childhood event compared to Officer candidates (72.3% versus 64.6%), $\chi^2(1) = 18.46, p < .001$.

Table 23: Statistics Related to Individual Childhood Abuse Items

Childhood Adversity Item	Percent Yes	Percent No
(How often) did a parent or adult living in your home swear at you, insult you, or put you down?	58.1	41.9
(How often) did a parent or other adult living in your home push, grab, shove, slap, or throw something at you?	39.9	60.1
(How often) did a parent or other adult living in your home push, grab, shove, slap, or throw something at each other?	21.7	78.3
(How often) did an adult ever touch you sexually or try to make you touch them sexually?	4.2	95.8
Did you live with someone who was depressed or mentally ill?	12.3	87.7
Did you live with someone who was a problem drinker or alcoholic?	15.7	84.3

An additional two items assessed childhood neglect (Table 24). The sum of ratings on these items was also computed to provide an index of childhood neglect. Recruits scored a mean of 8.90 ($SD = 1.62$) on this index (possible score range of 2 to 10). As shown in Table 24, ratings on both items were quite high, suggesting that the average respondent felt that it was often true that he or she felt loved or cared for (or, conversely, *not* neglected).

Recruits who provided an average rating of 4 or less (never or rarely true that he or she felt loved or cared for) on childhood neglect items were distinguished from the others (at least sometimes true that he or she felt loved and cared for). Based on this categorization, only 2.7% of respondents reported that they felt neglected.

- a. Compared to respondents with higher income, a higher proportion of those with lower income reported experiencing childhood neglect (3.7% versus 1.4%), $\chi^2(1) = 14.97, p < .001$; and
- b. Also, a higher proportion of NCM candidates than Officer candidates reported experiencing childhood neglect (3.2% versus 1.1%), $\chi^2(1) = 11.80, p < .001$.

Table 24: Statistics Related to Individual Childhood Neglect Items

Childhood Neglect Item	<i>M</i>	<i>SD</i>
There was someone to take care of you and protect you.	4.48	0.90
You felt loved.	4.42	0.89

Note. *M* = mean; *SD* = standard deviation.

3.4.2 Exposure to Violence

Seven items assessed past exposure to violence. Percentages of respondents who reported having experienced and never having experienced each violent event throughout their lifetime are presented in Table 25. Recruits most frequently reported being in a potentially fatal accident where they could have been killed but were not badly hurt (40.9%), while they least frequently reported being raped (2.8%).

Table 25: Statistics Related to Individual Exposure to Violence Items

Exposure to Violence Item	Percent Yes	Percent No
You were in an accident where you could have been killed but were not badly hurt.	40.9	59.1
You were in an accident where you were injured and had to spend at least one night in the hospital.	12.5	87.5
You saw a close family member or friend being badly injured or killed.	18.2	81.8
You saw a stranger being badly injured or killed.	26.6	73.4
You were seriously attacked, beaten up, or assaulted.	12.7	87.3
You were threatened with a knife, gun, club, or other weapon.	22.6	77.4
You were raped (someone forced you to have sex when you did not want them to).	2.8	97.2

Respondents were grouped according to whether or not they were ever exposed to any one of the seven violent events throughout their lifetime (scores of 0 versus scores of 1 to 7). Based on this categorization, only 35.2% of respondents reported never having experienced a violent event in the past.

- a. A higher proportion of respondents of older age groups reported exposure to violence compared to 17-19 year olds, $\chi^2(2) = 19.53, p < .001$ (Figure 21);
- b. This was also the case for NCM candidates compared to Officer candidates (69.1% versus 53.7%), $\chi^2(1) = 68.92, p < .001$; and
- c. Males compared to females (67.7% versus 50.4%), $\chi^2(1) = 62.82, p < .001$.

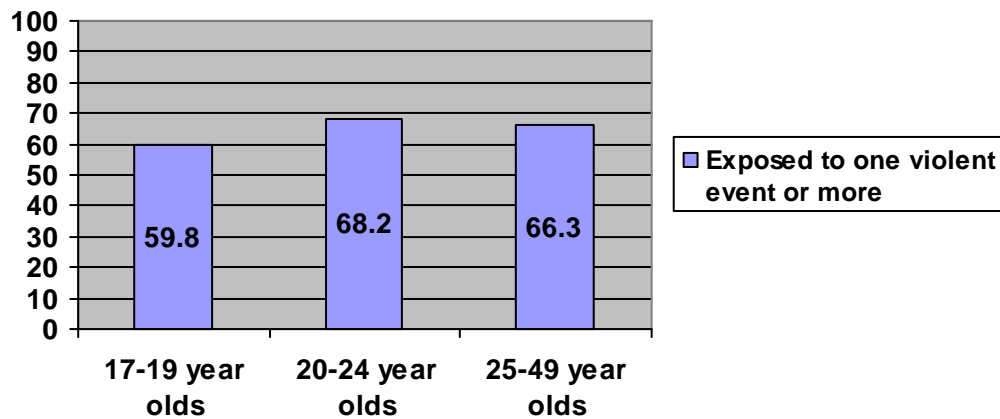


Figure 21: Prevalence of Exposure to Violence (One Event or More) by Age Group

3.4.3 Life Events in the Past Year

As more recent psychosocial stressors, major life events experienced in the past year were assessed using a 50-item checklist. A list of the 10 most commonly reported negative life events is presented in Table 26.

Table 26: Ten Most Frequently Reported Life Events Experienced in the Past Year

Life event	Percentage of Respondents Reporting Event
Failed course	22.5
Expected to work more	22.5
Had problems finding a good job	18.0
Had problems sleeping	15.2
Was fired or laid off	12.0
Had trouble with boss or coworkers	10.2
Had frequent colds or influenza	6.2
Had surgery	5.9
Wife or girlfriend became pregnant (men only)	5.5
Became pregnant (women only)	4.0

An overall index of negative life events in the past year was computed by counting the number of events respondents reported having experienced in the past year. A mean score of 4.01 ($SD = 3.92$) was observed on the negative life events scale (possible score range of 0 to 50). Respondents therefore experienced between four and five negative life events in the past year on average.

The total number of negative life events experienced by respondents was not normally distributed. A categorical variable was therefore computed on the basis of a median split. Recruits who reported experiencing no more than three negative life events in the past year (54.6%) were therefore distinguished from those who reported experiencing four negative life events or more in the past year (45.4%).

- a. Negative life events differed by age group, $\chi^2(2) = 42.61, p < .001$. More specifically, a higher proportion of 20-24 year olds reported experiencing four or more negative life events in the past year than other age groups (Figure 22);
- b. Also, a higher proportion of recruits with lower income reported experiencing four or more negative life events in the past year (52.1% versus 45.9%), $\chi^2(1) = 11.59, p < .001$; and
- c. Last, a higher proportion of NCM candidates than Officer candidates reported experiencing four or more negative life events in the past year (50.2% versus 33.0%), $\chi^2(1) = 85.92, p < .001$.

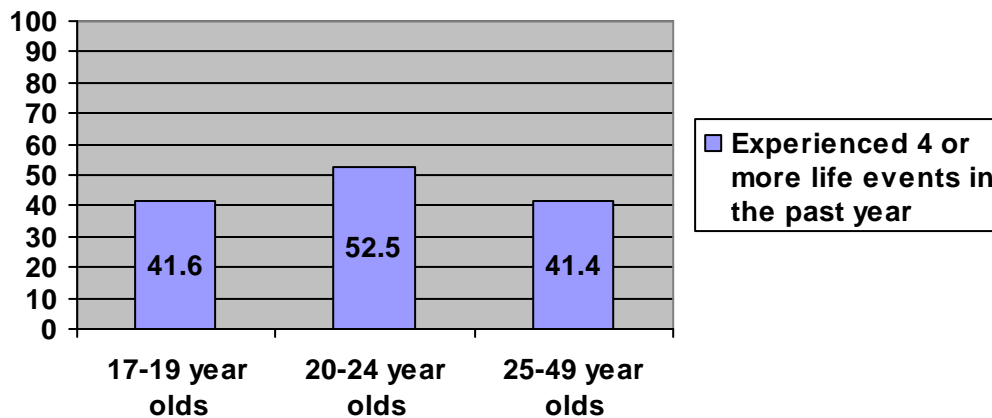


Figure 22: Prevalence of Life Events (Four or more) in the Past Year by Age Group

3.4.4 Social Support

One social factor that may buffer health outcomes is the degree of social support individuals receive from family and friends. Four types of social support were examined in the RHQ: affectionate support (someone who provides love and affection), emotional/informational support (someone in whom to confide/from whom to obtain advice), positive social interaction (friends or family with whom to socialize), and tangible support (someone who provides practical support and help). Recruits indicated how much of each type of social support was available to them prior to basic training. Since the same scales were included in an optional module of the CCHS, cycle 2.1, comparisons with a larger Canadian sample were possible.

Recruits obtained mean scores of 12.69 ($SD = 3.11$) on Affectionate Support (possible score range of 3 to 15), 33.42 ($SD = 7.38$) on Emotional/Informational support (possible score range of 8 to 40), 13.14 ($SD = 2.52$) on Positive Social Interaction (possible score range of 3 to 15), and 16.20 ($SD = 4.06$) on Tangible Support (possible score range of 4 to 20). This suggests that respondents felt they had someone to turn to for each type of social support most of the time, on average.

Since social support indices were not normally distributed, respondents were categorized according to whether or not they reported receiving affectionate support, emotional/informational support, positive social interaction, and tangible support most or all of the time on average (cutoff scores of 12 for affectionate support and positive social interaction, 48 for emotional/informational support, and 16 for tangible support, as these scores would reflect an average item rating of at least 4, or “most or all of the time”, on each of the scales). The proportion of recruits who received each type of social support, based on these categories, is presented in Table 27. While age and sex standardized prevalence proportions are high, they are lower than respective estimated prevalence proportions among respondents of this optional CCHS module.

Table 27: Prevalence of Social Support among Recruits and Canadians

Type of Social Support	Recruits – Crude Proportion	Recruits – Standardized Proportion	Canadian Proportion
Affectionate support	72.9	77.5	90.6
Emotional/informational support	70.0	74.1	85.4
Positive social interaction	80.4	78.7	88.2
Tangible support	67.4	69.0	83.8

- a. As shown in Figure 23, differences by age group were observed, with a higher proportion of older respondents indicating that they received affectionate support, $\chi^2(2) = 29.63, p < .001$, emotional/informational support, $\chi^2(2) = 21.53, p < .001$, and tangible support most to all of the time, $\chi^2(2) = 13.14, p < .001$.

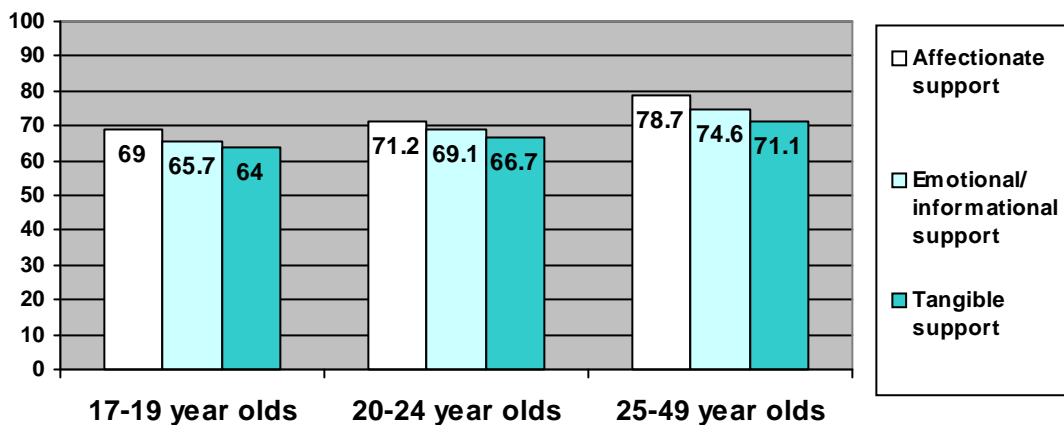


Figure 23: Prevalence of Social Support by Age Group

- a. A higher proportion of respondents of higher income reported receiving affectionate support, $\chi^2(1) = 20.33, p < .001$, emotional/informational support, $\chi^2(1) = 13.50, p < .001$, positive social interaction, $\chi^2(1) = 11.89, p < .001$, and tangible support most to all of the time, $\chi^2(1) = 38.81, p < .001$ (Figure 24).

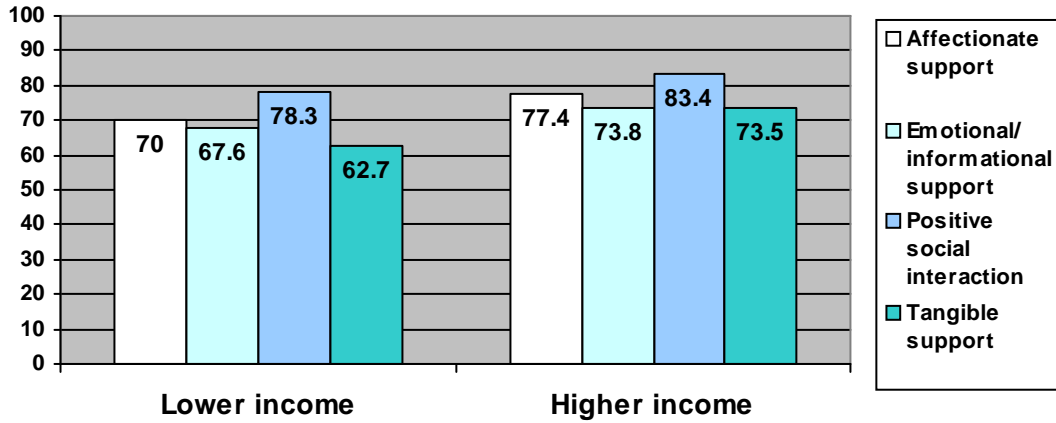


Figure 24: Prevalence of Social Support by Income Group

- a. Differences in social support according to rank were fewer in number. More specifically, A higher proportion of Officer candidates reported receiving tangible support most to all of the time compared to NCM candidates, $\chi^2(1) = 18.20, p < .001$ (Figure 25).

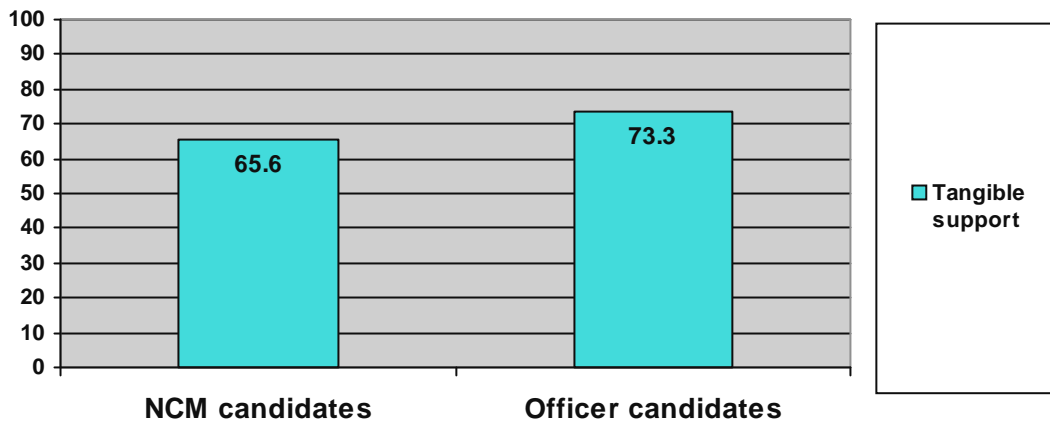


Figure 25: Prevalence of Social Support by Rank

- a. Finally, a higher proportion of females reported receiving affectionate support, $\chi^2(1) = 40.68$, $p < .001$, emotional/information support, $\chi^2(1) = 48.75$, $p < .001$, positive social interaction, $\chi^2(1) = 17.53$, $p < .001$, and tangible support most or all of the time, $\chi^2(1) = 23.06$, $p < .001$ (Figure 26).

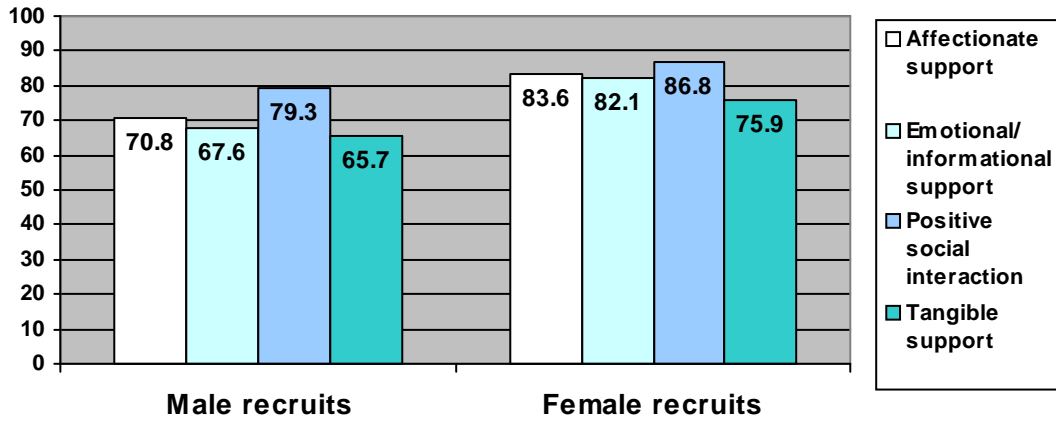


Figure 26: Prevalence of Social Support by Sex

4 Discussion

Overall, these findings paint a picture of recruits as a relatively healthy population. The prevalence proportions of injury and various health conditions were relatively low in this population. This is not surprising given that recruits with excessively poor health would have potentially been screened out as part of the medical screening process prior to recruit training. However, the majority of recruits also appeared to be equipped with dispositions known to foster resilience (most notably, agreeableness, conscientiousness, positive affect, mastery, and self-esteem).

In addition, a number of health, lifestyle, dispositional, and social differences were observed as a function of age, income, rank, and sex. Many differences according to income (e.g., in physical activity) or sex (e.g., in binge drinking, fruit and vegetable consumption, and smoking) are consistent with patterns observed in the Canadian population (Bryan, Tremblay, Perez, Arden, & Katzmarzyk, 2006; Perez, 2002; Tjepkema, 2004). However, there are some inconsistencies. For example, Perez (2002) observed a higher rather than lower frequency of fruit and vegetable consumption in older age groups. Also, demographic patterns of smoking status in CF recruits were not entirely consistent with patterns reported in other studies of the Canadian population. One analysis by Millar and Locker (2007) reported no clear pattern in smoking status by income and a lower rather than higher prevalence of smoking in older age groups. However, their analysis included a different breakdown of age categories (i.e., 18-34 years, 35-44, 35-54). In line with the present findings, results of the Canadian Tobacco Use Monitoring Survey point to a consistently higher prevalence of smoking among 20-24 relative to 15-19 year old Canadians from 1999 to 2008 (Statistics Canada, 2009).

A noteworthy recurring observation involved rank differentials, with Officer candidates oftentimes emerging as a healthier group than NCM candidates. In many cases, findings were in line with age and income differences, suggesting that socio-economic factors might explain this gap. Demographic comparisons presented in the current report were only carried out on a univariate level. However, it would be of interest to explore demographic health differentials on a multivariate level in future analyses of the RHQ in order to adjust for the contribution of multiple demographic factors.

Additional key findings are outlined and discussed below, along with some study limitations.

4.1 Health Status

In line with their highly positive ratings of self-rated health, the vast majority of CF recruits reported a minimal severity of somatic symptoms. A slightly higher proportion of female CF recruits nevertheless reported more severe symptoms. Previous studies have revealed similar sex differences in somatic complaints, with women reporting more numerous, more intense and more frequent somatic symptoms in a wide variety of contexts (Barsky, Peekna, & Borus, 2001). One factor that may have accounted for sex differences in somatic symptoms in the current report is that one of the symptoms that was included in the measure (i.e., “Menstrual cramps or other problems with your periods”) does not apply to men. Women’s total scores were thus based on a higher number of possible symptoms than were men’s scores. Nevertheless,

evidence from other studies suggests that sex differences in somatic symptom reporting occur whether or not gynaecological or reproductive symptoms are excluded from measures (Barsky *et al.*, 2001).

Increased rates of obesity were identified as an important health issue among CF members in the HLIS 2004 (HLIS, 2004). Data from the RHQ suggest that the prevalence of obesity is relatively low among the CF recruit population. A slightly higher proportion of male recruits were identified as overweight relative to estimates for the Canadian population. One problem with BMI as an index of weight, however, is that it does not account for muscle mass. Given that this trend was specific to male recruits, this might have been a contributing factor.

The psychological health of CF members was also identified as a key issue based on results of the CCHS Canadian Forces Supplement on Mental Health (*The Daily*, 2005, September 5), which revealed a prevalence of depression among serving members of up to twice the estimated prevalence in the general Canadian population. Again, data from the RHQ suggest that the prevalence of various psychological disorders in the recruit population is low. Depression emerged as the most prevalent condition (4.1%), although the proportion of recruits identified as probable cases with moderate to severe impairment was only 1.2%. However, it is difficult to determine whether psychological health is better than the norm in the recruit population, since no comparable measurements of psychological health are available for the general Canadian population. Unadjusted prevalences of depression (4.1%), panic disorder (0.9%), and PTSD (1.8%) nevertheless appear to be close to or less than national figures of 4.3% for depression, 1.4% for panic disorder, and 9.2% for the lifetime prevalence of PTSD⁹ (Canadian Forces Health Services, 2009).

4.2 Health Behaviour

A relatively high proportion of recruits was physically active and consumed the recommended daily servings of fruits and vegetables. In addition, the prevalence of smoking was low relative to the estimated national prevalence. On the other hand, results also pointed to binge drinking as a potential problem among this population. In particular, the relatively higher prevalence of drinking more than two alcoholic drinks on any one day of a typical week, yet relatively lower prevalence of drinking more than the recommended number of alcoholic drinks per week among recruits compared to the Canadian population provides support for this view.

In line with previously observed age trends in alcohol consumption (Liu & Kaplan, 1996; Maggs & Schulenberg, 2004; Nolen-Hoeksema, 2004), male CF recruits as well as those less than 25 years of age exhibited a greater tendency to engage in binge drinking relative to their female and older counterparts, respectively. One potential implication of these patterns is that these groups of recruits may be at increased risk of injury. Indeed, heavy drinking has been found to be a major determinant of injury, which is estimated to account for 40% of alcohol-attributable disability-adjusted life years (Cherpitel, 1993, 2007). Alcohol consumption is also implicated in motor vehicle accidents, which represent the leading cause of death among Canadians under

⁹ These figures are standardized to reflect the age and sex profile of the CF Regular Force population. Therefore, differences in national figures are less likely to result from differences in sex profiles, but may still be a function of age differences since CF recruits are generally younger than CF Regular Force members.

the age of 25 years (Statistics Canada, 2003, 2004). Observed prevalence proportions for being a passenger of a driver who had too much to drink (15.9%) and driving after having had too much to drink (15.4%) in the past year also signal much room for improvement.

4.3 Psychological Disposition

While there is less context from which to interpret observations regarding psychological disposition among recruits compared to the general population, general trends are suggestive of the presence of favourable characteristics (e.g., resilience factors of agreeableness, conscientiousness, openness, positive affect, dispositional optimism, hardiness, mastery, and self-esteem) and absence of unfavourable characteristics (e.g., risk factors of difficulty identifying feelings, neuroticism, and negative affect) among this group. Relatively high levels of self-esteem, in particular, also support the notion that psychological dispositions are not a vulnerable point specific to this population.

4.4 Social Environment

Social environmental determinants of health are of increasing concern and were therefore examined in the RHQ (Raphael, 2003). Results revealed that the majority of recruits did not experience childhood adversity and were not exposed to violent events in the past. However, prevalence proportions of having experienced some events seemed high (e.g., being insulted or put down by a parent or adult living in their home; being pushed, grabbed, shoved, slapped, or having had something thrown at them by a parent or adult living in their home; being in an accident where they could have been killed but were not seriously hurt).

Again, it is difficult to determine whether childhood adversity, exposure to violent events, or major life events are more or less common in the CF recruit population than is the norm, as there are no comparable measurements available for the general Canadian population. As a very rough comparison, however, only 4% of Canadians of 15 years or more reported having experienced four to five life events in the past year (out of a maximum of five events) based on results of the 1998 General Social Survey (Crompton, 2003). This figure is much lower than the 45.4% of CF recruits who reported having experienced four or more major life events in the past year in the present study.

While the level of social support that recruits reported having prior to basic training was very high, results pointed to a lower level among the recruit population relative to the general Canadian population. It would be interesting to examine how levels of social support change over time as recruits progress toward their careers and establish social networks within the CF. Monitoring social support may also prove to be valuable, given that this variable has been associated with more favourable health and organizational outcomes among military personnel (e.g., Bliese & Britt, 2001).

Taken together, such observations emphasize the need for future research comparing the social backgrounds of recruits and the general Canadian population. Social environmental factors may prove to be important determinants of health throughout service. Already, there is evidence that past exposure to adverse or violent events is associated with important military outcomes,

including early discharge from basic military training as well as current and post-deployment psychological disorders (Cabrera *et al.*, 2007; Chapin, 2004; Gahm *et al.*, 2007).

4.5 Limitations

Throughout the present report, estimated prevalence proportions for the general Canadian population based on the CCHS, cycle 2.1, were presented in order to provide a context from which to understand observations made among recruits who completed the RHQ. It must be reiterated that variations in prevalence proportions that might have emerged be interpreted with caution, since important methodological differences between the RHQ and the CCHS (paper and pencil questionnaires versus telephone interviews) and slight differences in the age range of these populations (17-49 years versus 15-49 years) may limit the accuracy of comparisons.

Also, results may have been subject to social desirability bias since recruits provided their service numbers on their forms. This may particularly have been the case for items that assessed undesirable health-related behaviours or for those that assessed the experience of adverse childhood events. Indeed, results of research conducted among US Navy recruits suggested that non-confidentiality may contribute to a marked underreporting of childhood abuse (Olson, Stander, & Merrill, 2004). Such underreporting may have thus led to an underestimation of the prevalence of adverse childhood experiences among CF recruits.

Last, results presented in the current report relate to CF recruits who began basic military training between July 2003 and December 2004 and may thus not generalize to later cohorts (i.e., recruits who did their training in subsequent years). Nevertheless, their contribution should not be undervalued, as this report provides the first comprehensive look into the health and lifestyle of this unique population. Efforts are currently underway to update the RHQ database with more current data and to streamline the availability of current data.

5 Conclusion

To conclude, findings presented in this report represent an important contribution to the body of knowledge about health issues of importance to the CF recruit population, as information on this topic has been limited to date. Results paint a picture of recruits as a relatively healthy population. Nonetheless, binge drinking, which can increase the risk of injury, emerged as a potential issue that might guide health promotion efforts for this population. Also, greater understanding of the extent to which baseline social environmental factors play a role in health outcomes throughout military service could help better understand the needs of CF members, and facilitate the development of more tailored and effective services. As previously mentioned, this report is the first among a series presenting descriptive analyses performed using the RHQ. Next steps will include examining temporal trends on some key aspects of health across recruit cohorts and carrying out more detailed analysis in some selected areas.

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One of the key challenges to arriving at an understanding of post-deployment illnesses is a lack of baseline information on exposure to potential risk factors and health characteristics in military personnel. The Recruit Health Questionnaire (RHQ) is a paper and pencil measure that was developed to address this concern by gathering general background information and assessing current health status and practices among Canadian Forces (CF) recruits. Collection of data using the RHQ is ongoing and will continue indefinitely. As the first among a series of reports presenting results of the RHQ, the current report provides a comprehensive look at some of the health and health-related factors assessed by this tool. The study sample consisted of 3852 Canadian Forces (CF) recruits (72.6% Non-Commissioned Member [NCM] Candidates and 27.4% Officer candidates), who were primarily male (84.1%) and under the age of 25 years (66.6%). Overall figures on health status, lifestyle, as well as dispositional and social environmental variables influencing health were examined in addition to age, income, rank (NCM or Officer candidate), and sex differences. Results suggested that CF recruits represent a generally healthy population, with low prevalences of physical and psychological health problems. Moreover, recruits obtained favourable scores on measures of dispositional factors related to health, such as agreeableness and self-esteem. However, results pointed to a potentially greater prevalence of binge drinking as well as important differences in social environmental factors (e.g., lower social support) among recruits compared to the Canadian population, thus warranting additional research in these areas. Finally, analyses revealed recurring demographic differences in health, with a general tendency for more favourable health and lifestyle among Officer compared to NCM candidates. Important differences in health status may have occurred since the time frame on which the present report focuses. Trends over time on a smaller number of key health and health-related factors will be explored in future reports.

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Recruit; Health Survey; Health; Lifestyle; Personality; Social Environment



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