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Résumé de l'article

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Abstract

Nursing programs are highly competitive and stressful environments; nursing educators are looking for ways to mitigate the negative consequences of demanding training programs. This article explores and compares the mental health status and sociodemographic and personal characteristics that influence the psychological distress of nursing and non-nursing students learning in either official language of Canada. An online and paper survey was administered during class time to 990 students, 186 of whom were in an undergraduate nursing program in one of two postsecondary institutions in Manitoba, Canada. Findings demonstrate that students in nursing programs are more likely to report poor mental health than students in other undergraduate programs and that nursing students in the French-language institution report poorer mental health outcomes as compared to nursing students in the English-language institution. Life satisfaction and high self-esteem are positively associated with well-being, whereas age, gender, and learning in a second language are risk factors contributing to anxiety.

Résumé

Les programmes de formation en sciences infirmières sont particulièrement compétitifs ; les éducateurs cherchent à atténuer les effets négatifs de ses programmes exigeants sur les apprenants. Cet article décrit et compare l'état de santé mentale, ainsi que les caractéristiques sociodémographiques et personnelles qui l'influencent, des étudiants en sciences infirmières et leurs paires, apprenants dans l'une des deux langues officielles du Canada. Un sondage en ligne et sur papier a été complété par 990 étudiants, dont 186 en sciences infirmières, dans un programme de premier cycle dans deux universités du Manitoba, Canada. Les données révèlent que les étudiants en sciences infirmières rapportent plus souvent souffrir d'une santé mentale languissante que leurs paires, et ce davantage pour ceux inscrits au programme en français. La satisfaction de vie et l'estime de soi sont associées positivement au bien-être, tandis que l'âge, le genre et l'apprentissage dans une deuxième langue contribuent à l'anxiété.

Postsecondary institutions offering nursing education are considered highly competitive and demanding environments for professional training (Edwards *et al*., 2010; Onan *et al*., 2019). Rigorous academic curricula, emotionally challenging clinical placements, financial strain and unmet personal needs can affect academic performance and educational satisfaction within nursing programs (Beanlands *et al*., 2019; Yüksel & Bahadir-Yilmaz, 2019). Furthermore, time constraints may increase nursing students' concerns in meeting expectations, contribute to students' inability to access necessary resources and further impede their ability to develop positive coping mechanisms (Jenkins *et al*., 2019). Nursing programs have endeavoured to reduce the negative impacts of the learning environment (Cleary *et al*., 2012; Labrague *et al*., 2018) and improve student success and retention (Glew *et al*., 2019; Zambas *et al*., 2020).

An additional stressor for nursing students from diverse ethnic and cultural backgrounds is the language barrier (Garone & Van de Craen, 2017; Glew *et al*., 2019). Language skills, which include speaking, writing, reading and listening, are critical in the nursing profession, as communication proficiency is required for information exchange between patients and healthcare providers and delivery of quality patient care (Hull, 2016). In some programs, English as a Second Language (ESL) students are provided with additional communication and academic resources and support; this has improved academic performance and reduced attrition rates (Dominguez, 2017; Pitkäjärvi, 2012; Sokolowich, 2020).

But what about jurisdictions where learning is achieved in a minoritized second language, such as Anglophone students learning in French in a Canadian province outside of Quebec? Considering that learning in a second language may have a direct impact on communication and academic performance (Onovo, 2019; James, 2018; Henderson *et al*., 2016), mental health (Prieto-Welch, 2016; Shadowen *et al*., 2019), and help-seeking behaviours (Hillis, 2017; Prieto-Welch, 2016), we sought to gain insight into how nursing students experience higher education in their second language in Manitoba, a province where English is the official language of the majority. Our research question is: How are nursing students enrolled in a minoritized official language (French) nursing program faring with respect to mental health and coping strategies as compared to 1) students within their own institution and 2) nursing and non-nursing students in an English-language postsecondary institution? This study is part of a larger study on student mental health and risk behaviour. Sociodemographic variables, mental health status, mental health indicators, personal characteristics and coping strategies were explored.

Background

Nursing Students' Mental Health

Postsecondary students in general experience stressors associated with academic life, such as financial constraints, workload and examinations (Acharya *et al*., 2018; Deasy *et al*., 2016). Nursing students, however, must also contend with potentially difficult psychosocial relationships, including interactions between nursing staff, instructors and patients, as well as events such as death and the impact of illness on patients (Alzayyat & Al-Gamal, 2014). The added pressure of learning in the clinical environment increases the likelihood of students worrying about their placement and the potential problems that could arise in the practice environment (Bartlett *et al*., 2016). Hence, in nursing schools, environmental demands exist in both academic and clinical components of educational programs, which may have repercussions on their mental health and coping abilities.

When comparing nursing students to non-nursing students, numerous researchers have determined that nursing students experience higher levels of psychological distress (Bartlett *et al*., 2016; Labrague *et al*., 2018) and exhibit higher levels of physiological and psychological symptoms compared to other disciplines in healthcare (Edwards *et al*., 2010; Karaca *et al*., 2019). Stress experienced by nursing students increases the prevalence of moderate-to-severe depression (Tung *et al*., 2018), suicidal ideation (Aradilla-Herrero *et al*., 2014), sleep disturbances (Bunjo *et al*., 2019; Thomas *et al*., 2017) and eating disorders (Mazzaia & Cruz Santos, 2018; Vijayalakshmi *et al*., 2018). Exposure to sustained levels of psychological distress may negatively impact academic performance and success (American College Health Association, 2019; Owens *et al*., 2012) and increase the risk of numerous serious health problems (Gloria & Steinhardt, 2016; Olvera Alvarez *et al*., 2019). To counter the effects of a stressful learning environment, it is recommended that effective coping mechanisms be integrated into nursing education, particularly during clinical components of the program, to better prepare students throughout their career (Alzayyat & Al-Gamal, 2014; Barnhardt, 2017).

Learning in a Second Language

Typically, the literature pertaining to learning in a second language concerns culturally diverse ESL students, usually international students (Calder *et al*., 2016; Onovo, 2019; Shadowen *et al*., 2019). However, a growing number of learners in a second language are immersion students in Canada (Statistics Canada, 2017). Living in a bilingual country, Anglophone students in provinces and territories other than Quebec have the opportunity to receive part or all of their schooling in French, either from a young age (early immersion) or in later years (late immersion) (Genesee & Van Gruderbeeck, 1988). Although perceived as beneficial, immersion programs are challenged with respect to second language development,

where an integrated language and content instruction approach is used (Cammarata, 2016; Lightbown, 2014). Few articles in the literature pertain to how Canadian French immersion students fare in higher education: most explore student engagement and sociolinguistic performance or competence (Mougeon & Rehner, 2014; Yang & Rehner, 2015). To our knowledge, the mental health of immersion students pursuing postsecondary education in a second language in a Canadian context has yet to be explored.

Mental Health – Our Theoretical Framework

Mental health is defined as "a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community" (WHO, 2020). Mental health is comprised of three dimensions: hedonic, eudaimonic and social. Hedonic, also referred to as subjective or emotional well-being, reflects how one feels and is satisfied with life (Diener *et al*., 2003). Eudaimonic, otherwise known as functional or psychological well-being, refers to living a meaningful and purposeful life; it has several subcomponents, such as autonomy, environmental mastery, personal growth, positive relations, purpose in life, and self-acceptance (Ryff, 1989). Social well-being, reflecting community participation and membership, is measured through coherence, actualization, integration, acceptance and contribution in social spheres (Keyes, 1998). These three dimensions are generally considered to determine global mental well-being. A scale reflecting these dimensions has been developed, in which mental health is categorized as flourishing (positive), moderate (neither flourishing or languishing) and languishing (negative); these categories align with the definition of a major depressive disorder in the Diagnostic and Statistical Manual of Mental Disorders (Keyes, 2002). This measure is therefore useful in determining students' mental health status.

Mental health and mental illness are dynamic and change over time, depending on an individual's age, gender and socioeconomic status (Keyes, 2002). A recent article exploring the relationship between mental distress and well-being in young adults suggests that both mental distress and mental well-being should be assessed to obtain an accurate picture of overall mental health, as some individuals living with mental disorders may nonetheless achieve moderate well-being (Hides *et al*., 2020). Consequently, indicators of both well-being and mental distress should be considered.

The literature presents other personal constructs related to well-being, such as life satisfaction, self-esteem and body image. Life satisfaction, or having a favorable attitude towards one's life, is a cognitive form of subjective well-being, hence belongs to the hedonic dimension (Diener *et al*., 2003). Self-esteem is often perceived as a defense mechanism, a renewable personal resource, which provides protection from experiences that are harmful

(Cast & Burke, 2002); it is defined as an individual's overall positive evaluation of the self (Rosenberg *et al*., 1995) which can produce feelings of worth and competency. The latter is closely related to self-efficacy, which is a person's belief in their ability to succeed in a particular situation and is often studied in educational environments (Linnenbrink & Pintrich, 2003). Body image refers to people's evaluation of their body size and shape and the degree to which they value their physical appearance (Cash & Pruzinsky, 2004). Some studies have shown an interrelationship between these personal characteristics, such as life satisfaction and self-esteem (Acun-Kapikiran *et al*., 2014; Navarro *et al*., 2014), and self-esteem and body image (Ahadzadeh *et al*., 2018; Lacroix *et al*., 2020). These constructs are often studied in relation to young adult mental health and risk behaviour (American College Health Association, 2019), as they may influence well-being.

Given that nursing students and students with language barriers are at greater risk of poor mental health, we hypothesized a greater prevalence of poor mental health and indicators of mental distress, such as depression, anxiety, sleep deprivation and suicidal ideation for nursing students enrolled in the French-language institution (FLI), as compared to both the general student population within the same institution and nursing students in an English-language institution (ELI). However, we expected that nursing students in both institutions would report using similar positive coping mechanisms, as they are studying in a health-related field and should be informed of appropriate strategies to cope with stress. We also expected similar use of professional mental health services by nursing students in both programs, since these are predominantly provided in English and should, therefore, not present a linguistic barrier to nursing students in either institution.

Study Context

A brief description of the institutional contexts in which the study has been conducted is presented. Two mid-sized universities in the province of Manitoba were selected for this study. The School of Nursing and Health Studies (SNHS) at Université de Saint-Boniface (FLI), the largest Francophone university in Western Canada, was created in 2017 and typically enrolls 140 students in their Bachelor of Nursing program. In this institution, students are taught in French, but have clinical placements in predominantly English-language healthcare facilities; hence, they are expected to be functional in both official languages. Students at this university are recruited from the provincial French school division and French immersion programs, as well as French universities abroad (16%). Enrollment in the nursing program at the time of this study included 56% French immersion students, 35% Francophone students, and 9% international students (Registrar, 2020). The Faculty of Health Studies at Brandon University, an English-language institution (thereafter referred to as ELI), has approximately 900 students annually and offers a bachelor of nursing undergraduate degree in Brandon and a psychiatric nursing undergraduate degree at two different

sites (Brandon and Winnipeg). Most students at Brandon University have English as their first language; 11.7% are international students and 13.3% self-identify as Indigenous. Nursing programs in both institutions are accredited by provincial governing bodies (College of Registered Nurses of Manitoba and College of Registered Psychiatric Nurses of Manitoba). Bachelor of nursing students from both universities must pass national licensing examinations prior to practice. Examination can be done in either official language.

Method

Design and Procedure

A quantitative non-experimental correlational study was used to measure socioeconomic profiles, mental health status, mental health indicators, personal characteristics and coping strategies. Students attending undergraduate programs (nursing and non-nursing) were invited to participate in an online or paper-based survey distributed on campus and completed during class time. The survey was administered by research assistants, who also obtained informed consent from participants. The study was approved by the Research Ethics Board of both universities.

Sample

Convenience sampling was used for data collection. Students from preselected classes where faculty members were in agreement to provide time for survey administration were invited to participate, which ensured adequate representation pertaining to academic programs and years of study. Data collection was conducted from November 19 to December 7, 2018. A total of 990 students (662 from FLI and 328 from ELI) participated. Of these, 68 and 118 were nursing students at FLI and ELI, respectively. Response rates are 49% for nursing programs and 47% globally for FLI, and 17% and 9% respectively for ELI.

Measures

The 66-question survey focused on academic and socioeconomic status, ethnolinguistic identity, mental health and associated behaviours, substance use, sexual practices, road safety and use of new technologies. Data pertaining to mental health (status, indicators, personal characteristics and coping strategies) are presented here, as well as academic and socioeconomic data such as age, gender, linguistic and cultural background, and income.

Questions relating to mental health included the Mental Health Continuum-Short Form (Keyes, 2002, 2009), which classifies mental health into three categories (flourishing, moderate or languishing), taking into consideration emotional, psychological and social well-being. Indicators of mental distress (suicidal ideation, depression, anxiety and sleep

deprivation), as well as general physical health, mental health, and personal characteristics (life satisfaction, self-esteem and body image), were measured (American College Health Association, 2019). Personal characteristics, including life satisfaction and self-esteem, were measured using a 5-point Likert scale, whereas body image had a choice of 4 categorical responses. The single item scale to measure self-esteem was used, as it has psychometric properties equivalent to Rosenberg's Self-Esteem Scale (RSE) (Brailovskaia & Margraf, 2018). The survey was made available in print and online through LimeSurvey. Data from hard copies were transferred to the LimeSurvey platform.

Statistical Analysis

All statistical analyses were performed using SPSS version 24.0 for Windows (SPSS Inc., Chicago, IL). Sociodemographic variables, mental health indicators and personal characteristics were described as proportions for categorical variables, and as means and standard deviations (SD) for continuous variables. Chi-square or Fisher's exact tests and ANOVA tests were used to identify statistically significant differences between the four groups (FLI – nursing, non-nursing students; ELI – nursing, non-nursing students). The Ω^2 for omnibus ANOVA and the Cohen's d for pairwise comparison were computed to estimate effect sizes of group differences for continuous variables. The Cramer's V for chi-squared test was also computed.

Hierarchical multiple logistic regressions were conducted to 1) study the influence of personal and sociodemographic characteristics in the correlations and to 2) explore how the two sites (FLI and ELI) and the two programs (nursing and non-nursing) correlated with mental health indicators. Five categorical mental health indicators were selected: 1) loss of sleep because of worries; 2) depression; 3) anxiety; 4) poor self-reported mental health; and 5) suicidal ideation (thought seriously, prepared a plan and attempted suicide). Pearson correlations between mental health indicators and independent variables were conducted. In all logistic regression analyses, the outcome variable was coded "1" for "Yes" and "0" for "No". For each outcome variable, the independent variables were grouped into three blocks: Block 1 included sociodemographic variables like age, gender, origin, urban or rural living, teaching language, hours worked and living arrangement as covariates; Block 2 included program, site and their interaction (Site x Program) to test the predictive ability of these variables beyond sociodemographic variables; and Block 3 included personal characteristics (life satisfaction, self-esteem and body image) to examine whether these variables provide incremental predictive ability beyond the program and site variables. Due to the high number of independent variables in Block 1, univariate logistic models with $p \leq 0.20$ were tested to choose variables used in the multiple logistic regression and a forward stepwise variable selection procedure for Block 1. To reduce multicollinearity, the two variables in Block 2 were centred at their mean. Enter procedure was used with the three variables in

Block 2 and with the three variables in Block 3. For each outcome, the first model included sociodemographic variables with $p < 0.10$. The second model added program, site and their interaction. In the final model, the three personal characteristic variables were added: life satisfaction, self-esteem and body image. Variables within each block were analyzed with regards to their significance. We derived adjusted odds ratios (AORs) and 95% confidence intervals (CIs) from the multivariable logistic regression models. A significance level of 5% was the criterion for a statistically significant effect in the full model. Based on the criterion that the standardized residual (std. residual) is lower than 3, the outliers were checked. Only one outlier for the *prepared a plan for suicide* outcome variable and three outliers for the *attempted suicide* outcome variable were identified and removed from the model. Collinearity statistics were conducted by using tolerance (< 0.1) for multiple linear regressions.

Results

Sociodemographic Profile

Table 1 provides a summary of the sociodemographic characteristics, comparing nursing and non-nursing students from the two universities. A greater proportion of participants at ELI were nursing students as compared to those at FLI. On average, ELI nursing students were slightly older than other groups. In both nursing programs, the majority of students were female as opposed to higher percentages of males in non-nursing programs. Whereas approximately one fifth of ELI participants reported having moved to Manitoba (province) to pursue postsecondary education, this proportion was smaller for nursing students and greater for non-nursing students at FLI. A significantly higher number of FLI students reported having spent most of their life in an urban setting, were dependent on their parents for financial support and did not speak the teaching language (French) at home as compared to ELI students.

When comparing average hours worked per week, more non-nursing students reported working 20 hours or more as compared to nursing students, who were more likely to report working less than 20 hours per week. The majority of students across all four programs claimed an annual income between $1-15,000 and no student debt, with the exception of ELI nursing students, who more often reported student debt of more than $15,000.

Mental Health Indicators, Personal Characteristics and Coping Strategies

Mental health indicators and scores, personal characteristics and coping strategies used for anxiety management are presented in Table 2. FLI nursing students were more likely to rate their mental health as poor and to report sleep deprivation because of worries. FLI students as a whole rated their mental health as "flourishing" whereas ELI students were more likely to rate their mental health as "moderate". Higher percentages of FLI nursing

Table 1
Sociodemographic Profiles, per Institutional Cohort

	French-Language Institution (FLI)		English-Language Institution (ELI)		Chi-square (χ^2) or Fisher (*F*) statistics; Cramer's V for Chi-square test or Ω^2 for ANOVA test	*p* Value
	Nursing students n = 68	Non-nursing students n = 594	Nursing students n = 118	Non-nursing students n = 210		
Average age in years (standard deviation)[1]	21.97 (4.04)	21.98 (5.73)	**23.79** (5.79)	21.55 (5.16)	*F(3; 961)*=4.42; Ω^2=0.011	**< 0.001**[df]
Gender[2,3]						
Female	**88.2**	66.3	**91.5**	65.7	χ^2 (3)=39.91; V=0.202	**< 0.001**
Male	11.0	32.5	8.5	31.9		
Moved to Manitoba to pursue post-secondary education[2]	**7.4**	**32.2**	20.3	23.1	χ^2 (3)=25.66; V=0.161	**< 0.001**
Spent most of life[3]						
Rural	20.6	20.7	44.1	51.7	χ^2 (3)=83.91; V=0.292	**< 0.001**
Urban	**79.4**	**79.3**	55.9	48.3		
Teaching language is not language spoken at home[3]	**75.4**	**51.7**	7.7	11	χ^2 (3)=192.43; V=0.444	**< 0.001**
Have dependent children[4]	5.9	9.3	9.2	9.1	χ^2 (3)=0.87; V=0.030	0.833
Hours worked per week (average)[3]						
None	19.0	30.0	31.1	38.8		
Less than 20 hours	**67.6**	51.5	**58.0**	40.7	χ^2 (6)=20.98; V=0.103	**0.002**
20 hours or more	13.2	**17.8**	10.9	**20.6**		
Annual income[4]						
$ 0	2.9	14.1	6.8	13.1		
$ 1-15,000	79.4	66.7	75.4	68.0	χ^2 (6)=11.90; V=0.078	0.064
$ 15,000 or more	17.6	19.1	17.8	18.9		
Estimated student debt[3]						
$ 0	57.4	60.4	40.2	54.6		
$ 1-15,000	20.6	25.0	26.5	32.7	χ^2 (6)=35.34; V=0.134	**< 0.001**
$ 15,000 or more	22.1	14.6	**33.3**	12.7		
Dependent on parents for financial support[3]	**59.7**	**60.0**	42.4	46.9	χ^2 (3)=19.66; V=0.141	**< 0.001**

Notes: Data are reported in percentages except for age; statistical significance set at 5% (in bold).
1 : *p* value calculated using ANOVA test
2 : Few participants reported gender identification as non-binary; hence, this category was not included
3 : *p* value calculated using Chi-square
4 : *p* value calculated using Exact tests
Pairwise comparison for ANOVA test using Bonferroni:
d : FLI non-nursing versus ELI nursing
f : FLI nursing versus ELI non-nursing

students reported having seriously thought about suicide and attempted suicide as compared to other groups. Of significance, very few ELI nursing students reported attempting suicide, and ELI nursing students reported feeling depressed less often in the last year than other groups. Nursing students at both universities reported higher percentages of anxiety than their non-nursing counterparts. With respect to mental health scores and sub-scores, non-nursing students at FLI were more likely to score higher globally, as well as for emotional, psychological and social well-being, as compared to all other groups. It should be noted, however, that the Ω^2 for omnibus ANOVA for these four continuous variables, ranging from 0.006 to 0.034, and the Cohen's *d* for pairwise comparisons ($d_i < 0.01$) show smaller effect size. Many students across all programs reported being dissatisfied with life, and FLI nursing students were more likely to report poor self-esteem.

Table 2
Mental Health Indicators and Scores, Personal Characteristics and Coping Strategies for Anxiety Management, per Institutional Cohort

	French-Language Institution (FLI)		English-Language Institution (ELI)			
	Nursing students n = 68	Non-nursing students n = 594	Nursing students n = 118	Non-nursing students n = 210	Chi-square (χ^2) or Fisher (*F*) statistics; Cramer's V or Ω^2 for ANOVA	*p* Value
Mental health indicators						
Self-rated health						
Excellent/ very good	56.2	58.0	57.8	53.3		
Good/fair	37.5	39.9	40.5	44.2	χ^2 (6)=5.92; V=0.055	0.433
Poor	6.3	2.1	1.7	2.4		
Self-rated mental health						
Excellent/ very good	21.9	38.7	27.6	34.8		
Good/fair	54.7	54.6	61.2	53.6	χ^2 (3)=20.65; V=0.104	**0.002**
Poor	**23.4**	8.7	11.2	11.6		

Table 2 (cont'd)

	French-Language Institution (FLI)		English-Language Institution (ELI)			
	Nursing students n = 68	Non-nursing students n = 594	Nursing students n = 118	Non-nursing students n = 210	Chi-square (χ^2) or Fisher (*F*) statistics; Cramer's V or Ω^2 for ANOVA	*p* Value
Mental health indicators (cont'd)						
Mental health categories						
Flourishing	**52.7**	**58.2**	42	46.3		
Moderate	38.2	34.9	**52**	**42.9**	χ^2 (3)=16.54; V=0.099	**0.011**
Languishing	9.1	6.9	6	10.7		
Suicidal ideation (last year)						
Thought seriously about suicide	23.4	12.6	13.8	15.5	χ^2 (3)=5.94; V=0.079	0.114
Prepared a plan for suicide	15.6	7.9	8.6	10.7	χ^2 (3)=4.95; V=0.072	0.176
Attempted suicide	**10.9**	5.8	**0.9**	5.3	χ^2 (3)=8.63; V=0.095	**0.035**
Depression (last year)	40.6	46.9	**28.7**	39.6	χ^2 (3)=14.17; V=0.122	**0.003**
Loss of sleep because of worries (last year)	**64.1**	53.8	46.1	47.3	χ^2 (3)=7.91; V=0.091	**0.048**
Anxiety	**92.2**	74.1	**93.9**	88.8	χ^2 (3)=42.99; V=0.212	< **0.001**
Mental health scores[1]						
Well-being, score (standard deviation)						
Emotional	10.11 (3.24)	**10.92 (3.06)**	10.27 (2.88)	10.48 (3.23)	*F(3; 941)*=2.77; Ω^2=0.006	**0.040**
Psychological	20.21 (6.74)	**21.14 (6.89)**	20.19 (5.83)	19.03 (7.26)	*F(3; 931)*=4.84; Ω^2=0.012	**0.002**[e]
Social	13.03 (6.35)	**14.62 (6.26)**	12.03 (5.32)	12.11 (5.96)	*F(3;921)*=11.84; Ω^2=0.034	< **0.001**[de]
Global score	43.28 (15.23)	**46.61 (14.98)**	42.49 (12.15)	41.53 (15)	*F(3; 899)*=7.09; Ω^2=0.020	< **0.001**[e]
Personal characteristics						
Satisfaction with life						
Satisfied	25.00	21.50	14.90	19.70		
Uncertain	18.80	17.30	19.30	16.80	χ^2 (3)=3.77; V=0.044	0.708
Dissatisfied	56.30	61.20	65.80	63.50		
High self-esteem						
Agree	42.2	61.5	51.7	56.5		
Uncertain	7.8	14.2	14.7	16.9	χ^2 (3)=23.15; V=0.11	**0.001**
Disagree	**50.0**	24.3	**33.6**	26.6		

Table 2 (cont'd)

	French-Language Institution (FLI)		English-Language Institution (ELI)			
	Nursing students n = 68	Non-nursing students n = 594	Nursing students n = 118	Non-nursing students n = 210	Chi-square (χ^2) or Fisher (*F*) statistics; Cramer's V or Ω^2 for ANOVA	*p* Value
Personal characteristics (cont'd)						
Positive body image						
Most of the time or always	43.80	51.70	37.90	45.20		
Sometimes	37.50	36.30	44.80	36.50	χ^2 (3)=12.31; V=0.080	0.055
Never	18.80	12.10	17.20	18.30		
Coping strategies to manage anxiety						
Healthy living	63.5	51.4	62.6	51.5	χ^2 (3)=7.70; V=0.091	0.053
Meditation/ mindfulness	47.6	28.9	45.2	34.8	χ^2 (3)=18.12; V=0.14	< **0.001**
Therapy or counselling	12.7	12.8	14.8	13.2	χ^2 (3)=0.34; V=0.019	0.952
Prescription medication	**19.0**	8.0	**15.7**	13.2	χ^2 (3)=12.75; V=0.117	**0.005**
Self-medicating	**25.4**	10.1	**20.0**	16.2	χ^2 (3)=18.3; V=0.141	< **0.001**
Student accommo-dation services	**9.5**	4.0	**7.0**	2.0	χ^2 (3)=8.95; V=0.098	**0.030**

Notes: Data are reported in percentages; *p* values are calculated using Chi-square, except for mental health scores, which are calculated as the sum for each subscale and total score.

1 : Data presented as scores: *p* values are calculated using ANOVA test to compare the 4 groups.

Pairwise comparison for ANOVA test using Bonferroni:

d : FLI non-nursing versus ELI nursing e : FLI non-nursing versus ELI non-nursing

Nursing students in both programs were more likely to report positive coping strategies to manage their anxiety, such as healthy living practices, meditation/mindfulness, prescription medication, and using student accommodation services, than non-nursing students. They were also more likely to self-medicate. Less than 15% of students overall reported therapy or counselling as a coping strategy.

Hierarchical Multiple Regressions of Mental Health Indicators

Hierarchical multiple logistic regressions analyses were conducted to explore the influence of the two sites and the two programs on selected mental health indicators. Hierarchical regressions were conducted in three models: the first concerned sociodemographic variables, the second included program, site and their interaction, and the third included personal characteristics. Collinearity was verified; results reveal that no collinearity relationships exist (Tol < 0.1).

Hierarchical multiple logistic regressions of mental health indicators are reported in Table 3 and Table 4 for the full model (model 3). More results (models 1 to 3) are presented in Table 5 and Table 6 in appendix. Results suggest that the three blocks significantly predict outcome variables except for Block 2, with respect to loss of sleep because of worries (χ^2 = 3.22; p = 0.359), suicidal thoughts (χ^2 = 5.26; p = 0.154) and prepared a plan for suicide (χ^2 = 4.13; p = 0.248). The Hosmer-Lemeshow goodness-of-fit test for all these logistic regressions indicated an acceptable fit of observed cases in each category to expected cases based on the logistic regression. All models, including the overall models, fit the data well. The contributions of the individual predictors were examined by evaluating the individual coefficients and their statistical significance in the model.

Within the full model (Model 3) and for sociodemographic characteristics (Block 1), age was positively associated with anxiety (*AOR* = 1.05; *95%CI* = 1.01-1.09; p = 0.014) and negatively associated with poor self-rated mental or emotional health (*AOR* = 0.91; *95%CI* = 0.85-0.98; p = 0.011). Female students were more likely to report loss of sleep because of worries (*AOR* = 1.68; *95%CI* = 1.20-2.35; p = 0.002) and anxiety (*AOR* = 2.28; *95%CI* = 1.50-3.49; p < 0.001) than male students. Students who did not speak the teaching language at home were more likely to report anxiety (*AOR* = 2.23; *95%CI* = 1.42-3.52; p = 0.001). Those living alone were more likely to report suicidal thoughts (*AOR* = 2.15; *95%CI* = 1.09-4.24; p = 0.027) and attempted suicide (*AOR* = 6.29; *95%CI* = 2.56-15.43; p < 0.001). However, students who spent most of their life in urban settings were more likely to report seriously thinking about suicide (*AOR* = 1.84; *95%CI* = 1.09-3.09; p = 0.022). Students who moved to Manitoba to pursue post-secondary education were less likely to report depression (*AOR* = 0.47; *95%CI* = 0.32-0.69; p < 0.001) and more likely to report anxiety (*AOR* = 2.83; *95%CI* = 1.83-4.36; p < 0.001). Students working 20 hours or more per week were more likely to report depression (*AOR* = 1.66; *95%CI* = 1.12-2.48; p = 0.012) and to prepare a plan for suicide (*AOR* = 1.92; *95%CI* = 1.07-3.46; p = 0.029) than those who were not working or who worked less than 20 hours per week.

Results in the full model show no significant contribution of interaction between program and site for any outcome variables. However, the program variable contributed significantly as a predictor of poor self-rated mental or emotional health, whereas site contributed significantly to predict depression, anxiety and attempted suicide. Students in nursing programs were more likely to report poor self-rated mental or emotional health (*AOR* = 2.04; *95%CI* = 1.11-3.75; p = 0.022) than students in non-nursing programs. FLI students were more likely to report depression (*AOR* = 1.49; *95%CI* = 1.04-2.015; p = 0.031) and attempted suicide (*AOR* = 2.84; *95%CI* = 1.19-6.78; p = 0.026) but less likely to report anxiety (*AOR* = 0.30; *95%CI* = 0.17-0.50; p < 0.001) than ELI students. We note that the length of the confidence interval for the interaction (Program x Site) to predict the attempted suicide variable is too large.

Table 3
Hierarchical Multiple Logistic Regression of Loss of Sleep Because of Worries, Depression, Anxiety and Poor Self-Rated Mental or Emotional Health, Full Model (Model 3)

	Loss of Sleep Because of Worries (last year)	Depression (last year)	Anxiety	Poor Self-Rated Mental or Emotional Health
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Block 1 (sociodemographic characteristics)				
Average age			1.05 (1.01 ; 1.09)*	0.91 (0.85 ; 0.98)*
Gender				
Male (*ref*)	-----	-----	-----	
Female	1.68 (1.20 ; 2.35)**	1.42 (0.98 ; 2.04) +	2.28 (1.50 ; 3.49)***	
Moved to Manitoba to pursue post-secondary education		0.47 (0.32 ; 0.69)***	2.83 (1.83 ; 4.36)***	1.14 (0.55; 2.37)
Spent most of life				
Rural (*ref*)		-----		
Urban		1.16 (0.81 ; 1.66)		
Teaching language is not language used at home	1.23 (0.88 ; 1.72)		2.23 (1.42 ; 3.52)**	
Hours worked per week (average)				
Less than 20 hours (*ref*)		-----		-----
20 hours or more		1.66 (1.12 ; 2.48)*		1.77 (0.96 ; 3.26) +
Live alone				2.05 (0.87 ; 4.80) +
Block 2 (variables of interest)				
Program				
Non-nursing (*ref*)	-----	-----	-----	-----
Nursing	1.00 (0.65 ; 1.53)	0.65 (0.41 ; 1.01) +	1.61 (0.77 ; 3.39)	2.04 (1.11 ; 3.75)*
Site				
FLI (*ref*)	-----	-----	-----	-----
ELI	1.36 (0.95 ; 1.95) +	1.49 (1.04 ; 2.15)*	0.30 (0.17 ; 0.50)***	1.05 (0.61 ; 1.83)
Programs x Sites	1.48 (0.69 ; 3.20)	1.13 (0.50 ; 2.56)	1.40 (0.35 ; 5.62)	1.62 (0.51 ; 5.17)
Block 3 (personal characteristics)				
Satisfaction with life				
Satisfied (*ref*)	-----	-----	-----	-----
Uncertain	1.86 (1.26 ; 2.74)**	4.05 (2.73 ; 6.02)***	1.01 (0.59 ; 1.75)	6.45 (3.55 ; 11.70)***
Dissatisfied	1.80 (1.20 ; 2.69)**	2.52 (1.69 ; 3.76)***	1.65 (0.85 ; 3.18)	2.96 (1.51 ; 5.81)**
High self-esteem				
Agree (*ref*)	-----	-----	-----	-----
Uncertain	2.79 (1.78 ; 4.36)***	2.50 (1.59 ; 3.92)***	3.20 (1.43 ; 7.17)**	1.66 (0.72 ; 3.80)*
Disagree	2.23 (1.54 ; 3.21)***	2.45 (1.67 ; 3.60)***	2.05 (1.14 ; 3.66)*	4.51 (2.39 ; 8.49)***
Positive body image				
Most of the time or always (*ref*)	-----	-----	-----	-----
Sometimes	1.09 (0.69 ; 1.73)	1.32 (0.82 ; 2.12)	1.37 (0.69 ; 2.72)	1.45 (0.72 ; 2.92)*
Never	1.34 (0.96 ; 1.86) +	1.30 (0.92 ; 1.83)	3.15 (1.90 ; 5.24)***	1.29 (0.71 ; 2.33)

Table 3 (cont'd)

	Loss of Sleep Because of Worries (last year)	Depression (last year)	Anxiety	Poor Self-Rated Mental or Emotional Health
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Goodness of fit				
χ^2 (df; *p*)	109.93 (11 ; $p < 0.001$)	168.35 (13 ; $p < 0.001$)	187.77 (13 ; $p < 0.001$)	136.98 (13 ; $p < 0.001$)
χ^2 Hosmer and Lemeshow (df; *p*)	7.38 (8 ; p = 0.496)	3.66 (8 ; $p = 0.886$)	8.12 (8 ; $p = 0.422$)	6.81 (8 ; $p = 0.558$)
R^2 de Nagelkerke	0.16	0.24	0.32	0.30
Correct percentage classifying	65.4%	69.3%	84.8%	90.2%

aOR : adjusted odds ratio CI : confidence interval *Ref* : reference group
FLI : French-Language Institution ELI : English-Language Institution

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; +$p < 0.10$.

Table 4
Hierarchical Multiple Logistic Regression of Suicidal Ideation Variables, Full Model (Model 3)

	Thought Seriously About Suicide	Prepared a Plan for Suicide	Attempted Suicide
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Block 1 (sociodemographic characteristics)			
Average age		0.96 (0.90 ; 1.02)	.94 (.86 ; 1.03)
Gender			
Male (*ref*)		-----	-----
Female		1.23 (0.65 ; 2.33)	2.04 (0.83 ; 5.01)
Moved to Manitoba to pursue post-secondary education	1.21 (0.68 ; 2.15)		
Spent most of life			
Rural (*ref*)	-----		-----
Urban	1.84 (1.09 ; 3.09)*		1.38 (0.63 ; 3.04)
Teaching language is not language used at home			
Hours worked per week (average)			
Less than 20 hours (*ref*)	-----	-----	
20 hours or more	1.48 (0.88 ; 2.49)	1.92 (1.07 ; 3.46)*	
Live alone	2.15 (1.09 ; 4.24)*		6.29 (2.56 ; 15.43)***
Block 2 (variables of interest)			
Program			
Non-nursing (*ref*)	-----	-----	-----
Nursing	1.18 (0.69 ; 2.04)	1.23 (0.65 ; 2.31)	0.86 (0.33 ; 2.22)

Table 4 (cont'd)

	Thought Seriously About Suicide	Prepared a Plan for Suicide	Attempted Suicide
	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)
Site			
FLI (*ref*)	-----	-----	-----
ELI	0.87 (0.53 ; 1.41)	0.89 (0.52 ; 1.51)	2.84 (1.19 ; 6.78)*
Programs x Sites	2.06 (0.73 ; 5.84)	1.89 (0.56 ; 6.34)	6.57 (0.63 ; 68.57)
Block 3 (personal characteristics)			
Satisfaction with life			
Satisfied (*ref*)	-----	-----	-----
Uncertain	2.89 (1.78 ; 4.70)***	3.69 (2.04 ; 6.70)***	3.28 (1.57 ; 6.85)**
Dissatisfied	1.40 (0.80 ; 2.48)	2.34 (1.22 ; 4.49)*	1.37 (0.571 ; 3.29)
High self esteem			
Agree (*ref*)	-----	-----	-----
Uncertain	1.81 (0.94 ; 3.47) +	2.04 (0.96 ; 4.35) +	2.64 (1.01 ; 6.91)*
Disagree	3.48 (2.06 ; 5.88)***	2.93 (1.56 ; 5.52)**	2.63 (1.15 ; 6.05)*
Positive body image			
Most of the time or always (*ref*)	-----	-----	-----
Sometimes	2.37 (1.31 ; 4.28)**	2.66 (1.31 ; 5.40)**	4.67 (1.79 ; 12.23)**
Never	1.59 (0.95 ; 2.65) +	1.61 (0.86 ; 3.01)	2.71 (1.12 ; 6.54)*
Goodness of fit			
χ^2(df; *p*)	108.73 (6 ; $p < 0.0001$)	87.46 (12 ; $p < 0.001$)	72.92 (13 ; $p < 0.0001$)
χ^2 Hosmer and Lemeshow (df; *p*)	8.52 (8 ; $p = 0.384$)	7.94 (8 ; $p = 0.439$)	9.55 (8 ; $p = 0.298$)
R^2 de Nagelkerke	0.214	0.208	0.234
Correct percentage classification	98.8%	90.0%	95.0%

aOR : adjusted odds ratio CI : confidence interval *Ref* : reference group
FLI : French-Language Institution ELI : English-Language Institution

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; +$p < 0.10$.

For personal characteristics (Block 3), life satisfaction and self-esteem were associated with all mental health indicators except for anxiety, which did not correlate with life satisfaction. Results suggest that students who were dissatisfied with life were more likely to report loss of sleep because of worries, depression, poor self-rated mental or emotional health and to think seriously about suicide, prepare a plan for suicide and attempt suicide than those satisfied with life. The same applied for participants who disagreed with having high self-esteem. Body image was negatively associated with anxiety and suicide variables; students who reported negative body image were at greater risk of reporting anxiety, having serious thoughts about suicide, preparing a plan for suicide and attempting suicide than those who felt comfortable with their body image and body size most of the time or always.

Discussion

This study is one of the first to report on the mental health of students in a Canadian nursing program taught in a minoritized second language. We explored and compared the mental health status of nursing students in a French-language program with non-nursing students in the same postsecondary institution and nursing students in an English-language university in a predominantly Anglophone province in Manitoba, Canada. Coping strategies were identified, as well as risk and protective factors associated with specific mental health indicators. Findings suggest that students in both nursing programs are more likely to have moderate or languishing mental health and anxiety than their peers in non-nursing programs. Student nurses studying in the French-language program fared worse with respect to mental health than both their institutional peers and nursing students in the English-language program. Overall, life satisfaction and self-esteem are positively associated with many mental health indicators, as also reported by others (Chernomas & Shapiro, 2013; Edwards *et al.*, 2010; Karaca *et al.*, 2019). Risk factors for anxiety include being older, female, and not speaking the teaching language at home. Students who are from an urban centre, living alone and working more than 20 hours per week are at greater risk of suicidal ideation. These findings are also reflected in the literature (Goldman-Mellor *et al.*, 2018; Sivertsen *et al.*, 2019).

Significant differences were noted between students in the two nursing programs. Nursing students in the French-language program, for whom the teaching language is not the language spoken at home, were more likely to report poor mental health, sleep deprivation and suicidal ideation as compared to nursing students studying in English. FLI nursing students were also more likely to score with languishing mental health (9.1%) as compared to their student peers in non-nursing programs (6.9%), nursing students at ELI (6%), as well as university students in the United States (4%) and Australia (6%) (Hides *et al.*, 2020; Keyes *et al.*, 2012). As hypothesized, learning in a minoritized second language appears to be associated with anxiety. Others have suggested that the linguistic minority context may be challenging for students in French-language universities in both academic and clinical settings (Savard *et al.*, 2018). A limited number of studies have explored the role of self-efficacy in higher learning in a second language (Peguret, 2014; Raoofi *et al.*, 2012). French immersion students with greater confidence in their French-language abilities will often adopt effective learning management strategies that lead to academic success (Peguret, 2014). This in turn may improve satisfaction and increase self-esteem, as success builds and reinforces students' self-perception of competency and worth. Future studies on the impact of studying in a minoritized second language in higher education, especially for French immersion students across Canada, is needed.

Others have shown that life satisfaction, self-esteem and body image may mitigate well-being in nursing students (Elsherif & Abdelraof, 2018; İlhan *et al*., 2016). Our findings suggest that life satisfaction and self-esteem have the most mediating effects on mental health for all students. Interestingly, nursing students in the French-language program were more likely to have poor self-esteem as compared to non-nursing students within the same postsecondary institution. This has also been reported for male nursing students as compared to their female counterparts (Feng *et al*., 2019; Cao *et al*., 2016). Self-esteem has been associated with nursing student mental health, coping (Karaca *et al*., 2019; Kim & Lee, 2015) and communication skills (Dimitriadou-Panteka *et al*., 2014; Gurdogan *et al*., 2016). Nursing students who have higher self-esteem generally cope with stress more easily, have higher job satisfaction, are more successful, are more engaged with therapeutic nursing care, and generally feel more positive about life (Edwards *et al*., 2010; Ni *et al*., 2010), whereas nursing students with low self-esteem have difficulties in communicating with colleagues and patients, reduced empathy and efficacy, and poorer performance at work (Lima *et al*., 2017). Integrating strategies to improve nursing students' self-esteem within nursing programs are needed (Choi, 2016; Ni *et al*., 2010; Terp *et al*., 2019), especially among students learning in a second language.

Factors which may positively impact self-esteem in nursing students, as described by Valizadeh *et al*. (2016), were increased knowledge, professional autonomy, religious beliefs that focused on serving people, feeling valued by instructors and other nurses, and choosing to study nursing because of a true interest in the work (as opposed to choosing nursing because of the salary). Nurse educators can enhance students' sense of worth by incorporating student feedback whenever possible, resolving issues and complaints, and engaging students through more participatory teaching strategies (Valizadeh *et al*., 2016). The importance of student-centred methods to promote learning has been highlighted by others in nursing programs taught in a minoritized language (Pitkäjärvi, 2012). Specific programmatic approaches and strategies addressing language skills and communication, particularly in official language minority communities, should be implemented, as this may have an impact on students' self-esteem and academic performance (Sokolowich, 2020).

Coping Mechanisms

As expected, nursing students on both campuses generally adopted positive coping strategies to manage their anxiety, including healthy living practices such as good nutrition, physical activity, adequate sleep, meditation or mindfulness. Some also used prescribed medication, but a greater proportion of nursing students in our sample self-medicated. Self-medication by nursing students is reported in the literature as a common occurrence (Gama & Secoli, 2017; Williams & Crawford, 2016) and is associated with both positive and negative connotations (Williams & Crawford, 2016). As a positive approach, self-medication

is viewed as an opportunity to promote empowerment and is deemed the first step in self-care while limiting use of formal medical supports (Bennadi, 2014; Williams & Crawford, 2016). Negatively, the World Health Organization (2000) highlights that self-medication is one of the many global health challenges. The possible risks associated with self-medication include incorrect self-diagnosis and improper use of medications leading to complications (Williams & Crawford, 2016). Considering the prevalence of self-medication within this study and globally, further research on this topic is warranted.

Professional Support Services

Within this study, less than 15% of participants, regardless of program or institution, reported using counselling services for mental health issues. Students' willingness to seek help and availability of services and supports remains an ongoing issue in higher learning institutions (Chernomas & Shapiro, 2013). The importance of developing available and effective responses to the mental health needs of youth has been documented in the public health domain (Mental Health Commission of Canada, 2016). Increasingly, associations focusing on mental health in higher education in Canada (Canadian Association of College & University Student Services; Centre for Innovation in Campus Mental Health) recognize the important role that postsecondary institutions play in promoting student well-being, preventing risk-taking behaviours and improving access to resources and support services. However, the lack of comprehensive strategies and policies regarding campus mental health and counselling services across Canada persists (De Somma *et al*., 2017). Further complicating the issue is the hesitancy of nursing students to seek services within health systems because of fear of being seen in the waiting room or treated by peers or professors (Stecker, 2004). The barrier to accessing care is even greater for Canadians who speak in a minoritized official language (de Moissac & Bowen, 2017; Ngwakongnwi *et al*., 2012), ESL students (Olsen, 2012), and students learning in a second language (Garone & Van de Craen, 2017). More research into service utilization and needs across different campuses is needed secondary to ongoing mental health concerns in postsecondary establishments.

Social Support, Mentorship and Environment

In light of our findings, nursing educational programs should provide more social support to students to reduce risk-taking and enhance protective factors to promote positive mental health. Instilling supportive strategies such as peer mentorship programs may prove successful. A scoping review on nursing student peer mentorship programs concluded that these programs have benefits because they foster positive relationships between nursing students and help new students acclimatize to the demands of nursing educational programs (Jacobs, 2016). Others have shown that positive social supports help students cope with the stress of nursing education (Yıldırım *et al*., 2017). Additionally, nurse educators are in a prime

position to model and address work life balance, as well as recognize risk behaviours and refer students to appropriate resources, including mental health supports, student accommodation services and financial supports (Chernomas & Shapiro, 2013). Furthermore, millennials are also driving infrastructural changes on campuses because of their need for meeting spaces with instructors and peers, transitional spaces to converse outside of class, and space to meet as students and work as teams (Rickes, 2009). Adapting teaching practices and providing adequate space for social interaction may have an impact on student well-being and academic success, particularly as campuses adjust to new social distancing practices related to the COVID-19 pandemic.

Limitations

This article is one of the first to report on the mental health of Canadian students learning in a minoritized second language in postsecondary education, and more specifically among nursing students; nonetheless, this study has some limitations. The sample size is small, especially for FLI nursing students as compared to ELI participants, who were most often nursing students despite efforts to recruit adequate representation of all student subpopulations. However, ELI response rates were lower than for other categories. Given that not all faculty agreed to forfeit class time for data collection, many students did not participate, particularly in ELI sites; data should be considered with caution, as representativeness cannot be ensured. Concerning the four mental health scores in particular, the omega-squared values were very small, indicating too small an effect size to accurately test differences between groups. Thus, these variables were not used to explore correlations between mental health and predicted variables. This study was conducted in two mid-sized universities in Manitoba; findings may only be generalizable to similar-sized universities and in provinces with comparable linguistic contexts. As few studies on nursing students' mental health have focused on linguistic contexts, our findings shed light on this potential risk factor that may affect the growing number of French immersion students as they pursue professional degrees and higher education.

Conclusion

This study aimed to examine mental health indicators, sociodemographic and personal characteristics, as well as coping strategies of nursing and non-nursing students in two postsecondary institutions in Canada. Our findings demonstrate that nursing students, particularly those learning in a minoritized second language, have more anxiety and are at greater risk of poor mental health than non-nursing students. The association between student mental health and both program and site of study is lessened when controlled for sociodemographic variables and personal characteristics. This study illustrates the importance of

further research to capture nursing students' perception of their abilities to mitigate stress and learn skills that promote well-being. Improving the mental health and wellness of nursing students is an ongoing initiative and responsibility for students, educators and administrators, as the future health of all Canadians is impacted by the health and wellness of the people delivering care.

References

Acharya, L., Jin, L., & Collins, W. (2018). College life is stressful today – emerging stressors and depressive symptoms in college students. *Journal of American College Health*, *66*(7), 655-664. https://doi.org/10.1080/07448481.2018.1451869

Acun-Kapikiran, N., Körükcü, Ö., & Kapikiran, Ş. (2014). The relation of parental attitudes to life satisfaction and depression in early adolescents: The mediating role of self-esteem. *Educational Sciences: Theory & Practice*, *14*(4), 1246-1253.

Ahadzadeh, A. S., Rafik-Galea, S., Alavi, M., & Amini, M. (2018). Relationship between body mass index, body image, and fear of negative evaluation: Moderating role of self-esteem. *Health Psychology Open*, *5*(1), 1-8. https://doi.org/10.1177/2055102918774251

Alzayyat, A., & Al-Gamal, E. (2014). A review of the literature regarding stress among nursing students during their clinical education. *International Nursing Review*, 61(3), 406-415. https://doi.org/10.1111/inr.12114

American College Health Association (ACHA). (2019). National college health assessment undergraduate student reference group: Executive summary. Retrived 2 October, 2020, from https://www.acha.org/documents/ncha/NCHA-II_SPRING_2019_UNDERGRADUATE_REFERENCE%20_GROUP_EXECUTIVE_SUMMARY.pdf

Aradilla-Herrero, A., Tomas-Sabado, J., & Gomez-Benito, J. (2014). Associations between emotional intelligence, depression and suicide risk in nursing students. *Nurse Education Today*, *34*(4), 520-525. https://doi.org/10.3389/fpsyg.2018.02380

Barnhardt, W. (2017). *From stress to success: How stress coping strategies and emotional intelligence affect student success in healthcare programs* [Doctoral thesis, Wingate University].

Bartlett, M. L., Taylor, H., & Nelson, J. D. (2016). Comparison of mental health characteristics and stress between baccalaureate nursing students and non-nursing students. *Journal of Nursing Education*, *55*(2), 87-90. https://doi.org/10.3928/01484834-20160114-05

Beanlands, H., McCay, E., Fredericks, S., Newman, K., Rose, D., Santa Mina, E., Schindel Martin, L., Schwind, J., Sidani, S., Aiello, A. & Wang, A. (2019). Decreasing stress and supporting emotional well-being among senior nursing students: A pilot test of an evidence-based intervention. *Nurse Education Today*, *76*, 222-227. https://doi.org/10.1016/j.nedt.2019.02.009

Bennadi, D. (2014). Self-medication: A current challenge. *Journal of Basic and Clinical Pharmacy*, *5*(1), 19-23. https://doi.org/10.4103/0976-0105.128253

Brailovskaia, J., & Margraf, J. (2018). How to measure self-esteem with one item? Validation of the german single-item self-esteem scale (g-sise). *Current Psychology*, *39*(4), 2192-2202. https://doi.org/10.1007/s12144-018-9911-x

Bunjo, Z., Bunjo, L. J., Bacchi, S., Donnelly, F., Hudson, J. N., & Symonds, I. (2019). Sleep patterns and risky driving behaviors in clinical medical and nursing students. *Academic Psychiatry*, *43*(4), 555-556. https://doi.org/10.1007/s40596-019-01100-3

Calder, M. J., Richter, M. S., Mao, Y., Kovacs Burns, K., Mogale, R. S., & Danko, M. (2016). International students attending Canadian universities: Their experiences with housing, finances, and other issues. *Canadian Journal of Higher Education*, *46*(2), 92-110. https://doi.org/10.47678/cjhe.v46i2.184585

Cammarata, L. (2016). Foreign language education and the development of inquiry-driven language programs: Key challenges and curricular planning strategies. In L. Cammarata (Ed.), *Content-based foreign language teaching: Curriculum and pedagogy for developing advanced thinking and literacy skills* (pp. 123-143). Routledge/Taylor Francis.

Cao, D., Weiwei, P., & Feng, G. (2016). Correlation between self-esteem, stress and professional identity of male nursing students in the school. *Chinese Nursing Research*, *30*(2A), 430-433.

Cash, T. F., & Pruzinsky, T. (2004). *Body image: A handbook of theory, research, and clinical practice*. Guilford Press.

Cast, A D., & Burke, P. J. (2002). A theory of self-esteem. *Social Forces*, *80*(3), 1041-1068. https://doi.org/10.1353/sof.2002.0003

Chernomas, W. M., & Shapiro, C. (2013). Stress, depression, and anxiety among undergraduate nursing students. *International Journal of Nursing Education Scholarship*, *10*(1), 255-266. https://doi.org/10.1515/ijnes-2012-0032

Choi, Y.-J. (2016). Evaluation of a program on self-esteem and ego-identity for Korean nursing students. *Nursing and Health Sciences*, *18*(3), 387-392. https://doi.org/10.1111/nhs.12281

Cleary, M., Horsfall, J., Baines, J., & Happell, B. (2012). Mental health behaviours among undergraduate nursing students: Issues for consideration. *Nurse Education Today*, *32*(8), 951-955. https://doi.org/10.1016/j.nedt.2011.11.016

de Moissac, D., & Bowen, S. (2017). Impact of language barriers on access to healthcare for official language minority Francophones in Canada. *Healthcare Management Forum*, vol. *30*(4), 207-212. https://doi.org/10.1177/0840470417706378

De Somma, E., Jaworska, N., Heck, E., & MacQueen, G. M. (2017). Campus mental health policies across Canadian regions: Need for a national comprehensive strategy. *Canadian Psychology*, 58, 2, 161-167. https://doi.org/10.1037/cap0000089

Deasy, C., Coughlan, B., Pironom, J., Jourdan, D., & Mannix-McNamara, P. (2016). Psychological distress and help seeking amongst higher education students: Findings from a mixed method study of undergraduate Nursing/Midwifery and teacher education students in Ireland. *Irish Educational Studies*, *35*(2), 175-194. https://doi.org/10.1080/03323315.2016.1146157

Diener, E., Oishi, S., & Lucas, R. (2003). Personality, culture, and subjective well-being: Emotional and cognitive evaluations of life. *Annual Review of Psychology*, *54*(1), 403-425. https://doi.org/10.1146/annurev.psych.54.101601.145056

Dimitriadou-Panteka, A., Koukourikos, K., & Pizirtzidou, E. (2014). The concept of self-esteem in nursing education and its impact on professional behaviour. *International Journal of Caring Sciences*, *7*(1), 6-11.

Dominguez, C. (2017). *Language proficiency and academic success of bilingual hispanic nursing students* [Doctoral thesis, University of Texas].

Edwards, D., Burnard, P., Bennett, K., & Hebden, U. (2010). A longitudinal study of stress and self-esteem in student nurses. *Nurse Education Today*, *30*(1), 78-84. https://doi.org/10.1016/j.nedt.2009.06.008

Elsherif, Z. A., & Abdelraof, A. S. E. (2018). The relation between body image satisfaction, self-esteem and the academic behabior among the first and fourth year students in the Faculty of Nursing Tanta University. *Clinical Nursing Studies*, *6*(3), 28-38. https://doi.org/10.5430/cns.v6n3p28

Feng, D., Kong, W., Zhao, W., Li, Z., & Wang, L. (2019). The mediating role of perceived prejudice in the relationship between self-esteem and psychological distress among Chinese male nursing students. *Journal of Professional Nursing*, *35*(6), 505-511. https://doi.org/10.1016/j.profnurs.2019.05.003

Gama, A. S.M., & Secoli, S. R. (2017). Self-medication among nursing students in the state of the Amazonas – Brazil. *Revista Gaucha Enfermagem*, *38*(1), 1-7. https://doi.org/10.1590/1983-1447.2017.01.65111

Garone, A., & Van de Craen, P. (2017). The role of language skills and internationalization in nursing degree programmes: A literature review. *Nurse Education Today*, *49*, 140-144. https://doi.org/10.1016/j.nedt.2016.11.012

Genesee, F., & Van Gruderbeeck, N. (1988). L'immersion française : une histoire à succès. *Québec français*, (70), 28-30. https://id.erudit.org/iderudit/45211ac

Glew, P. J., Ramjan, L. M., Salas, M., Raper, K., Creed, H., & Salamonson, Y. (2019). Relationships between academic literacy support, student retention and academic performance. *Nurse Education in Practice*, *39*, 61-66. https://doi.org/10.1016/j.nepr.2019.07.011

Gloria, C., & Steinhardt, M. (2016). Relationships among positive emotions, coping, resilience and mental health. *Stress and Health*, *32*(2), 145-156. https://doi.org/10.1002/smi.2589

Goldman-Mellor, S., Allen, K., & Kaplan, M. S. (2018). Rural/urban disparities in adolescent nonfatal suicidal ideation and suicide attempt: A population-based study. *Suicide and Life-Threatening Behavior*, *48*(6), 709-719. https://doi.org/10.1111/sltb.12390

Gurdogan, E. P., Uslusoy, E. Ç., Kurt, S., & Yasak, K. (2016). Comparison of the self esteem and communication skills at the 1st and senior year nursing students. *International Journal of Caring Sciences*, *9*(2), 496-502.

Henderson, S., Barker, M., & Mak, A. (2016). Strategies used by nurses, academics and students to overcome intercultural communication challenges. *Nurse Education in Practice*, *16*(1), 71-78. https://doi.org/10.1016/j.nepr.2015.08.010

Hides, L., Quinn, C., Stoyanov, S., Cockshaw, W., Kavanagh, D. J., Shochet, I., Deane, F., Kelly, P., & Keyes, C. (2020). Testing the interrelationship between mental well-being and mental distress in young people. *The Journal of Positive Psychology*, *15*(3), 314-324. https://doi.org/10.1080/17439760.2019.1610478

Hillis, E. R. (2017). *Exploring linguistic barriers to help-seeking behaviors: The lived experiences of Chinese undergraduate students*. [Doctoral thesis, University of Memphis].

Hull, M. (2016). Medical language proficiency: A discussion of interprofessional language competencies and potential for patient risk. *International Journal of Nursing Studies*, *54*, 158-172. https://doi.org/10.1016/j.ijnurstu.2015.02.015

İlhan, N., Sukut, Ö., Akhan, L. U., & Batmaz, M. (2016). The effect of nurse education on the self-esteem and assertiveness of nursing students: A four-year longitudinal study. *Nurse Education Today*, *39*, 72-78. https://doi.org/10.1016/j.nedt.2015.12.026

Jacobs, St. (2016). A scoping review examining nursing student peer mentorship. *Journal of Professional Nursing*, *33*(3), 212-223. https://doi.org/10.1016/j.profnurs.2016.09.004

James, N. (2018). Using narrative inquiry to explore the experience of one ethnically diverse ESL nursing student. *Teaching and Learning in Nursing*, *13*(1), 35-40. https://doi.org/10.1016/j.teln.2017.08.002

Jenkins, E. K., Slemon, A., O'Flynn-Magee, K., & Mahy, J. (2019). Exploring the implications of a self-care assignment to foster undergraduate nursing student mental health: Findings from a survey research study. *Nurse Education Today*, *81*, 13-18. https://doi.org/10.1016/j.nedt.2019.06.009

Karaca, A., Yildirim, N., Cangur, S., Acikgoz, F., & Akkus, D. (2019). Relationship between mental health of nursing students and coping, self-esteem and social support. *Nurse Education Today*, *76*, 44-50. https://doi.org/10.1016/j.nedt.2019.01.029

Keyes, C. L. M. (1998). Social well-being. *Social Psychology Quarterly*, *61*(2), 121-140. https://doi.org/10.2307/2787065

Keyes, C. L. M. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behavior*, *43*(2), 207-222. https://doi.org/10.2307/3090197

Keyes, C. L. M. (2009). *Brief description of the mental health continuum short form (MHC-SF)*.

Keyes, C. L. M., Eisenberg, D., Perry, G. S., Dube, S. R., Kroenke, K., & Dhingra, S. S. (2012). The relationship of level of positive mental health with current mental disorders in predicting suicidal behavior and academic impairment in college students. *Journal of American College Health*, *60*(2), 126-133. https://doi.org/10.1080/07448481.2011.608393

Kim, S., & Lee, S. (2015). The influence of job-seeking stress, career decision-making self-efficacy, self-esteem and academic achievement on nursing students' happiness. *Korean Journal of Adult Nursing*, 27(1), 63-72. https://doi.org/10.7475/kjan.2015.27.1.63

Labrague, L. J., McEnroe-Petitte, D. M., Papathanasiou, I. V., Edet, O. B., Tsaras, K., Leocadio, M. C., Colet, P., Kleisiaris, C. F., Fradelos, E. C., Rosales, R. A., Vera Santos-Lucas, K., & Velacaria, P. I. (2018). "Stress and coping strategies among nursing students: an international study". *Journal of Mental Health*, *27*(5), 402-408. https://doi.org/10.1080/09638237.2017.1417552

Lacroix, E., Atkinson, M. J., Garbett, K. M., & Diedrichs, P. C. (2020). One size does not fit all: Trajectories of body image development and their predictors in early adolescence. *Development and Psychopathology*, 1-10. https://doi.org/10.1017/S0954579420000917

Lightbown, P. (2014). *Focus on content-based language teaching.* Oxford University Press.

Lima, B. V., Trajano, F. P., Neto, G. C., Alves, R. S., Farias, J. A., & Fernandes Braga, J. E. (2017). Evaluation of anxiety and self-esteem in students concluding the nursing graduation course. *Journal of Nursing UFPE = Revista de Enfermagem UFPE*, *11*(11), 4326-4333. https://doi.org/10.5205/reuol.23542-49901-1-ED.1111201708

Linnenbrink, E., & Pintrich, P. (2003). The role of self-efficacy beliefs in student engagement and learning in the classroom. *Reading and Writing Quarterly*, *19*(2), 119-137. https://doi.org/10.1080/10573560308223

Mazzaia, M. C., & Cruz Santos, R. M. (2018). Risk factors for eating disorders among undergraduate nursing students. *Acta Paulista de Enfermagem, 31*(5), 456-62. https://doi.org/10.1590/1982-0194201800065

Mental Health Commission of Canada. (2016). *The mental health strategy for Canada: A youth perspective.* Retrieved 6 October, 2020, from https://www.mentalhealthcommission.ca/sites/default/files/2016-07/Youth_Strategy_Eng_2016.pdf

Mougeon, F., & Rehner, K. (2015). Engagement portraits and (socio)linguistic performance: A transversal and longitudinal study of advanced L2 learners. *Studies in Second Language Acquisition*, *37*(3), 425-456. https://doi.org/10.1017/S0272263114000369

Navarro R. L., Ojeda, L., Schwartz, S. J., Piña-Watson, B., & Luna, L. L. (2014). Cultural self, personal self: Links with life satisfaction among Mexican American college students. *Journal of Latina/o Psychology*, *2*(1), 1-20. https://doi.org/10.1037/lat0000011

Ngwakongnwi, E., Hemmelgarn, B. R., Musto, R., King-Shier, K. M., & Quan, H. (2012). Language barriers: Use of regular medical doctors by Canada's official language minorities. *Canadian Family Physician*, *58*(12), e709-e716.

Ni, C., Liu, X., Hua, Q., Lv, A., Wang, B., & Yan, Y. (2010). Relationship between coping, self-esteem, individual factors and mental health among Chinese nursing students: A matched case-control study. *Nurse Education Today*, *30*(4), 338-43. https://doi.org/10.1016/j.nedt.2009.09.003

Olsen, M. (2012). English-as-a-second language (ESL) nursing student success: a critical review of the literature. *Journal of Cultural Diversity*, *19*(1), 26-32.

Olvera Alvarez, H. A., Provencio-Vasquez, E., Slavich, G. M., Cedeño Laurent, J. G., Browning, M., McKee-Lopez, G., Robbins, L., & Spengler, J. D. (2019). Stress and health in nursing students: The nurse engagement and wellness study. *Nursing Research*, *68*(6), 453-463. https://doi.org/10.1097/NNR.0000000000000383

Onan, N., Karaca, S., & Unsal Barlas, G. (2019). Evaluation of a stress coping course for psychological resilience among a group of university nursing students. *Perspectives in Psychiatric Care*, *55*(2), 233-238. https://doi.org/10.1111/ppc.12340

Onovo, G. (2019). Fundamentals of nursing practice and the culturally diverse ESL nursing students: The students' perspectives for teaching and learning in nursing. *Teaching and Learning in Nursing*, 14(4), 238-245. https://doi.org/10.1016/j.teln.2019.03.003

Owens, M., Stevenson, J., Hadwin, J. A., & Norgate, R. (2012). Anxiety and depression in academic performance: An exploration of the mediating factors of worry and working memory. *School Psychology International*, *33*(4), 433-449. https://doi.org/10.1177/0143034311427433

Peguret, M. (2014). Le sentiment d'autoefficacité et les stratégies d'apprentissage chez les étudiants de français langue seconde venant d'immersion. *Revue des sciences de l'éducation*, *40*(3), 579-599. https://doi.org/10.7202/1029075ar

Pitkäjärvi, M.-A. (2012). *English-language-taught degree programmes in faculties of healthcare in Finnish universities of applied sciences: Students' and teachers' conceptions of the implementation*. [Doctoral thesis, University of Helsinki].

Prieto-Welch, S. (2016). International student mental health. *New Directions for Student Services*, *2016*(156), 53-63. https://doi.org/10.1002/ss.20191

Raoofi, S., Tan, B. H., & Chan, S. H. (2012). Self-efficacy in second/foreign language learning contexts. *English Language Teaching*, *5*(11), 60-73. https://doi.org/10.5539/elt.v5n11p60

Rickes, P. (2009). Make way for millennials! How today's students are shaping higher education spaces. *The Journal of the Society for College and University Planning*, *37*(2), 7-17.

Rosenberg, M., Schooler, C., Schoenbach, C., & Rosenberg, F. (1995). Global self-esteem and specific self-esteem: Different concepts different outcomes. *American Sociological Review*, *60* (1), 141-56. https://doi.org/10.2307/2096350

Ryff, C. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, *57*(6), 1069-1081. https://doi.org/10.1037/0022-3514.57.6.1069

Savard, J., Benoît, J., Dubouloz, C.-J., & Breau-Godwin, S. (2018). Clinical placements to facilitate working within Francophone minority communities = Des stages en français pour se préparer à travailler auprès des communautés francophones en situation minoritaire. *Reflets*, *24*(2), 154-181. https://doi.org/10.7202/1053867ar

Shadowen, N. L., Williamson, A. A., Guerra, N. G., Ammigan, R., & Drexler, M. L. (2019). Prevalence and correlates of depressive symptoms among international students: Implications for university support offices. *Journal of International Students*, 9(1), 129-149. https://doi.org/10.32674/jis.v9i1.277

Sivertsen, B., Hysing, M., Knapstad, M., Harvey, A. G., Reneflot, A., Lønning, K.-J., & O'Connor, R. C. (2019). Suicide attempts and non-suicidal self-harm among university students: Prevalence study. *British Journal of Psychiatry Open*, *5*(2), e26. https://doi.org/10.1192/bjo.2019.4

Sokolowich, J. (2020). A programmatic approach to supporting multilingual students. *Nurse Educator*, *45*(5), 236-238. https://doi.org/10.1097/NNE.0000000000000760

Statistics Canada. (2017). Enrolments of French immersion programs, public elementary and secondary schools, Canada. Retrieved 2 October, 2020, from https://www150.statcan.gc.ca/n1/daily-quotidien/171103/cg-c001-eng.htm

Stecker, T. (2004). Well-being in an academic environment. *Medical Education*, *38*(5), 465-478. https://doi.org/10.1046/j.1365-2929.2004.01812.x

Terp, U., Hjarthag, F., & Bisholt, B. (2019). Effects of a cognitive behavioral-based stress management program on stress management competency, self-efficacy and self-esteem experienced by nursing students. *Nurse Educator*, *44*(1), E1-E5. https://doi.org/10.1097/NNE.0000000000000492

Thomas, C. M., McIntosh, C. E., Lamar, R. A., & Allen, R. L. (2017). Sleep deprivation in nursing students: The negative impact for quality and safety. *Journal of Nursing Education and Practice*, *7*(5), 87-93. https://doi.org/10.5430/jnep.v7n5p87

Tung, Y.-J., Lo, K. K. H., Ho, R. C. M., & Tam, W. W. S. (2018). Prevalence of depression among nursing students: A systematic review and meta-analysis. *Nurse Education Today*, *63*, 119-129. https://doi.org/10.1016/j.nedt.2018.01.009

Valizadeh, L., Zamanzadeh, V., Badri Gargari, R., Ghahramanian, A., Jabbarzadeh Tabrizi, F., & Keogh, B. (2016). Pressure and protective factors influencing nursing students' self-esteem: A content analysis study. *Nurse Education Today*, *36*, 468-472. https://doi.org/10.1016/j.nedt.2015.10.019

Vijayalakshmi, P., Thimmaiah, R., Gandhi, S., & Math, S. B. (2018). Eating attitudes, weight control behaviors, body image satisfaction and depression level among Indian medical and nursing undergraduate students. *Community Mental Health Journal*, *54*(8), 1266-1273. https://doi.org/10.1007/s10597-018-0333-x

Williams, A., & Crawford, K. (2016). Self medication practices among undergraduate nursing and midwifery students in Australia: A cross sectional study. *Contemporary Nurse*, 2(4), 410-420. https://doi.org/10.1080/10376178.2016.1197782

World Health Organization. (2000). Guidelines for the regulatory assessment of medicinal products for use in self-medication. Retrieved 6 October, 2020, from https://apps.who.int/iris/bitstream/handle/10665/66154/WHO_EDM_QSM_00.1_eng.pdf

World Health Organization. (2020). Mental health: Strengthening our response. Retrieved 2 October, 2020, from https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response

Yang, J., & Rehner, K. (2015). Learner beliefs about sociolinguistic competence: A qualitative case study of four university second language learners. *Language Learning in Higher Education*, *5*(1), 157-180. https://doi.org/10.1515/cercles-2015-0008

Yıldırım, N., Karaca, A., Cangür, S., Acıkgoz, F., & Akkus, D. (2017). The relationship between educational stress, stress coping, self-esteem, social support, and health status among nursing students in Turkey: A structural equation modeling approach. *Nurse Education Today*, *48*, 33-39. https://doi.org/10.1016/j.nedt.2016.09.014

Yüksel, A., & Bahadır-Yılmaz, E. (2019). The effect of mentoring program on adjustment to university and ways of coping with stress in nursing students: A quasi-experimental study. *Nurse Education Today*, *80*, 52-58. https://doi.org/10.1016/j.nedt.2019.06.006

Zambas, S., Dutch, S., & Gerrard, D. (2020). Factors influencing Māori student nurse retention and success: An integrative literature review. *Nurse Education Today*, *91*, 104477. https://doi.org/10.1016/j.nedt.2020.104477

Keywords

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Mots clés

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Appendix

Table 5, *Hierarchical Multiple Logistic Regression of Loss of Sleep Because of Worries, Depression, Anxiety and Poor Self-Rated Mental or Emotional Health*, **Table 6**, *Hierarchical Multiple Logistic Regression of Suicidal Ideation Variables*, with the three models.

Table 5

Hierarchical Multiple Logistic Regression of Loss of Sleep Because of Worries, Depression, Anxiety and Poor Self-Rated Mental or Emotional Health

	Loss of Sleep Because of Worries (last year)			Depression (last year)			Anxiety			Poor Self-Rated Mental or Emotional Health		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)
Block 1 (sociodemographic characteristics)												
Average age							1.03 (0.99 ; 1.07)+	1.03 (0.99 ; 1.07)	1.05 (1.01 ; 1.09)*	0.92 (0.86 ; 0.98)*	0.91 (0.84 ; 0.97)**	0.91 (0.85 ; 0.98)*
Gender												
Male (*ref*)	-----	-----	-----	-----	-----	-----	-----	-----	-----			
Female	1.88 (1.38 ; 2.54)***	1.95 (1.43 ; 2.66)***	1.68 (1.20 ; 2.35)**	1.50 (1.08 ; 2.07)*	1.60 (1.15 ; 2.22)**	1.42 (0.98 ; 2.04) +	2.94 (2.01 ; 4.31)***	2.67 (1.79 ; 3.97)***	2.28 (1.50 ; 3.49)***			
Moved to Manitoba to pursue post-secondary education				0.69 (0.49 ; 0.96)*	0.70 (0.50 ; 0.98)*	0.47 (0.32 ; 0.69)***	3.57 (2.41 ; 5.28)***	2.96 (1.96 ; 4.46)***	2.83 (1.83 ; 4.36)***	2.32 (1.19 ; 4.52)*	1.98 (1.00 ; 3.90)*	1.14 (0.55; 2.37)
Spent most of life												
Rural (*ref*)				-----	-----	-----						
Urban				1.43 (1.05 ; 1.95)*	1.31 (0.94 ; 1.81)	1.16 (0.81 ; 1.66)						
Teaching language is not language used at home	1.54 (1.17 ; 2.04)**	1.37 (1.00 ; 1.89) +	1.23 (0.88 ; 1.72)				1.47 (0.98 ; 2.20) +	2.17 (1.41 ; 3.34)***	2.23 (1.42 ; 3.52)**			
Hours worked per week (average)												
Less than 20 hours (*ref*)				-----	-----	-----				-----	-----	-----
20 hours or more				1.62 (1.13 ; 2.33)**	1.59 (1.10 ; 2.28)*	1.66 (1.12 ; 2.48)*				1.69 (0.99 ; 2.87) +	1.79 (1.04 ; 3.08)*	1.77 (0.96 ; 3.26) +
Live alone										1.95 (0.92 ; 4.12) +	1.97 (0.92 ; 4.24) +	2.05 (0.87 ; 4.80) +

Table 5 (cont'd)

	Loss of Sleep Because of Worries (last year)			Depression (last year)			Anxiety			Poor Self-Rated Mental or Emotional Health		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)
Block 2 (variables of interest)												
Program												
Non-nursing (*ref*)		-----	-----		-----	-----		-----	-----		-----	-----
Nursing		1.07 (0.71 ; 1.60)	1.00 (0.65 ; 1.53)		0.73 (0.49 ; 1.09)	0.65 (0.41 ; 1.01) +		1.75 (0.85 ; 3.62)	1.61 (0.77 ; 3.39)		2.43 (1.43 ; 4.14)**	2.04 (1.11 ; 3.75)*
Site												
FLI (*ref*)		-----	-----		-----	-----		-----	-----		-----	-----
ELI		1.23 (0.87 ; 1.73)	1.36 (0.95 ; 1.95) +		1.38 (1.00 ; 1.92) +	1.49 (1.04 ; 2.15)*		0.31 (0.19 ; 0.52)***	0.30 (0.17 ; 0.50)***		1.02 (0.63 ; 1.67)	1.05 (0.61 ; 1.83)
Programs x Sites		----- 1.57 (0.75 ; 3.27)	----- 1.48 (0.69 ; 3.20)		1.33 (0.63 ; 2.83)	1.13 (0.50 ; 2.56)		1.39 (0.35 ; 5.45)	1.40 (0.35 ; 5.62)		2.32 (0.83 ; 6.44)	1.62 (0.51 ; 5.17)
Block 3 (personal characteristics)												
Satisfaction with life												
Satisfied (*ref*)			-----			-----			-----			-----
Uncertain			1.86 (1.26 ; 2.74)**			4.05 (2.73 ; 6.02)***			1.01 (0.59 ; 1.75)			6.45 (3.55 ; 11.70)***
Dissatisfied			1.80 (1.20 ; 2.69)**			2.52 (1.69 ; 3.76)***			1.65 (0.85 ; 3.18)			2.96 (1.51 ; 5.81)**
High self-esteem												
Agree (*ref*)			-----			-----			-----			-----
Uncertain			2.79 (1.78 ; 4.36)***			2.50 (1.59 ; 3.92)***			3.20 (1.43 ; 7.17)**			1.66 (0.72 ; 3.80)
Disagree			2.23 (1.54 ; 3.21)***			2.45 (1.67 ; 3.60)***			2.05 (1.14 ; 3.66)*			4.51 (2.39 ; 8.49)***

Table 5 (cont'd)

	Loss of Sleep Because of Worries (last year)			Depression (last year)			Anxiety			Poor Self-Rated Mental or Emotional Health		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)
Block 3 (personal characteristics) ***(cont'd)***												
Positive body image												
Most of the time or always (*ref*)			-----			-----			-----			-----
Sometimes			1.09 (0.69 ; 1.73)			1.32 (0.82 ; 2.12)			1.37 (0.69 ; 2.72)			1.45 (0.72 ; 2.92)
Never			1.34 (0.96 ; 1.86) +			1.30 (0.92 ; 1.83)			3.15 (1.90 ; 5.24)***			1.29 (0.71 ; 2.33)
Goodness of fit												
χ^2 (df; *p*)	29.44 (2 ; $p < 0.001$)	32.66 (5 ; $p < 0.001$)	109.93 (11; $p < 0.001$)	21.83 (4; $p < 0.001$)	33.39 (7; $p < 0.001$)	168.35 (13; $p < 0.001$)	101.17 (4 ; $p < 0.001$)	133 (7; $p < 0.001$)	187.77 (13 ; $p < 0.001$)	20.95 (4 ; $p < 0.001$)	31.67 (2 ; $p < 0.001$)	136.98* (13 ; $p < 0.001$)
χ^2 Hosmer and Lemeshow (df; *p*)	1.09 (2 ; $p = 0.579$)	7.62 (6 ; $p = 0.05$)	7.38 (8 ; $p = 0.496$)	5.48 (5; $p = 0.360$)	2.646 (7; $p = 0.916$)	3.66 (8 ; $p = 0.886$)	7.61 (8 ; $p = 0.472$)	10.52 (8 ; $p = 0.230$)	8.12 (8 ; $p = 0.422$)	4.79 (7; $p = 0.686$)	7.89 (8 ; $p = 0.444$)	6.81 (8 ; $p = 0.558$)
R^2 de Nagelkerke	0.045	0.050	0.16	0.034	0.051	0.24	0.18	0.23	0.32	0.049	0.073	0.30
Correct percentage classification	58.0%	58.6%	65.4%	60.8%	62.2%	69.3%	83.2%	82.8%	84.8%	89.3%	89.3%	90.2%

aOR: adjusted odds ratio, CI: confidence interval, *Ref*: reference group FLI: French-Language Institution ELI: English-Language Institution

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; +$p < 0.10$.

Table 6
Hierarchical Multiple Logistic Regression of Suicidal Ideation Variables

	Thought Seriously About Suicide			Prepared a Plan for Suicide			Attempted Suicide		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)
Block 1 (sociodemographic characteristics)									
Average age				0.94 (0.89 ; 1.00) +	0.94 (0.88 ; 1.00) +	0.96 (0.90 ; 1.02)	.92 (.84 ; 1.01) +	.92 (.85 ; 1.01) +	.94 (.86 ; 1.03)
Gender									
Male (*ref*)				-----	-----	-----	-----	-----	-----
Female				1.74 (0.97 ; 3.14) +	1.69 (0.93 ; 3.07) +	1.23 (0.65 ; 2.33)	2.51 (1.09 ; 5.79)*	2.6 (1.14 ; 6.22)*	2.04 (0.83 ; 5.01)
Moved to Manitoba to pursue post-secondary education	2.12 (1.24 ; 3.61)**	1.97 (1.15 ; 3.37)*	1.21 (0.68 ; 2.15)						
Spent most of life									
Rural (*ref*)	-----	-----	-----				-----	-----	-----
Urban	1.84 (1.15 ; 2.93)*	1.93 (1.19 ; 3.14)**	1.84 (1.09 ; 3.09)*				1.81 (0.89 ; 3.67)	1.43 (0.67 ; 3.06)	1.38 (0.63 ; 3.04)
Teaching language is not language used at home									
Hours worked per week (average)									
Less than 20 hours (*ref*)	-----	-----	-----	-----	-----	-----			
20 hours or more	1.51 (0.94 ; 2.44) +	1.53 (0.95 ; 2.47) +	1.48 (0.88 ; 2.49)	1.94 (1.13 ; 3.33)*	1.96 (1.14 ; 3.38)*	1.92 (1.07 ; 3.46)*			
Live alone	2.23 (1.20 ; 4.15)*	2.17 (1.16 ; 4.06)*	2.15 (1.09 ; 4.24)*				3.94 (1.82 ; 8.51)***	4.61 (2.06 ; 10.33)***	6.29 (2.56 ; 15.43)***

Table 6 (cont'd)

	Thought Seriously About Suicide			Prepared a Plan for Suicide			Attempted Suicide		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)
Block 2 (variables of interest)									
Program									
Non-nursing (*ref*)		-----	-----		-----	-----		-----	-----
Nursing		1.44 (0.87 ; 2.36)	1.18 (0.69 ; 2.04)		1.50 (0.83 ; 2.71)	1.23 (0.65 ; 2.31)		1.99 (0.88 ; 4.52) +	0.86 (0.33 ; 2.22)
Site									
FLI (*ref*)		-----	-----		-----	-----		-----	-----
ELI		0.83 (0.53 ; 1.30)	0.87 (0.53 ; 1.41)		0.82 (0.51 ; 1.35)	0.89 (0.52 ; 1.51)		0.91 (0.36 ; 2.29)	2.84 (1.19 ; 6.78)*
Programs x Sites		2.68 (1.02 ; 7.01)*	2.06 (0.73 ; 5.84)		2.63 (0.86 ; 8.05) +	1.89 (0.56 ; 6.34)		11.27 (1.16 ; 109.15)*	6.57 (0.63 ; 68.57)
Block 3 (personal characteristics)									
Satisfaction with life									
Satisfied (*ref*)			-----			-----			-----
Uncertain			2.89 (1.78 ; 4.70)***			3.69 (2.04 ; 6.70)***			3.28 (1.57 ; 6.85)**
Dissatisfied			1.40 (0.80 ; 2.48)			2.34 (1.22 ; 4.49)*			1.37 (0.571 ; 3.29)
High self esteem									
Agree (*ref*)			-----			-----			-----
Uncertain			1.81 (0.94 ; 3.47) +			2.04 (0.96 ; 4.35) +			2.64 (1.01 ; 6.91)*
Disagree			3.48 (2.06 ; 5.88)***			2.93 (1.56 ; 5.52)**			2.63 (1.15 ; 6.05)*

Table 6 (cont'd)

	Thought Seriously About Suicide			Prepared a Plan for Suicide			Attempted Suicide		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)	aOR (95%CI)
Block 3 (personal characteristics) *(cont'd)*									
Positive body image									
Most of the time or always (*ref*)			-----			-----			-----
Sometimes			2.37 (1.31 ; 4.28)**			2.66 (1.31 ; 5.40)**			4.67 (1.79 ; 12.23)**
Never			1.59 (0.95 ; 2.65) +			1.61 (0.86 ; 3.01)			2.71 (1.12 ; 6.54)*
Goodness of fit									
χ^2(df; *p*)	18.46 (4 ; $p = 0.001$)	23.72 (7 ; $p = 0.001$)	108.73 (6 ; $p < 0.0001$)	13.74 (3 ; $p = 0.003$)	17.87 (6 ; $p = 0.007$)	87.46 (12 ; $p < 0.001$)	24.23 (4 ; $p < 0.0001$)	33.25 (7; $p < 0.0001$)	72.92 (13; $p < 0.0001$)
χ^2 Hosmer and Lemeshow (df; *p*)	0.24 (3; $p = 0.970$)	0.693 (6; $p = 0.995$)	8.52 (8; $p = 0.384$)	4.28 (7; $p = 0.747$)	5.95 (7; $p = 0.546$)	7.94 (8; $p = 0.439$)	7.94 (8; $p = 0.439$)	5.65 (8 ; $p = 0.686$)	9.55 (8 ; $p = 0.298$)
R^2 de Nagelkerke	0.038	0.049	0.214	0.034	0.44	0.208	0.082	0.113	0.234
Correct percentage classification	85.8%	85.8%	98.8%	90.4%	90.4%	90.0%	94.8%	94.8%	95.0%

aOR: adjusted odds ratio, CI: confidence interval, *Ref*: reference group FLI: French-Language Institution ELI: English-Language Institution

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; + $p < 0.10$.