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Native/aboriginal students use natural health products for health maintenance more so than other university students

Abstract

Background and aim: University student use of Natural Health Products (NHP) for health maintenance (HealthM) is assessed in Canada. We hypothesize greater use of NHP by Native/Aboriginal and female students. Demographic predictor variables and the top ten NHP used are determined.

Methods: A cross-sectional survey of 963 students (n=212 Native/Aboriginal; n=751 non-Native/Aboriginal) was conducted. $\chi 2$ and Fisher's exact tests analyzed group differences. Multiple logistic regressions determined predictor variables of NHP use.

Results: Of 963 surveyed students, 268 (27.8%) used NHP for HealthM, while 695 students (72.2%) did not. More Native/Aboriginal students used commercial tobacco (47% vs. 13%, P<0.001) and NHP (67% vs. 45%, P<0.001) than non-Native/Aboriginal students. Gender was not associated with NHP use (P=0.527). Canadians used echinacea more than non-Canadians (Odds Ratio. OR=4.96; 95% CI: 1.2-21.0). Ginger (OR=0.39; 95% CI: 0.2-0.78) and garlic (OR=0.28; 95% CI: 0.13-0.6) were popular amongst non-Canadians. Native/Aboriginal students used homeopathics (OR=39.9; 95% CI: 8.6-185.4) and rat root (OR=56.73; 95% CI: 6.91-465.8). Chamomile was less used by males (OR=0.33; 95% CI: 0.13-0.83) and used more by upperclassmen (OR=2.6 95% CI: 1.3-5.3).

Conclusion: Homeopathics and rat root are popular amongst Native/Aboriginal students. Garlic and ginger are popular amongst non-Canadians than Canadian students; however, more Canadians used echinacea for HealthM than non-Canadians. Chamomile is less popular amongst males. Commercial tobacco is used more by Native/Aboriginal students. Predictors of NHP use are: Native/Aboriginaland upperclassman.

Keywords: native/aboriginal, health, natural health product, student, gender, tobacco

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Abbreviations: CAM, complementary and alternative medicine; CI, confidence intervals; healthm, health maintenance; NHP, natural health products; Nv/Nm, non-vitamin non-mineral dietary supplement; OR, odd ratios; U.S., united states; VM/MV, vitamins and minerals and multivitamins

Introduction

The popularity of natural health products (NHP) is increasing globally. In the United States (U.S.) alone, the NHP industry generateda revenue of almost $27 billion in 2009.[1] A primary reason for the use of NHP by consumers is that they are natural substances.[2] Many NHP are derived from plants, but they also derive from animals, microorganisms, fungi, and protists. Natural health products fall under the broader category of Complementary and Alternative Medicine (CAM). The National Center for Complementary and Alternative Medicine defines CAM as a diverse group of non-allopathic practices or products.[3] Natural health products are a type of CAM, which includes vitamins, minerals, herbals, and traditional medicine. In Canada, cosmetics with botanicals, such as toothpaste and shampoo, can also fall under the NHP group.[3,4]

Populations throughout the world, such as in Turkey,[5] Jamaica,[6] Canada,[4] and the U.S,[1] use NHP. In North America, certain racial/ethnic groups use herbal or natural supplements more than other racial/ethnic groups. For example, U.S. non-Hispanic whites (19%) and Native Americans (16%) were the top two users of herbal or natural supplements amongst adults.[7] The difference between these two groups was not significant.CAM are used for their health benefits and it was shown that U.S. Hispanicsuse mint for stomach pain and colds, while aloevera is used for sore throat and high blood pressure.[8] Several studies compared the results of the 1987, 1992, and 2000 data on the usage of vitamins and minerals and multivitamins (VM/MV) between different U.S. ethnicities (Hispanic, non-Hispanic white, and non-Hispanic African American, and others.[9] It was found that the use of VM/MV increased over the years from 1987 to 2000.[9]

Generally more females than males use herbal remedies for health maintenance (HealthM). For example, Nurshowed that 64.0% of females use herbal remedies vs. 36.0% of males (P<0.001).[5] A similar study was conducted with university students. Although not statistically significant, more females than males used a non-vitamin non-mineral dietary supplement (Nv/Nm).[10] Barnes and colleagues found greatest use of CAM in participants with higher education, of older age (35-69years old) and of female gender.[11] Although females show greater use of Nv/Nm supplements than males, the use of Nv/Nmvaries according to the race/ethnicity of the woman. For example Native American females use more Nv/Nm supplements than white females (46.7% vs 41.0%) and both groups use more Nv/Nm supplements than Native American males (29.2%) and white males(37.2%).[12]. Studies conducted in Israel.[13] and in the U.S.,[14] found a significant difference between genders and CAM use. In Israel, it was found that use of one or more CAM products in the previous year was 46.4% for white females vs. 39.4% for white males.[13] In the U.S., it was reported that 21.0% of females used CAM in the past 12months vs.16.7% of males.[14] It was also reported that 32.2% of persons with

multiple race/ethnic background (including Asian, American Indian/Alaska Native, other race, white, and black), 24.6% of Asian people, and 21.9% of Alaskan Indian people use CAM more than white people (19.1%) and black(14.3%).[14].

Although females show greater use of NHP than males, NHP use varies according to the education of the woman. The greatest use of CAM and multivitamin/mineral supplements was found in female participants with higher education.[1,11] White educated females had higher use of Nv/Nm supplements and health products than males.[12,15] In general, a higher percentage of educated people use vitamins, minerals, and multivitamins compared to people who are less educated.[9] A study on adults from minority ethnic groups (Hispanic, non-Hispanic white, and non-Hispanic black) reports that high-level educated adults (e.g., college) use more CAM than low-level educated adults (e.g., high school).[16] Kennedy also found that higher education level resulted in greater use of CAM.[14]

A previous study showed more students use herbs than non-students.[17] More than 70% of students used Nv/Nm and other drugs for depression. This suggests a relationship between students' psychological motivations and herbs used.[10,17,18] A survey performed in five U.S. universities indicates that 66% of students use dietary supplements at least once a week.[19] While previous research shows the use of NHP by adults varies for different ethnic or education groups, prior research does not specifically focus upon Native/Aboriginal university students' use of NHP for HeathM. For example, a recent Canadian study on NHP use by adults excluded Native/Aboriginal people.[20]

The term "Aboriginal" is the official Canadian term analogous to the U.S. term "Native American". In Canada, Aboriginal people include: First Nations (equivalent to the U.S. "American Indian" term), Métis, and Inuit. In the U.S. Native Americans include: American Indians, Alaska Natives, and Native Hawaiians. In this paper the inclusive term Native/Aboriginal will be used.

The number of Native/Aboriginal people in Canada currently surpasses one million.[21] The growth rate of Canadian Aboriginal people is expected to increase from 2006-2031 as compared to Canadian non-Aboriginal people (1.1%-2.2% vs. 1.0% respectively). Canadian researchers monitor Native/Aboriginal health by measuring common disease and death rates in an attempt to understand health disparities.[22,23]

The purpose of our research is to investigate the use of NHP for HealthM by Native/Aboriginal and non-Native/Aboriginal students. It builds on a previous study where we examined how Native/Aboriginal and non-Native/Aboriginal students learned about NHP.[24] In this past research, we found that the main source of information about NHP for Native/Aboriginal students was the Elders. In this current study, we are interested in the types of NHP used by students. We hypothesize that there is a greater use of NHP for HealthM by Native/Aboriginal students, and a greater use of NHP by female students for HealthM. We will determine the top ten NHP used for HealthM by gender and ethnicity. Finally, we will determine demographic predictor variables associated with student use of the top ten NHP used for HealthM.

Materials and methods

Participants and study design

A cross-sectional survey was completed by 963 students in fall 2011 (from mid-October to the end of November) in two Canadian universities. There were 800 students enrolled at First Nation University of Canada,[25] and 13,120 students from University of Regina.[26] We had 212 Native/Aboriginal students and 751 non-Native/Aboriginal students completed the survey from both universities. The combined survey participants (≥18years old) were female (n=645), male (n=280), or transgendered (n=7) missing data (n=31). Non-students were excluded from the study. Both universities are in Regina, Saskatchewan, Canada. The First Nation University of Canada is a Canadian University that focuses on indigenous knowledge. The study was conducted with approval from the Research Ethics Board of the University of Regina.

Instrument

Our survey assessed students' use of medicinal plant NHP and took approximately 30minutes to complete. The questionnaire was divided into three parts, including health and demographic information (Part I), the general use of NHP (Part II), and the use of specific NHP in the past year (Part III).[24] Demographic characteristics included ethnicity, age, grade level, gender, country of origin, and smoking status. The options for race/ethnicity were: white; black; Native/Aboriginal; Asian; Pacific Islander; two or more ethnicities; and other. The options for university level were: undergraduate (first, second, third, and four+ year) and graduate.[24]

The survey plant list included 18 medicinal plants, such as aloe vera, ginger, and echniacea/blackroot (*Echinacea angustifolia* DC.). However, students had the option to include other plants not listed (e.g., rat root (*Acorusamericanus* (Raf.) Raf.)), which is commonly used by Native/Aboriginal people in Saskatchewan, Canada.[27]

Statistical analysis

Fisher's exactand χ^2 tests were utilized to analyze group differences. Multiple logistic regression models (MLR) were used to estimate odds ratios (OR) and 95% Confidence Intervals (CI) to assess joint effects of the following variables regarding the use of specific NHP for HealthM: age, gender, Native/Aboriginal status, non-Native/Aboriginal Canadian status, education level (underclassman first or second vs. upperclassman ≥third year), and smoking status. SAS Software 9.2 was used to analyze data and compute summary statistics. The alpha level for significance was set at 0.05. Since estimates for small groups can be unreliable due to small sample size, one variable was omitted from the model in order to get reasonable estimates for the remaining variables.

Given the total sample size of (n=963), power calculations showed that if the comparing groups split 2:1 (i.e., 642 to 321), there would be 83% power to detect a difference in proportions of 40% vs. 50%, and 84% power to detect a difference in proportions of 10% vs. 17%. For the analyses restricted to respondents reporting NHP use, the total usable sample size of 639, if split 2:1 for a factor, will give 82% power to detect a difference in proportions of 38% vs. 50%, and there will be 84% power to detect a difference in proportions of 10% vs. 19%.

Results

Of a total number of 963 surveyed students, 268(27.8%) used NHP for HealthM, while 695 students (72.2%) do not.

Ethnicity, age, and NHP use for HealthM

Table 1 shows the comparisons between the survey sample subgroups defined by three variables: ethnicity, age, and NHP use for HealthM. Three different descriptive tables were combined to create (Table 1). The factors compared were: age group, university grade level, gender, use of commercial tobacco, use of NHP for health, and use of NHP for health in the past year. The first sub-table (Part

I Ethnicity) compares Native/Aboriginal vs. non-Native/Aboriginal students. The second sub-table (Part II Age) compares age groups. Students were grouped into young ≤25years and older ≥26years. The third sub-table (Part III HealthM) examines whether or not NHP were used for HealthM.

When comparing age as the first variable in Table 1, younger students were compared to older students. Non-Native/Aboriginal students were younger (90%) compared to Native/Aboriginal students (59%, P<0.001).

Table 1 Comparisons of groups defined by ethnicity, age, and natural health product use for health maintenance

	Part 1. Comparison of Non-Native/Aboriginal Vs. Native/Aboriginal for NHP			**Part II. Comparison of Younger(≤25 Years) Vs. Older(≥26 Years) for NHP**			**Part III. Comparison of NHP Use for Healthm Vs. NHP Use for not Healthm**		
Variable(and all Responses)	**Non-Native/ Aboriginal(N=751)**	**Native/ Aboriginal(N=212)**	**P-Value**	**Young(≤25 years) (N=160)**	**Old (≥ 26 years) (N=794)**	**P-Value**	**Not for Health M(N=695)**	**For Health M(N=268)**	**P-Value**
Age Groups(%)	743	211		794	160		690	264	
18-25	670(90%)	124(59%)	<0.001	794(100%)	0(0%)	<0.001	588(85%)	206(78%)	0.01
26+	73(10%)	87(41%)		0(0%)	160(100%)		102(15%)	58(22%)	
Grade Level(%)	740	207		784	157		685	262	
1st year	311(42%)	62(30%)	<0.001	342(44%)	26(17%)	<0.001	277(40%)	96(37%)	0.01
2nd year	216(29%)	57(28%)		241(31%)	31(20%)		208(30%)	65(25%)	
3rd year	94(13%)	46(22%)		101(13%)	39(25%)		91(13%)	49(19%)	
4th+ year	91(12%)	36(17%)		90(11%)	37(24%)		92(13%)	35(13%)	
Graduate	28(4%)	6(3%)		10(1%)	24(15%)		17(2%)	17(6%)	
Gender(%)	730	202		777	149		668	257	
Female	501(69%)	151(75%)	0.093	546(70%)	102(68%)	0.658	460(68%)	185(71%)	0.65
Male	229(31%)	51(25%)		231(30%)	47(32%)		208(31%)	72(28%)	
Citizenship(%)	596	159		620	129		545	210	
Non-Canadian	101(17%)	1(1%)	<0.001	83(13%)	18(14%)	0.864	72(13%)	30(14%)	0.7
Canadian	495(83%)	158(99%)		537(87%)	111(86%)		473(87%)	180(86%)	
Commercial Tobacco Use(%)	737	207		779	157		682	262	
Yes	96(13%)	98(47%)	<0.001	125(16%)	66(42%)	<0.001	122(18%)	72(27%)	0
No	641(87%)	109(53%)		654(84%)	91(58%)		560(82%)	190(73%)	
Q1. Use NHP for health(%)	749	212		792	160		693	268	
Yes	340(45%)	142(67%)	<0.001	372(47%)	104(65%)	<0.001	217(31%)	265(99%)	<0.001
No	409(55%)	70(33%)		420(53%)	56(35%)		476(69%)	3(1%)	
Q2. Use NHP for health in last year(%)	498	181		544	128		411	268	
Yes	295(59%)	114(63%)	0.378	313(58%)	90(70%)	0.008	169(41%)	240(90%)	<0.001
No	203(41%)	67(37%)		231(42%)	38(30%)		242(59%)	28(10%)	

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First year students showed highest use of NHP in general, for both ethnicities (Table 1, Part I). Non-Native/Aboriginal students used more NHP in the first university year (42% vs. 30%, P<0.001) as compared to Native/Aboriginal students. When comparing age (old and young) within the first year, younger students used more NHP vs. older students (44% vs.17%, P<0.001) (Table 1 Part II).

Results showed significant relationships for citizenship (being Canadian or non-Canadian). Canadian Native/Aboriginal students used more NHP than Canadian non-Native/Aboriginal students (99% vs. 83% respectively, P<0.001).

Commercial tobacco use was another significant factor for students who used NHP for HealthM. More Native/Aboriginal students used commercial tobacco than non-Native/Aboriginal students (47% vs. 13% respectively, P<0.001). Commercial tobacco was highly used by older students vs. younger students (42% vs. 16%, P<0.001). Commercial tobacco was used by 27% of all students who reportedly used NHP for HealthM compared to 18% of tobacco users who used NHP for other purposes (P<0.001).

Regarding Question 1 (Q1) in Table 1 (Have you ever used medicinal plant or herbal products for health or well-being?), more Native/Aboriginal students used NHP for health compared to non-Native/Aboriginal students (67% vs. 45% respectively, P<0.001). Older students used NHP more for HealthM compared to younger students (65% vs. 47%, P<0.001). Students who chose "Yes" to Q1 used NHP more for HealthM than for other purposes (99% vs. 31%, P<0.001).

Regarding Question 2 (Q2) in Table 1 (Have you used medicinal plant or herbal products for health or well-being in past year?), older students who answered yes to Q2 showed significant use of NHP compared to younger students (70% vs. 58% respectively, P=0.008). There were significantly more students who use NHP for HealthM compared to students who used NHP for other purposes (90% vs. 41%, P<0.001).

Logistic regression odds ratio for the likelihood of NHP use for health maintenance

Table 2 shows the results from MLR modeling to determine which variables are associated with NHP use for HealthM. Among the six predictors analyzed, only two were found to be significant for NHP use for HealthM: Native/Aboriginal (95% OR=2.5, CI=1.6-3.9, P=0.001) and upper classman (95% OR=1.5, CI=1.0-2.1, P=0.048). For example, the 95% CI of the OR (1.6-3.9) indicates that odds of NHP use for HealthM are significantly higher for Native/Aboriginal students compared to non-Native/Aboriginal students because the CI does not contain 1. This means that being Native/Aboriginal and upperclassman are significant predictor variables of NHP use.

Table 2 Logistic regression odds ratio for the likelihood of natural health product use for health maintenance

Factor	Odds ratio (95% C.I.)	P-Value
Native/Aboriginal	2.5(1.6, 3.9)	<0.001
Female	1.1(0.8, 1.7)	0.527
Older Age(≥26 years old)	1.1(0.7, 1.7)	0.754
Commercial Tobacco Use	1.0(0.6, 1.5)	0.897
Canadian	0.8(0.5, 1.3)	0.341
Upperclassman	1.5(1.0, 2.1)	0.048

Top ten plants used for health maintenance: gender and ethnicity

Table 3 shows the gender specific proportional use of the top ten plants used for HealthM both overall and by ethnicities. Aloe vera was the most popular NHP for HealthM use by 21% of all respondents, 27% of Native/Aboriginal students, and 19% of non-Native/Aboriginal students. Ginger, echinacea, garlic, chamomile, peppermint, ginseng, homeopathic remedies, rat root, and "others" were the remainder of the top ten plants in decreasing order of use. With the exception of chamomile, plants were used equally by males and females. Males (all respondents and Native/Aboriginal students) were less likely to use chamomile compared to females (all respondents; 3% vs.7%, P=0.019, Native/Aboriginal; 2% vs. 11%, P=0.048).

Top ten plants used for health maintenance: native/aboriginal and non-native/aboriginal university students

Figure 1 shows that Native/Aboriginal students (14% males, 13% females) were more likely to use aloe vera than non-Native/Aboriginal students of either gender (10% males, 9% females). Native/Aboriginal students were more likely to use homeopathic remedies, rat root, and other NHP for HealthM. Native/Aboriginal females were more likely to use ginger, chamomile, peppermint, and ginseng than other students (10%, 10%, 7%, and 6% respectively).

Table 3 Top ten plants used for health maintenance by gender and ethnicity

	All Respondents			Native/Aboriginal			Non-Native/Aboriginal		
Plant Name	Females(N=652)	Males(N=280)	P-Value	Females(N=151)	Males (N=51)	P-Value	Females (N=501)	Males (N=229)	P-Value
Aloe Vera									
No	585(90%)	250(89%)	0.816	131(87%)	44(86%)	1	454(91%)	206(90%)	0.79
Yes	67(10%)	30(11%)		20(13%)	7(14%)		47(9%)	23(10%)	
Ginger									
No	602(92%)	257(92%)	0.791	136(90%)	47(92%)	0.787	466(93%)	210(92%)	0.54
Yes	50(8%)	23(8%)		15(10%)	4(8%)		35(7%)	19(8%)	

Table continued

	All Respondents			Native/Aboriginal			Non-Native/Aboriginal		
Plant Name	**Females(N=652)**	**Males(N=280)**	**P-Value**	**Females(N=151)**	**Males (N=51)**	**P-Value**	**Females (N=501)**	**Males (N=229)**	**P-Value**
No	594(91%)	263(94%)	0.188	142(94%)	49(96%)	0.734	452(90%)	214(93%)	0.16
Garlic									
No	619(95%)	261(93%)	0.35	141(93%)	50(98%)	0.297	478(95%)	211(92%)	0.08
Yes	33(5%)	19(7%)		10(7%)	1(2%)		23(5%)	18(8%)	
Chamomile									
No	608(93%)	272(97%)	0.019	134(89%)	50(98%)	0.048	474(95%)	222(97%)	0.19
Yes	44(7%)	8(3%)		17(11%)	1(2%)		27(5%)	7(3%)	
Peppermint									
No	618(95%)	270(96%)	0.316	141(93%)	49(96%)	0.734	477(95%)	221(97%)	0.56
Yes	34(5%)	10(4%)		10(7%)	2(4%)		24(5%)	8(3%)	
Ginseng									
No	621(95%)	274(98%)	0.068	142(94%)	50(98%)	0.457	479(96%)	224(98%)	0.2
Yes	31(5%)	6(2%)		9(6%)	1(2%)		22(4%)	5(2%)	
Homeopathic-remedies									
No	940(98%)	275(98%)	1	140(93%)	47(92%)	1	500(100%)	228(100%)	0.53
Yes	12(2%)	5(2%)		11(7%)	4(8%)		1(0%)	1(0%)	
Rat Root									
No	644(99%)	276(99%)	0.759	143(95%)	48(94%)	1	501(100%)	228(100%)	0.31
Yes	8(1%)	4(1%)		8(5%)	3(6%)		0(0%)	1(0%)	
Other									
No	645(99%)	277(99%)	1	144(95%)	48(94%)	0.715	0(0%)	0(0%)	
Yes	7(1%)	3(1%)		7(5%)	3(6%)		0(0%)	0(0%)	

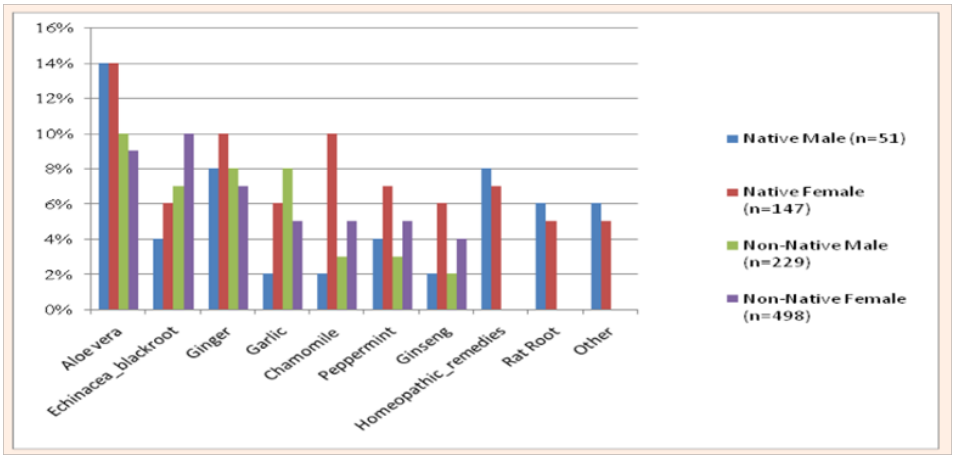

Figure 1 This bar graph shows the association between the top ten plants that are used across gender and ethnicity.

Multivariable logistic regression models for the probability of reporting use of a NHP for health maintenance

Table 4 shows results from MLR models used to assess joint effects of Native/Aboriginal status, age, gender, commercial tobacco use, Canadians non-Native/Aboriginal, and education level (Underclassman (first or second year) vs. Upperclassman (≥third year) on the use of specific NHP for HealthM. When estimates were unreliable (due to small sample size), one variable (Canadians non-Native/Aboriginal) was omitted from the model in order to get reasonable estimates for the remaining variables. More non-Canadians used ginger and garlic for HealthM than Canadian students (OR=0.39; 95% CI: 0.2-0.78, P=0.008 and OR=0.28; 95% CI: 0.13-0.58, P<0.001 respectively). However, more Canadians used echinacea for HealthM than non-Canadians (OR=4.96; 95% CI: 1.18-20.96, P=0.029). More Native/Aboriginal students used homeopathic remedies and rat root for HealthM than non-Native/Aboriginal students (OR=39.9; 95% CI: 8.58-185.4, P<0.01 and OR=56.73; 95% CI: 6.91-465.8, P<0.001, respectively). Males were less likely to use chamomile than females for HealthM (OR=0.33; 95% CI: 0.13-0.83, P=0.018), and more upperclassmen were likely to use chamomile for HealthM than under classmen (OR=2.63; 95% CI: 1.32-5.25, P=0.006).

Table 4 Summary of nine multivariable logistic regression models for the probability of reporting use of a natural health product for health maintenance

	Natural Health Product					
	Aloe Vera		**Ginger**		**Chamomile**	
Characteristic	**OR(95% C.I.)**	**P-value**	**OR(95% C.I.)**	**P-value**	**OR(95% C.I.)**	**P-value**
Aboriginal	1.62(0.86, 3.06)	0.135	1.26(0.59, 2.66)	0.55	1.55(0.67, 3.59)	0.307
Older Age(26+)	1.11(0.58, 2.14)	0.749	1.2(0.57, 2.57)	0.63	0.43(0.16, 1.18)	0.101
Male	1.16(0.68, 1.96)	0.591	1.02(0.56, 1.87)	0.95	0.33(0.13, 0.83)	0.018
Tobacco Use	0.82(0.43, 1.58)	0.555	1.61(0.82, 3.16)	0.17	1.99(0.87, 4.53)	0.101
Canadian	0.83(0.41, 1.69)	0.608	0.39(0.2, 0.78)	0.01	1.3(0.38, 4.52)	0.675
Upperclassman	1.59(0.95, 2.67)	0.08	0.81(0.43, 1.51)	0.5	2.63(1.32, 5.25)	0.006
	Homeopathic Remedies		**Rat Root**		**Echinacea Blackroot**	
	OR(95% C.I.)	**P-value**	**OR(95% C.I.)**	**P-value**	**OR(95% C.I.)**	**P-value**
Aboriginal	39.9(8.58,185.4)	<. 001	56.73(6.91,465.8)	<. 001	0.58 (0.24, 1.42)	0.234
Older Age(26+)	0.8(0.24, 2.63)	0.712	0.22 (0.04, 1.14)	0.07	0.90 (0.37, 2.2)	0.815
Male	1.24(0.42, 3.71)	0.695	1.39(0.39, 4.9)	0.67	0.93(0.49, 1.73)	0.811
Tobacco Use	0.52(0.17, 1.59)	0.255	1.06(0.31, 3.61)	0.92	0.46(0.17, 1.22)	0.119
Canadian					4.96(1.18,20.96)	0.029
Upperclassman	0.87(0.28, 2.65)	0.804	2.41(0.7, 8.27)	0.16	1.15(0.62, 2.14)	0.649
	Garlic		**Peppermint**		**Ginseng**	
	OR(95% C.I.)	**P-value**	**OR(95% C.I.)**	**P-value**	**OR(95% C.I.)**	**P-value**
Aboriginal	0.85(0.33, 2.18)	0.741	2.34(0.95, 5.76)	0.06	1.37(0.48, 3.95)	0.557
Older Age(26+)	1.74(0.77, 3.96)	0.186	1.16(0.46, 2.95)	0.76	1.27(0.44, 3.66)	0.654
Male	1.00(0.50, 1.99)	0.992	0.76(0.34, 1.73)	0.52	0.54(0.21, 1.43)	0.218
Tobacco Use	1.53(0.69, 3.39)	0.293	0.85(0.33,2.18)	0.73	1.16(0.41, 3.27)	0.772
Canadian	0.28(0.13, 0.58)	<. 001	0.40(0.16, 1.03)	0.06	0.40(0.15, 1.1)	0.076
Upperclassman	1(0.5, 2.03)	0.99	1.22(0.57, 2.65)	0.61	0.98(0.41, 2.36)	0.966

Discussion

This research was carried out to determine if there is significant NHP use for HealthM in a university student sample. Our findings corroborate those of prior studies showing that higher education levels and being of older age are associated with NHP use as compared to lower education and young age.[5,9,16,28-30] Unlike the majority of previous research which shows more females use CAM than males,[5,12-15] we find no significant difference between gender and NHP use. The exception to this result was the fact that male students use less chamomile than female students.

Native/Aboriginal students reported significant use of commercial tobacco. A positive association was found between tobacco with older age and with NHP used for HealthM. Fifty-two percent of Native/Aboriginal who are 15 years and older smoke tobacco everyday compared to 16% of Canadian people in the same age group.[31]

Commercial tobacco is used by more students who reportedly used NHP for HealthM compared to tobacco users who used NHP for other purposes. It could be that students using tobacco products may use NHP as a way to decrease the negative effects associated with tobacco. This would support a survey performed in five U.S. universities that reported that students using tobacco products are more likely to take several dietary supplements weekly.[19] It is suggested in this last study that students may incorrectly perceive the frequent uses of dietary supplements to be a substitute for other healthy behaviors.[19] This, however, warrants more investigation because in Native/Aboriginal culture, tobacco is traditionally used in ceremonies (e.g., prayers and offerings) and is also used as a medicine or as an anesthetic.[32,33] It is interesting that although students may perceive the use of dietary supplements as a substitute for healthy behaviors,[19] they also report that they are unsure of the effectiveness and safety of CAM.[34]

We find predictive variables for the use of NHP are Native/Aboriginal and upper classman. A study which surveyed U.S. older adults found the top plants used included garlic, echinacea, ginger, aloe vera, and ginseng(46.9%, 27.8%, 18.9%, 17.4%, and 13.2% respectively).[35] We find that students use similar NHP for HealthM purposes(our top plants include e.g., 47%aloe vera, 33% ginger, 27% echinacea, 21% garlic, 14%ginseng). In a study done by Kirkpatrick and colleagues predictor variables of Nv/Nm use were determined, such as gender, income level, marital status, perception of physical health, presence of a chronic disease, ethnicity, and education level.[35] Participants of young age, rather than old age, and those with presence of chronic disease, rather than without chronic disease, showed significant difference in use of Nv/Nm.[35] Our study demonstrates the importance of rat root for Native/Aboriginal students. We find that ethnicity is associated with homeopathic remedies and rat root use while education level and gender were associated with chamomile use. In Saskatchewan, rat root is used as a stimulating tonic and a remedy for respiratory system ailments by Aboriginal people.[27] Rat root rhizome extract demonstrates anti-inflammatory, antimicrobial, and antioxidant activity.[36]

Higher education and income have been cited in several studies as predictors of NHP use.[2,9,11,14,16] Educated people are more likely to learn about NHP through their own readings, to learn about their illnesses and the range of treatments available to them, and to question their health care provider.[37] Disposable income means that people can afford NHP not funded by the public health care system. In the current study, Native/Aboriginal students, because of their cultural background, are more likely to adhere to a holistic approach that encompasses the spiritual, mental, physical, and emotional aspects of health.[38] This might explain why the use of NHP, especially medicinal plants, is appealing to Native/Aboriginal students. Similarly, alternative healthcare users are more likely to believe in the importance of the mind and spirit in creating health and illness.[37]

Strengths and limitations of the study

One of the major strengths of our study is the focus on the use of NHP for HealthM amongst both Native/Aboriginal and non-Native/Aboriginal university students. Although assessment of commercial tobacco use by Native/Aboriginal students was strength, respondents could not specify whether the tobacco was used as a NHP for HealthM or if commercially purchased or cultivated; due to the design of our survey question regarding tobacco. The survey did not go into depth regarding tobacco use for HealthM. It did not allow for clarification regarding use of tobacco for recreation or for ceremonial purposes. Furthermore, the authors feel that Native/Aboriginal students may have misinterpreted the term 'homeopathic' to refer to 'home remedies'. Future research should investigate this possibility.

Conclusion

We conducted a survey of Canadian university students, with a sizable Native/Aboriginal sample, to assess use of NHP for health maintenance. Previously conducted research suggests NHP use is popular in the general population, especially amongst older adults and adult females. However, less was known about student use of NHP, and if there are variations in NHP use associated with gender, age, or ethnicity.

We find no gender differences in overall NHP use for health maintenance in students. In addition, Native/Aboriginal ethnicity is a strong predictor of NHP use for HealthM by students. Homeopathic remedies and rat root are popular amongst Native/Aboriginal students; Echinacea's popular amongst Canadian (non-Native/Aboriginal) students. Chamomile is found to be less popular amongst males (both all respondents and Native/Aboriginal people) than females. Upperclassmen are more likely to use chamomile compared to underclassmen.

Although this study set out to determine NHP usage amongst Native/Aboriginal students and non-Native/Aboriginal students, we also discovered that Native/Aboriginal students are more likely to use commercial tobacco than non-Native/Aboriginal students. Significantly more Canadian Native/Aboriginal students use commercial tobacco than non-Native/Aboriginal students. This leads to more questions about commercial tobacco use and misuse in the Aboriginal population.[38] Homeopathic remedies and rat root are preferred by Native/Aboriginal students who turn to Elders to learn about NHP.[24] This illustrates the importance of Elders in sharing their knowledge about traditional medicines and that more courses/programs should be developed to promote this exchange between Elders and Native/Aboriginal students. Future research on Natural Health Products use should include a Native/Aboriginal sub-sample.

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Conflict of interest

The authors declare that there is no conflict of interest.

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