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ABORIGINAL AND NON-ABORIGINAL STUDENTS LEARN ABOUT NATURAL HEALTH PRODUCTS FROM DIFFERENT INFORMATION SOURCES

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ABSTRACT

Natural health products (NHPs) include naturally derived botanical and nonbotanical products. Past research indicates a high prevalence of NHPs use amongst adults in the United States and Canada but does not clearly characterize NHPs use amongst students, ethnic variations of such use, or how users learn about NHPs. We hypothesize that there is a difference between Aboriginal and non-Aboriginal students in how they learn about NHPs. To investigate this question, we conducted a cross-sectional study at First Nations University of Canada and the University of Regina, Saskatchewan, Canada, during the fall of 2011. Aboriginal (n=214) and non-Aboriginal (n=749) students participated in the 28 question survey. Our results indicate that Aboriginal students who use NHPs are found in all age groups, are mostly female, are smokers and nonsmokers, and learn about NHPs from Elders and healers. Compared to non-Aboriginal students, Aboriginal students rely significantly less on alternative and conventional health providers, electronic media, print media, and advertising as their sources of information about NHPs. Thus, Aboriginal students use Elders or healers as a primary source of information to learn about NHPs, as compared to non-Aboriginal students. Future work should investigate the role of Elder traditional educators to convey NHPs information directed specifically to Aboriginal university students.

Keywords: Aboriginal, Educational/instructional media design, Natural health products, Public health, Traditional medicine.

Complementary and alternative medicine (CAM) is a broad term that includes many prevention and treatment methods, often used instead of conventional Western medicine. Reasons people use CAM include maintaining health, relieving acute symptoms, treating chronic conditions, cosmetic purposes (Barnes et al., 2008) and improving physical or mental performance (Ferreira et al., 2012). Complementary and alternative medicine includes therapies such as meditation, massage, yoga, chiropractic treatment, and a variety of substances to be ingested or used topically (Barnes et al., 2008) such as natural health products (NHPs). Use of CAM has been increasing in North America. In the United States, the number of adults who have ever used herbs or dietary supplements grew from 50.6 million in 2002 to 55.1 million in 2007 (Wu et al., 2011). In 2002, 36.0% of adults used CAM in the United States. By 2007, 38.3% of adults and 11.8% of children were using some form of CAM (Barnes et al., 2008). In Canada (1994–95), a national telephone survey indicated that 15% of Canadians aged 15 years and over had visited at least one alternative health practitioner in the past year (Singh and Levine, 2006). The National Population Health Survey indicates that 15%, 16%, and 17% of the Canadian population consulted a CAM practitioner in 1994–95, 1996–97, and 1998–99, respectively (Millar, 2001). A study conducted in 2002 about CAM use in the United States and Canada, has shown that the highest numbers of per-

sons using CAM have the following characteristics: they are aged between age 20–64 years; are female; have higher education; and are White (McFarland et al., 2002).

One of the most common types of CAM used is NHPs. Natural health products, such as dietary supplements, functional foods, and ethnomedicine, are a multibillion dollar per year industry in North America. Largely unregulated, these products derive from whole organisms (e.g., plants, fungi, animals, algae, and bacteria) and are consumed in a variety of forms (e.g., fresh, dried, extracted, fermented, cooked) and ways (e.g., alone or mixed). While falling along the continuum of foods and drugs they are usually neither. They are often utilized primarily for disease prevention or treatment, physical/mental performance enhancement, or spiritual practice, rather than for food energy. The origins of many NHPs can be traced to regional traditional or ethnomedicine practices. In 2004, a new Canadian regulation (part of the Food and Drugs act) stated that NHPs include any plant, animal, or microorganismal products, vitamins and minerals, and homeopathic medicines used for disease prevention and treatment, as well as health and wellness maintenance (Andrews and Boon, 2005). Excluded from the mainstream definition of NHPs are blood products, commercial tobacco, marijuana, or any injectable form products (Andrews and Boon, 2005).

Two national surveys in the United States indicate that 12–14% of the sample used herbal preparations/natural supplements (Kaufman et al., 2002). On the other hand, a national survey on NHPs used in Canada determined that 9.3% of Canadians had used botanical and naturally derived nonbotanical products in the past 2 days in 2000–2001 (Singh and Levine, 2006). In a Canadian study published in 2002 it was reported that 13% of the men and 16% of the women had used at least one herbal supplement within the last 24 hours (Troppmann et al., 2002). In 2010, a survey, conducted using computer assisted telephone interviews, indicated that up to 73% of the interviewees used NHPs (Health Canada, 2012).

Singh and Levine (2006) have assessed the prevalence of NHPs use, user characteristics, and user rationale for NHPs use in Canada. For example,

they report that women were more likely to use NHPs than men, especially between the ages of 36–75 years where women were 1.5–2 times more likely to use NHPs. Natural Health Products use was more prevalent in White respondents compared to non-White respondents. However, this study and others excluded or insufficiently represented important ethnic subgroups. Another study indicates the importance of traditional medicine use across different ethnicities/cultures for disease treatment or illness prevention (Arcury et al., 2007). Many of the cited studies do not address the Aboriginal/Native American population (Arcury et al., 2007; Wu et al., 2011; Foote et al., 2003). One exception is the National Center for Complementary and Alternative Medicine report, which states that 50.3% of the sample (who use NHPs in the United States) is American Indian/Alaskan Native (U.S. Department of Health & Human Services, 2008). This suggests how important it is to include Aboriginal and Native populations in any study about CAM and NHPs.

There are some published studies that discuss the prevalence of NHPs use amongst students. A study regarding nonvitamin nonmineral (NVNM) supplement use amongst college students shows that college students use such supplements more than middle-aged adults. The authors suggest that college students more likely have higher exposure to advertising from television, internet, and magazines (Newberry et al., 2001). Another study assessed the prevalence of NVNM supplement use amongst university students (Perkin et al., 2002). It was found that 51.7% of the participants learned about NVNM supplements from their friends and family, 43% received their information from health food stores, 31.6% learned from magazine and newspapers, and 3.8% from dietetics professionals (Perkin et al., 2002). A Turkish study of NVNM supplement usage amongst university students indicates that the most frequently used sources of information about NVNM supplements are television (76.3%), magazines and newspapers (41.5%) and internet websites (37.3%) (Ayranci et al., 2005). In a study conducted at the State University of New Jersey examining herbal use by students, it was found that the majority of students use nonprofessional sources of infor-

mation about NHPs such as family, friends, coaches, and media (Ambrose and Samuels, 2004). Amongst older adults, 51.6% of the participants using NVNM supplements revealed that the media was their source of information (Wold et al., 2007). Another study of older adults and their use of NHPs indicated that 49% of the sample learned about NHPs from friends and family (Levine et al., 2009). Despite the documented increase in the prevalence of NHPs use in the adult North American population, these prior studies do not yet show a clear picture about the sources of information from which students might learn about NHPs. Currently, it seems that most students learn about NHPs from nonprofessional sources such as family, friends, and media.

In 2010, a telephone survey conducted in Canada indicates that respondents show strong interest in learning more information regarding NHPs, and indicate interest in all potential sources of such information presented to them (e.g., doctors, websites, publications, dieticians, nurses, family, and friends). The respondents indicate many possible ways to learn about NHPs, from traditional health care channels to various media sources. This survey indicates that the preferred ways to learn about NHPs are from physicians (55%), newspaper articles (48%), family and friends (46%), and magazines (46%). While this survey is indicative of preferred sources of NHPs information amongst adult Canadians, it does not clarify possible ethnic variations in utilized information sources (Reid, 2011).

Complementary and alternative medicine use amongst adult North Americans is increasing and NHPs are a commonly used form of CAM. Some studies have begun to characterize the prevalence of CAM/NHP use amongst North American population subgroups, such as adult ethnic minorities. Other studies have begun to characterize how adults learn about NHPs. To date, the prevalence of CAM/NHPs use amongst Aboriginal/Native university students is unclear, as are any differences in the sources of information utilized by Aboriginal/Native students to learn about NHPs as compared to mainstream (non-Aboriginal) students.

The main objectives of this study are to determine the proportion of NHPs users amongst

Canadian university students (Aboriginal and non-Aboriginal) and to identify the sources of information utilized by students to learn about NHPs. We hypothesize that Aboriginal/Native students use NHPs more than non-Aboriginal students, and there will be a difference between Aboriginal and non-Aboriginal students in how they learn about NHPs. Plants are an important component of the Aboriginal culture and Aboriginal people have a long history of using these as food and medication. We would expect that they would use NHPs more than other mainstream groups. In addition, we hypothesize that Aboriginal students are more influenced by family/cultural members in how they learn about NHPs. Finally, we hypothesize that older students are more strongly influenced by family/cultural members than are younger students, who may be more strongly influenced by media sources of NHPs information.

METHODS

Definition

In this study we define natural health products (NHPs) as naturally derived bioactive organisms (e.g., plants, fungi, animals, algae, and bacteria) and their products, excluding dietary supplements such as vitamins and minerals, food replacement formulas, protein formulas, amino acids, and weight gain formulas. In particular, we focus upon naturally derived botanicals and their products.

Study Sample

This cross-sectional study was conducted at First Nations University of Canada (FNUUniv) and the University of Regina (U of R), Regina, Saskatchewan, Canada, during Fall 2011. Regina is the capital city of the Canadian prairie province of Saskatchewan. In the fall of 2010, U of R enrolment was 12,458 students, and FNUUniv enrolment was 625 students. During that period, there were 389 Aboriginal students and 180 non-Aboriginal students enrolled at the FNUUniv. This compares to 689 Aboriginal students and 8,757 non-Aboriginal students enrolled at the U of R. On average, the student body at the FNUUniv is comprised of 77% females and average student age is 28–29 years. The FNUUniv was estab-

lished in 1976 as the Saskatchewan Indian Federated College through a federated partnership with the U of R. Its mission is to enhance the quality of life, and to preserve, protect, and interpret the history, language, culture, and artistic heritage of Native/Aboriginal people.

A total of 963 students completed the survey from both universities combined. To be admissible to participate in the research, students had to be 18 years and over, attend the FNUniv or U of R, and be able to complete the questionnaire. Tables were set up at the universities and students were invited to fill out the survey. With permission from the instructors, classrooms were also visited. Thus, the participants were recruited as a convenience sample. The survey was also sent to FNUniv campuses in Saskatoon and Prince Albert, Saskatchewan. Participation was voluntary and anonymous. The Research Ethics Board, U of R, approved this project (File #91R1011).

Questionnaire Design

The survey contained three parts. Part One asked the respondents about demographics (e.g., ethnicity, age, grade level, gender, self-reported health status, and commercial tobacco smoking status). Part Two of the survey contained ten questions about medicinal plants and herbal product use. Part Three of the survey contained a list of medicinal plants and herbal products commonly used in North America. Students could add NHPs that they used, if they were not on the provided list of commonly used botanicals. Results from these questions will be examined in a companion paper.

Statistical Analysis

Of the 214 Aboriginal students and 749 non-Aboriginal students who participated in the survey (total=963), 9 respondents did not fill in age, and were omitted from the age group comparison. In the data analysis, we used the full sample in Table 1 analyses; however, we only used 174 Aboriginal and 458 non-Aboriginal students in the other data analyses. Natural health products nonusers were omitted from further analysis. Chi square and Fisher's exact tests were used to assess associations between Aboriginal/non-Aboriginal and each source of NHPs information (i.e., family member, Elder or healers,

media, etc.). Multiple logistic regression models were used to assess adjusted associations between respondent characteristics and each of nine NHPs information sources. These were applied to the demographic data (i.e., age, gender, grade level, self-reported health, and smoking status). Descriptive statistics and 95% confidence intervals (CIs) were used to compare data between and within the Aboriginal and non-Aboriginal groups. A *p* value less than 0.05 was considered to be statistically significant. All data were analyzed by using SAS® 9.2 software.

Power analyses for this study determined 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 total sample size of 963 if the groups (Aboriginal and non-Aboriginal) to be compared split 2:1 (i.e., 642:321). For the analyses restricted to respondents reporting NHPs use, the total usable sample size of 639, if split 2:1 for a factor, would give 82% power to detect a difference in proportions of 38% vs. 50%, and 84% power to detect a difference in proportions of 10% vs. 19%.

RESULTS

Chi-Square

We found that only Aboriginal students showed a statistically significant relationship with Elders or healers, as a source of information about NHPs, $\chi^2(1)=169.85$, $p<0.001$. We also found that only non-Aboriginal students showed a statistically significant relationship with print media, as an information source, $\chi^2(1)=13.90$, $p=0.0002$. Non-Aboriginal students showed a statistically significant relationship with alternative and conventional health care providers as a source of information about NHPs, $\chi^2(1)=6.13$, $p=0.0133$ and $\chi^2(1)=9.56$, $p=0.0020$, respectively.

Table 1 shows the comparison of survey respondents with and without natural health product (NHPs) use amongst 963 responding students, excluding 9 respondents omitted from the age group comparison. There were 214 (22.2%) Aboriginal and 749 (77.8%) non-Aboriginal respondents (data not shown). Of the respondents, 639 (66.3%) indicated use of NHPs, while 324 (33.6%) indicated no such use. Thus, a majority of surveyed students use NHPs.

Table 1. Comparison of Survey Respondents with and without Evidence of Natural Health Product Use

Variable	Response	NHPs Nonuser (n= 324)	NHPs User (n= 639)	p-value
Age (years)	18-19	167 (41%)	236 (59%)	<0.001
	20-21	73 (35%)	134 (65%)	
	22-23	35 (30%)	80 (70%)	
	24-25	11 (16%)	58 (84%)	
	26-30	23 (27%)	61 (73%)	
	31-40	12 (24%)	39 (76%)	
	41+	1 (4%)	24 (96%)	
Older age (years)	18-25 years	286 (36%)	508 (64%)	<0.001
	26+ years	36 (23%)	124 (78%)	
University grade level	1st year	135 (36%)	238 (64%)	0.481
	2nd year	94 (34%)	179 (66%)	
	3rd year	42 (30%)	98 (70%)	
	4th+ year	43 (34%)	84 (66%)	
	Graduate	8 (24%)	26 (76%)	
Gender	Male	97 (35%)	183 (65%)	0.933
	Female	219 (34%)	426 (66%)	
	Transgendered	2 (29%)	5 (71%)	
Canadian	Non-Canadian	34 (33%)	68 (67%)	0.666
	Canadian	232 (36%)	421 (64%)	
Health self-rating	Poor	0 (0%)	5 (100%)	0.042
	Average	156 (34%)	308 (66%)	
	Good	86 (41%)	123 (59%)	
Commercial tobacco use	Yes	44 (23%)	150 (77%)	<0.001
	No	278 (37%)	472 (63%)	
Q1: Use of NHPs for health	Yes	0 (0%)	482 (100%)	<0.001
	No	322 (67%)	157 (33%)	
Q2: Use of NHPs for health in last year	Yes	0 (0%)	409 (100%)	<0.001
	No	45 (17%)	225 (83%)	
Q3: Age learned about NHPs	0-10 years	0 (0%)	142 (100%)	<0.001
	11-16 years	2 (1%)	221 (99%)	
	17-25 years	3 (2%)	129 (98%)	
	26+ years	0 (0%)	12 (100%)	
	Not applicable	6 (25%)	18 (75%)	
	Not sure	4 (4%)	97 (96%)	
Q5: Cost per month (\$ Canadian)	< \$5	6 (2%)	364 (98%)	0.813
	\$5-\$10	1 (1%)	92 (99%)	
	\$10-\$25	0 (0%)	74 (100%)	
	\$26-\$50	0 (0%)	37 (100%)	
	\$51-\$100	0 (0%)	14 (100%)	
	More than \$100	0 (0%)	10 (100%)	
	Q6: Told physician about NHPs use	Yes	0 (0%)	
No	6 (2%)	303 (98%)		
Not applicable/ don't remember	11 (5%)	198 (95%)		
Q7: Asked physician about NHPs use	Yes	7 (9%)	73 (91%)	<0.001
	No	266 (39%)	421 (61%)	
	Not applicable/ don't remember	49 (26%)	140 (74%)	
Q8: Use physician prescribed meds	Yes	180 (33%)	359 (67%)	0.747
	No	140 (34%)	267 (66%)	
Q9: Use OTC meds	Yes	207 (33%)	412 (67%)	0.805
	No	114 (34%)	219 (66%)	
Q10: Have sufficient info on NHPs	Yes	27 (13%)	189 (88%)	<0.001
	No	76 (34%)	148 (66%)	
	Haven't looked for information	218 (42%)	298 (58%)	

Age and NHPs Usage amongst Students (Aboriginal and Non-Aboriginal Students Combined)

Age was collapsed into two categories: one category for those who are “younger” (18–25 years), and a second category for those who are “older” (26 years and above). Amongst younger age (18–25 years), 64.0% (508/794) of the respondents use NHPs.

There is a significant difference ($p < 0.001$) between users and nonusers of NHPs by age. Amongst the older age group (26 years and above) 78% (124/160) use NHPs compared to 64% (508/796) of those 25 years and younger. Natural health products are popular amongst students of all ages.

Gender and NHPs Usage (Aboriginal and Non-Aboriginal Students Combined)

Natural health products are popular for both genders, with 65.3% (183/280) of the male respondents and 66.0% (426/645) of the female respondents using NHPs.

Commercial Tobacco Products Users and NHPs Usage (Aboriginal and Non-Aboriginal Students Combined)

Amongst commercial tobacco users, 77.3% (150/194) use NHPs and 62.9% (472/750) of nonsmokers use NHPs. Although smokers are more likely to use NHPs, they are popular amongst both commercial tobacco users and nonusers ($p < 0.001$).

Table 2 shows the comparison between Aboriginal and non-Aboriginal respondents who use

NHPs. Respondents who did not report any direct or indirect information about NHPs use were omitted from this analysis. There were 174 (174/214=81.3%) Aboriginal respondents and 458 (458/749=61.1%) non-Aboriginal respondents who answered “yes” to the NHPs usage question, or who answered another question implying such use.

Use of NHPs for Health (Aboriginal vs. Non-Aboriginal Students)

This question in Part Two of the survey asks the respondents if they use NHPs for health. There was a statistically significant difference between Aboriginal and non-Aboriginals in NHPs use. Aboriginals are more likely to use NHPs for health than non-Aboriginals (81% vs. 73%, $p = 0.039$).

Figure 1. Percentages Reporting each NHPs Information Source by Aboriginal Status. Significant Differences are Shown with an *.

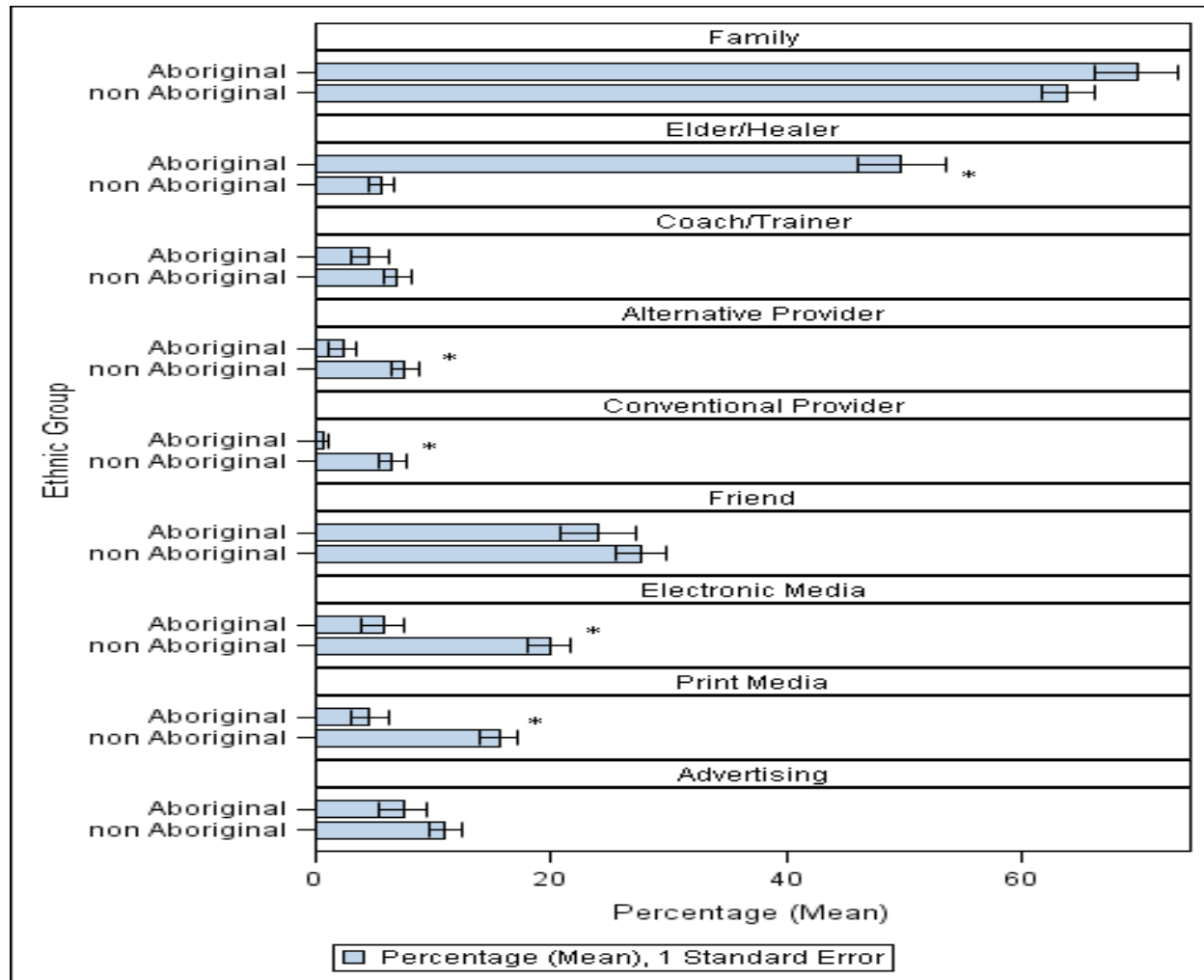


Table 2. Comparison between Aboriginal and Non-Aboriginal Respondents Who Use Natural Health Products.

Variable	Response	Non-Aboriginal (n= 458)	Aboriginal (n= 174)	p-value		
Age (years)	18-19	203 (44%)	33 (19%)	<0.001		
	20-21	109 (24%)	25 (14%)			
	22-23	62 (14%)	18 (10%)			
	24-25	34 (7%)	24 (14%)			
	26-30	34 (7%)	27 (16%)			
	31-40	15 (3%)	24 (14%)			
	41+	1 (0%)	23 (13%)			
Older age (years)	26+	50 (11%)	74 (43%)	<0.001		
University grade level	1st year	190 (42%)	48 (28%)	0.007		
	2nd year	129 (28%)	50 (29%)			
	3rd year	61 (13%)	37 (22%)			
	4th ⁺ year	55 (12%)	29 (17%)			
	Graduate	20 (4%)	6 (04%)			
	Gender	Male	142 (31%)		41 (19%)	0.104
Canadian	Canadian	291 (81%)	130 (99%)	<0.001		
	Poor	2 (1%)	3 (2%)	<0.001		
Health self-rating	Average	203 (65%)	105(83%)			
	Good	105 (34%)	18 (14%)			
	No	382 (85%)	90 (53%)			
Commercial tobacco use	No	124 (27%)	33 (19%)	<0.001		
Q1: Use of NHPs for health	No	166 (36%)	59 (34%)	0.039		
Q2: Use of NHPs for health in last year	No	86 (19%)	56 (33%)	0.655		
Q3: Age (years) learned about NHPs	0-10	178 (40%)	43 (25%)	<0.001		
	11-16	90 (20%)	39 (23%)			
	17-25	4 (1%)	8 (5%)			
	26+	14 (3%)	4 (2%)			
	Not applicable	76 (17%)	21 (12%)			
	Not sure	296 (64%)	122 (70%)			
	Q4: Learned, family member	Yes	26 (6%)		87 (50%)	0.192
	Q4: Learned, Elder or Healer	Yes	32 (7%)		8 (5%)	<0.001
	Q4: Learned, coach/trainer	Yes	35 (8%)		4 (2%)	0.360
	Q4: Learned, alternative provider	Yes	30 (6%)		1 (1%)	0.015
Q4: Learned, conventional provider	Yes	128 (28%)	42 (24%)	<0.001		
Q4: Learned, friend	Yes	92 (20%)	10 (6%)	0.422		
Q4: Learned, electronic media	Yes	72 (16%)	8 (5%)	<0.001		
Q4: Learned, print media	Yes	51 (11%)	13 (7%)	<0.001		
Q4: Learned, advertising	Yes	260 (60%)	104 (67%)	0.237		
Q5: Cost per month (\$ Canadian)	< \$5	74 (17%)	18 (12%)	0.225		
	\$5-\$10	58 (13%)	16 (10%)			
	\$10-\$25	28 (6%)	9 (6%)			
	\$26-\$50	10 (2%)	4 (3%)			
	\$51-\$100	5 (1%)	5 (3%)			
	More than \$100	71 (16%)	28 (17%)			
	Q6: Told physician about NHPs use	Yes	217 (50%)		86 (52%)	0.864
Q7: Asked physician about NHPs use	No	146 (34%)	52 (31%)	0.682		
	Not applicable/ don't remember	52 (11%)	21 (12%)			
	Yes	304 (66%)	117 (68%)			
	No	106 (23%)	34 (20%)			
Q8: Use physician prescribed meds	Yes	199 (44%)	68 (40%)	0.332		
Q9: Use OTC meds	No	159 (35%)	60 (35%)	0.902		
Q10: Have sufficient info on NHPs	Yes	143 (31%)	46 (26%)	0.526		
	No	105 (23%)	43 (25%)			
	Haven't looked for information	213 (46%)	85 (49%)			

Sources of Information about NHPs (Aboriginal vs. Non-Aboriginal Students)

This question in Part Two of the survey asks the respondents to identify the sources of information used to learn about medicinal plants and their use.

The respondents could select more than one choice. The choices were: family member, Elder or healer,

coach, alternative health provider, conventional health provider, friends, electronic media, print media, and advertising. Table 2 and Fig. 1 show the information sources used by respondents to learn about NHPs.

There were no significant differences ($p=0.192$) between Aboriginal and non-Aboriginal students

Table 3: Comparison between Younger (≤ 25 years) and Older (≥ 26 years) Respondents Who Use Natural Health Products (Aboriginal and Non-Aboriginal Respondents Combined).

Variable	Response	Young Under 25 y (n= 508)	Older Over 26 y (n= 124)	p-value
Age (years)	18-19	236 (46%)	0 (0%)	<0.001
	20-21	134 (26%)	0 (0%)	
	22-23	80 (16%)	0 (0%)	
	24-25	58 (11%)	0 (0%)	
	26-30	0 (0%)	61 (49%)	
	31-40	0 (0%)	39 (31%)	
	41+	0 (0%)	24 (19%)	
University grade level	1st year	215 (43%)	20 (17%)	<0.001
	2nd year	152 (30%)	26 (21%)	
	3rd year	70 (14%)	28 (23%)	
	4th+ year	55 (11%)	29 (24%)	
	Graduate	8 (2%)	18 (15%)	
Gender	Male	149 (30%)	32 (28%)	0.727
Canadian	1	336 (86%)	82 (85%)	0.807
Health self-rating	Poor	3 (1%)	2 (2%)	0.131
	Average	235 (69%)	70 (77%)	
	Good	104 (30%)	19 (21%)	
Commercial tobacco Use	No	400 (81%)	69 (57%)	<0.001
Q1: Use of NHPs for health	No	136 (27%)	20 (16%)	0.014
Q2: Use of NHPs for health in last year	No	190 (38%)	34 (27%)	0.031
Q3: Age (years) learned about NHPs	0-10 years	111 (22%)	29 (24%)	<0.001
	11-16 years	188 (38%)	31 (26%)	
	17-25 years	90 (18%)	38 (32%)	
	26+ years	0 (0%)	12 (10%)	
	Not applicable	18 (4%)	0 (0%)	
	Not sure	87 (18%)	9 (8%)	
Q4: Learned, family member	Yes	335 (66%)	77 (62%)	0.462
Q4: Learned, Elder or Healer	Yes	72 (14%)	41 (33%)	<0.001
Q4: Learned, coach/trainer	Yes	39 (8%)	1 (1%)	0.003
Q4: Learned, alternative provider	Yes	29 (6%)	10 (8%)	0.305
Q4: Learned, conventional provider	Yes	28 (6%)	2 (2%)	0.095
Q4: Learned, friend	Yes	131 (26%)	39 (31%)	0.215
Q4: Learned, electronic media	Yes	81 (16%)	21 (17%)	0.786
Q4: Learned, print media	Yes	64 (13%)	16 (13%)	0.881
Q4: Learned, advertising	Yes	48 (9%)	16 (13%)	0.248
Q5: Cost per month (\$ Canadian)	< \$5	295 (62%)	67 (59%)	0.287
	\$5-\$10	71 (15%)	20 (18%)	
	\$10-\$25	58 (12%)	15 (13%)	
	\$26-\$50	26 (5%)	10 (9%)	
	\$51-\$100	14 (3%)	0 (0%)	
	More than \$100	9 (2%)	1 (1%)	
Q6: Told physician about NHPs use	Yes	64 (13%)	34 (29%)	<0.001
	No	240 (50%)	58 (49%)	
	Not applicable/ don't remember	172 (36%)	26 (22%)	
Q7: Asked physician about NHPs use	Yes	48 (10%)	24 (20%)	<0.001
	No	333 (66%)	82 (67%)	
	Not applicable/ don't remember	124 (25%)	16 (13%)	
Q8: Use physician prescribed meds	No	219 (44%)	48 (39%)	0.274
Q9: Use OTC meds	No	181 (36%)	37 (30%)	0.208
Q10: Have sufficient info on NHPs	Yes	136 (27%)	50 (40%)	0.010
	No	118 (23%)	28 (23%)	
	Haven't looked for information	250 (50%)	46 (37%)	

in using a family member as a source of information about NHPs (64%–70%). Of the Aboriginal respondents, 50% (n=87) indicated that they learned about NHP from an Elder or healer. This dropped to 6% (n=26) amongst non-Aboriginal students. Thus, the percentage of respondents learning from Elders or healers is significantly higher ($p < 0.001$) in the Aboriginal student sample than in the non-Ab-

original sample. On the other hand, non-Aboriginal student users relied significantly more ($p = 0.015$) on alternative health providers, conventional health providers, electronic media, and print media as their sources of information, compared to Aboriginal student users of NHPs. In regards to learning information from a coach/trainer, friend, and advertising, there were no significant differences between

Aboriginal and non-Aboriginal student users of NHPs ($p = 0.225$).

NHPs Usage (Younger vs. Older Students, Aboriginal and Non-Aboriginal Respondents Combined)

Table 3 shows the comparison between younger (≤ 25 years) and older (≥ 26 years) respondents amongst those with NHPs use (Aboriginal and non-Aboriginal respondents combined). Age was collapsed into two categories: “younger” aged 18–25 years old ($n=508$), and “older,” 26 years and older ($n=124$).

Older respondents were significantly more likely to use commercial tobacco (older 43% vs. younger 19%, $p < 0.001$), to use NHPs for health purposes (older 84% vs. younger 73%, $p=0.014$), and more likely to have learned about NHPs from an Elder/healer (older 33% vs. younger 14%, $p < 0.001$).

Logistic Regression Results

Table 4 shows the results from multiple logistic regression models for the probabilities of use of nine potential information sources: family member, Elder or Healer, coach, alternative health provider, conventional health provider, friends, electronic media, print media, and advertising. The predictor variables for each model were indicator variables for:

Aboriginal and non-Aboriginal, age groups, gender (transgender responders were omitted), and commercial tobacco use. An odds ratio of 1.0 indicates there is no association; a value above 1.0 indicates the variable is associated with a higher likelihood of an information source being reported by respondents; and a value below 1.0 indicates the variable is associated with a lower likelihood of an information source being reported by respondents (all data shown in Table 4 are after adjustment of age group, gender, and commercial tobacco use).

There were no significant associations with family members as an information source about NHPs, (Odds Ratio=1.31, $p=0.344$). Aboriginal status was strongly associated with an Elder or healer as a source of information about NHPs (Odds Ratio = 20.64, $p < 0.001$). However, age group was only significant by itself (Odds Ratio = 3.1, $p < 0.001$ (data not shown), because it was not significant after adjustment (Odds Ratio = 1.07, $p=0.837$). Younger respondents and males were more likely to use a coach or trainer as a NHPs information source ($p= 0.036$). Non-Aboriginal and older respondents were statistically more likely to report an alternative health provider as an information source ($p=0.047$). There were no significant associations with conventional health provider as an information source ($p=0.947$).

Table 4. Summary of Multivariable Logistic Regression Models for the Probability of Reporting a Source of Natural Health Production Information.

Characteristic	Information Source					
	Family Member		Elder or Healer		Coach/Athletic Trainer	
	Odds Ratio (95% C.I.)	p	Odds Ratio (95% C.I.)	p	Odds Ratio (95% C.I.)	p
Aboriginal	1.31 (0.75-2.31)	0.344	20.14 (10.1-40.51)	<0.001	1.1 (0.43-2.78)	0.841
Older age (26+)	0.66 (0.37-1.18)	0.162	1.07 (0.56-2.06)	0.837	0.11 (0.01-0.87)	0.036
Male	0.79 (0.48-1.31)	0.363	1.59 (0.83-3.06)	0.164	2.74 (1.27-5.93)	0.010
Commercial tobacco use	0.82 (0.48-1.41)	0.473	1.03 (0.55-1.94)	0.919	0.66 (0.25-1.77)	0.411
Characteristic	Alternative Health Provider		Conventional Health Provider		Friend	
	Odds Ratio (95% C.I.)	p	Odds Ratio (95% C.I.)	p	Odds Ratio (95% C.I.)	p
	Aboriginal	0.09 (0.02-0.41)	0.002	0.0 (0.00-3.802)	0.947	0.88 (0.51-0.51)
Older age (26+)	2.54 (1.01-6.35)	0.047	1.14 (0.24-5.34)	0.867	1.39 (0.79-0.47)	0.257
Male	0.66 (0.27-1.62)	0.367	0.87 (0.26-2.9)	0.827	1.42 (0.87-2.31)	0.162
Commercial tobacco use	1.21 (0.47-3.09)	0.692	1.2 (0.31-4.58)	0.793	0.85 (0.5-1.47)	0.572
Characteristic	Electronic Media		Print Media		Advertising	
	Odds Ratio (95% C.I.)	p	Odds Ratio (95% C.I.)	p	Odds Ratio (95% C.I.)	p
	Aboriginal	0.24 (0.1-0.56)	0.001	0.14 (0.05-0.41)	<0.001	0.31 (0.1-0.95)
Older age (26+)	2.38 (1.15-4.93)	0.019	3.4 (1.57-7.35)	0.002	3.57 (1.45-0.81)	0.006
Male	1.56 (0.84-2.88)	0.160	0.86 (0.42-1.78)	0.689	1.57 (0.69-3.59)	0.286
Commercial tobacco use	1.12 (0.55-2.26)	0.755	1.18 (0.54-2.59)	0.677	0.79 (0.29-2.12)	0.637

All data are presented after adjustments.

Similarly, there were no significant associations with friends as an information source ($p=0.635$). There was a statistically significant finding that Aboriginal respondents were less likely to report electronic media as an information source (Odds Ratio= 0.24, $p < 0.001$). After adjustment for age group, gender, and commercial tobacco, older age was statistically associated with a greater likelihood of reporting electronic media as a source (Odds Ratio = 2.38, $p=0.019$). Similar to the electronic media findings, Aboriginal respondents were significantly less likely to report print media as an information source (Odds Ratio = 0.14, $p < 0.001$). After adjustment for age group, gender and commercial tobacco, older age was significantly associated with a greater likelihood of reporting print media as a source of information to learn about NHPs (Odds Ratio= 3.4, $p=0.002$). Older respondents were more likely ($p=0.040$) to report advertising as an information source for NHPs. After adjustment for age group, gender, and commercial tobacco, Aboriginal status was not significantly associated with a lower likelihood of reporting advertising as a source of information regarding NHPs.

DISCUSSION

The present study is an analysis of the data of a large survey of Canadian students to determine prevalence of NHPs use and predictors of information sources. We hypothesize that there will be differences between Aboriginal and mainstream non-Aboriginal students. Two national surveys in the United States indicate that 12–14% of the adult population uses NHPs (Kaufman et al., 2002), while in 2010, a survey (conducted using computer assisted telephone interviews) indicates that up to 73% of the interviewees use NHPs (Health Canada, 2012). In our study, we find that 66.3% of all student respondents indicate use of NHPs, which corroborates previous findings in the general population. This indicates that NHPs use amongst students is clearly an important health phenomenon, worthy of attention. We also discover that NHPs use is greater amongst Aboriginal students compared to non-Aboriginal students (81.3% vs. 61.1%). We suggest that future studies looking at NHPs use should include this ethnic group in their sample. While the current

study was performed with Aboriginal students, we find older Aboriginal students are more likely to use NHPs compared to non-Aboriginal students.

In Canada, between 1996–2006, the Aboriginal population grew by 45%, which is 8% faster than the non-Aboriginal population. In 2006, there were more than one million Aboriginals in Canada (Statistics Canada, 2008). Aboriginals represent 4% of the Canadian population (Statistics Canada, 2008). Growth in the Aboriginal population, juxtaposed with known health disparities, suggests a need to include Aboriginals in future population and public health research (Reading and Nowgesic, 2002; Adelson, 2005). Studies comparing Aboriginal and non-Aboriginal samples (Wilson et al., 2010) can be used to better understand health disparities. Our study includes Aboriginal students and focuses on comparing Aboriginal with non-Aboriginal students.

In a review paper that examined previous social science research regarding the Aboriginal population (Wilson and Young, 2008), the authors find that there is a paucity of information regarding certain aspects of health care in the Aboriginal population. For example, they find that while there is knowledge focusing on this group in regards to conventional health care (i.e., health care professionals and hospitals), there is not enough research about traditional approaches to healing and traditional medicines. In addition, there are some papers discussing the use of community-based participatory research methods. It is recommended that more community-based participatory research seek to improve health, well-being, and access to culturally appropriate care (Ferreira and Gendron, 2011; Wilson et al., 2008). These authors show the importance of including the Aboriginal population in future studies as part of ongoing efforts to tease out health-related differences and causes amongst various ethnic subgroups from the dominant culture.

ELDER AND HEALERS

Previous studies have shown the importance of traditional healing for Aboriginal communities and that Elders and healers play an important role in traditional healing (McCabe, 2007; Crosato et al., 2007). In addition, culturally relevant pedagogical approaches to education can provide important help

in treatment and wellness programs for Aboriginals, through appropriate cultural messaging, knowledge, and learning (Green, 2010). There was a study in which Native American patients were interviewed regarding the use of traditional healers together with the use of physicians (Marbella et al., 1998). The authors found that 38.0% of those patients interviewed use traditional healers concurrently with physicians, indicating the importance of both complementary and alternative medicine and allopathic medicine in Native American healthcare practices today (Marbella et al., 1998). Our study supports the importance of Elders and healers for Aboriginal students as a source of information about NHPs use. We find that approximately half of the Aboriginal respondents indicate that they learn about NHPs from an Elder or healer. This dropped to only 6% (n=26) amongst non-Aboriginal students. Thus, the percentage of respondents learning from Elders or healers is significantly higher for Aboriginal students than for non-Aboriginal students.

The major objectives in the current study are to clarify the extent of NHPs use amongst university students (Aboriginal and non-Aboriginal) and to determine the predictors of NHPs information sources (family member, Elders or healer, coach, alternative health care provider, conventional health care provider, friends, electronic media, print media, and advertising). We hypothesized a difference between Aboriginal and non-Aboriginal students in use prevalence of NHPs and in how they learn about NHPs. In addition, we hypothesized that Aboriginal students are more likely affected by family members than non-Aboriginal students, and older students are more affected by family members than are younger students in learning about NHPs.

We find no difference between Aboriginal students and non-Aboriginal students regarding the family as a source of information. This was surprising since we thought that NHPs would sometimes be used as traditional medicines and hence be learned from Aboriginal family members. Traditional knowledge is often passed from generation to generation with Aboriginal children spending time on the land with their parents and grandparents collecting medicines.

A strength of the current study is the large sample size of the Aboriginal and non-Aboriginal student groups, permitting a detailed analysis of predictive factors underlying NHPs use and sources of information used to learn about NHPs, amongst university students. The inclusion of the Aboriginal students in this study is an important contribution to the literature, which insufficiently includes or outright excludes this ethnic category. However, some study limitations are noteworthy. Important information was not captured in the survey such as anthropometrics (e.g., body mass and height for BMI), which would give us more information about health in addition to self-reported health status. Also, in Part One of the survey (demographic section) the question about health states could have been more specific than: Good, Average, and Poor. In addition, there is a possibility of sample bias (e.g., students who participated could have been more interested in NHPs).

In our study we deliberately sought to characterize the use of NHPs by Aboriginal and non-Aboriginal university students, in an attempt to capture important information about an ethnic student population that is known both for health disparities and continued use of traditional medicines. To better understand the prevalence of NHPs use by university students, and to better understand how Aboriginal students come to learn to use NHPs, our findings can facilitate the Aboriginal community to address health care issues from within the community, as well as at the interface of allopathic medicine and traditional medicine.

Prior research shows how traditional ways of disease prevention and treatment are important for Aboriginal communities (McCabe, 2007; Crosato et al., 2007). It is important to document the current uses of NHPs by Aboriginal students today, as well as to understand the continued importance of Elders or healers in the transfer of traditional knowledge of products in relation to health care practices. The findings of the current study indicate that indeed, Aboriginal university students do use NHPs more than mainstream students, and rely on Elders as an important source of information regarding NHPs use as compared to mainstream students. We sug-

gest that Elders can play a larger role in Aboriginal students' postsecondary and traditional education in ethnomedicine. For example, Elders can be involved in novel pedagogical approaches and delivery modalities to reach Aboriginal university students, such as live and distance delivery of health-related courses.

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