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Saudi Arabian Students In Detroit Use Natural Health Products More So Than Other University Students In Detroit

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SAUDI ARABIAN STUDENTS IN DETROIT USE NATURAL HEALTH PRODUCTS MORE SO THAN OTHER UNIVERSITY STUDENTS IN DETROIT

by

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THESIS

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Approved by:

_____

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DEDICATION

I would like to begin by thanking my parents, albeit I understand any amount of gratitude shown to them is woefully inadequate. My father's unconditional support is largely the reason that this Master's degree was completed in the United States of America (USA). No words are sufficient to describe my late mother's contribution to my life before she passed away. I owe every bit of my existence to her. This thesis is dedicated to her memory. Also my sisters and brothers have provided great support to me in achieving this goal. I have been fortunate on this journey to receive tremendous love from the rest of my extended family in Saudi Arabia. Their support and encouragement has been instrumental in my overcoming several hurdles in life.

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TABLE OF CONTENTS

LIST OF TABLES

Chapter 1: Introduction

Natural Health Products (NHP) are defined by Canadian Health Food Association (CHFA) as herbal remedies, vitamins and minerals, probiotics, homeopathic medicines, traditional medicines, and other nutritional supplements, such as fatty acid and amino acids (CHFA, 2014). In the USA, Complementary and Alternative Medicine (CAM) is defined as a health care system, therapies, diverse medicines, and products that are not considered conventional medicine (Barnes et al., 2002). Natural Health Products can derive from plants, animals, microorganisms, fungi, and protists. Consumers worldwide use NHP because they believe that NHP are not harmful to their health (Levine et al., 2009). The use of NHP has risen in developing countries for personal Health Maintenance (HealthM) (UNESCO, 1996). Additionally, in most of these developing cultures, herbal therapies have become more widespread in use for illnesses. The increasing cost of human HealthM is another factor for the use of herbal therapy (Delgoda et al., 2010).

There are various reasons why people use NHP, such as drinking a tisane to alleviate symptoms of cold/flu or taking an NHP for healthM (Wu et al. 2011). Garlic is an example of a common NHP that has positive effects which include acting as an anti-osteoporotic product for bone health, an anti-clotting treatment for cardiovascular disease, and as a solution to decrease blood pressure level (Mukherjee et al., 2004). Other common herbs, such as ginger and curcumin showed optimistic results in rats by reducing the LDL cholesterol and increasing HDL cholesterol. According to research published by the *Medical Journal of*

Australia, ginger has shown some other practical effects, such as decreasing knee pain (Tapsell et al., 2006). Mint and aloe vera are NHP that are used to alleviate stomach pain, colds, high blood pressure, and other illnesses (Mikhail et al., 2004). Given their function as natural remedies around the world, NHP or medicinal plants have been embraced in various cultures as a way to improve health and for disease prevention and treatment.

Natural Health Products have been used throughout history in various cultures and their use can be traced back millennia. For example, people in China have a long history of using medicinal plants. Thousands of years ago, the Chinese started using traditional medicinal plants to improve the human immune system (Tan and Vanitha, 2004). Scientific research found the potential of Chinese herbs related to secondary metabolites, such as alkaloids and flavonoids, which have been studied in human cell cultures and animal models (Shan et al., 1999; Cao and Lin 2003; Lin and Zhang 2004). India is another country whose people have widely used medicinal herbs for an extended portion of their history to alleviate disease and improve health (Devasagayam and Sainis 2002). Some Indian medicinal herbs used as ayurvedic medicine have chemical compounds to enhance the immune system, otherwise less resistant to disease-causing agents (Devasagayam and Sainis 2002). *Commiphora mukul* has a potential effect on cell death and is studied to prevent prostate cancer (Singh et al., 2005). In North America, medicinal plants play an important role in the lives of Native Americans. They not only use herbs for preventing and alleviating diseases, but herbs are also used as part of their traditional ceremonies and

prayers (Moerman, 1996). The widespread use of NHP exists across many cultures as well as different religions, such as Islam throughout the Middle East and North Africa as a part of the respective belief systems and values.

Botanicals have been studied throughout Islamic history dating back 1434 years ago during the time of Hazrat the Prophet Muhammad, Sallallaho Alaihe Wasillam (SAW) (Nasr, 1976) The Prophet Muhammad was born in 570 and died in 632 (PBS, 2002), and the study of NHP has continued after his death. Medicinal plants are described in the Holy Quran (Nasr, 1976). The Holy Quran is a collection of Allah's words that was given to the Prophet Muhammad over a 22 year period in different Surahs (Alislam, 2014). Surahs are topics in the Holy Quran, such as Al-Inaam, Al-Rehman, Al-Bakra, Al-Momeenoon (Nasr, 1976). The Prophet Muhammad SAW used these types of plants and recommended them for treating several types of diseases (Nasr 1976). Today, Muslim physicians continue to study medicinal plants and have written many books on the subject. One such example is Abdul Malik Bin Habib Undlasi who wrote the book "Tib-e-Nabvi" which describes the use of different medicinal plants as mentioned in the Holy Quran (Ghaznavi 1987).

The interest continues in studying NHP mentioned in the Islamic Holy Quran and Alhadith (Ahmad et al., 2009). Alhadith is Allah's words said by Prophet Muhammad which are not included in the Holy Quran (Onislam, 2005). A recent research study investigates medicinal Islamic plants and their potential effects on various diseases (Ahmad et al., 2009). The researchers studied medicinal plants that were mentioned from the Holy Quran and Alhadith (32

plants from 30 species of 23 families). The plants are listed alphabetically with full descriptions of names (English and Arabic), family, part use, and medical purpose followed by citation references from the Holy Quran, Alhadith, and other Islamic books. Notably, about 80% of these plants are used worldwide as a primary health care option (Ahmad et al., 2009). Natural health products are found in the Arabic culture whether the users are Muslim or not. Traditional Arabic Medicine (TAM) has become an important part of modern Middle Eastern life (Azaizeh et al., 2010).

Also, TAM has been used in different countries such as Syria and Israel to prevent various diseases (Alachkar et al., 2011; Said et al., 2002). Researchers in both countries have done a cross-sectional survey on NHP that have been used by the general population (Alachkar et al., 2011; Said et al., 2002). The results show that NHP were used for treating common diseases including skin disease, kidney problems, diabetes, digestive system, coughing, preventing cancer, liver diseases, cholesterol level, and weight management (Alachkar et al., 2011; Said et al., 2002).

Another study was conducted in Jordan on the use of TAM among elders (Aburjai et al., 2007). The survey was administrated to 28 elders of the Ajloun Heights region in Jordan where 10 females, 10 males, 3 traditional practitioners, and 5 village heads participated in this study. The ages ranged between 60-96 years old. The interview results show that 46 plants and herbs were used to alleviate various diseases; however, the interviewers found that some plants were considered safe to use and others unsafe (Aburjai et al., 2007). An

epidemiological cross-sectional research study that included countries from Jordan to United Arab Emirates used a questionnaire to study the use of TAM that was associated with common diseases in primary health care (Albraik et al., 2008). Most of the participants felt that the use of TAM alongside their allopathic medication was safe; however, a few patients found some adverse reactions to using TAM with their prescriptions (Albraik et al., 2008).

In addition to the cultural influences, age also impacts the use of NHP. This observation can be seen in the use of NHP by certain age groups. In two Turkish studies, the largest number of users for herbal products were participants aged 19-20 years old (Ayranci et al., 2005) and 18-27 years old (Nur, 2010). In comparison, the greatest users in the older population were 65-74 years old (Arcury et al., 2007). The use of herbs and dietary supplements among USA adults was studied via National Health Interview Survey (NHIS) in 2002 and 2007 (Wu et al., 2011). This research showed that individuals who are 65 years old or older used herbs and dietary supplements in 2007 more than older adults in 2002; on the other hand, younger adults used herbs and dietary supplements in 2007 less than younger adults in 2002 (Wu et al., 2011). The relationship between age and NHP is possibly influenced by education.

Research suggests that participants who have higher education are more likely to use NHP for HealthM. For example, in a study comparing the results of the 1987, 1992, and 2000 NHIS, college students use dietary supplements more than high school students in 1987, 1992, and 2000 (Millen et al., 2004). The data were consistent for all three years for any vitamin or mineral and multivitamin use

(Millen et al., 2004). A comparable study was done in the USA among educated minority ethnic groups that use CAM and includes Hispanics, non-Hispanic Whites, and non-Hispanic Blacks (Graham et al., 2005). Results show that non-Hispanic Whites use CAM more than Hispanic and non-Hispanic Blacks (Graham et al., 2005). Thus, besides ethnicity/race the studies using NHIS data show that education is another factor that influences NHP use.

The latest research has become more focused upon the uses of NHP by students. A recent study was done to determine the use of NHP among Aboriginal (Native American) and non-aboriginal university students in Canada (Alqahtani et al., under review by *IJIH*). The results show that Aboriginal students use NHP for HealthM significantly more than non-aboriginal students (Alqahtani et al., under review by *IJIH*). In a similar study, Alkholy et. al. (2013) found that Aboriginal and non-aboriginal students learn about NHP from different information sources. The results show that Canadian Aboriginal students at university are more likely to get information about NHP from Elders or healers than non-aboriginal students (who use electronic media to learn about NHP) (Alkholy et al., 2013).

Ambrose conducted a study to determine the use of NHP among university students and to examine the campus physicians' attitudes about NHP use through a cross-sectional survey (Ambrose and Samuels, 2004). At Rutgers University in New Jersey, USA, 1,745 students and 40 practitioners participated in a study regarding NHP use. More than half of the students are using NHP to improve their health status, such as relief of pain, physical symptoms, illness

prevention, and for HealthM. The results show that students know little about NHP and they are self-prescribed without consulting a physician. About 75% of practitioners encouraged students to use NHP with more focus on helping them better understand NHP use (Ambrose and Samuels, 2004). It has been established that age and education levels influence NHP use; further clarity can be found by looking at usage between genders.

Generally, more females than males use NHP for HealthM. A study was done in Turkey to determine the use of herbal remedies by 3,876 adults (Nur, 2010). Results of the survey data show 39.2% are using herbs, and 64.0% of the users are females compared to 36.0% males, which was statistically significant (Nur, 2010). A recent study was conducted in Riyadh, Saudi Arabia on the knowledge of primary health care physicians about complementary alternative medicine (CAM) (Elolemy and Albedah, 2012). A cross-sectional descriptive survey was administered to 518 participants in Riyadh. Saudi and non-Saudi citizens participated in the study. A majority of respondents with knowledge of CAM are females with 95% responding compared to 83% of males; the difference was not statistically significant. While the study revealed positive attitudes about CAM, the patients were not well informed about CAM (Elolemy and Albedah, 2012).

An additional study was done in Saudi Arabia to determine the use of Traditional Alternative Medicine (TAM) among Saudi residents (Al-Faris et al., 2008). About 1,408 Saudi residents in Riyadh participated in a cross-sectional survey from a primary health care giver. Results show that females use TAM

more than males (*n=656* females with 76.5%; vs. *n=299* with 54.4%), and the difference was significant (Al-Faris et al., 2008). The high percentage of NHP use in Saudi Arabia reflects the exposure to the medicinal plants used traditionally.

Overall, information regarding the use of NHP by adults has been well-studied; however, less is known about college students. A few studies have been conducted on the use of NHP by university students irrespective of ethnicity. Only a limited number of papers have looked at the use of NHP by other cultural groups beside the majority group. The purpose of the current study is to examine the use of NHP by Saudi students and non-Saudi university students in the USA.

Chapter 2: Objective of the Study

The objective of this study is to address these hypotheses: (1) There are geo-ethnic differences in NHP used by university students in Detroit; and (2) There are gender differences in NHP used by university students in Detroit. We also determine the predictor variables (e.g., sex, age, grade level, ethnicity, citizenship) that influence NHP use by university students in Detroit.

Chapter 3: Material and Methods

Participants and Study Design

A cross-sectional survey was conducted utilizing a convenience sample in Winter 2014. The participants were students from Wayne State University (WSU) (*n=560; 193* males and *367* females). Non-students were excluded from the study. All participants were ≥18 years old. Students were recruited from WSU in Detroit, Michigan, USA. The study was conducted with approval from the Institutional Review Board at WSU.

Any student enrolled at WSU might volunteer to participate in the study. Wayne State University is located in Midtown Detroit in Southeast Michigan, USA, and it was established in 1868 (WSU, 2014). According to the Center for Immigration Studies (CIS) in 2002, the metropolitan Detroit area is home to one of the fastest growing Middle East populations in the United States (e.g., Dearborn, Dearborn Heights, Sterling Heights) (CIS, 2002). The CIS reports since 1970 the Middle Eastern population has increased in the USA seven-fold from 200,000 to 1.5 million in the USA population (CIS, 2002).

Instrument

The Medicinal Plant and Herbal Product Survey assessed students' use of medicinal plants/NHPs, and it was previously piloted at WSU during the Summer 2013 semester (*n=76* students). Participants in the current study filled out a revised survey during the Winter 2014 semester. This twenty-two descriptive question survey was completed in approximately 5-10 minutes. Demographic information was also obtained (e.g., age, race, ethnicity). The survey was

provided online (Survey Monkey) to students in both English and Arabic languages (Appendix A & B). Students at WSU received an announcement to participate on the WSU Pipeline in the My Pipeline tab and Student tab, and by email.

The administered survey was designed to collect the following information from students: demographic characteristics, such as race, ethnicity, nationality, gender, grade level, age, height, weight. Demographic information was self-reported. The options for race were: White, Black, Asian, and Native American. The ethnicity options were Hispanic and Middle Eastern; and if Middle Eastern they chose between Saudi or non-Saudi heritage. The age of all the participants was ≥18 years old. The options for university level were: undergraduate (1^{st} year, 2^{nd} year, 3^{rd} year, and 4^{th} or more years) and graduate.

Students were also asked about medicinal plant and herbal product use (Appendix A). Some questions on the survey included: Have you ever used medicinal plants or herbal products for health or well-being? Do you take physician prescribed medication? Have you ever told your physician about your medicinal plant or herbal product use? From whom, or where, have you learned about medicinal plants and their use? On average, how much money do you spend on medicinal plants and herbal products per month? Additionally, students were asked to answer the following questions about their use after they pick their own plants: When you use the plant, how frequently do you use it? In what form have you used the plant? (Appendix A).

Statistical Analysis

χ^2 test was used to detect group differences, with the alpha-level set at 0.05. Multiple logistic regression models was used to determine the odds ratio (OR) with 95% Confidence Intervals (CI) to assess joint effects of the following variables: sex, ethnicity, citizenship, grade level, and age with regards to the use of NHP. Age was defined as young age (18 to 25 years old) and older age (26^+ year). Data were analyzed with SPSS Software 22.

Chapter 4: Results

Power Analysis

Given the total sample size of (*n=560*), power calculations showed that we have a high enough distinction to detect meaningful differences. Assuming that predictor variables account for a modest amount of variance (R-squared of about 0.30), that gives balanced samples from both groups with alpha-level of 0.05. Thus we should have a power of 0.80 to detect differences (measured as effect sizes) of 0.4 to 0.5 standard deviation units or greater.

Comparisons of Gender, Ethnicity, Citizenship Variables and NHP Use

Tables 1-3 show χ^2 test results with different variables regarding the use of NHP. Table.1 shows no difference between male and female students in use of NHP (p=0.90). Table 2.1 shows Hispanic students use NHP more than Middle Eastern students (p=0.025). The use of NHP among Middle Eastern students shows no difference vs. non-Middle Eastern p=0.519 (Table 2.2). Table 3.1 shows that Saudi students use NHP more than other students and also more than Saudi students born in the USA (p=0.013). Results also show significant use of NHP by Saudi students compared to other students with (p=0.003) (Table 3.2).

Logistic Regression Odds Ratio for the Likelihood of NHP Use

Table 4 shows the results from MLR modeling to determine which variables are associated with NHP use. Among the five predictors analyzed (gender, ethnicity, citizenship, grade level, and age), only grade level and age were found to be significant, including: grade 1st year (95% OR=0.43, CI=0.22-

0.88, p=0.02), grade 2nd year (95% OR=0.46, CI=0.25-0.84, p=0.01), and young age (18 to 25 years old) (95% OR=0.41, CI=0.24-0.69, p=0.001).

Chapter 5: Discussion

Saudi Arabia is a significant country in the Middle East as its geography is mostly desert with a unique flora on the Arabian Peninsula. The flora of Saudi Arabia has a wide range with 2250 species, and more than 1200 medicinal plant species used for traditional medicine (Mossa et al., 1987). Medicinal plants are essential in traditional health remedies, and TAM are an important part of Saudi's heritage and an economic component of the biodiversity in Saudi Arabia (Collenette,1998; and El-Ghazali et al., 2010).

In the last few years, the Saudi Arabian government opened an international education door allowing Saudi students to study in different countries around the world. The number of Saudi students in the USA has increased every year since the program began in 2005. In 2012, the number of Saudi students in the USA was 44,566, increasing 30% over 2011 (Judicial Watch, 2013). In Fall 2012, among the top ten countries represented by international students at WSU, Saudi Arabia is ranked fourth with 171 Saudi students (WSU, 2012).

This research was carried out to determine if there is significant NHP use in a USA university student sample involving different ethnic groups. Our findings corroborate prior studies showing NHP use is associated with specific ethnic groups, such as previously found with Aboriginal/Native Americans vs. mainstream students (Alqahtani et al., in review by *IJIH*, 2014; and Alkholy et al., 2013). We find that Saudi students in Detroit use NHP more than other Detroit students. Results by Graham et al. (2005) show non-Hispanic Whites use CAM

more than Hispanic and non-Hispanic Blacks (Graham et al., 2005); however, we find a significant difference in NHP use between Hispanic student vs. non-Hispanic students in Detroit.

We also agree with Ayranci and colleagues that lower education levels and younger ages are correlated negatively with NHP use as compared to higher educational levels and older age (Ayranci et al., 2005). In our previous research, we find upperclassman (≥ third year) is a predictor variable of NHP use by Canadian university students (Alqahtani et al., in review by *IJIH*, 2014); currently, we find underclassman (1st year and 2nd year) is a predictor variable of NHP use by USA university students. We also find no significant difference between genders and NHP use here and with our previous research findings (Alqahtani et al., in review by *IJIH*, 2014).

Chapter 6: Strengths and Limitations

The major strength of our study is the focus on NHP use among Saudi students in the USA vs. non-Saudi students in the USA. Using the term Hispanic in the survey limits its detail because it did not allow for clarification regarding non-Hispanic Latin American vs. Hispanic students. As a result of this grouping, it is possible that Brazilian students were categorized as “other non-Middle Eastern”.

Chapter 7: Conclusions

There is significant use of NHP among Saudi students compared to other university students in Detroit, Michigan, USA; Hispanic students also show significant use of NHP compared to other Middle Eastern students. Predictors of NHP use are: grade level (1st year and 2nd year) and young age (18 to 25 years old). Future work should be undertaken to look at: (1) what Saudi students in the USA are using as NHP as compared to Saudi students in Saudi Arabia, and (2) USA Latin Americans vs. Latin Americans.

Gender	NHP Non-Users (n)	NHP Non-Users (%)	NHP Users (n)	NHP Users (%)	Total (n)	p-value
Female	n=135	24.1	n=232	41.4	n=367	=0.90
Male	n=72	12.9	n=121	21.6	n=193	
Total	n=207	37.0	n=353	63.0	n=560	

Table 1 Comparisons of Gender and NHP Use

Ethnicity	NHP Non-Users (n)	NHP Non-Users (%)	NHP Users (n)	NHP Users (%)	Total (n)	p-value
Hispanic	n=0	0.00	n=11	2.0	n=11	=0.025*
Middle-Eastern	n=58	10.4	n=108	19.3	n=166	
Non-Middle-Eastern	n=149	26.6	n=234	41.8	n=383	
Total	n=207	37.0	n=353	63.0	n=560	

Table 2.1 Comparisons of Ethnicity and NHP Use
* Statistically Significant

Ethnicity	NHP Non-Users (n)	NHP Non-Users (%)	NHP Users (n)	NHP Users (%)	Total (n)	p-value
Middle-Eastern	n=58	10.4	n=108	19.3	n=166	=0.519
Non-Middle-Eastern	n=149	26.6	n=245	43.8	n=394	
Total	n=207	37.0	n=353	63.0	n=560	

Table 2.2 Comparisons of Ethnicity and NHP Use

Citizenship	NHP Non-Users (n)	NHP Non-Users (%)	NHP Users (n)	NHP Users (%)	Total (n)	p-value
Non-Saudi	n=194	34.6	n=302	53.9	n=496	
Saudi	n=12	2.1	n=45	8.0	n=57	=0.013*
U.S. Saudi	n=1	0.2	n=6	1.1	n=7	
Total	n=207	37.0	n=353	63.0	n=560	

Table 3.1 Comparisons of Citizenship and NHP Use
* Statistically Significant

Citizenship	NHP Non-Users (n)	NHP Non-Users (%)	NHP Users (n)	NHP Users (%)	Total (n)	p-value
Other Middle-Eastern	n=194	34.6	n=302	53.9	n=496	
Saudi	n=13	2.3	n=51	9.1	n=64	=0.003*
Total	n=207	37.0	n=353	63.0	n=560	

Table 3.2 Comparisons of Citizenship and NHP Use
* Statistically Significant

Characteristic	p-value	OR (95% C.I.)
Female	0.56	1.12 (0.77, 1.65)
Ethnicity		
Hispanic	1.00	
Middle-Eastern	0.95	1.02 (0.66, 1.57)
Nationality		
Other Middle-Eastern	0.24	0.26 (0.03, 2.38)
Saudi	0.47	0.43 (0.04, 4.27)
Grade level		
1st year	0.02*	0.43 (0.22, 0.88)
2nd year	0.01*	0.46 (0.25, 0.84)
3rd year	0.74	0.91 (0.50, 1.63)
4th year	0.13	0.65 (0.38, 1.13)
Young age (18 to 25 years old)	0.001*	0.41 (0.24, 0.69)
Constant	0.02	16.16

Table 4 Logistic Regression Odds Ratio for the Likelihood of NHP Use
* Statistically Significant

APPENDIX

Appendix A Copy of the Online NPH Survey

Research Study On Natural Health Product Use Among Saudi University Students

1. In which language would you like the survey?
   - English
   - Arabic

Research Information Sheet
Title of Study: Research study on natural health product use among Saudi university students

Principal Investigator (PI): Dr. Maria Pontes Ferreira, PhD, RD, is an assistant professor in Nutrition and Food Science, Phone: (313) 577-8752
Purpose: You are being asked to be in a research study on the use of natural health products for health maintenance by university students. You were chosen because whether you are a King Saud University student or Wayne State University student. This study is being conducted at King Saud University and Wayne State University. The study is being conducted to understand how geo ethnic and gender play a role in the use of natural health products for health maintenance. In this study, natural health products are defined as: botanical, herbs, and medicinal plants. Study Procedures: If you take part in the study, you will be asked to complete an online survey. The first part of the survey asks you general demographic questions such as age, gender, and ethnicity. Your height and weight will also be asked so that your body mass index can be calculated. The second part of the survey asks you if you have taken natural health products, how you learned about them, from whom, and how much you spend on the purchase of natural health products. The last part of the survey asks you if you use natural health products, and if so, how often, for how long you have used these products, reason for use, and if the products were effective. There are a total of 23 questions, which should take no more than 5-10 minutes to complete.
Benefits: As a participant in this research study, there will be no direct benefit for you; however, information from this study may benefit other people now or in the future.
Risks: By participating in this study, you may experience the social risk of loss of confidentiality.
Costs: There will be no costs to you for participation in this research study.
Compensation: You will not be paid for taking part in this study.
Confidentiality: All information collected about you during the course of this study will be kept without any identifiers.

Voluntary Participation /Withdrawal: Taking part in this study is voluntary. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with whether King Saud University or Wayne State University or their affiliates.
Questions: If you have any questions about this study now or in the future, you may contact Dr. Maria Pontes Ferreira, PhD, RD [email:mpferreira@wayne.edu] or one of her research team members at the following phone number 3135778752. If you have questions or concerns about your rights as a research participant, the Chair of the Human
Investigation Committee can be contacted at (313) 577-1628. If you are unable to contact the research staff, or if you want to talk to someone other than the research staff, you may also call (313) 577-1628 to ask questions or voice concerns or complaints.

Participation:

2. By completing the survey you are agreeing to participate in this study.
   - Yes, I have read the consent.
   - No, I have not read the consent

3. Gender (Biological Sex)
   - Male
   - Female

4. Race
   - White
   - Black
   - Asian
   - Native American (AI, AN, NH/Pacific Islander)

5. Ethnicity
   - Hispanic
   - Middle-Eastern Heritage
   - Other

Other please specify……..

6. Nationality
   - Saudi
   - Saudi born in the USA
   - Other non-Saudi

Other please specify……..

7. Current Age (in years)
   .....

8. Please indicate your institutional affiliation.

- King Saud University.
- Wayne State University.

Other please specify……..

9. Grade level
- 1st year
- 2nd year
- 3rd year
- 4th year or more
- Graduate

10. Please select the answer that corresponds to your height. (Reminder: 1 foot = 12 inches; example: 5 feet 5 inches = 65")
…….

11. Please select the answer that corresponds to your weight in pounds. This will be used, along with your height to calculate your body mass index.
……..

12. At what age did you learn about medicinal plants or herbal products and their use?
……..

13. From whom, or where, have you learned about medicinal plants and their use? (Please select all that apply.)

- Family Member
- Elder/Healer
- Coach/Athletic Trainer
- Alternative Health Practitioner
- Conventional Health Practitioner/ Physician
- Friend
- Electronic Media (e.g. Television, Internet, Radio)
- Print Media (e.g. Books, Magazines, Newsletters)
- Advertising
- Other (please specify)

……..

14. Have you ever used medicinal plants or herbal products for health or well-being?
- Yes
- No

15. Please choose one answer.	Yes	No
1. Have you ever told your physician about your medicinal plant or herbal product use?		
2. Has your physician ever asked you about medicinal plant or herbal product use?		
3. Do you take physician-prescribed medication?		
4. Do you take over-the-counter medication?		
5. Have you found sufficient information on the use of medicinal plants and herbal products?		

16. On average, how much money do you spend on medicinal plants and herbal products per month?

- o Less than $5
- o $5-$10
- o $10-$15
- o $15-$20
- o $20-$25
- o $25-$30
- o $30-$35
- o $35-$40
- o $40-$45
- o $45-$50
- o $50-$100
- o More than $100

17. Have you used medicinal plants or herbal products for health or well-being in the past year? This includes drinking ginger tea to relieve sore throat, garlic for blood pressure, herbal tea for calmness.

- o Yes
- o No

18. When you use the plant, how frequently do you use it? Please check only the plants that you use.

NHP	Daily	Weekly	Monthly	As needed	N/A
Aloe vera					
Chamomile					
Echinacea					
Fenugreek					
Garlic					
Ginger					
Gingko					
Ginseng					
Green Tea					
Kava Kava					
Mint (e.g., peppermint, spearmint)					
Sage					
St. John's Wort					
Thyme					
Valerian					
Other-1					
Other-2					
Other-3					
Other-4					

Other (please specify, and list as Other-1 is, Other-2 is, etc.)

19. When you use the plant, for how long do you use it? Please check only the plants that you use.

NHP	1-6 days	1-3 months	1-6 months	6+ months	N/A
Aloe vera					
Chamomile					
Echinacea					
Fenugreek					
Garlic					
Ginger					
Gingko					
Ginseng					
Green Tea					
Kava Kava					
Mint (e.g., peppermint, spearmint)					
Sage					
St. John's Wort					
Thyme					
Valerian					
Other-1					
Other-2					
Other-3					
Other-4					

Other (please specify, and list as Other-1 is, Other-2 is, etc.)

20. In what form have you used the plant? (Please check all that apply, and please check only the plants that you use).

NHP	Dried	Fresh	Tincture (plant extract)	Capsule /pill	Topically (on the skin)	Infusion (tea)	N/A
Aloe vera							
Chamomile							
Echinacea							
Fenugreek							
Garlic							
Ginger							
Gingko							
Ginseng							
Green Tea							
Kava Kava							
Mint (e.g., peppermint, spearmint)							
Sage							
St. John's Wort							
Thyme							
Valerian							
Other-1							
Other-2							
Other-3							
Other-4							

Other (please specify, and list as Other-1 is, Other-2 is, etc.)

21. What have you used this plant for? (Please check all that apply.)
NOTE: This question has been split into two parts, question #21 and #22, Please check list on both questions before inserting "Other" for cause of use.

NHP	Health maintenance	Treat a chronic condition	Treat a physical condition	Treat a mental condition	Weight loss	Muscle gain	Increase energy	N/A
Aloe vera								
Chamomile								
Echinacea								
Fenugreek								
Garlic								
Ginger								
Gingko								
Ginseng								
Green Tea								
Kava Kava								
Mint (e.g., peppermint, spearmint)								
Sage								
St. John's Wort								
Thyme								
Valerian								
Other-1								
Other-2								
Other-3								
Other-4								

Other (please specify, and list as Other-1 is, Other-2 is, etc.)

22. What have you used this plant for? (Please check all that apply.)
NOTE: This question has been split into two parts, question #21 and #22,

Please check list on both questions before inserting "Other" for cause of use.

NHP	Beauty purposes	Sexual purposes	Simply like taking it	Alternative to other medicine	Traditional reasons	Spiritual reasons	Other	N/A
Aloe vera								
Chamomile								
Echinacea								
Fenugreek								
Garlic								
Ginger								
Gingko								
Ginseng								
Green Tea								
Kava Kava								
Mint (e.g., peppermint, spearmint)								
Sage								
St. John's Wort								
Thyme								
Valerian								
Other-1								
Other-2								
Other-3								
Other-4								

Other (please specify, and list as Other-1 is, Other-2 is, etc.)

23. Did the plant work?
    Please check only the plants that you use.

NHP	Effective	Ineffective	Don't Know	N/A
Aloe vera				
Chamomile				
Echinacea				
Fenugreek				
Garlic				
Ginger				
Gingko				
Ginseng				
Green Tea				
Kava Kava				
Mint (e.g., peppermint, spearmint)				
Sage				
St. John's Wort				
Thyme				
Valerian				
Other-1				
Other-2				
Other-3				
Other-4				

Other (please specify, and list as Other-1 is, Other-2 is, etc.)

24. Any adverse effects?
    Please check only the plants that you use.

NHP	Yes	No	N/A
Aloe vera			
Chamomile			
Echinacea			
Fenugreek			
Garlic			
Ginger			
Gingko			
Ginseng			
Green Tea			
Kava Kava			
Mint (e.g., peppermint, spearmint)			
Sage			
St. John's Wort			
Thyme			
Valerian			
Other-1			
Other-2			
Other-3			
Other-4			

Other (please specify, and list as Other-1 is, Other-2 is, etc.)

25. Thank you for taking time to participate in the survey. Click "Next" to close the window.
    - ○ Next

Appendix B Copy of the Arabic Translation of the Online NHP Survey

صفحة معلومات البحث
عنوان الدراسة
دراسة بحثية على مدى إستخدام طلاب الجامعة السعوديين للمنتجات الطبيعية للصحه
الباحث الرئيسي: الدكتورة ماريا بونتس فريرا، استاذ مساعد في قسم التغذية وعلوم الأطعمه، هاتف ٢٥٧٨٧٧٥٣١٣١٠٠
الهدف: السؤال في هذه الدراسة عن مدى استخدام طلاب الجامعة السعوديين للمنتجات الطبيعة للمحافظة على الصحه العامه. لقد تم اختيارك لانك إما طالب في جامعة الملك سعود او طالب جامعه وين ستيت. وهذه الدراسة ستطبق على الجامعتين (جامعة الملك سعود وجامعة وين ستيت) لمعرفة تأثير العرق والجنس على إستخدام المنتجات الطبيعية للصحه للمحافظة على الصحه العامه.
في هذه الدراسة تم تعريف المنتجات الطبيعيه للصحه على أنها أعشاب ونباتات طبيه
إجرائات الدراسة:
إذا وافقت على المشاركه في هذه الدراسة سوف تسأل بإنهاء تعبيئة هذه الإستماره اليكترونيا.
الجزء الأول في هذه الاستماره يتطلب معرفة البيانات الشخصية على سبيل المثال العمر والجنس والعرق.
أيضا معرفة الطول والوزن مهمة ومطلوبه لحساب معدل كتلة الجسم.
الجزء الثاني في هذه الإستمارة يتطلب الايجابه على اسئله عامه عن إستخدام المنتجات الطبيعيه للصحه مثال على ذلك:هل سبق لك ان تناولت منتجات طبيعيه للصحه ، كيف تعرفت عليها، ماهي مصادرك التثقيفيه حول المنتجات الطبيعيه، كم المبلغ الذي يصرف لشراء المنتجات الطبيعيه للصحه.
الجزء الأخير في هذه الإستماره يتركز على استخدام المنتجات الطبيعية مثل عدد مرات الاستخدام و مدة استخدامها وسبب الاستخدام وتأثيرها إن وجد.
يوجد ثلاث وعشرون سؤالا في هذه الاستبيان يستغرقون من ١٠ ٥ دقائق للايجابة عليها.
الفوائد: بالمشاركه في هذه الدراسه لا توجد فائده اساسيه للطالب/ الطالبة وعلى الرغم من ذلك المعلومات المستخرجه من هذه الدراسه قد تفيد اناس اخرين في الوقت الحالي او في المستقبل.
الخطوره: لا توجد اي مخاطر مباشره للطالب/ الطالبه بالمشاركه في هذه الدراسة، ولكن قد يكون هناك مخاطره لفقدان سريه وخصوصيه المعلومات
التكاليف: لا توجد اي تكاليف ماليه على الطالب/ الطالبة بالمشاركة في هذه الدراسة البحثية
التعويضات: لن يعوض الطالب/ الطالبة ماديا بالمشاركة في هذا البحث
الخصوصية و السريه:
جميع المعلومات التي سوف يتم الحصول عليها من الطالب/ الطالبة خلال هذه الاستماره سوف تكون محفوظة بدون معرفة هوية الطالب/ الطالبة.
التطوع بالمشاركه/الإنسحاب:المشاركه في هذه الدراسه تطوعية.
لدى الطالب/ الطالبة الحرية في عدم الإيجابة على اي سؤال ويحق للطالب الانسحاب في اي وقت.
قرار الطالب/ الطالبه بالمشاركة اوالإنسحاب لن يغير علاقاتهم بجامعة الملك سعود او جامعة وين ستيت أو الجهات التابعة لهما.
الاسئلة: يحق للطالب/ الطالبة في حالة الاستفسار عن هذه الدراسة حاليا آو مستقبلا بالتواصل مع الدكتورة ماريا بونتس فريرا عبرالبريد الإليكتروني mpferreira@wayne.edu أو اي عضو من اعضاء فريق البحث على رقم الهاتف ٢٥٧٨٧٧٥٣١٣١٠٠
إذا لديك اي اسئلة أخرى او مخاوف حول حقوقك كمشارك في البحث الرجاء التواصل مع رئيس لجنه التحقيق الإنسانية على الهاتف ٨٢٦١٧٧٥٣١٣٠٠
في حالة عدم المقدرة على التواصل مع اعضاء فريق البحث آو في حالة الرغبة بالتواصل مع شخص آخر خارج فريق البحث الرجاء الاتصال على الرقم٨٢٦١٧٧٥٣١٣١٠٠ للطرح الاسئلة او الشكاوي.

1 حين الانتهاء من تعبية هذه الاستماره سوف تعتبر موافقه على المشاركة في هذه الدراسة
- ○ نعم موافق
- ○ لا غير موافق

2 الجنس
- ذكر
- انثى

3 السلاله
- ابيض
- اسود
- آسيوي
- امريكي أصلي

4 العرق
- اسباني/لاتيني
- من دول الشرق الاوسط
- آخر

آخر الرجاء التحديد .....

5 الجنسيه
- سعودي
- سعودي مولود في امريكا
- غير سعودي

الرجاء التحديد.....

6 العمر الحالي بالسنوات
- .....

7 الرجاء تحديد الجامعة التي تنتسب اليها؟
- جامعة الملك سعود
- جامعة وين ستيت
- آخرى فضلا حدد

.....

8 المستوى التعليمي
- السنة الأولى
- السنة الثانية
- السنة الثالثة
- اربع سنين أو أكثر
- دراسات عليا

9 الرجاء تحديد الطول بالمتر:
.....

10 الرجاء تحديد الوزن بالكيلوجرام :
.....

11 حدد العمر الذي تعرفت فيه على النباتات الطبيه ومنتجات الاعشاب واستخداماتها؟
- .....

12 ممن او من اين حصلت على معلوماتك حول النباتات الطبيه واستخدماتها؟يمكنك اختيار اكثر من ايجابه واحده

- احد افراد العائلة
- شخص كبير في السن اوحكيم
- مدرب رياضي
- الطب البديل
- معالج الطب البديل
- صديق
- وسائل الاعلام الاليكترونيه مثال كتب، مجلات، جرائد
- وسائل الاعلام المطبوعه مثال كتب ومجلات وجرائد
- إعلانات
- أخرى

يرجى التحديد.....

13 بشكل عام هل سبق لك أن استخدمت نباتات طبية او منتجات الاعشاب للمحافظه على الصحه؟
- نعم
- لا

14 الرجاء إختيار إجابه واحده	**نعم**	**لا**
1 هل سبق لك ان اخبرت طبيبك عن استخدامك للنباتات الطبيه او منتجات الاعشاب ؟		
2 هل سبق لك ان سالك طبيبك عن استخدام النباتات الطبيه او منتجات الاعشاب ؟		
3 هل تتناول ادويه بوصفه طبيه؟		
4 هل سبق لك ان وجدت معلومات وافيه عن النبات الطبيه ومنتجات الاعشاب؟		
5 هل من عادتك تناول الأدوية التي لاتحتاج الى وصفة طبية		

15 بشكل عام كم المبلغ الذي تنفقه شهريا لشراء النباتات الطبيه ومنتجات الاعشاب؟
- اقل من 5 ريال
- 5 10 ريال
- 10 15 ريال
- 15 20 ريال
- 20 25 ريال
- 25 30 ريال

- 30 35 ريال
- 35 40 ريال
- 40 45 ريال
- 45 50 ريال
- 50 100 ريال
- اكثر من 100 ريال

16 هل سبق لك استخدام النباتات الطبيه او منتجات الاعشاب للصحه او المحافظه عليها في السنه الماضيه؟ هذا يشمل شرب شاي الزنجبيل لازله التهاب الحلق او استخدام الثوم لضغط الدم وايضا شاهي الاعشاب لاسترخاء

- نعم
- لا

17 متى تستخدم النبات ؟ وكم عدد المرات المستخدمة؟ الرجاء اختيار فقط النباتات التي تستخدمها

النباتات او الاعشاب	يوميا	اسبوعيا	شهريا	حسب الحاجة	غير مطابق
الصبار					
البابونج					
القنفذية/ اكنيشيا					
الحلبه					
الثوم					
الزنجبيل					
الجنكه/كزبرة البئر					
الجنسينغ					
الشاي الأخضر					
الكافا كافا					
النعناع					
المرمية					
حشيشة القلب					
الزعتر					
الناردين					
آخر 1					
آخر 2					
آخر 3					
آخر 4					

(في حالة الرغبة في إضافة نبات جديد يكتب اسمه في الاسفل وبياناته في الأعلى مقابل آخر)

18 حدد المده التي تستخدم فيها النبات عند استخدامها؟ الرجاء اختيار فقط النباتات التي تستخدمها

النباتات او الاعشاب	1 6 أيام	1 3 أشهر	1 6 أشهر	اكثر من 6 أشهر	غير مطابق
الصبار					
البابونج					
القنفذية/ اكنيشيا					
الحلبه					
الثوم					
الزنجبيل					
الجنكه/كزبرة البئر					
الجنسينغ					
الشاي الأخضر					
الكافا كافا					
النعناع					
المرمية					
حشيشة القلب					
الزعتر					
الناردين					
آخر 1					
آخر 2					
آخر 3					
آخر 4					

(في حالة الرغبة في إضافة نبات جديد يكتب اسمه في الاسفل وبياناته في الأعلى مقابل آخر)

19 في اي هيئة او شكل تستخدم النبات؟ يمكنك اختيار اكثر من اجابه. الرجاء اختيار فقط النباتات التي تستخدمها

النباتات او الاعشاب	جاف	طازج	مستخلص نبات	حبوب	دهان للجلد	شراب كالشاي	غير مطابق
الصبار							
البابونج							
القنفذية/ اكنيشيا							
الحلبه							
الثوم							
الزنجبيل							
الجنكه/كزبرة البئر							
الجنسينغ							
الشاي الأخضر							
الكافا كافا							
النعناع							
المرمية							
حشيشة القلب							
الزعتر							
الناردين							
آخر 1							
آخر 2							
آخر 3							
آخر 4							

(في حالة الرغبة في إضافة نبات جديد يكتب اسمه في الاسفل وبياناته في الأعلى مقابل آخر)

20 لماذا تستخدم هذه النباتات؟ يمكنك اختيار اكثر من اجابة ملاحظه:

1 هذا السؤال انقسم الى جزئين سؤال 20 وسؤال 21
2 الرجاء اختيار من القائمه في السؤالين قبل الاجابة على (اخر) لاسباب الاستخدام
5 الرجاء اختيار فقط النباتات التي تستخدمها

النباتات او الاعشاب	للمحافظة على الصحة العامه	لمعالجة الحالات المزمنة	لمعالجة الحالات البدنية	لمعالجة الحالات العقلية	لفقدان الوزن	لزيادة العضلات	لزيادة الطاقة	غير مطابق
الصبار								
البابونج								
القنفذية/ اكنيشيا								
الحلبه								
الثوم								
الزنجبيل								
الجنكه/كزبرة البئر								
الجنسينغ								
الشاي الأخضر								
الكافا كافا								
النعناع								
المرمية								
حشيشة القلب								
الزعتر								
الناردين								
آخر 1								
آخر 2								
آخر 3								
آخر 4								

(في حالة الرغبة في إضافة نبات جديد يكتب اسمه في الاسفل وبياناته في الأعلى مقابل آخر)

21 لماذا تستخدم هذه النباتات؟ يمكنك اختيار اكثر من اجابة

ملاحظه:

1 هذا السؤال انقسم الى جزئين سؤال 20 وسؤال 21

2 الرجاء اختيار من القائمه في السؤالين قبل الاجابة على (اخر) لاسباب الاستخدام

ج الرجاء اختيار فقط النباتات التي تستخدمها

النباتات او الاعشاب	للجمال	اسباب جنسية	ببساطه احب استخدامه	بديل لدواء آخر	لأسباب دينية	أخرى	غير مطابق
الصبار							
البابونج							
القنفذية/ اكنيشيا							
الحلبه							
الثوم							
الزنجبيل							
الجنكه/كزبرة البئر							
الجنسينغ							
الشاي الأخضر							
الكافا كافا							
النعناع							
المرمية							
حشيشة القلب							
الزعتر							
الناردين							
آخر 1							
آخر 2							
آخر 3							
آخر 4							

(في حالة الرغبة في إضافة نبات جديد يكتب اسمه في الاسفل وبياناته في الأعلى مقابل آخر)

22 ماهي نتجية استخدامك للنبات؟ الرجاء اختيار فقط النباتات التي تستخدمها

النباتات او الاعشاب	فعال	غير فعال	لا اعلم	غير مطابق
الصبار				
البابونج				
القنفذية/ اكنيشيا				
الحلبه				
الثوم				
الزنجبيل				
الجنكه/كزبرة البئر				
الجنسينغ				
الشاي الأخضر				
الكافا كافا				
النعناع				
المرمية				
حشيشة القلب				
الزعتر				
الناردين				
آخر 1				
آخر 2				
آخر 3				
آخر 4				

(في حالة الرغبة في إضافة نبات جديد يكتب اسمه في الاسفل وبياناته في الأعلى مقابل آخر)

23 هل وجدت آثار جانبية ضاره لإستخدامك للنباتات ؟ الرجاء اختيار فقط النباتات التي تستخدمها

النباتات او الاعشاب	نعم	لا	غير مطابق
الصبار			
البابونج			
القنفذية/ اكنيشيا			
الحلبه			
الثوم			
الزنجبيل			
الجنكه/كزبرة البئر			
الجنسينغ			
الشاي الأخضر			
الكافا كافا			
النعناع			
المرمية			
حشيشة القلب			
الزعتر			
الناردين			
آخر 1			
آخر 2			
آخر 3			
آخر 4			

(في حالة الرغبة في إضافة نبات جديد يكتب اسمه في الاسفل وبياناته في الأعلى مقابل آخر)

24 شكرا لمشاركتك في تعبئة هذه الاستماره.

REFERENCES

Aburjai, T., Hudaib, M., Tayyem, R., Yousef, M., & Qishawi, M. (2007). Ethnopharmacological Survey of Medicinal Herbs in Jordan, the Ajloun Heights Region. *Journal of Ethnopharmacology*, *110*(2), 294-304.

Ahmad, M. Khan, M.A. Marwat, S.K. (2009): Useful Medicinal Flora Enlisted in Holy Quran and Ahadith. American-Eurasian *Journal of Agriculture and Environment Science* 5 (1): 126-140.

Alachkar, A., Jaddouh, A., Elsheikh, M. S., Bilia, A. R., & Vincieri, F. F. (2011).Traditional medicine in Syria: Folk Medicine in Aleppo Governorate. *Natural Product Communications*, *6*(1), 79-84.

Albraik, F. A., Rutter, P. M., & Brown, D. (2008). A cross‐sectional Survey of Herbal Remedy Taking by United Arab Emirate (UAE) Citizens in Abu Dhabi. *Pharmacoepidemiology and Drug Safety*, *17*(7), 725-732.

Al-Faris, E. A., Al-Rowais, N., Mohamed, A. G., Al-Rukban, M. O., Al-Kurdi, A., Al-Noor, M. A. B., ... & Sheikh, A. (2008). Prevalence and Pattern of Alternative Medicine Use: The Results of a Household Survey. *Annals of Saudi Medicine*, *28*(1), 4.

Alislam. (2014) The Holy Quran, the Revealed Word of God. http://www.alislam.org/quran/ Mar 27,2014.

Alkholy, S. O., Alqahtani, S. N., Cochrane, A., Pontes Ferreira, M., & Gendron, F. (2013). Aboriginal and Non-Aboriginal Students Learn About Natural Health Products from Different Information Sources. *Pimatisiwin: A Journal of Aboriginal & Indigenous Community Health*, *11*(1).

Alqahtani, S.N., Alkholy, S.O., Haque, D., Gendron, F. Ferreira, M.P. (*in review by IJIH,* 2014). Native/Aboriginal Students Use Natural Health Products for Health Maintenance More so Than Other College Students*. International Journal of Indigenous Health*.

Ambrose, E. T., & Samuels, S. (2004). Perception and Use of Herbals Among Students and Their Practitioners in a University Setting. *Journal of the American Academy of Nurse Practitioners*, *16*(4), 166-173.

Arcury, T. A., Grzywacz, J. G., Bell, R. A., Neiberg, R. H., Lang, W., & Quandt, S. A. (2007). Herbal Remedy Use as Health Self-Management Among Older Adults. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *62*(2), S142-S149.

Ayranci, U., Son, N., & Son, O. (2005). Prevalence of Nonvitamin, Nonmineral Supplement Usage Among Students in a Turkish University. *BMC Public Health*, *5*(1), 47.

Azaizeh, H., Saad, B., Cooper, E., & Said, O. (2010). Traditional Arabic and Islamic Medicine, a Re-Emerging Health Aid. *Evidence-Based Complementary and Alternative Medicine*, *7*(4), 419-424.

Canadian Health Food Association (CHFA). (2014). Understanding the Issues: Defining Natural Health Product. https://www.chfa.ca/defining-natural-health products/ Feb 19, 2014.

Barnes, P. M., Powell-Griner, E., McFann, K., & Nahin, R. L. (2004). Complementary and Alternative Medicine Use Among Adults: United States, 2002. In *Seminars in Integrative Medicine, 2*(2), 54-71.

Cao, L. Z., & Lin, Z. B. (2003). Regulatory Effect of *Ganoderma lucidum* Polysaccharides on Cytotoxic T-lymphocytes Induced by Dendritic Cells in Vitro. *Acta Pharmacologica Sinica*, *24*(4), 321-326.

Center for Immigration Studies. (2002). Immigration from the Middle East. A Profile of the Foreign-born Population from Pakistan to Morocco. http://www.cis.org/MiddleEasternImmigrantsProfile. April 17, 2014.

Collenette S. Checklist of Botanical Species in Saudi Arabia. West Sussex **(**UK**)**: International Asclepiad Society, 1998. p. 78.

Delgoda, R., Younger, N., Barrett, C., Braithwaite, J., Davis, D. (2010). The Prevalence of Herbs Use in Conjunction with Conventional Medicines in Jamaica. *Complementary Therapies in Medicine, Volume 18,* 13-20.

Devasagayam, T. P. A., & Sainis, K. B. (2002). Immune System and Antioxidants, Especially Those Derived from Indian Medicinal Plants. *Indian Journal of Experimental Biology*, *40*(6), 639-655.

El-Ghazali, G. E., Al-Khalifa, K. S., Saleem, G. A., & Abdallah, E. M. (2010). Traditional Medicinal Plants Indigenous to Al-Rass Province, Saudi Arabia. *Journal of Medicinal Plant Research*, *4*(24), 2680-2683.

Elolemy, A. T., & AlBedah, A. M. (2012). Public Knowledge, Attitude and Practice of Complementary and Alternative Medicine in Riyadh Region, Saudi Arabia. *Oman Medical Journal*, *27*(1), 20.

Ghaznavi, K. (1987): Tib-i-Nabvi and Modern Science. Al Faisal, Lahore, Pakistan1(2): 1-14.

Graham, R. E., Ahn, A. C., Davis, R. B., O'Connor, B. B., Eisenberg, D. M., &

Phillips, R. S. (2005). Use of Complementary and Alternative Medical Therapies Among Racial and Ethnic Minority Adults: Results from the 2002 National Health Interview Survey. *Journal of the National Medical Association*, *97*(4), 535.

Judicial Watch Because no One is Above the Law. (2013). No. of Saudi Students in US Doubles in 2 Years. http://www.judicialwatch.org/blog/2013/11/no-of-saudi-students-in-u-s-doubles-in-2-years/. November 25, 2013.

Levine, M. A., Xu, S., Gaebel, K., Brazier, N., Bédard, M., Brazil, K., ... & MacLeod, S. M. (2009). Self-Reported use of Natural Health Products: a Cross-Sectional Telephone Survey in Older Ontarians. *The American Journal of Geriatric Pharmacotherapy*, *7*(6), 383-392.

Lin, Z. B., & Zhang, H. N. (2004). Anti-Tumor and Immunoregulatory Activities of *Ganoderma lucidum* and its Possible Mechanisms. *Acta Pharmacologica Sinica*, *25*,1387-1395.

Mikhail, N., Wali, S., & Ziment, I. (2004). Use of Alternative Medicine among Hispanics. *Journal of Alternative & Complementary Medicine*, *10*(5), 851-859.

Millen, A. E., Dodd, K. W., & Subar, A. F. (2004). Use of Vitamin, Mineral, Nonvitamin, and Nonmineral Supplements in the United States: the 1987, 1992, and 2000 National Health Interview Survey results. *Journal of the American Dietetic Association*, *104*(6), 942-950.

Moerman DE. (1996). An Analysis of the Food Plants and Drug Plants of Native North America. *Journal of Ethnopharmacol*.52:1–22.

Mossa, J.S., Al-Yahya, M.A., Al-Meshal. I.A. (1987). Medicinal Plants of Saudi Arabia. Riyadh: King Saud University Press.

Mukherjee, M., Das, A. S., Mitra, S., & Mitra, C. (2004). Prevention of Bone Loss by oil Extract of Garlic (Allium sativum Linn.) in an Ovariectomized Rat Model of Osteoporosis. *Phytotherapy Research*, *18*(5), 389-394.

Nasr, S.H. (1976): Islamic Science-An Illustrated Study. Westerham press, Ltd, Westerham, Kent (England) pp: 15.

Nur, N. (2010). Knowledge and Behaviors Related to Herbal Remedies: a Cross-Sectional Epidemiological Study in Adults in Middle Anatolia, Turkey. *Health & Social Care in the Community*, *18*(4), 389-395.

Onislam (2005). What is a Hadith Qudsi? http://www.onislam.net/english/shariah/hadith/faqs/446673.html Mar 27, 2014.

Public Broadcasting Service. (2002) Muhammad: Lagacy of A Prophet. http://www.pbs.org/muhammad/timeline_html.shtml Mar 28, 2014.

Shan, B. E., Yoshida, Y., Sugiura, T., & Yamashita, U. (1999). Stimulating Activity of Chinese Medicinal Herbs on Human Lymphocytes in Vitro. *International Journal of Immunopharmacology*, *21*(3), 149-159.

Said, O., Khalil, K., Fulder, S., & Azaizeh, H. (2002). Ethnopharmacological Survey of Medicinal Herbs in Israel, the Golan Heights and the West Bank Region. *Journal of Ethnopharmacology*, *83*(3), 251-265.

Singh, S. V., Zeng, Y., Xiao, D., Vogel, V. G., Nelson, J. B., Dhir, R., & Tripathi, Y. B. (2005). Caspase-Dependent Apoptosis Induction by

Guggulsterone, a Constituent of Ayurvedic Medicinal Plant Commiphora Mukul, in PC-3 Human Prostate Cancer Cells is Mediated by Bax and Bak. *Molecular Cancer Therapeutics*, *4*(11), 1747-1754.

Tan, B. K., & Vanitha, J. (2004). Immunomodulatory and Antimicrobial Effects of Some Traditional Chinese Medicinal Herbs: a Review. *Current Medicinal Chemistry*,11 (11), 1423-1430.

Tapsell, L. C., Hemphill, I., Cobiac, L., Sullivan, D. R., Fenech, M., Patch, C. S., ... & Inge, K. E. (2006). Health Benefits of Herbs and Spices: the Past, the Present, the Future. *Faculty of Health and Behavioural Sciences-Papers*. *185*(4), S4-S24.

UNESCO (1996). *Culture and Health*, Orientation Texts – World Decade for Cultural Development 1988 – 1997, Document CLT/DEC/PRO – 1996, Paris, France, pgs. 129.

Wayne State University. (2014). Aim Higher. About. http://wayne.edu/about.php Apr 10, 2014.

Wayne State University. (2012). Office of International Students and Scholars. 2012 International Student Statistics. http://www.oiss.wayne.edu/statistics/2012detailstats.php. Apr 10, 2014.

Wu, C. H., Wang, C. C., & Kennedy, J. (2011). Changes in Herb and Dietary Supplement Use in the US Adult Population: a Comparison of the 2002 and 2007 National Health Interview Surveys. *Clinical Therapeutics*, *33*(11), 1749-1758.

ABSTRACT

SAUDI ARABIAN STUDENTS IN DETROIT USE NATURAL HEALTH PRODUCTS MORE SO THAN OTHER UNIVERSITY STUDENTS IN DETROIT

by

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Natural Health Products (NHP), are defined as products that derive from organisms and may include supplements and herbal/traditional remedies. Prior research indicates that females use NHP more than males. We have unpublished data to show that students use NHP for health maintenance with significantly different use of NHP by Native/Aboriginal students vs. other students. Less is known about Saudi students. We hypothesize that: (1) There are gender differences in NHP used; and (2) There are geo-ethnic differences in NHP used. We also determine the predictor variables that influence NHP use by students. Students from Wayne State University (*n=560; 193* males and *367* females) participated in a cross-sectional online survey of NHP with a sample size of 64 Saudi students. χ^2 test analyzed group differences, with the alpha set at 0.05. Multiple logistic regression models (MLR) determined the odds ratio (OR) with 95% Confidence Interval (CI) to assess joint effects of the following variables; age, sex, ethnicity, citizenship, and grade level regarding the use of NHP. Data were analyzed with SPSS Software 22. Of 560 surveyed students,

353 (63%) used NHP, while 207 students (37%) did not. There is significant NHP use among students from a diverse sample. χ^2 test shows that no difference between Middle Eastern vs. non-Middle Eastern students (p=0.519). However, Saudi students use NHP more than other students (p=0.003). Also, Hispanic students use NHP more than Middle Eastern students (p=0.025). There were no differences between male and female NHP use (p=0.9). The MLR show three predictors of NHP use: Freshman (95% OR=0.43, CI=0.22-0.88, p=0.02), Sophomore (95% OR=0.46, CI=0.25-0.84, p=0.01), and young age (18 to 25 years old) (95% OR=0.41, CI=0.24-0.69, p=0.001). Future work should be undertaken to clarify the NHP used by Saudi university students in the USA vs. Saudi university students in Saudi Arabia.

AUTOBIOGRAPHICAL STATEMENT

Samiah Aqlahtani received her bachelor's of Nutrition and Food Science in 2002 from the College of Education for Home Economics and Arts Education in Jeddah, Saudi Arabia. In 2008 she received her Master's degree in Nutrition and Food Science at the King Abdul-Aziz University in Jeddah, Saudi Arabia. In 2010, she joined the Nutrition and Food Science (NFS) program at WSU in Detroit, Michigan, USA in pursuit of a PhD. While working towards her doctoral goal, she added a master's degree from NFS at WSU.

Alqahtani is a member of SACNAS (a professional society) and participated in poster presentations at SACNAS 2012 and SACNAS 2013 for graduate students. Alqahtani is also a member of Dr. Ferreira's lab in NFS at WSU where she is working on her PhD with Dr. Ferreria. Her research interests are in nutrition, health, food science, and statistics. Currently, Alqahtani is a research assistant for the OCS where she uses her statistical and nutritional backgrounds to conduct and analyze data on the Green Warriors behavioral change campus initiative.