***Continuing Education Contact Hour Opportunity Pending**

Comparison of US and Indian College Students' Health Behaviors that Contribute to the Development of Chronic Diseasess

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Abstract

Heart disease, cancer, stroke, diabetes, and respiratory diseases are the leading chronic diseases worldwide. For American college students, specifically, behavioral risk factors for chronic disease include: insufficient sleep, inactivity, unhealthy eating habits, poor mental health, substance abuse, unhealthy relationships, and unsafe sexual practices. Although little has been reported in the literature, and no national assessment was conducted of college-aged students in India; there is some evidence that that this population may also engage in the behavioral risk factors of alcohol and tobacco use.

A convenience sample of English-speaking, college-aged students from a medium-sized, rural university in India and a medium-sized, rural university in the United States participated in a survey about their behavioral health risks for chronic disease. The chronic disease risk factors of substance abuse, physical inactivity, and poor nutrition were similar between the two respondent groups; however, choice of substance to abuse (US- alcohol, India- tobacco) significantly differed between the groups. Health promotion intervention programming for college-age students in both countries would be similar and should focus on decreasing personal risk factors and promoting protective factors for chronic disease prevention.

Introduction

A behavioral health risk factor is any characteristic or exposure that increases the possibility of developing a disease or injury (Sutter Health, 2010). The chances of becoming ill with a chronic disease depend in part on the number and type of behavioral health risk factors possessed by an individual. Behavioral health risk factors include: tobacco smoking, poor diet, insufficient vaccination, excessive alcohol consumption, and physical inactivity (Centers for Disease Control and Prevention [CDC], 2016). The number of people with chronic diseases is rising fast. It is so common, healthcare providers must spend more of their time with people who have more than one condition. For example, most consultations in primary care consist of patients with chronic conditions and account for 84% of the total spending in the United States (McGrail, Lavergne, & Lewis, 2016).

Global burden of chronic disease

The increased average age of the world's population and population growth has caused a shift from communicable disease towards non-communicable disease. According to the Global Burden of Disease Study 2010, non-communicable diseases rose to eight million between 1990 and 2010, accounting for 34.5 million deaths worldwide by 2010 (Lozano et al., 2012). Additionally, DALYs (disability-adjusted life-years) caused by communicable diseases increased by 27.8% (Murray & Lopez, 2013). Globally, cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes are the leading chronic diseases, accounting for almost 40 million deaths each year. Behavioral (e.g. physical inactivity, poor nutrition, alcohol and tobacco use) and metabolic (e.g. hypertension, obesity, high blood glucose) risk factors can be improved, though (World Health Organization [WHO], 2015b). For example, alcohol abuse results in the death of almost three million people annually, and over six million people die from tobacco use and exposure to tobacco smoke. Global obesity rates have doubled over the past three decades, low vegetable and fruit consumption is responsible for about 3% of global disease burden, and physical inactivity has increased in industrial and urban areas (Ezzati & Riboli, 2013).

Risk factors such as alcohol and tobacco use as well as physical inactivity and poor diet greatly contribute to the global disease burden (Ezzati & Riboli, 2013). Countries with lower socioeconomic status seem to possess higher chronic disease rates due to higher behavioral risk factors especially alcohol use, tobacco use, physical inactivity, and low vegetable and fruit intake. Almost 75% of deaths from chronic diseases are in lower income countries (WHO, 2015b). For example, most smokers now reside in lower-income countries, and tobacco use coupled with second-hand smoke exposure is responsible for over six million deaths/year globally; mostly in lower-income countries. It also seems that many risk factors historically prominent in higher-income countries are now being seen at similar levels in lower-income countries (Ezzati & Riboli, 2013).

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College students: United States and India

In the United States, about half of all adults have some type of chronic condition such as heart disease, stroke, cancer, type 2 diabetes, obesity, and arthritis (CDC, 2016). Over 85% of health care spending in the United States is for chronic conditions, and about half of all deaths annually are from the chronic diseases of heart disease and cancer. Over one-third of adults are obese, over 50 million adults suffer from arthritis, and diabetes is a leading cause of kidney failure. Unhealthy lifestyle behavioral risk factors can lead to increased risk for these conditions (CDC, 2016). For American college students, specifically, behavioral risk factors for chronic disease can be decreased by eating a balanced diet, preventing sexually transmitted diseases, obtaining adequate sleep and exercise, avoiding harmful substances, and maintaining mental health (CDC, 2015b).

In India, the leading causes of death are heart disease, chronic obstructive pulmonary disease, and stroke. The mortality rates for all ages in India include: cardiovascular diseases (24%), cancer (6%), respiratory diseases (11%), diabetes (2%), nutritional conditions (37%), and injuries (10%) (WHO, 2015a). Although there is little information on chronic diseases rates for college students in India, some behavioral risk factors of all Indians include smoking, physical inactivity, and high blood pressure. For example, 25.1% of males and 2.0% of females report smoking tobacco daily in India (WHO, 2015a) as compared to United States rates of 18% and 14.8% (CDC, 2015a). In India, almost 11.0% of males and 17.3 % of females reported being physically inactive (WHO, 2015b) as compared to United States rates of 40.0% and 50.0%, respectively (WHO, 2016). Over one-third of males and 31.7% of females reported hypertension in India (WHO, 2015b) compared to United States rates of 34.1% and 32.7% (CDC, 2015c).

Purpose

To determine these rates and risk factors for American students, the American College Health Association surveys college students annually using the *National College Health Assessment* that includes questions covering a wide range of health issues such as: alcohol, tobacco, and other drug use, sexual health, weight, nutrition and exercise, mental health, and personal safety and violence (American College Health Association, 2016a). Even though the survey has only been used in the United States, college students are a diverse, yet distinct, population with specific health risks and needs. Although little has been reported in the literature, and no national assessment was conducted of college-aged students in India, there is some evidence that this population may also engage in the behavioral risk factors of alcohol and tobacco use (WHO, 2015a). Therefore, the purpose of this study was to determine the types and levels of behavioral health risk factors that contribute to chronic disease in college-aged students in India as compared to those in the United States.

Methods

Sample

A convenience sample of 79 (English-speaking) college-aged (between the traditional 18-23 years of age) students enrolled in a medium-sized, rural university in West Bengal, India as well as 76 college-aged American students enrolled in a medium-sized, rural university in Northeast Missouri, USA were asked to participate in a survey about their behavioral health risks. Each was given an informed consent document that described the purpose of the study, that they were not required to participate, and that they could withdraw at any time without penalty. All 155 students (100%) signed the form and freely agreed to participate in the study.

Instrument

The American College Health Association's (ACHA) *National College Health Assessment (ACHA-NCHA II),* a nationally- recognized survey, was used to collect data on participants' behavioral health risks. It was developed by an interdisciplinary team of college health professionals and was systematically evaluated with reliability and validity analyses. These analyses include performing item reliability analysis overlapping items with nationally representative database, conducting measurement and construct validity analyses comparing results of the ACHA-NCHA with a nationally representative database, and comparing relevant percentages with nationally representative databases. Some of the sets used for evaluation of reliability and validity are the National College Health Risk Behavior Survey CDC 1995 and Harvard School of Public Health 1999 College Alcohol Study (CAS) (American College Health Association, 2016b).

The survey included 66 sections that focused on health habits, behaviors, and perceptions in the following areas: Alcohol, Tobacco, and Other Drug Use; Sexual Health; Weight, Nutrition and Exercise; Physical Health; Mental Health; and Impediments to Academic Performance (ACHA, 2016). In this study, data on sexual health was not reported because there was not enough data collected from the Indian participants to compare with the American participants. Additionally, data on mental health and impediments to academic performance were not reported because the study focused on individual behaviors that may lead to chronic diseases. As such, a total of 20 items were used for the study. Two items addressed demographic variables, sex and residence. Eighteen items addressed behaviors and perceptions. One item asked "How would you describe your general health?" Six items began with the stem, "In the last 30 days, on how many days did you use…" and then asked about cigarettes; tobacco from a water pipe (hookah); cigars, little cigars, clove cigarettes; alcohol; smokeless tobacco; and marijuana. Two items asked about alcohol use the "…last time you partied/socialized…". Specifically the number of drinks consumed and the number of hours alcohol was consumed were addressed. One item asked about the number of times the participant had consumed five or more drinks of alcohol in one sitting. One item asked the participants to describe their weight status. One item asked about the number of servings of fruits and vegetables that were eaten each day. Four items addressed physical activity with questions pertaining to the number of days over the past week the participant had in engaged in moderate intensity aerobic exercise, vigorous intensity aerobic exercise, and 8-10 strength training exercises for 8-12 repetitions each, while the fourth item asked about exercising to lose weight in the last 30 days. One item asked if the participant "…had a dental exam and cleaning in the last 12 months?", and one item asked if the participant "…used sunscreen regularly with sun exposure?"

Procedure

During summer 2013, after IRB approval and participant consent, respondents from India completed the confidential surveys in a classroom at the conclusion of a school day. A student volunteer collected the surveys, placed them in an envelope, and delivered them to the researcher for data input and analysis. During fall 2013, after IRB approval and participant consent, respondents from the United States completed the confidential surveys in a classroom at the conclusion of a school day. To maintain confidentiality, no names, only code numbers, were placed on the surveys; and all surveys were shredded once the data was recorded.

Analysis

Descriptive statistics were computed on all items. Subsequently, responses to the 18 behavioral and perception items were dichotomized so that participants were categorized into one of two groups, for example, users or non-users, and a series of Chi-square analyses were computed (n = 15) to determine if there were significant differences in the responses of United States student participants versus Indian student participants, when there was a minimum cell size of five for each respective response in the analysis.

Results

Demographics

As seen in Table 1, a total of 155 students from both India and the United States participated in this study. A little over half (53%, 42/79) of respondents from India were male, and a majority (71%, 54/76) of respondents from the United States were female. Almost 60% (44/76) of respondents from the United States resided in off-campus housing followed by residence hall (36%, 27/76). On the other hand, of respondents from India, a little over half (52%, 41/79) resided at their parent/guardian's home.

General Health

The first question on the survey required respondents to rate their general health; answers could range from "Don't know," "Poor," "Fair," "Good," "Very good," to "Excellent." A vast majority (92.1%, 70/76) of respondents from the United States rated their general health as "Good," "Very good," or "Excellent," while only 67% (53/79) of respondents from India rated their general health in these top categories (Table 2).

Tobacco, alcohol, and other drug use

The next questions asked respondents about tobacco, alcohol, and other drug use. When asked "Within the last 30 days, did you use cigarettes or hookah?" some (15.8 %, 12/76) respondents from the United States and about 38% (30/79) of respondents from India noted that they used cigarettes in the last 30 days. Almost 15% (11/76) of respondents from the United States and a little over 3% (3/79) of respondents from India noted that they smoked tobacco from a water pipe/hookah over that time period. Respondents from India were significantly (*p= .001*) more likely than those from the United States to have used cigarettes over the last 30 days.

When asked "Within the last 30 days, did you use alcohol?", a majority (81.6%, 62/76) of respondents from the United States and 24.1% (19/79) of respondents from India noted that they used alcohol in the last 30 days. Respondents from the United States were significantly *(p= .000*) more likely than those from India to use alcohol over the last month.

When asked about the last time they socialized, 55.2% (42/76) of respondents from the United States and 6.3% (5/79) of respondents from India noted that they drank five or more drinks during that time. In addition, 63.2% (48/76) of respondents from the United States and12.7 % (10/79) of respondents from India noted they spent more than two hours drinking during that time. Respondents from the United States were significantly (*p=.000)* more likely than those from India to drink five or more drinks and to drink for two or more hours the last time they socialized. Also, 57.9% (44/76) of respondents

Table 1.

Demographics of Study Participants (n = 155)

Demographic Variable	Frequency n (%) US	Frequency n (%) India	Frequency n (%) Total
Gender			
Male	22 (14.2)	42 (27.1)	64 (41.3)
Female	54 (34.8)	37 (23.9)	91 (58.7)
Current Residence			
Campus Residence Hall	27 (18.6)	7 (4.8)	34 (23.4)
Fraternity/Sorority House	0 (0)	2 (1.2)	2 (1.2)
Other Campus Housing	3 (2.1)	4 (2.8)	7 (4.8)
Parent/Guardian's Home	0 (0)	41 (28.3)	41 (28.3)
Other off-campus Housing	44 (30.3)	11 (7.6)	55 (37.9)
Other	0 (0)	4 (2.8)	4 (2.8)

Table 2.

Chi-square values applied to behaviors that contribute to chronic disease of college aged students in India and US

Variable	US Students n	India Students n	Chi-Square	DF	P
General Health					
Good health or better	70	53	----	----	----
Fair or poor health	4	26			
Last 30 days: Smoked cigarettes					
No	65	46	10.96	1	.001
Yes	12	30			
Last 30 days: Smoked tobacco from water pipe-hookah					
No	66	72	----	----	----
Yes	11	3			
Last 30 days: Smoked cigars					
No	68	64	0.12	1	.735
Yes	9	10			
Last 30 days: Drank alcohol					
No	15	55	45.64	1	.000
Yes	62	19			
Last 30 days: Used smokeless tobacco					
No	71	65	0.18	1	.667
Yes	6	7			
Last 30 days: Smoked marijuana					
No	65	65	----	----	----
Yes	12	2			
Number of drinks last time partied					
Non-Binge	35	57	33.16	1	.000
Binge Drinker	42	5			
Hours drinking last time partied					
2 or fewer	29	51	29.49	1	.000
More than 2	48	10			
Last 2 weeks: 5 or more drinks of alcohol at a sitting					
Less than 1	33	61	31.19	1	.000
Binge Drinker	44	9			
Self-described weight					
Not overweight	53	50	0.26	1	.607
Overweight	24	27			
Number of fruits/ vegetables per day					
< 5 servings	71	50	14.25	1	.000
>5 servings	5	22			
Past 7 days: Moderate exercise for at least 30 minutes					
None	50	40	0.08	1	.778
Most days	26	23			
Past 7 days: Vigorous exercise for at least 20 minutes					
None	26	31	2.91	1	.088
At least 1 day	50	33			
Past 7 days: Exercise to strengthen muscles					
Less than 1	47	46	3.41	1	.065
At least twice	29	14			
Last 30 days: Exercise to lose weight					
No	38	33	3.94	1	.047
Yes	39	16			
Last 12 months: Dental exam/cleaning					
No	16	38	38.10	1	.000
Yes	59	11			
Used sunscreen regularly with sun exposure					
No	34	32	7.17	1	.007
Yes	40	13			

from the United States, and 11.4% (9/79) of respondents from India noted that over the last two weeks they drank five or more drinks at a sitting. Respondents from the United States were significantly (*p= .000*) more likely than those from India to drink five or more drinks at a sitting which is considered binge-drinking.

When asked "Within the last 30 days, did you use marijuana?" almost 16% (12/76) of respondents from the United States and almost 3% (2/79) of respondents from India noted that they used marijuana in the last 30 days.

Weight, nutrition, and exercise

The next questions asked respondents about weight, nutrition, and exercise. Almost 70% (53/76) of respondents from the United States and 63.3% (50/79) of respondents from India described themselves as at about the right weight. Although most described themselves as about the right weight, a little over half (51.3%, 39/76) of respondents from the United States and 20.3% (16/79) of respondents from India noted that they exercised to lose weight over the last 30 days. Respondents from the United States were significantly *(p=.047*) more likely to exercise to lose weight than those from India.

When asked about the usual number of fruits/vegetable servings consumed each day, only 6.6% (5/76) of respondents from the United States and 27.8% (22/79) of respondents from India noted that they consumed five or more servings each day. Respondents from India were significantly (*p=.000*) more likely than those from the United States to consume five or more servings of fruits/vegetables each day. In addition, 34.2% (26/76) of respondents from the United States and 29.1% (23/79) of respondents from India noted that they participated in moderate exercise for at least 30 minutes on one day or more over the last week; and 65.8% (50/76) of respondents from the United States and 41.8% (33/79) of respondents from India noted that they participated in vigorous exercise for at least 30 minutes on one day or more over the last week.

Additional behavioral health risk factors

Some additional behavioral risk factors were included in the survey. Almost 78% (59/76) of respondents from the United States and almost 14% (11/79) of respondents from India noted that they received a dental exam/cleaning over the last year. Respondents from the United States were significantly *(p=.000*) more likely than those from India to receive a dental exam/cleaning. A little over half (52.6%, 40/76) of respondents from the United States and 16.5% (13/79) of respondents from India noted that they used sunscreen regularly with sun exposure. Respondents from the United States were significantly (p=.007) more likely than those from India to regularly use sunscreen.

Discussion

A convenience sample of English-speaking, college-aged students from a medium-sized, rural university in India and a medium-sized, rural university in the United States participated in a survey about their behavioral health risks for chronic disease. The chronic disease risk factors of substance abuse, physical inactivity, and poor nutrition were similar between the two respondent groups, however; choice of substance to abuse significantly differed between the groups.

For college students in the United States, physical inactivity, poor nutrition, and substance abuse are leading risk factors for chronic diseases such as heart disease and stroke, diabetes, and cancer (CDC, 2016). In this study, only about one-third of respondents from the university in the United States reported obtaining 30 minutes each day of exercise, but about half reported exercising to lose weight. With only 7% of respondents noting that they consume five or more fruits and vegetables each day, they may not receive adequate amounts of the nutrients needed to prevent disease and promote health (CDC, 2015b). Also, about 60% reported that they binged (consuming five or more alcoholic drinks in one sitting) within the past two weeks, and 16% reported using marijuana in the last month. Consistent with the literature, for survey respondents from the United States, physical inactivity, substance abuse (specifically alcohol abuse), and poor nutrition habits seem to be leading behavioral risk factors for chronic disease and injuries (CDC, 2016).

For people in India, similar to many countries with low socioeconomic levels, alcohol and tobacco use, physical inactivity, and low vegetable and fruit consumption are key risk factors for chronic diseases (Ezzati & Riboli, 2013; WHO, 2011). Most survey respondents from India did not use alcohol or marijuana within the past 30 days, though, as positive health behaviors can help protect against heart disease, cancer, and injuries. On the other hand, consistent with the literature (WHO, 2015a), almost 40% reported using cigarettes, only 28% reported consuming five or more fruits and vegetables each day, and just 30-40% obtained moderate to vigorous exercise each week. For survey respondents from India, cigarette use, poor nutrition, and physical inactivity seem to be the leading behavioral risk factors for chronic diseases such as cardiovascular diseases, cancer, and respiratory diseases – the leading causes of death in India (WHO, 2015a; WHO, 2016).

Respondents from the United States were significantly more likely than those from India to rate their health as 'good' possibly due to higher socioeconomic levels as well as better access to health care. Poor sanitation, a key environmental contributor to malnutrition and respiratory infections in India, may also play a factor. The chronic disease risk factors of substance abuse, physical inactivity, and poor nutrition were similar between the two respondent groups; however, choice of substance to abuse differed between the groups. Respondents from India were significantly more likely to use cigarettes than those from the United States. The death rate from tobacco is increasing in the Asian regions (Ezzati & Riboli, 2013), and because of environmental factors (tobacco products are far cheaper, more accessible, family-grown, and not as highly-regulated as in the United States), cigarettes may be easier to obtain in India.

Cultural factors play a role in alcohol use (Ezzati & Riboli, 2013). Alcohol abuse, specifically binge-drinking, was reported significantly more often by respondents from the United States. Alcohol use and abuse is a risk factor for injuries and violence in young adults (Ezzati & Riboli, 2013). Although only about one-third of both respondent groups obtained at least some moderate physical activity each week, about half of respondents from the United States seemed to exercise so they could lose weight. Over the past three and one-half decades,

the United States had the greatest increase in obese persons as compared to other countries, and exercise rates have also declined in industrialized countries (Ezzati & Riboli, 2013).

Both respondent groups reported not obtaining the recommended amount of fruits and vegetable each day, however, respondents from India obtained significantly more servings than their counterparts from the United States. Respondents from the United States mostly lived in off-campus housing or used college housing and food service. Whether on-campus foodservice or off-campus cooking on their own, respondents from the United States have access to a myriad of food choices and decisions to make, both healthy and unhealthy. In India, however, many respondents lived at home with their parents. In this environment, parents may possibly make the food choices for the students. Respondents from the United States were significantly more likely than those from India to receive a dental exam and regularly use sunscreen. Possibly because dentistry in India may be more expensive and many Indians have darker skin pigmentation, these protective factors were not generally addressed.

Because only a small group of respondents from one university in India and one university in the United States were surveyed, study generalizability is limited. Demographics also differed between the two universities as many respondents from the United States were female and lived on campus, but many from India were male and lived at home. In addition, self-report data cannot be independently verified, and respondents may have been less than honest on some more sensitive questions. Lastly, the instrument used was developed for students in the United States and may have been difficult to understand for respondents from India.

The college-aged population possesses specific health risks that may lead to future chronic disease and disability. If results of this study are confirmed in larger, more definitive studies, there are a few implications for health educators who work with college students in these countries. Respondents in this study from two different countries possessed similar risk factors (substance abuse, poor nutrition, and physical inactivity) for the leading global chronic diseases. These similar risk factors can be improved, though (WHO, 2015b), by making better, more-informed, personal behavior choices. Health promotion programming for college students in both countries would be similar and need to focus on decreasing personal risk factors and promoting protective factors for chronic disease prevention. The difference, though, in programming for these two counties would be addressing the dissimilar environmental risk factors like level of access to health care, different laws and regulations, and influence of family and media that also affect their health-related choices. Policy advocacy interventions would generally be conducted to address these environmental influences on behavior, and each country would probably conduct very different initiatives.

This study improves our understanding of behavioral health risk factors in both college students in India and in America. The significance of these risk factors pertaining to college students in India warrants the need for more in-depth research with more college students to identify why they engage in these behaviors and their attitudes towards these behaviors. Those who work with college/university students in India could learn from this data and help to create classroom-based prevention programs to influence the students' knowledge, attitudes, and behaviors about ways to reduce the burden of chronic diseases. Additionally, health professionals working in substance/heath education could create programs aimed at parents and students, including home visits and education to help improve behaviors that can lead to chronic diseases.

There are some strategies that can help reduce the negative impact of assimilation so students from India will not adopt unhealthy lifestyle behaviors. These strategies can include: organizing media and advocacy campaigns to raise awareness about chronic diseases; creating coalitions/organizations in the institution; providing extracurricular activities that promote behavior that reduces the chance of getting chronic diseases; and design school-based programs that raise awareness of chronic diseases.

In order to be more specific in targeting programming and policy-making to address the dissimilar environmental factors, a health needs assessment should be conducted. Assessments have been conducted in colleges and universities in the United States; however, no national assessment was conducted of college-aged students in India. A suggested future direction for research would be to conduct a large-scale health needs assessment of college-aged students in India similar to the ones conducted in the United States. Conducting a health needs assessment is important no matter what county or community is being served. Needs assessments inform intervention programming decisions and prioritize health risks to be addressed. In both India and the United States, the majority of all deaths are due to chronic disease, therefore; it would also be important in future research to examine other related health behaviors like sexual health, mental health, and personal safety that may also directly or indirectly contribute to disease risk. Implementing evidence-based individual and environmental interventions targeted to specific health needs of all college students can address chronic disease risk early in a young person's life.

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This article may provide one
Continuing Education Contact Hour Opportunity for CHES (Approval Pending)
Instructions and self-study questions may be found on page 44

From the Editor:

"The meaning of life is to find your gift. The purpose of life is to give it away."

Pablo Picasso

As I read through the citations of the 2016 Eta Sigma Gamma Award winners, Picasso's words resonated. Each day, we all make decisions that involve choosing among competing priorities. When Gammans choose to share their talents, time and and expertise to meet the needs of others, a sense of purpose begins to evolve. This purpose of giving---whether it is achieved through teaching our peers about health/wellness behaviors, advocating for more funding for disease management or initiating research activities with our local communities, unites us as members of Eta Sigma Gamma. The Gammans and Chapters highlighted in these citations represent the excellent work of Gammans on campuses and in communities across the nation. We thank you for sharing your gifts and wish you continued success!

Additional descriptions and examples of Gammans hard at work can be found in the articles included in this issue. From investigating the role of acculturation in health information seeking behaviors (see Guyler and colleagues) to researching the differences found in health behaviors in college students in two different countries (see Rhoades and co-authors), health educators are learning more about the complexity of health behaviors. Hudson & Marshall provide interesting reading on the emerging activity of "sexting" in one university setting. I thank each of these authors for sharing their gift of knowledge for our health education readership.
