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A comparison of self-reported physical health and health conditions of American Indian/Alaskan Natives to other college students

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Abstract

American Indian/Alaska Natives comprise a small portion of the general college student population, but often have the poorest health and wellness, as well as the highest dropout rates compared to any other race or ethnicity. Despite the well-documented issues this group faces in higher education, they are often ignored in studies due to their status as the minority within the minority, comprising only 0.8% of all college students in the US. This study examines the differences in college students' overall ratings of health across racial and ethnic groups, focusing specifically on the health and wellness of AI/AN students compared to their counterparts. This paper also investigates the physical health issues students experienced in the past 12 months and the health issues' impact on their academic achievement. Results showed that AI/AN students reported the lowest overall health ratings and the most health issues in the past year.

Keywords

American Indian/Alaska Natives; College retention; College dropout; Student health; Academic achievement; Health and wellness

Introduction

According to the United States Census Bureau, approximately 3 million people reported their sole race as American Indian/Alaska Native (AI/AN), and 2.3 million people reported their race as combined AI/AN and one or more other races (U.S. Census Bureau, 2011). These numbers indicate a shift from the census in 2000, where 2.5 million people reported their sole race as AI/AN and 4.1 million people reported their race as combined AI/AN and one or more other races (U.S. Census Bureau, 2011).

Although these prevalence rates clearly show that AI/NA peoples constitute a significant population in the United States, American Indian/Alaska Natives make up only about 0.8 percent of all college students nationwide (O'Brien, 1992). AI/ANs are the minority within the minority of the approximate 19 million college students in the United States (U.S. Department of Education, 2009). College dropout among AI/AN students throughout the United States are well-documented, however (Braxton, Brier & Steele, 2008; Patterson et al., In-press; Tinto, 1975; 1993). According to Brown and Robinson Kurpius (1997), 75 percent to 93 percent of AI/AN students drop out of college prior to degree completion, and this group, alarmingly, has consistently held the lead in having the highest dropout rates and lowest graduation rates among minorities in the United States (Benjamin, Chambers, & Reiterman, 1993; O'Brien, 1990; Kidwell, 1994; Ponterotto, 1990; Tierney, 1996; U.S. Department of Education, 2009). Research indicates that AI/AN students enter colleges and universities with poorer health and wellness issues than their counterparts, placing them at a greater risk of dropout.

Despite the research on the risks that AI/AN students face, they are the minority within the minority and, resultantly, their issues are often easily ignored and statistically considered unreliable and not significant (Pavel et al., 1998). In terms of succeeding in college, it is important for any student entering college to be healthy and have some level of perceived wellbeing. As a group AI/ANs are disproportionately affected with heart disease, cancer, chronic liver disease, and diabetes and disproportionately suffer from health inequities than any other group within the United States (Carter-Pokras & Baquet, 2002; Centers for Disease Control and Prevention, 2011; Commission on Social Determinants of Health, 2008; IHS, 2003 & 2012; Pan American Health Organization/World Health Organization, 1999; Wame, 2006). American Indian/Alaska Native students who evaluate their health and wellness as fair or poor have higher rates of failing in high school compared to students who rated their health as good or excellent (Blum et al., 1992).

The purpose of the present paper is to explore differences in the overall ratings of physical health of college students self-identifying in differing racial/ethnic groups, as well in the types of physical issues experienced within the past 12 months. The focus of these analyses was to compare AI/AN students with students in other racial/ethnic groups. Since this is relatively new research territory that uses a very large and unique data set, the analyses presented here should be considered exploratory. As a result, no a priori hypotheses were tested. Rather, a series of research questions was identified, and the data was used to answer these questions:

1. How do AI/AN students compare to students in other racial/ethnic groups on ratings of general health?
2. How many physical health issues have AI/NA students experienced in the past year compared to students in other racial/ethnic groups?
3. Do the physical health issues experienced by AI/AN students in the past 12 months differ from those experienced by students in other racial/ethnic groups in the same time frame?

Since females are documented as more willing to report symptoms (Kroenke & Spitzer, 1998) and to seek treatment (Adamson et al., 2003), we have included gender as a control variable in each of our analyses.

Method

Data Source and Sample

The American College Health Association (ACHA) granted permission to use the data in the present study. These data were collected via four administrations of the National College Health Assessment (NCHA; Fall 2008, Spring 2009, Fall 2009, and Fall 2010), a bi-annual survey administered by ACHA since 2000. A sample survey (ACHA, n.d.c), information about participation history (ACHA, n.d.b), and information concerning the reliability, validity, and generalizability of survey results (ACHA, n.d.a) are available from ACHA's website (<http://www.acha-ncha.org/overview.html>).

The focus of the present analyses relates to comparisons of physical health concerns among students from different racial/ethnic backgrounds, with the primary comparison group being AI/AN Students; accordingly, these four administrations were selected to allow for a sufficient number of students in each group, making such group comparisons statistically feasible. However, since only undergraduate students are of concern in these analyses, graduate student responses were removed from the data set. The resulting sample contained 153,484 student records, 104,426 (68.0%) identifying as white, 9,066 (5.9%) identifying as Black, 9,941 (6.5%) identifying as Hispanic, 14,854 (9.7%) identifying as Asian or Pacific Islander, 2,125 (1.4%) identifying as American Indian, Alaskan Native, or Native Hawaiian, 5,075 (3.3%) identifying as Biracial or Multiracial, 3,903 (2.5%) identifying as other, and 4,094 (2.7%) unknown.

Although the proportion of AI/AN students in the final sample is small, the proportion of AI/AN respondents in each survey administration ranged from 14.1% (Fall 2008) to 37.1% (Spring 2009). The Fall 2009 and 2010 administrations had equivalent proportions of AI/AN participants (24.8% and 24.0%, respectively). In order to justify pooling the four survey administrations to create a larger sample of AI/AN Students, it is important to examine the composition and characteristics of the AI/AN Students in each group. Thus, across the four administrations, AI/AN Students were compared according to gender composition and overall health ratings in order to determine if these four separate groups of students could be considered comparable. Since there were no significant differences across the four administrations on either variable – general health ratings (chi square = 14.17, $p > .05$) and gender (chi square = 12.02, $p > .05$) – data from the four administrations were combined for all analyses.

Some additional exclusions were made based on the racial/ethnic and gender identification items. First, the students who responded “biracial or multiracial,” or “other,” and those who did not respond at all to the racial/ethnic identification item were excluded from all subsequent analyses ($N = 13,012$). The students identifying as biracial and multiracial were excluded because, while there are certain gene patterns that may make certain groups more or less susceptible to illness and health issues, it is the *culture* that determines how people in these groups cope with health issues. Since we do not know in what culture the students who identify as bi-racial or multiracial have been raised, we really have no idea how they should be expected to cope.

In addition, students who either did not respond to the gender identification question ($N = 3,900$) and those who indicated “transgendered” ($N = 217$) were also excluded. The latter group was excluded because there were too few students who responded in this way,

resulting in empty cells in the analyses. The resulting sample size is 139,176 with the number of AI/AN Students in the final sample dropping to 2,098, a decrease of 27 students.

Measures

Racial/Ethnic Identification—This categorical variable was created based on students' responses to the item, "How do you usually describe yourself?" The choices are White, non-Hispanic; Black, non-Hispanic; Hispanic or Latino/a; Asian or Pacific Islander; American Indian, Alaskan Native, or Hawaiian; Biracial or Multiracial; and Other. As mentioned above, cases were dropped from the analyses if this item was marked Biracial or Multiracial or Other and if there was no response. The group responding as American Indian, Alaskan Native, or Hawaiian are identified through out as AI/AN.

Gender Identification—This categorical variable was created based on students' responses to the item, "What is your gender?" As mentioned above, cases where there was no response to this item or where the response was Transgender were dropped from the analyses.

Overall Health Rating (OHR)—In order to create this variable, scores from the item, "How would you describe your general health?" were used. This item uses a likert-type scale, where 1 indicates poor general health and 5 indicates excellent overall health.

Past Year Physical Health Issues (PYPHI)—Over a series of four survey items, students were asked to indicate if they experienced certain categories of health issues over the past 12 months. If they did not experience the health issue, they simply indicated that they did not experience it in the past 12 months. If they experienced the issue, they would indicate the degree to which it impacted their academic performance. The categories of physical health issues addressed in these four items that are of interest to the present study are: allergies; cold/flu/sore throat; chronic health problem or serious illness (e.g., diabetes, asthma, cancer); chronic pain; injury (fracture, sprain, strain, cut); sexually transmitted disease/infection; sinus infection/ear infection/bronchitis/strep throat; and sleep difficulties. In order to compute the total number of categories of physical health issues experienced in the past year, students were given a score of "1" for each category experienced, regardless of the degree to which it impacted academics. Those who did not experience that category of health issue in the past year were given a score of "0". The final variable was created by summing the number of categories of physical health issues experienced in the past year, with scores ranging from 1 to 8.

Data Analysis Procedures

In order to answer the first two research questions, 2 Two-Way Analyses of Variance (ANOVA) were used. In both analyses, the main effects of racial/ethnic identification and gender identification were tested, as well as the interaction of racial/ethnic and gender identification. In the first ANOVA, the overall health rating served as the dependent variable, and the second used the total number of categories of physical health issues experienced in the past 12 months. In order to follow up significant differences for the racial/ethnic main effect, planned contrasts were used, with the AI/AN student category as the comparison group (Anderson & Finn, 1996; Ott, 1993; Tabachnik & Fidell, 2007). Bonferoni's Inequality was used to determine the alpha level for each planned contrast (Anderson & Finn, 1996); with tests of significance being conducted for four planned contrasts (AI/AN students compared to students in each of the other race/ethnicity groups), the resulting p value must be less than 0.02 in order for the difference to be considered statistically significant. Effect sizes for significant mean differences were computed using Cohen's d (Cohen, 1988).

To address the final research question, a chi square analysis was performed for each physical health issue, separately for males and females, to determine if there were differences in the likelihood of reporting each illness by racial/ethnic identification within each gender. The effect size for each significant chi square analyses was examined using Cramer's Phi coefficient (Yatani, n.d.).

Results

Table 1 shows each of the identification groups' means and standard deviations for each of the dependent variables. Table 2 displays the percentages of students in each group who have experienced each category of physical health issue in the past 12 months.

Differences in Overall Health Ratings

All three effects that are tested in the first ANOVA are statistically significant (See Table 3 for F-statistics and p values). In terms of gender, males reported better overall general health than females (3.80 versus 3.58). This represents a mean difference of 0.26 standard deviation units, indicating a small effect size. In terms of racial/ethnic identification, AI/AN students have the lowest overall average. However, the results of the planned contrasts indicate that AI/AN students' overall health ratings are significantly different from those students who identify as White ($d = -0.19$) and those who identify as Black ($d = -0.06$), both of which can be considered small effects.

The interaction term of racial/ethnic identification and gender identification is also statistically significant ($F = 15.07, p < .001$). In order to aid interpretation of the interaction effect, the mean health ratings of each subgroup have been plotted in Figure 1. Females in all racial/ethnic groups report lower overall ratings of general health, but this difference between males and females is slightly larger for the traditionally underrepresented groups, Blacks, Hispanics, Asians, and AI/AN Students, as compared to White students. In addition, AI/AN women have the lowest ratings of overall health as compared to any other group.

Differences in Total Number of Categories of Physical Health Issues Experienced

For total number of categories of physical health issues reported in the past 12 months, there are significant effects for racial/ethnic identification, gender identification, and for the interaction of racial/ethnic group and gender (See Table 4 for F-statistics and p values). In terms of gender, females report more categories of physical health issues than males (2.11 versus 1.71), which can be considered a small effect (*Cohen's* $d = 0.24$). With regard to racial/ethnic differences in total number of health issues reported, the planned contrasts indicate that AI/AN students had significantly higher scores than students in all other groups. The biggest differences, with medium effect sizes, are for AI/AN students and Black ($d = 0.39$), Hispanic ($d = 0.34$), and Asian students ($d = 0.40$). There are actually very small differences between AI/AN students and those identifying as White ($d = 0.12$).

The interaction of race/ethnicity and gender is plotted in Figure 2. Although females in each racial/ethnic group report significantly more physical health issues each year than males, the gender difference is larger for some groups than for others. In fact, among AI/AN students, there is a much larger gender effect than among any of the other racial/ethnic groups, and AI/AN women have the highest number of reported physical health issues of any other group.

Differences in Categories of Physical Health Issues Experienced

Table 2 shows the percentage of students reporting each physical health issue in the past 12 months by racial/ethnic group and by gender. In order to examine differences among

students in different race/ethnicity groups, chi square analyses were performed for each health issue separately for males and females. To follow up difference among AI/AN students, an additional chi square was performed comparing AI/AN males to AI/AN females in terms of the incidence of each physical health issue. Results are described by health issue below.

Allergies—Among women, there is a significant difference in the reported incidence of allergies among the five race/ethnicity groups (chi square = 43.72, $p < 0.001$), with the greatest incidence among AI/AN women (6.1%). The effect size, as measured by Cramer's Phi coefficient, is very small, however (0.02). Among men, there is also a significant difference in the incidence of allergies (chi square = 40.51, $p < 0.001$). The effect size for this difference is equally small (0.03), and the highest reported incidence is among Black males (5.6%). AI/AN men and Asian men report allergies with equal frequency are second highest in terms incidence. Among AI/AN students, there is no difference between men and women in the reported incidence of allergies (chi square = 1.43, $p < 0.231$).

Cold, flu, and sore throat—AI/AN women are more likely to report cold, flu, and sore throat in the past 12 months as compared to women in the other race/ethnicity groups (25.6%; chi square = 354.09, Cramer's Phi = 0.06). AI/AN men also have the highest reported incidence of cold, flu, and sore throat, compared to men identifying as other races/ethnicities (16.9%; chi square = 32.04, Cramer's Phi = 0.03). Both of these effect sizes are considered small. Among AI/AN students, women have a greater reported incidence of cold, flu, and sore throat (chi square = 19.69, Cramer's Phi = 0.10). This effect size is still considered small.

Chronic health problem or serious illness—Among women, AI/AN students have the highest reported incidence of chronic health problems or serious illnesses in the past 12 months, and the difference is statistically significant (9.0%; chi square = 103.20, $p < 0.001$; Cramer's Phi = 0.03). AI/AN men have the second highest reported incidence of chronic health problems or serious illnesses in the past 12 months (4.7%), second only to Black men (5.2%); the differences among these groups are statistically significant (chi square = 31.65, $p < 0.001$) as well, which is a small effect size (Cramer's Phi = 0.03). AI/AN women are significantly more likely to report chronic health problems or illness (chi square = 11.98, $p < 0.001$; Cramer's Phi = 0.08).

Chronic pain—AI/AN women have the highest incidence of reported chronic pain as compared to women in other race/ethnic groups (6.8%; chi square = 52.79, $p < 0.001$; Cramer's Phi = 0.02). Race/ethnicity groups also differ significantly in the incidence of chronic pain for men (chi square = 51.93, $p < 0.001$; Cramer's Phi = 0.03). AI/AN men are second only to Black men with regard to the incidence of chronic pain (4.2% versus 5.6%). Among AI/AN students, women are more likely to report chronic pain than men (6.8% versus 4.2%; chi square = 5.21, $p < 0.05$, Cramer's Phi = 0.05)

Injury—There are no significant differences between racial/ethnic groups in reported injury among women (chi square = 7.22, $p < 0.13$). Among men, the reported incidence of injury does vary significantly in the racial/ethnic groups (chi square = 58.18, $p < 0.001$; Cramer's Phi = 0.04). Black men report the highest levels (6.9%), followed by AI/AN men (5.4%). The incidence of physical injury in AI/AN men and women is equivalent (chi square = 2.52, $p < 0.12$).

Sexually transmitted disease/infection (STD/STI)—Among both men and women, AI/AN students are second highest with regard to the incidence of STD/STI. Black men and

women have the highest reported incidence (4.5% and 2.6%, respectively), followed by AI/AN men and women (3.3% and 2.4%, respectively). The race/ethnicity difference is significant among both women (chi square = 69.5, $p < 0.001$; Cramer's Phi = 0.03) and men (chi square = 87.81, $p < 0.001$; Cramer's Phi = 0.04). AI/AN men and women do not differ significantly with regard to incidence of STD/STI (chi square = 1.57, $p < 0.22$).

Sinus infection/ear infection/strep throat—As with cold, flu, and sore throat, AI/AN women are significantly more likely to report sinus/ear infection and/or strep throat (11.9%; chi square = 279.84, $p < 0.001$; Cramer's Phi = 0.06). AI/AN men also report the greatest incidence of sinus/ear infection and/or strep throat as compared to men in other race/ethnicity groups (6.6%; chi square = 42.93, $p < 0.001$; Cramer's Phi = 0.03). AI/AN women report this physical health issue to a significantly higher degree than AI/AN men, however (chi square = 13.75, $p < 0.001$; Cramer's Phi = 0.08).

Sleep difficulties—Among the race/ethnicity groups, AI/AN women have the highest incidence of sleep difficulties (29.8%; chi square = 128.42, $p < 0.001$; Cramer's Phi = 0.04). For men, there are significant differences among the five racial/ethnic groups (chi square = 26.29, $p < 0.001$; Cramer's Phi = 0.02). However, AI/AN men have an incidence of sleep difficulties comparable to men who identify as White, Hispanic, and Asian (all around 20.0%). For Black men, the incidence is much lower (16.2%). Among AI/AN students, women have a higher incidence of sleep difficulties compared to men (chi square = 19.73, $p < .001$; Cramer's Phi = 0.10).

Discussion

Regardless of gender identification, students who identify as AI/AN Students and Asians rate their overall physical health lowest, compared to students identifying with other racial/ethnic groups. Those students who identify as white have the highest overall health ratings in comparison to all other groups. Regardless of racial/ethnic identification, females report the lowest overall health ratings as compared to males. However, within some racial/ethnic groups, the differences between males and females are greater than for other groups. White and Asian males and females exhibit less of a difference in overall health ratings as compared to differences between males and females in all of the other racial/ethnic groups.

As with overall ratings of health, there were differences by racial/ethnic identification and by gender in the number of physical health issues experienced in the past year. American Indian/Alaskan Native students reported the most health issues, compared to the other groups, and females reported more issues than males. American Indian/Alaskan Native female students reported the greatest number of health issues as compared to all other groups. Results showed differences in the specific types of physical health differences experienced as well. Both AI/AN men and women were more likely to experience cold, flu, and sore throat and sinus infection/ear infection/strep throat as compared to students in other groups. American Indian/Alaskan women also had a significantly greater incidence of these acute infections, compared to AI/AN men. American Indian/Alaskan women also had the highest incidence of allergies, chronic health problems or serious illnesses, chronic pain, and sleep difficulties as compared to all other groups.

Although the effect sizes for each of the differences were small, these differences do warrant further investigation. From these data, it is unclear if AI/AN women truly experience more physical health issues or if they are merely more open to sharing them on a health survey. If AI/AN students, especially women, are more likely to experience physical health issues, this susceptibility would likely have a negative impact on their ability to function in the college setting, an issue that should also be subjected to further investigation.

Conclusion

AI/AN students who enter college are coming from communities that have been disproportionately affected by chronic conditions such as heart disease, cancer, chronic liver disease, and diabetes within the United States (Carter-Pokras & Baquet, 2002; Centers for Disease Control and Prevention, 2011; Commission on Social Determinants of Health, 2008; IHS, 2003 & 2012; Pan American Health Organization/World Health Organization, 1999; Wame, 2006). These young people's health conditions are a reflection of their communities and, it seems, they enter college with these health issues.

To the best of our knowledge, no other study presents findings from a sample size in the range of these data. While statistically significant scores were fairly certain due to the very large data set, effect sizes between groups were mostly low. AI/AN students are fairly comparable to students in other racial/ethnic groups on ratings of general health. Again, while there is statistical significance, effect sizes are small. American Indian/Alaskan Natives report about the same amount and have similar physical health issues in the past year compared to their count parts. With the current and persistent high rates of AI/AN college dropout, barriers to college success should continue to be evaluated. Without knowing the health reports of AI/AN students who dropped out of college, these findings provide little guidance toward understanding the connection between AI/AN student health and college success.

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Figure 1.
Interaction of Racial/Ethnic and Gender Identification on Overall Ratings of Physical Health

Figure 2.
Interaction of Racial/Ethnic and Gender Identification on Total Categories of Physical Health Issues Experienced Past 12 Months

Table 1

Means and Standard Deviations of Dependent Variables by Race/Ethnicity and Gender

Group	Overall Health Rating						Total Physical Health Issues					
	Total		Male		Female		Total		Male		Female	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
White	3.68	0.82	3.82	0.83	3.61	0.81	2.07	1.66	1.77	1.69	2.22	1.62
Black	3.59	0.90	3.84	0.88	3.48	0.89	1.57	1.80	4.41	1.99	1.64	1.71
Hispanic	3.58	0.88	3.78	0.87	3.48	0.87	1.70	1.66	1.53	1.75	1.79	1.60
Asian	3.54	0.87	3.67	0.88	3.47	0.86	1.63	1.54	1.46	1.62	1.73	1.49
Native	3.53	0.87	3.73	0.88	3.44	0.86	2.27	1.85	1.84	1.89	2.47	1.80

Table 2

Incidence of Physical Health Issues Past 12 Months by Race/Ethnicity and Gender

Physical Health Issue	Race/Ethnic Group	Overall	Gender	
			Male	Female
Allergies	White	3.5	3.7	3.4
	Black	4.6	5.6	4.1
	Hispanic	3.8	4.2	3.7
	Asian	4.3	4.8	4.0
	Native American	5.7	4.8	6.1
Cold, Flu, Sore Throat	White	19.4	15.5	21.5
	Black	12.0	11.9	12.1
	Hispanic	16.6	13.8	18.1
	Asian	18.7	15.2	20.7
	Native American	22.9	16.9	25.6
Chronic Health Problem or Serious Illness	White	4.5	3.4	5.1
	Black	4.8	5.2	4.6
	Hispanic	4.2	3.5	4.6
	Asian	3.2	2.9	3.4
	Native American	7.6	4.7	9.0
Chronic Pain	White	3.7	3.3	3.9
	Black	4.9	5.6	4.6
	Hispanic	3.9	3.5	4.1
	Asian	3.0	2.7	3.1
	Native American	6.0	4.2	6.8
Injury (fracture, sprain, strain, cut)	White	3.5	4.0	3.2
	Black	4.5	6.9	3.2
	Hispanic	3.8	4.6	3.3
	Asian	3.2	3.8	2.9
	Native American	4.4	5.4	3.9
Sexually Transmitted Disease/Infection	White	1.6	2.0	1.4
	Black	3.2	4.5	2.6
	Hispanic	2.1	2.5	2.0
	Asian	1.5	1.7	1.4
	Native American	2.7	3.3	2.4
Sinus Infection/Ear Infection/Strep Throat	White	7.8	5.9	8.8
	Black	5.7	5.5	5.8
	Hispanic	6.3	5.2	6.8
	Asian	4.3	3.7	4.7
	Native American	10.2	6.6	11.9

Physical Health Issue	Race/Ethnic Group	Overall	Gender	
			Male	Female
Sleep Difficulties	White	21.4	20.4	21.9
	Black	17.0	16.2	17.3
	Hispanic	21.6	20.0	22.4
	Asian	20.8	20.0	21.3
	Native American	26.8	20.5	29.8

Table 3

Effects of Racial/Ethnic and Gender Identification on Overall Health Ratings

Source	df	Mean Square	F	p
Gender	1	503.03	727.92	.001
Race/Ethnicity	4	77.65	112.37	.001
Gender $\times$ Race/Ethnicity	4	15.07	21.81	.001
Error	136340	0.69		
Total	136350			

Table 4

Effects of Racial/Ethnic and Gender Identification on Total Physical Health Issues Experienced Past 12 Months

Source	df	Mean Square	F	p
Gender	1	963.93	354.21	.001
Race/Ethnicity	4	955.91	351.26	.001
Gender $\times$ Race/Ethnicity	4	58.67	21.56	.001
Error	136340	2.72		
Total	136350			