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Examining Health Behaviors, Health Literacy, and Self-efficacy in College Students With Chronic Conditions

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ABSTRACT

Background: Every year, young adults with chronic conditions matriculate into college, which is a unique transitional period in that students may be managing a chronic condition on their own for the first time. Therefore, it is important to examine which factors may contribute to positive health behaviors and risky behaviors in college students with chronic conditions. **Purpose**: The current study examined associations between health literacy, self-efficacy, and health behaviors in a sample of college students with chronic conditions. **Methods**: Data were collected from 147 undergraduate students at a Mid-Atlantic U.S. university. Students completed an online consent and questionnaires assessing chronic conditions, health literacy, self-efficacy, and health behaviors (general behavior, wellness maintenance, substance use). **Results**: Asthma was the most prevalent self-reported chronic condition (26.1%). Higher levels of health literacy and self-efficacy were significantly associated with general health behaviors and wellness maintenance and fewer substance use behaviors. **Discussion**: These findings highlight health literacy and self-efficacy as potential foci for maintaining healthy behaviors in college students with chronic conditions. **Translation to Health Education Practice**: College health centers are important facilitators of promoting college student health. Incorporating health literacy and self-efficacy into Health Education interventions could be effective in improving student health.

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Background

There are approximately 19 million students enrolled in colleges and universities across the United States.[1] Many of these students have some form of a chronic condition or disease, which can be defined as a condition lasting 3 months or longer.[2] Each year, 500 000 to 750 000 adolescents with chronic conditions become legal adults[3] and as of 2001, at least 15% of college freshmen reported having a chronic condition or disability.[4] The percentage of college students with chronic conditions has been increasing in recent years due to higher survival rates for youth with chronic conditions.[5] As such, it is becoming more important to examine factors that promote positive health behaviors in adulthood, especially for those who are managing a chronic condition within the context of college demands. Health literacy and self-efficacy are of particular importance for college students given that many students have recently reached legal age and are now solely responsible for seeking and understanding how to use health services. These college students may also be away from home, which means that they do not have easy access to their usual health care providers or support from family.

Health behaviors are generally conceptualized as actions that impact an individual's health and encompass healthy lifestyle behaviors, such as maintaining a healthy diet and regular exercise, as well as risky behaviors, including drug and alcohol use.[6] Depending on an individual's views about health, he or she may choose to utilize the health care system through annual visits or preventative screenings, among other health-related behaviors. To date, however, few studies have examined health behaviors in college students with a chronic condition. Risky behaviors are often more frequent in adolescents/young adults with chronic conditions compared to adolescents without chronic conditions.[7,8] These risky behaviors may co-occur in adolescents with chronic conditions because these adolescents may have a greater need to gain peer acceptance[8]; this desire for peer acceptance may be due to feeling different from their peers because of having a chronic condition. Moreover, depending on the chronic condition, adolescents may have a shorter life span, causing them to choose to live their life "to the fullest," which can include engaging in risky behaviors.[9] Additionally, existing studies have investigated short-term and long-term changes in health

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behaviors following the diagnosis of a chronic condition in middle to late adulthood.[10,11] Researchers have examined health behavior changes in emerging adults 1 year after completing high school, including substance use, driving while intoxicated, risky driving (eg, speeding, driving without a seat belt), sleep, physical activity, and diet.[12] In general, these studies have found that individuals tend to not make health behavior changes and that college students report higher rates of unhealthy behaviors such as binge drinking, marijuana use, and less fruit and vegetable consumption. However, that study and others investigating health behaviors in college students have not considered how having a chronic condition may impact a student's health behaviors.

In particular, health literacy and self-efficacy have been found to positively impact health behaviors.[13,14] *Health literacy* is generally defined as "the capacity of an individual to obtain, interpret, and understand basic health information and services in ways that are health-enhancing."[15(p5)] The assessment of health literacy is not yet widely used in clinical practice or at the community health level.[16] As such, few studies have specifically examined health literacy and healthy or risky behaviors. One study found that higher levels of health literacy were associated with less risky habits (smoking, drinking, and lack of exercise) in a sample of Japanese adults.[17] Other studies examining health literacy in college students have focused primarily on medication adherence but not other health behaviors. For example, one study found that higher health literacy levels were positively associated with the amount of medical care received in adolescents with HIV but not with medication adherence, which was the main outcome of interest.[18] Therefore, further research on health literacy in the context of its impact on health behaviors is warranted.

Another factor, self-efficacy, is one's belief in one's own ability to accomplish a specific task, has been documented as important in changing and maintaining diet, physical activity, smoking habits, safe-sex practices, and reducing drug and alcohol use.[19] In type I diabetes, self-efficacy has been associated with increased adherence to diet.[20] Another study found an association between self-efficacy and physical activity in patients with chronic obstructive pulmonary disease.[21] With respect to college students, few studies have focused specifically on self-efficacy and either healthy lifestyle behaviors or risky behaviors. One study in obese college students suggested that intervention programs may be more effective in reducing body mass index and increasing physical activity levels when specifically focused on self-efficacy.[22] Despite the importance of both health literacy and self-efficacy, studies to date have not examined how these factors predict health behaviors specifically in college students with chronic conditions.

Purpose

The purpose of the current study was to determine the impact of health literacy and self-efficacy on health behaviors in college students with chronic conditions. Specifically, we examined associations between health literacy and health behaviors defined as general behaviors, wellness maintenance, and substance use and between self-efficacy and the same set of health behaviors. Based on previous research, we hypothesized that (1) higher levels of health literacy and self-efficacy would be associated with healthy lifestyle behaviors. On the other hand, we hypothesized that (2) higher levels of health literacy and self-efficacy would be associated with less substance use among college students with a chronic condition.

Methods

Participants and procedure

Participants in this study consisted of a convenience sample of undergraduates from a Mid-Atlantic U.S. university with a self-identified chronic health condition lasting 3 months or longer. Participants were recruited through the online university research participation system and were awarded credit for an applicable class following survey completion. The online consent and questionnaires were administered through Qualtrics. The survey took approximately 45 minutes to an hour to complete. Participants were eligible for the study if they were at least 18 years of age and currently enrolled as an undergraduate student. Data were collected from April to August 2016. The study was approved by the appropriate institutional review board.

Measures

Demographics

Participants completed a demographic questionnaire, which included information about their age, gender identity, race/ethnicity, and academic class standing, among other descriptors.

Health literacy

The All Aspects of Health Literacy Scale (AAHLS)[16] is a 13-item measure that produces 3 subscales. The AAHLS items evaluate functional health literacy ("How often do you need someone to help you when you are given information to read by your doctor, nurse, or pharmacist?"), communicative health literacy

(eg, "When you talk to a doctor or nurse, do you ask the questions you need to ask?"), and critical health literacy (eg, "Are you the sort of person who might question your doctor or nurse's advice based on your own research?"). A mix of response scales is used throughout the measure. The first 3 items have individual response scales, whereas items 1 through 11 are answered with a 3-point scale of *rarely, sometimes*, or *often*. The last 2 items are dichotomous choices. The AAHLS was scored according to each subscale's mean item scores and proportion of responses. Higher scores indicate more health literacy. The Functional, Communicative, and Critical Health Literacy scales were used in this study. In the current study, the Cronbach's α reliability coefficients were .52 for Functional, .77 for Communicative, and .83 for Critical Health Literacy subscales. Overall, the AAHLS had a Cronbach's α of .81 for the current sample.

Self-efficacy

The Chronic Disease Self-efficacy Scales[23] is a 33-item measure with 10 different subscales. Each item is evaluated on a 10-point scale from 1 = *not at all confident* to 10 = *totally confident*. Subscales are categorized into 3 broad categories: self-efficacy to perform self-management behaviors, general self-efficacy, and self-efficacy to achieve outcomes. This measure is scored by taking the mean of the items for each scale, where higher average scores indicate higher self-efficacy. In the current study, the Cronbach's α reliability coefficients were .94 for Management, .95 for General, and .97 for Outcome Self-efficacy subscales. Overall, the Chronic Disease Self-efficacy Scales had a Cronbach's α reliability of .98 in this study.

Health behaviors

The Health Behaviors Questionnaire[24] is a 40-item measure that examines general behaviors (eg, "I get enough sleep"), wellness maintenance (eg, "I see a doctor for regular checkups"), accident prevention (eg, "I keep emergency numbers in my phone"), traffic behaviors (eg, "I speed while driving"), and general substance use behaviors (eg, "I don't take chemical substances which might injure my health [eg, food additives, drugs, stimulants]; I don't drink alcohol; I don't smoke"). The questionnaire uses a 5-point Likert scale, with 1 being *strongly disagree*, 3 being *neither agree not disagree*, and 5 being *strongly agree*. Scores were calculated by summing items in each subscale. Only the General Behaviors, Wellness Maintenance, and Substance Use Behavior subscales were used in analyses. Higher scores indicate more healthy behaviors (ie, more general behaviors and wellness maintenance) and less substance use. Cronbach's α in the current study was .73 for General Behaviors, .82 for Wellness Maintenance, and .67 for Substance Use subscales.

Data analysis

Analyses were conducted with IBM SPSS 24 software. Descriptive statistics on variables of interest were conducted. Age and chronic condition type were tested as potential covariates with our predictor and outcome variables (eg, health literacy, self-efficacy, health behaviors, substance use). Age was tested as a covariate with Pearson correlation analyses. Analysis of variance tests were used to determine whether variables differed across chronic condition type. Main analyses between health literacy, self-efficacy, and outcome variables (eg, wellness maintenance, general health behaviors, substance use) were tested using linear regression analyses. Significant covariates were entered into step 1 of the model. Subscales of each measure were entered simultaneously into step 2 of the model to account for multicollinearity.

Results

The study population consisted of 147 students at a Mid-Atlantic university who were currently enrolled in undergraduate classes. Participants were 18 to 37 years of age (M = 21.45, SD = 3.67). The majority of the sample was female and was mostly white/Anglo-American. Full demographics are reported in Table 1. Of the chronic conditions reported, the most frequent were asthma (n = 38; 26.1%), allergic rhinitis (n = 9; 6.4%), heart condition (n = 6; 4.2%), hypertension (n = 5; 3.4%), and diabetes (n = 4; 2.9%). Given that asthma and allergic rhinitis were the two most frequently reported conditions in this sample, they were coded as

Table 1. Demographic characteristics of the sample.

	n	%
Gender		
Female	108	73.5
Male	38	25.8
Other	1	0.7
Race/ethnicity		
White/Anglo-American	77	52.4
Black	31	21.1
Asian	17	11.6
Latino	11	7.5
Mixed	5	3.4
Other	5	3.4
American Indian	1	0.7
Academic class		
Freshman	45	30.6
Sophomore	30	20.4
Junior	17	11.6
Senior	52	35.4

Table 2. Descriptive statistics.

Subscale	M	SD	Range	Possible range
Functional Health Literacy	1.79	0.46	1–3	1–3
Communicative Health Literacy	2.60	0.50	1–3	1–3
Critical Health Literacy	2.12	0.56	1–3	1–3
Management Self-efficacy	7.37	2.12	1–10	1–10
General Self-efficacy	7.31	2.25	1–10	1–10
Outcome Self-efficacy	7.18	2.06	1–10	1–10
General Health Behaviors	3.26	0.55	1–5	1–5
Wellness Maintenance Behaviors	3.16	0.75	1–5	1–5
Substance Use Behaviors	3.16	0.98	1–5	1–5

asthma (0), allergic rhinitis (1); all other conditions were combined into an "other" (n = 100) category (2).

Descriptive statistics for all variables are presented in Table 2. Values in Table 2 are based on the scored values of each scale and subscale; higher values signify higher levels of reported behavior for each subscale, except for substance use, which indicates less substance use behaviors. Overall, this sample of college students with chronic conditions reported relatively high levels of communicative health literacy, general self-efficacy, management self-efficacy, and outcome self-efficacy.

Covariate testing revealed that age was significantly associated with functional health literacy (r = −0.028, P = .046), such that older students reported less functional health literacy. Analysis of variance tests revealed that variables did not differ across chronic condition type (Ps > .05). Therefore, age was controlled in all regression analyses.

Health literacy, specifically communicative health literacy, significantly and positively predicted general health behaviors (see Table 3). Higher levels of critical health literacy also significantly and positively predicted wellness maintenance. Although critical health literacy was a significant predictor of substance use, the overall model did not predict substance use. Nonetheless, it is important to note that the overall model of health literacy trended toward statistical significance in predicting substance use (P = .056).

Table 3. Regression analyses of health literacy and health behaviors.

	Step 1			Step 2		
Variable	*B*	SE *B*	*β*	*B*	SE *B*	*β*
General health behaviors						
Age	−0.001	0.013	−0.113	0.002	0.011	0.857
Functional				0.148	0.097	0.126
Communicative				0.361	0.101	0.334**
Critical				0.153	0.091	0.156
R^2	0.00			0.228**		
ΔR^2				0.228**		
Wellness maintenance						
Age	−0.014	0.017	−0.07	−0.01	0.016	−0.048
Functional				0.125	0.129	0.077
Communicative				0.24	0.131	0.163
Critical				0.493	0.118	0.369**
R^2	0.005			0.247**		
ΔR^2				0.242**		
Substance use						
Age	−0.012	0.023	−0.047	−0.01	0.023	−0.39
Functional				0.125	0.191	0.058
Communicative				0.069	0.197	0.035
Critical				0.387	0.177	0.218*
R^2	0.002			0.068		
ΔR^2				0.066*		

*P < 0.05. **P < 0.01.

Table 4. Regression analyses of self-efficacy and health behaviors.

	Step 1			Step 2		
Variable	*B*	SE *B*	*β*	*B*	SE *B*	*β*
General health behaviors						
Age	−0.003	0.013	−0.022	−0.001	0.012	−0.006
Management				0.048	0.037	0.189
General				0.015	0.032	0.063
Outcome				0.056	0.035	0.215
R^2	0.00			0.183**		
ΔR^2				0.183**		
Wellness maintenance						
Age	−0.013	0.017	−0.069	−0.12	0.016	−0.64
Management				0.069	0.047	0.274*
General				0.022	0.044	0.068
Outcome				0.034	0.046	0.094
R^2	0.005			0.167**		
ΔR^2				0.162**		
Substance use						
Age	−0.015	0.024	−0.057	−0.16	0.023	−0.06
Management				−0.128	0.071	−0.271
General				0.051	0.067	0.119
Outcome				0.163	0.066	0.335*
R^2	0.003			0.082*		
ΔR^2				0.079*		

*P < 0.05. **P < 0.01.

Self-efficacy significantly predicted general health behaviors, wellness maintenance, and substance use behaviors. In the association with general health behaviors, the overall model was statistically significant, but no individual subscales were significant predictors (see Table 4). Management self-efficacy was a positive significant predictor of wellness maintenance behaviors. Lastly, outcome self-efficacy was a positive significant predictor of substance use, in that higher outcome self-efficacy predicted less substance use.

Discussion

The current study examined associations between health literacy and health behaviors, as well as between self-efficacy and health behaviors, in a sample of undergraduate students with chronic conditions. Findings suggest that higher levels of both health literacy and self-efficacy may be important for general health and wellness maintenance behaviors in college students with chronic conditions. These findings supported our first hypothesis, which was that better health literacy and greater self-efficacy would positively predict healthy lifestyle behaviors. Moreover, our findings are consistent with prior research that has highlighted the importance of health literacy and self-efficacy in

promoting positive health behaviors.[13,18] Importantly, we have demonstrated that these associations between health literacy, self-efficacy, and positive health behaviors exist for college students with chronic conditions. Studies have shown that differences in health literacy in chronic condition groups account for disparities in knowledge and self-care, such as in patients with asthma and chronic obstructive pulmonary disease.[25,26] For instance, individuals who score low on health literacy report much more difficulty in managing their respective condition. Thus, in our study it is important to consider that students with chronic conditions who report lower health literacy and self-efficacy may experience similar difficulties.

Our second hypothesis, which stated that higher levels of health literacy and self-efficacy would be associated with less substance use, was also supported in that we found significant associations between the Outcome Self-efficacy subscale and the Critical Health Literacy subscale with general substance use behaviors. These findings expand on the body of literature on general substance use in students with chronic conditions, especially with respect to health literacy. Although higher self-efficacy has been previously associated with lower substance use,[18] results demonstrating a link between health literacy and substance use behaviors have been inconsistent. For instance, one study of young Swiss men found that substance users had greater health literacy,[27] which is contrary to our findings in the current study. In the context of the scales used, having higher communicative health literacy might translate into effective communication skills used in negotiating substance use around peers. With critical health literacy, which reflects the ability to evaluate and appraise the validity of health information, higher levels may reflect a better understanding of the negative consequences of substance use. Lastly, regarding outcome self-efficacy, these college students with chronic conditions may have stronger beliefs in their ability to maintain long term health-related outcomes, which would be achieved by avoiding substance use.

Our findings suggest that specific aspects of health literacy and self-efficacy may be protective against general substance use behaviors. This is important to consider given that research has documented higher rates of risky behaviors in adolescents with chronic conditions.[28] It may be that college students with chronic conditions who report higher health literacy may be more aware of any health-related consequences of engaging in substance use behaviors. In terms of self-efficacy, these college students may also feel more confident in their ability to avoid substance use. As protective factors for college students with chronic conditions, health literacy and self-efficacy may be useful factors to consider for future research.

Limitations

Limitations of the current study include a small convenience sample from a Mid-Atlantic university. As such, findings may not be generalizable beyond this sample of undergraduate students with chronic conditions and therefore should be replicated in a larger sample of more diverse students. Additionally, risky behaviors were operationalized from only one subscale of a larger measure and assessed substance use. The Substance Use subscale was very general and did not capture specific substance use behaviors. The items focused on to what extent college students avoided drugs, alcohol, and smoking but did not further investigate those behaviors in detail, such as 30-day usage. Risky behaviors include not only substance use but also other behaviors that may negatively impact health, such as risky sexual behaviors; these aspects of risky behaviors were not captured in this study. When considering reliability coefficients, the Functional Health Literacy subscale had a relatively low Cronbach's α of .52. Another limitation is that differences in associations between health behaviors, health literacy, and self-efficacy within chronic condition type were not examined. Samples sizes within each chronic condition group were not large enough to make comparisons between groups. Health behaviors may differ based on the nature of the condition, and it may be inaccurate to draw conclusions by homogenizing students with chronic conditions.

Translation to Health Education Practice

The results from the current study have possible implications for college health professionals in improving healthy behaviors among students with chronic conditions. College Health Education and health promotion services not only improve the general health of students but are also in a position to facilitate the transition from the pediatric to the adult health care world, especially for those with chronic conditions.[29] Addressing and improving health literacy and self-efficacy as intervention paths is a potential next step, although more research is needed to investigate the mechanisms behind these associations with health behaviors.

It may be useful for college Health Education professionals to design interventions focused specifically on improving health literacy. Given that discrepancies in health literacy in chronic condition groups have

resulted in health inequalities,[15] students with chronic conditions may benefit from receiving additional resources from their college health services. College health centers could provide educational materials such as pamphlets on how to best find and interpret health information, how to evaluate health information on the Internet, or how to effectively communicate with a health care professional.

In terms of self-efficacy, college health centers could help students with chronic conditions realize that they are in charge of their own health to some degree. Based on previous research, individuals with low self-efficacy may perceive that they cannot change their own health.[6] College health centers should provide resources that highlight how college students are in charge of their own health. It may be useful to educate students on the fact that health behaviors such as diet, exercise, and avoiding risky behaviors are within each student's control. One method could be through utilizing campus ads or social media to provide positive messages to students regarding their health behaviors. Overall, health literacy and self-efficacy may be promising factors that would help a large number of college students, especially those who face the unique challenge of managing a chronic condition.

Conflict of interest

The authors have no conflicts of interest to report. The authors confirm that the research presented in this article met the ethical guidelines, including adherence to the legal requirements, of the United States and received approval from the institutional review board of the participating university.

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