Continuing Education

University Students' Perceived Effectiveness of Their High School Health Education

Keith A. King and Shonna Snyder

ABSTRACT

A sample of 410 university students (96% response rate) completed a four-page survey regarding their perceived effectiveness of high school health education in increasing their health knowledge and adoption of healthy behaviors. Results indicated that the majority of students felt health education was important and that healthy behaviors were important to adopt. Students who had taken three or more high school health classes and who had a high school health teacher teach their health classes reported increased perceived effectiveness scores of high school health education. In addition, younger university students (freshmen and sophomores) were more likely than older university students (juniors and seniors) to feel that their high school health education was effective in increasing their health knowledge and health behavior. Based on these findings, it appears that increased high school health education and the hiring of certified health educators to teach high school health classes are warranted. Recommendations addressing these issues are offered in this article.

The most recent Youth Risk Behavior Survey (Centers for Disease Control and Prevention, 2000) revealed alarming statistics concerning the health of adolescents. In the past month, 1 in 3 high school students smoked cigarettes, 1 in 2 drank alcohol, 1 in 3 binge drank, 1 in 3 rode with a driver who had been drinking alcohol, and 1 in 4 used marijuana. During the past year, 1 in 3 students had been in a physical fight, 1 in 4 felt sad or hopeless for at least 2 consecutive weeks, 1 in 5 considered attempting suicide, and 1 in 12 attempted suicide. Significant linear increases were experienced from 1991 to 1999 in the percentage of high school students who had ever used marijuana, had used marijuana before age 13, currently used cocaine, and currently smoked. In addition to Youth Risk Behavior Survey data, the Substance Abuse and Mental Health Services Administration (1998) found that drug use among adolescents doubled between the years of 1992 and 1997.

Such risky behaviors greatly increase the risk for youth morbidity and mortality and contribute to future health problems. Currently, the leading causes of death in the United States are heart disease, cancer, stroke, and chronic obstructive pulmonary disease (U.S. Department of Health and Human Services [DHHS], 2000a). Among individuals aged 15 to 24 years, the leading causes of death are accidents, homicides, and suicides. Many of these deaths are preventable through the adoption of safe and healthy behaviors. Tobacco use, for example, is a modifiable risk factor responsible for more than 430,000 premature deaths each year (DHHS, 2000b). Such premature deaths could be avoided by healthy decision-making and continuous engagement in healthy behaviors.

School health education was implemented to assist students in making knowledgeable and informed decisions regarding

Keith A. King, PhD, CHES, is an assistant professor in the Health Promotion and Education Program at the University of Cincinnati, ML 0002, 526 TC, Cincinnati, OH 45221-0002; E-mail keith.king@uc.edu. Shonna Snyder, MEd, is a graduate assistant at Purdue University, West Lafayette, IN 47907.

their health. More than 95% of youth aged 5–17 years are enrolled in school, translating to about 48 million youth attending almost 110,000 elementary and secondary schools a day or approximately 180 days per year (O'Rourke, 1996). Adolescents spend one-third of their day and one-half of their awake hours in school. Thus, the school is an ideal arena to promote the proper growth and development of youth and educate them about changing their current and future health behaviors (Lohrman & Wooley, 1998; National Association of School Boards, 1991). Through their climate and curricula, schools can provide a focal point for efforts to reduce health risk behaviors and improve the health status of youth (Kann et al., 1995). DHHS (2000) has underscored the importance of school health education through Objective 7-2 of *Healthy People 2010* (pp. 7-14), which aims to "increase the proportion of middle, junior high, and senior high schools that provide school health education to prevent health problems."

University students are among the most recent graduates of high school. Most (80%) state departments of education require high school students to attend at least one health education course (Kann, Brener, & Allensworth, 2001). Therefore, the university population emerges as a unique and effective sample from which to draw in examining students' perceptions regarding their recent high school health education. The present study was conducted to examine the following research questions: (1) Do university students believe their high school health education was effective in increasing their knowledge regarding health issues? (2) Do university students believe their high school health education was effective in helping them to adopt healthy behaviors? (3) How important do university students feel that high school health classes are in convincing students to engage in healthy behaviors? (4) What overall value do university students place in adopting healthy behaviors? (5) Do perceived effectiveness of high school health education and perceived value in adopting healthy behaviors vary based on specific demographic variables?

METHODS

Participants

Students in physical activity classes (*N*=17 sessions) at a midwestern university served as the participants of this study. All students demonstrated voluntary agreement to participate in this study by signing an informed consent form. Confidentiality and anonymity of responses were ensured. No student refused to participate.

Instrument Development

A four-page, 44-item questionnaire was developed to examine college students' overall perceived effectiveness of their high school health education. Perceived effectiveness was measured via two subscales: (1) effectiveness in increasing students' knowledge of health issues and (2) effectiveness in helping students to adopt healthy behaviors. The "Increased Knowledge" subscale consisted of 9 items that required students to respond by using a 7-point Likert-type scale (1=*extremely ineffective*, 7=*extremely effective*). The "Helping to Adopt Healthy Behaviors" subscale consisted of 10 items that required students to respond by using the same 7-point Likert-type scale. Students' perceived overall importance of high school health class in convincing students to adopt healthy behaviors was also measured via 1 item requiring students to respond by using a 7-point Likert-type scale (1=*extremely unimportant*, 7=*extremely important*). To assess students' perceived value in adopting healthy behaviors, a "Health Values" subscale was developed. This "Health Values" subscale consisted of 10 items that required students to respond by using a 7-point Likert-type scale (1=*strongly disagree*, 7=*strongly agree*).

Face validity was established by developing the survey instrument based on a comprehensive review of the literature. Content validity was established by sending the survey instrument to a panel of three experts in high school health education for review. Suggested revisions offered by these experts were incorporated into the final survey instrument. Stability reliability was assessed by distributing the survey on two separate occasions (7 days apart) to a convenience sample of university students (*N*=28). Pearson r correlation coefficients indicated that stability reliability was equal to .83 for the Increased Knowledge subscale, .78 for the Helping to Adopt Healthy Behaviors subscale, and .77 for the Health Values subscale. Internal consistency reliability was computed for each of the three subscales using Cronbach alphas: Increased Knowledge subscale (.93), Helping to Adopt Healthy Behaviors subscale (.94), and Health Values subscale (.87).

Procedures

Surveys were distributed to students in physical activity courses during regularly scheduled class times. Students were informed of the study purpose, the voluntary nature of the study, and assured that all responses would be kept anonymous and confidential. Students who opted to participate were instructed to sign an informed consent form that also explained the study purpose and the voluntary participation. Students who opted to not complete the survey were instructed to sit quietly until all surveys were completed and then to turn in their blank survey along with the completed surveys, as a means to avoid any feelings of discomfort or embarrassment. All students opted to participate.

Data Analysis

The Statistical Package for the Social Sciences (SPSS) was used for all data analyses. Frequency distributions, means, standard deviations, and ranges of scores were computed to describe the demographic and background characteristics of respondents. One-way analyses of variance and multivariate analyses of variance (MANOVAs) were computed to identify differences in parametric subscale data based on demographic/background variables. If MANOVAs were found to be significant, then univariate F-tests were performed to identify the specific significant items. To reduce the likelihood of committing a Type I error, the alpha level of significance was set at the .05 level.

RESULTS

A total of 425 university students were distributed surveys. Of this total, 410 university students returned completed and usable surveys (96%). Most students were female (64%), white (66%), and majoring in a non-health related field (84%) (Table 1). Ages ranged from 18 to 40 years (M=21.3, SD=2.99). Grade levels of students were equally divided among freshmen (22%), sophomores (26%), juniors (21%), and seniors (26%). Approximately half (59%) of students attended a suburban high school, and half (50%) reported that they took one or fewer health courses while in high school.

Demographic Interactions

Analyses were conducted to test for potential interaction effects between demographic variables. Chi-square analyses were performed for nonparametric demographic variables, whereas one-way analyses of variance were conducted for parametric demographic variables. Two demographic interactions were found to be significant: (1) sex and major and (2) race and location. All other demographic interactions were not significant. Covariates were subsequently used for each of the significant demographic interactions in further analyses of this study. In this manner potential confounding variables were controlled.

Perceived Effectiveness of Health Education in Increasing Student Health Knowledge

Individual item means were calculated to assess students' perceived effectiveness of high school health education in increasing student knowledge regarding nine different health issues (Table 2). Results showed that, on average, students felt their high school health education was slightly ineffective in increasing their knowledge about how to safely express anger (M=3.25, SD=1.69) and how to effectively cope with stress (M=3.29, SD=1.73). Students felt that their high school health education was neither effective nor ineffective in increasing their knowledge about the remaining seven health issues.

Table 1. Demographic Characteristics of University Students

Characteristic	n [A]	%
Sex		
Male	143	36
Female	250	64
Age		
18-22	389	75
23 or older	97	25
Race/Ethnicity		
White	256	66
African American	90	23
Asian	25	6
Hispanic	7	2
Other	2	3
Grade Level		
Freshman	86	22
Sophomore	100	26
Junior	82	21
Senior	100	26
Graduate	22	6
Major		
Health promotion/education	33	8
Health-related (allied health)	34	8
Nonhealth major	343	84
Geographical Location of High School Attended		
Urban	105	26
Suburban	234	59
Rural	61	15
Number of health classes taken in high school (excluding physical education classes)		
None	15	4
One	185	46
Two	114	28
Three or more	91	23

Note: Data reflects those who responded to these items (missing values were excluded from the descriptive statistics). Some percentages do not total 100% due to rounding.
[A] N=410 university students.

A MANOVA found that perceived effectiveness in increasing knowledge differed significantly based on whether high school health education courses were taught by a health teacher [$F(9, 400)=1.88$, $p=.050$]. Students who reported that their high school health education courses were taught by a health teacher were significantly more likely than students who reported that their high school health education courses were taught by a nonhealth teacher (i.e., physical education teacher, home economics teacher, coach, other) to feel that their high school health education was effective in

Table 2. University Students' Perception of Effectiveness of High School Health Education in Increasing Their Knowledge of Health Issues

How effective do you feel your high school health education was in increasing your knowledge about . . .	Mean[A]	*SD*
The importance of regularly exercising	4.35	1.75
The consequences of illegal drug use	4.34	1.84
How to eat a well-balanced diet	4.18	1.74
The consequences of tobacco use	4.16	1.75
The consequences of alcohol abuse	4.14	1.78
Suicide warning signs	3.78	1.84
How to peacefully resolve conflicts	3.50	1.75
How to appropriately cope with stress	3.29	1.73
How to safely express your anger	3.25	1.69

Note: N=410 university students.
[A]Means based on a 7-point Likert scale (1=*strongly disagree*, 7=*strongly agree*)

increasing their knowledge about the consequences of tobacco use (M=4.41, SD=1.76 vs. M=3.80, SD=1.67, $F(1,408)$=12.30, p=.001), the consequences of alcohol abuse (M=4.33, SD=1.79 vs. M=3.85, SD=1.72, $F(1,408)$=7.07, p=.008), the consequences of illegal drug use (M=4.49, SD=1.85 vs. M=4.12, SD=1.80, $F(1,408)$=4.22, p=.04), how to peacefully resolve conflicts (M=3.64, SD=1.78 vs. M=3.28, SD=1.69, $F(1,408)$=4.25, p=.04), and how to eat a well-balanced diet (M=4.33, SD=1.85 vs. M=3.95, SD=1.54, $F(1,408)$=4.72, p=.03).

Perceived Effectiveness of Health Education in Student Healthy Behaviors

Individual item means were calculated to assess students' perceived effectiveness of high school health education in helping them to adopt 10 healthy behaviors (Table 3). On average, students felt their high school health education was slightly ineffective in helping them to safely express their anger (M=3.26, SD=1.75), decide to refrain from smoking (M=3.55, SD=81.96), decide to refrain from drinking alcohol (M=3.14, SD=1.77), peacefully resolve conflicts (M=3.32, SD=1.78), and effectively cope with stress (M=3.26, SD=1.73). Students felt that their high school health education was neither effective nor ineffective in helping them to adopt the remaining 5 healthy behaviors.

Importance of Health Classes in Convincing Students to Engage in Healthy Behaviors

Students were asked to use a 7-point Likert-type scale (1=*extremely unimportant*, 7=*extremely important*) to rate how important they felt high school health classes were in convincing students to engage in healthy behaviors. On average, students felt that high school health classes were slightly important in convincing students to engage in healthy behaviors (M=4.47, SD=1.72). A series of one-way analyses of variance revealed that perceived importance differed significantly based on student's race and number of high school health courses. Nonwhite students (M=4.69, SD=1.70) were significantly more likely than White students (M=4.33, SD=1.73) to feel that high school health classes were important in convincing students to engage in healthy behaviors [$F(1,389)$=3.98, p =.047)]. Similarly, students who had taken three or more high school health classes were significantly more likely than students who had taken two or fewer classes to feel that high school health classes were important [$F(1,404)$=4.05, p =.045)].

Perceived Value in Adopting Healthy Behaviors

Individual item means were calculated to assess students' perceived value in adopting healthy behaviors (Table 4). On average, students strongly agreed (6 or 7 on a 7-point Likert-type scale) that all listed healthy behaviors were important behaviors to adopt. Students were fairly neutral on whether refraining from drinking alcohol was important (M=4.07, SD=1.87). A MANOVA showed that perceived value in adopting healthy behaviors differed significantly based on race [$F(10, 371)$=3.65, p<.001]. Nonwhite students placed significantly higher value than White students in refraining from drinking alcohol (M=4.61, SD=1.88 vs. M=3.72, SD=1.82, $F(1, 382)$=16.60, p<.001), whereas White students placed significantly higher value than nonwhite students in peacefully resolving conflicts (M=6.25, SD=1.10 vs. M=5.82, SD=1.47, $F(1, 382)$=6.20, p=.013).

Perceived value in adopting healthy behaviors also differed significantly based on gender [$F(10, 381)$=3.74, p<.001]. Females placed significantly higher value than males in refraining from drinking alcohol (M=4.21, SD=1.86 vs. M=3.79, SD=1.95, $F(1, 390)$=4.28, p=.039); peacefully resolving conflicts (M=6.28, SD=1.13

Table 3. University Students' Perception of Effectiveness of High School Health Education in Helping Them Adopt Healthy Behaviors

How effective do you feel your high school health education was in helping you to . . .	Mean	SD
Decide to regularly exercise	3.99	1.85
Decide to refrain from using illegal drugs	3.90	2.04
Decide to eat a well-balanced diet	3.88	1.80
Be able to identify suicide warning signs	3.69	1.88
Decide to refrain from smoking cigarettes	3.55	1.96
Decide to drink alcohol in moderation	3.51	2.05
Peacefully resolve conflicts	3.32	1.78
Safely express your anger	3.26	1.75
Effectively cope with stress	3.26	1.73
Decide to refrain from drinking alcohol	3.14	1.77

Note: N=410 university students.
[A]Means based on a 7-point Likert scale (1=*strongly disagree*, 7=*strongly agree*).

vs. M=5.76, SD=1.40, F(1, 390)=15.57, p<.001); safely expressing anger (M=6.33, SD=1.07 vs. M=5.91, SD=1.41, F(1, 390)=10.93, p=.001); appropriately coping with stress (M=6.39, SD=1.02 vs. M=6.15, SD=1.31, F(1, 390)=3.92, p=.049); being able to identify suicide warning signs (M=6.56, SD=0.90 vs. M=6.17, SD=1.34, F(1, 390)=11.43, p=.001); and eating a well-balanced diet (M=6.26, SD=1.06 vs. M=5.83, SD=1.44, F(1, 390)=10.73, p=.001).

Perceived Effectiveness of High School Health Education Based on Number of High School Health Education Courses

A MANOVA found that perceived effectiveness in increasing knowledge differed significantly based on the number of health education courses students took in high school [F(9, 395)=3.25, p=.001]. Students who took three or more high school health classes reported significantly higher perceived effectiveness scores than students who took two or fewer high school health classes in increasing their knowledge about the consequences of alcohol abuse (F(1,405)=4.84, p=.028); how to peacefully resolve conflicts (F(1,405)=17.17, p<.001); how to safely express their anger (F(1,405)=23.97, p<.001); how to appropriately cope with stress (F(1,405) =22.95, p<.001); suicide warning signs (F(1,405) =11.39, p=.001); how to eat a well-balanced diet (F(1,405)=5.66, p=.018); and the importance of exercising regularly (F(1,405)=7.19, p=.008) (Table 5). Similarly, perceived effectiveness in helping students to adopt healthy behaviors differed significantly based on the number of health education courses students took in high school [F(10, 394)=4.36, p<.001]. Students who took three or more high school health classes reported significantly higher perceived effectiveness scores than students who took two or fewer high school health classes in helping them to refrain from smoking cigarettes (F(1,405)=9.84, p=.002); refrain from drinking (F(1,405)=17.80, p<.001); drink alcohol in moderation (F(1,405)=25.19, p<.001); refrain from illegal drug use (F(1,405)=9.18, p=.003); peacefully resolve conflicts (F(1,405)=22.38, p<.001); safely express their anger (F(1,405) =23.12, p<.001); appropriately cope with stress (F(1,405) =27.51, p<.001); be able to identify suicide warning signs (F(1,405) =14.53, p<.001); how to eat a well-balanced diet (F(1,405)=22.09, p<.001); and the importance of exercising regularly (F(1,405)=11.14, p=.001).

Perceived Effectiveness of High School Health Education Based on Student Grade Level

A MANOVA showed that perceived effectiveness in increasing knowledge differed significantly based on grade level [F(9, 380)=2.23, p=.02]. Compared to juniors, seniors, and graduates, students who were freshmen or sophomores reported significantly higher perceived effectiveness scores in increasing their knowledge about the consequences of alcohol abuse (F(1, 390)=4.95, p=.045), the consequences of illegal drug use (F(1, 390)=4.73, p=.03), how to peacefully resolve conflicts (F (1, 390)=11.18, p=.001), how to safely express their anger (F(1,390)=11.36, p=.001), how to appropriately cope with stress (F(1,390)=4.90, p=.026), and suicide warning signs (F(1,390)=7.11, p=.008) (Table 6). Perceived effectiveness in helping students to adopt healthy behaviors differed significantly based on grade level [F(10, 379)=1.86, p=.049]. Students who were freshmen or sophomores reported significantly higher perceived effectiveness scores in helping them to refrain from drinking (F(1, 388)=5.69, p=.018), identify suicide warning signs (F(1, 388)=4.79, p=.029), eat a well-balanced diet (F(1, 388)=3.99, p=.046). Perceived value in adopting healthy behaviors also differed significantly based on grade level [F(10, 379)=2.52, p=.006]. Students who were freshmen or sophomores reported significantly higher value in

refraining from smoking ($F(1, 390)=9.51$, $p=.002$); drinking alcohol in moderation ($F(1,390)=5.24$, $p=.023$); peacefully resolving conflicts ($F(1,390= 5.92$, $p=.015$); safely expressing anger ($F(1, 390= 5.82$, $p=.016$); coping with stress ($F(1,390)=7.16$, $p=.008$); and identifying suicide warning signs ($F(1, 390)=6.86$, $p=.009$).

Table 4. University Students' Perception of the Effectiveness of High School Health Education

Item	Mean[A]	*SD*
I feel it is important to cope with stress.	6.22	1.19
I feel it is important to refrain from smoking cigarettes.	6.15	1.44
I feel it is important to refrain from drinking alcohol.	4.07	1.87
I feel it is important to drink alcohol only in moderation.	5.34	1.79
I feel it is important to refrain from illegal drug use.	5.88	1.69
I feel it is important to peacefully resolve conflicts.	6.02	1.29
I feel it is important to safely express anger.	6.09	1.26
I feel it is important to identify suicide warning signs.	6.33	1.16
I feel it is important to eat a well-balanced diet.	6.04	1.27
I feel it is important to regularly exercise.	6.15	1.19

Note: $N=410$ university students.
[A]Means based on a 7-point Likert scale (1=*strongly disagree*, 7=*strongly agree*)

DISCUSSION

University students in the present study strongly felt that healthy behaviors were important to adopt. Such a finding is important to note because health behavior theories assert that attitudinal change precedes behavioral change (Ajzen, 1988; Bandura, 1977; Fishbein & Ajzen, 1975; Prochaska, 1979; Rosenstock, Strecher, & Becker, 1988). Increasing students' perceived value toward healthy behaviors may therefore be viewed as a prerequisite of or initial step toward healthy behavior.

The present study also found that the number of high school health classes was directly related to students' perceived effectiveness of health education. Students who had taken three or more health classes were significantly more likely than students who had taken two or fewer health classes to feel that their high school health education was effective in increasing their health knowledge and adoption of healthy behaviors. Various reports, including those from the Surgeon General (DHHS, 2000b), Centers for Disease Control and Prevention (1996, 1997), and the Institute of Medicine (2000) have underscored the importance of school health education in combating youth health problems. Results from the 2000 School Health Policies and Programs Study (Kann et al., 2001) revealed that 84% of senior high schools provided at least 450 minutes of required health education in each grade (equivalent to one 50-minute class per week for 9 weeks, one quarter). However, the percentage of high schools requiring health education decreases from 10% in grade 9 to 2% in grade 12. This compares to 44% requiring health education in grade 5. Only half (51%) of high schools offer elective health classes. More health offerings are clearly needed.

Bandura's Social Learning Theory (1977) asserts that increased exposure to and experience with a specific behavior leads to increased confidence in performing the behavior and thus increased likelihood of performing the behavior. It follows, therefore, that an effective strategy to promote the adoption of healthy behaviors would be to increase students' exposure to and experience with health education. Students in the present study who had the most experience with health education were most likely to feel that health education helped them to adopt healthy behaviors.

The present study also found that students who had a health teacher teach their high school health classes felt more knowledgeable regarding health than students who did not have a health teacher teach their high school health classes. Currently, less than 10% of required health classes in the United States have a teacher who majored in health education. Although the number of states issuing separate health education and physical education certificates has increased in recent years (Bennett, Perko, & Herstine, 2000), only 4% of health classes have a teacher who is a certified health education specialist (Kann et al., 2001). Moreover, less than 9% of teachers with graduate degrees who are teaching high school health have their graduate degree in health education.

To most effectively teach students regarding health behaviors and health decision-making, schools should mandate that health courses are delivered by certified health educators. Health educators have been trained on the National Health Education Standards basic benchmarks for competency within the field of health education (Joint Committee on National Health Education Standards, 1998). To ensure that such standards are consistently employed in regular classroom instruction, schools should place an emphasis on the hiring of certified health educators.

Table 5. Perceived Effectiveness of High School Health Education Based on Number of High School Health Education Courses

Perceived Effectiveness Subscale	*Attended 2 or Fewer High School Health Courses*[A] *M (SD)*	*Attended 3 or More High School Health Courses*[B] *M (SD)*	*F*	*p*
Effectiveness of HS Health Education in Increasing my Knowledge about . . .				
The consequences of alcohol abuse	4.05 (1.74)	4.52 (1.86)	4.84	.028
How to peacefully resolve conflicts	3.30 (1.72)	4.15 (1.74)	17.17	.000
How to safely express your anger	3.03 (1.61)	3.99 (1.75)	23.97	.000
How to appropriately cope with stress	3.08 (1.67)	4.04 (1.79)	22.95	.000
Suicide warning signs	3.63 (1.83)	4.36 (1.80)	11.39	.001
How to eat a well balanced diet	4.08 (1.71)	4.57 (1.84)	5.66	.018
The importance of exercising regularly	4.25 (1.73)	4.80 (1.77)	7.19	.008
Effectiveness of HS Health Education in Helping me to . . .				
Refrain from smoking	3.39 (1.96)	4.12 (1.94)	9.84	.002
Refrain from drinking alcohol	2.94 (1.71)	3.81 (1.88)	17.80	.000
Drinking alcohol in moderation	3.24 (1.79)	4.43 (2.60)	25.12	.000
Refrain from using illegal drugs	3.74 (2.07)	4.47 (1.86)	9.18	.003
Peacefully resolve conflicts	3.10 (1.76)	4.08 (1.69)	22.38	.000
Safely express anger	3.04 (1.72)	4.02 (1.70)	23.12	.000
Cope with stress	3.02 (1.68)	4.08 (1.71)	27.52	.000
Identify suicide warning signs	3.51 (1.88)	4.35 (1.77)	14.53	.000
Eat a well-balanced diet	3.67 (1.75)	4.65 (1.77)	22.10	.000
Exercise regularly	3.83 (1.83)	4.56 (1.83)	11.14	.001

Note: Means based on a 7-point Likert-type scale (1=*strongly disagree*, 7=*strongly agree*).
[A]*N*=314 university students.
[B]*N*=91 university students.

Many teachers delivering health courses have no degree or certification but desire additional training and staff development on a variety of health issues including CPR; first aid; emotional and mental health; nutrition; physical activity; tobacco; suicide; and violence prevention (Kann et al., 2001). Based on findings from the present study, it appears that continuing education and in-service training opportunities for teachers may lead to increased student satisfaction of health courses and more favorable student attitudes toward a healthy lifestyle.

Younger university students (freshmen and sophomores) in the present study were more likely to feel that their high school health education was effective in increasing their health knowledge and health behavior. In addition, younger students placed higher overall value on health and healthy behaviors. Freshmen and sophomores are the most recent graduates of high school. Differences between freshmen/sophomores and juniors/seniors may be due to recent changes in the health education curricula. Today the standards reflect much more attention to skill-building than in years past (Telljohann, Symons, & Miller, 2001). Perhaps such a change has contributed to more favorable student attitudes toward health. Another possible explanation may be that freshmen and sophomores have more recently taken their high school health classes. Thus, any information that they obtained during these courses may still be fresh in their minds.

Interestingly, of all the health behaviors assessed in the present study, students felt that being able to identify suicidal warning signs was most important. A recent study found that although the majority of university students believe suicide prevention to be important, only one in three feel confident that they can identify the warning signs in a friend at risk for suicide (King, 2000). This is particularly alarming because suicide is the third leading cause of death among 15 to 24-year olds (Hoyert, Kochanek, & Murphy, 1999). In addition, most student suicide attempters display behavioral and/or verbal warning signs (Knott & Range, 1998; Lester, 1997). Students are most likely to be the first to learn of a peer's suicidal ideation (Boldero & Fallon, 1995) because over 90% of students report they talk with friends to help cope with emotional problems (Robbins &

Table 6. Perceived Effectiveness of High School Health Education Based on Student Grade

Perceived Effectiveness Subscale	Freshmen & Sophomores[A] *M* (*SD*)	Juniors, Seniors & Graduate Students[B] *M* (*SD*)	*F*	*p*
Effectiveness of High School Health Education in Increasing my Knowledge about . . .				
The consequences of alcohol abuse	4.30 (1.79)	3.94 (1.74)	4.05	.045
The consequences of illegal drug use	4.51 (1.82)	4.11 (1.83)	4.73	.030
How to peacefully resolve conflicts	3.77 (1.78)	3.19 (1.67)	11.18	.001
How to safely express your anger	3.52 (1.73)	2.96 (1.59)	11.36	.001
How to appropriately cope with stress	3.48 (1.79)	3.09 (1.66)	4.97	.026
Suicide warning signs	4.03 (1.88)	3.54 (1.77)	7.11	.008
Effectiveness of High School Health Education in Helping me to . . .				
Refrain from drinking alcohol	3.33 (1.83)	2.91 (1.66)	5.69	.018
Identify suicide warning signs	3.90 (1.90)	3.49 (1.82)	4.79	.029
Eat a well-balanced diet	4.07 (1.82)	3.71 (1.73)	3.99	.046
I believe it is important to . . .				
Refrain from smoking cigarettes	6.43 (1.20)	5.99 (1.58)	9.51	.002
Drink alcohol in moderation	5.58 (1.68)	5.17 (1.91)	5.24	.023
Peacefully resolve conflicts	6.24 (1.14)	5.93 (1.38)	5.92	.015
Safely express my anger	6.31 (1.12)	6.02 (1.31)	5.82	.016
Appropriately cope with stress	6.44 (0.98)	6.13 (1.28)	7.16	.008
Be able to identify suicide warning signs	6.55 (0.89)	6.26 (1.28)	6.86	.009

Note: Means based on a 7-point Likert-type scale (1=*strongly disagree*, 7=*strongly agree*).
[A]*N*=186 freshmen and sophomores.
[B]*N*=204 juniors, seniors, and graduate students.

Tanck, 1995). Increased attention to the issue of suicide prevention education in the high schools is therefore warranted.

Based on the findings of this study, the following recommendations are offered.

• Schools should increase the number of high school health courses required for students to take (three or more courses if preferable).

• Schools should hire certified school health educators to teach health classes.

• School should ensure that teachers with degrees in health education teach all health classes.

• Schools should provide ongoing continuing education and in-service training opportunities for teachers on a variety of health issues including CPR; first aid; emotional and mental health; nutrition; physical activity; and tobacco; suicide; and violence prevention.

• Schools should continually assess the effectiveness of their health education curriculum by evaluating students' health knowledge, attitudes, and behaviors. The use of student interviews, focus groups, and surveys may prove most helpful.

Finally, the methodological limitations of the present study should be noted. First, the sample population was composed of students from one midwestern university. Thus, the results may not be generalizable to all university students. Second, the self-reported nature of the survey may have led some students to respond in a socially desirable manner. Third, the monothematic format of the survey may have resulted in a response-set bias in some students. Finally, some individuals may have had difficulty in accurately recalling their high school health education courses.

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