



# Assessing Diabetes Knowledge, Attitudes and Behaviors of College Students

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## Abstract

**Background:** To design a valid and reliable survey to assess diabetes knowledge, attitudes, and behaviors of college students.

**Methods:** Sixty college students in 3 health education courses were administered a 33-item instrument about diabetes.

**Results:** Sixty college students responded to the survey. The knowledge subset produced a KR20 coefficient of 0.277 for the knowledge questions. A group mean of 9.27 was found for the knowledge questions with a standard deviation of 1.48. The knowledge questions showed no statistical difference between genders. There were two questions with statistical differences found between race/ethnicity at the 0.01 and 0.05 levels. Cronbach's Alpha was performed on the attitude and behavior data. A score of 0.827 was found for the attitude items and 172 for behaviors. There were statistical gender differences for student attitudes toward diabetes for one item. There was no statistical difference found between race/ethnicities for attitudes towards diabetes. There were no significant differences found between the genders or race/ethnicities for behaviors.

**Conclusion:** While results of this study are limited by the small sample size and data collection in only one university, participants in this study attitudes regarding diabetes was great. Further studies should include a larger group of participants, with more diverse characteristics, observing different populations, at different universities.

**Keywords:** Diabetes; Pre-Diabetes; College students'; Race/Ethnicity; Gender

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## Introduction

The purpose of this study was to evaluate a survey instrument to assess diabetes knowledge, attitudes, and behaviors of college students enrolled in a health education introductory course. Diabetes is one of the nation's most prevalent, debilitating, deadly diseases and is the seventh leading cause of death in the United States [1]. It is a significant health problem in the United States affecting 34.2 million people, or 10.5% of the United State population, had diabetes (>136 mg/dl), diagnosed or undiagnosed in 2018 [1]. This total included 34.1 million adults aged 18 years or older, or 13% of all United State adults. About 7.3 million of these adults had diabetes but were not aware that they had the disease or did not report that they had it [2]. The prevalence of prediabetes is increasing in the United States among adolescents 12 to 18 years old and young adults aged 19 to 34 years, which puts them at increased risk of developing diabetes and cardiovascular disease. A recent study found that 18% of United State adolescents (1 in 5) and 24% of young adults (1 in 4) had prediabetes during 2005 to 2016 [3]. About 1.5 million new cases of diabetes (6.9 per 1,000 persons) were diagnosed among US adults aged 18 years or older in 2018 [4]. Evidence from recent studies show that diabetes can be delayed or prevented with lifestyle modifications and use of glucose lowering agents. Despite the advance in knowledge to prevent diabetes, undiagnosed and undertreated diabetes remain a significant problem. Diabetes is associated with an increased risk for a number of serious, sometimes life-threatening complications and certain populations experience an even greater threat. Good diabetes management can help reduce the risk of diabetes. However, many people are not even aware that they have diabetes until they develop one of its complications. Diabetes can be prevented by losing a modest amount of weight, getting 30 min of physical activity 5 days a week and eating healthier. People with pre-diabetes can delay or prevent the onset of the disease. Pre-diabetes is blood glucose levels that are higher than normal but not yet high enough to be diagnosed as diabetes. College students may be at risk for prediabetes because of their health practices and lack of consistent medical checkup.

To prevent the high prevalence of diabetes, health professionals and health educators need to target individuals at an early age for education about how to delay or prevent the onset of diabetes. It is very important to target college students because it has been found that 70% of individuals in this population tend to gain weight during their first year of college [5]. Because the association between elevated BMI and diabetes is well established, college students who are overweight or obese and those with pre-diabetes could benefit from diabetes education [6]. By the same token, college students who are not overweight or obese could also benefit from diabetes education because it has been reported that individuals in this population often engage in poor nutritional practices [7] and frequently lead sedentary lives [8]. It has also been noted that, by the end of the senior undergraduate year, the prevalence of obesity among college students increases markedly [9].

Being a college student and trying to manage diabetes is a demanding and tough task. Living a full life as a college student with diabetes is possible and manageable but requires extra precautions. An increasing trend in the prevalence of type 2 diabetes has been observed among youths; however, little is known about how informed young people are of its existence, prevalence and consequences. Type 1 diabetes is more common than Type 2 in people under age 20, but the incidence of Type 2 diabetes is increasing among young people [9]. Thousands of college students will be diagnosed with Type 2 diabetes or pre-diabetes during their college years. Type 1 diabetes is an autoimmune disorder called insulin-dependent diabetes mellitus or "juvenile" diabetes, in which the body makes no insulin at all. Type 2 diabetes is a chronic condition that affects the way your body metabolizes sugar or glucose. Both are important sources of fuel for your body. If you have type 2 diabetes, your body either resists the effects of insulin or does not produce enough insulin to maintain normal glucose levels. Type 2 diabetes is known as adult-onset diabetes, but today more children and college students are being diagnosed with the disorder, probably due to the rise in childhood obesity.

Type 2 diabetes is most consequential during the most productive midlife period but has also started to appear in younger age groups [9]. Type 2 diabetes is now increasingly diagnosed among adolescents and young adults, but it is a potentially preventable disease through a combination of lifestyle modification and pharmaceutical intervention [4-6]. Adopting a healthy lifestyle, including healthy diet choices and exercise habits, plays a critical role in the prevention and control of type 2 diabetes and has been associated with lower risk of type 2 diabetes [1,7,8]. Knowledge forms a basis for the adoption of good health-related practices and these lifestyle changes at the time of youth facilitate maintenance throughout a person's life [9,10]. It is very important that young people, as well as college students, to be well informed about the risk factors, preventive measures, complications and therapeutic interventions of diabetes, especially type 2 diabetes.

## Methods

### Research design

The researcher used a quantitative research design.

### Instrumentation

The instrument used for data collection was a 33-item survey including questions related to the college students' knowledge, attitudes, and behaviors about diabetes. Total scores were calculated

for knowledge of diabetes and attitude towards diabetes. Descriptive analysis was used for questions related to behaviors. The survey consisted of four demographic questions, twelve multiple choice formatted questions, seven true/false questions, and ten Likert scale questions. Questions addressed specific topic areas about diabetes. Students were asked 7 questions relating to their behaviors, or likelihood of behaviors, regarding checking glucose levels, exercising, and visiting the doctor. Twelve survey items were used as indicators of parent knowledge. These questions asked about types of diabetes, blood glucose levels, and prevention factors. Attitudes regarding diabetes were assessed through ten questions.

### Sample

A sample of convenience was used for this study. Participants were recruited from foundations of health courses in the Health Education and Recreation Department.

They were informed that their participation was completely voluntary and confidential. Students were asked to complete a knowledge, attitude, and behavior survey, which was administered by the researchers with permission from the instructors of the classes. The three classes used were randomly selected from a pool of five classes.

The pool consisted of undergraduate students, enrolled at a public, four-year degree granting institution in the Southeastern region of the United States. Sixty survey questionnaires were returned and used for this research study.

### Data analysis

All statistical analysis was computed using Statistical Package for Social Science (SPSS) and Microsoft Excel. Means and standard deviations were determined through descriptive statistics performed on individual demographic, knowledge, behavior, and attitude questions. Three t-tests were done to determine if there were mean differences in three areas: (1) Mean difference between male and female knowledge of diabetes, (2) Mean difference between male and female attitude towards diabetes, (3) Mean difference between male and female behaviors towards diabetes.

## Results

As shown in Table 1, of the sixty undergraduate students who participated in this research study, 35 (58.33%) identified themselves as Freshmen, 6 (10%) as Sophomores, 8 (13.33%) as Juniors, and 11 (18.33%) identified themselves as Seniors. The mean age was 20 years, ranging from 18 to 28 years of age. Forty-two (68%) identified their ethnicity as White, 13 (21%) Black or African American, 2 (7%) Hispanic, 1 (2%) Asian American, and 2 (2%) identified themselves as Other. Of the sixty undergraduate students who participated in this research study, 29 (48.33%) identified themselves as males, 31 (51.67%) identified themselves as females. The knowledge scale subset was scored correct or incorrect and assessed for internal consistency utilizing the Kuder-Richardson Formula #20 (KR20). The knowledge subset produced a KR20 coefficient of 0.277 for the knowledge questions. The low reliability score could be associated with wording of questions, low number of items, and reading level of the survey. In the future, conducting a pilot test to determine poorly worded questions may improve the internal consistency of the knowledge subset. A group mean of 9.27 was found for the knowledge questions with a standard deviation of 1.48. The knowledge questions showed no statistical difference between genders. There were two questions with statistical differences found between race/ethnicity: Question 5,

**Table:** Summary of participant demographics for the Study (N=60).

Characteristic	n-size	Percentage
<b>Gender</b>		
Male	29	48.33%
Female	31	51.67%
Total	60	100%
<b>Race</b>		
White	42	68.00%
Black or African American	13	21.00%
Hispanic or Latino	2	7.00%
Asian American	1	2.00%
Other	2	2.00%
Total	60	100%
<b>Class Rank</b>		
Freshman	35	58.33%
Sophomore	6	10.00%
Junior	8	13.33%
Senior	11	18.33%
Total	60	100%

asking participants about who specializes in the treatment of diabetes ( $p=\alpha<0.01$ ) and questions 6, asking participants about the meaning of diabetes ( $p=\alpha<0.05$ ). Cronbach's Alpha was performed on the attitude and behavior data. A score of 827 was found for the attitude items. There were statistical gender differences for student attitudes toward diabetes for one item. Item 3 showed that more males than females believed that family and friends support was important when dealing with diabetes. There was no statistical difference found between race/ethnicity for attitudes towards diabetes. Cronbach's Alpha for behavior was 172. There were no significant differences found between the genders for behaviors. There were no significant differences found between race/ethnicities for behaviors.

## Conclusions/Recommendations

In order to improve the reliability of most of the survey items, larger and more diverse samples of participants are needed. The low reliability score could be associated with the wording of questions and

low number of items. In the future, a pretesting of the readability and understanding of the survey items among the target audience may improve the internal consistency of the knowledge subset. Adding a quantitative component to assess knowledge, attitudes, and behaviors toward diabetes would also strengthen the study.

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