

## Original paper

# Perceived Severity and Susceptibility of Type II Diabetes Among Youth

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## Abstract

**Background:** In 2012, the prevalence rate of Type II diabetes among American population was 29.1 million, or 9.3% of population. As many as 1 in 3 American adults will have diabetes (Type I or Type II) in 2050 if present trends continue. Higher perceived severity and susceptibility of its risky factors may cause a higher level of attitudes toward practicing healthy behaviors among these subjects.

**Objective:** The aim of this study was to determine the constructs' status, knowledge about Type II diabetes, and their related factors among college students.

**Methods:** This cross-sectional study was carried out on 223 undergraduate students who enrolled in Southern Illinois University at Carbondale (SIUC) in a non- random convenience way. A questionnaire was used for data collection which measured the perceived severity and susceptibility and knowledge regarding Type II diabetes. Subjects' demographic variables such as age, sex, race/ethnicity, family history of diabetes, exercise level, and BMI were also recorded.

**Results:** 1.85 and 2.10 out of 4 were revealed as grand means of perceived susceptibility and perceived severity, respectively. Participants' chances of suffering from Type II Diabetes in the next few years as great was perceived at the highest level of susceptibility and concerning about the likelihood of having Type II diabetes in the future was at the lowest level. Whole life would be change due to having Type II diabetes was at the highest level of perceived severity while dyeing within 10 years due to having Type II diabetes was at the lowest level. Family history was the best predictor of perceived susceptibility to Type II diabetes.

**Conclusion:** Despite the fact that belief in the seriousness of the disease among subjects was at favorable level, their perceived susceptibility was low. Increasing perceived susceptibility and severity may induce an increase in practicing healthy behaviors among college students.

**Keywords:** Diabetes type II, Perceived severity, perceived susceptibility.

## Introduction

Health Belief Model (HBM) is considered one of the first and remains one of the best social cognitive models <sup>(1)</sup>. It was used for studying, promoting, and predicting the uptake of health services, but recently the model has been used predict more general health behavior <sup>(2)</sup>. The idea behind this model is that the likelihood of a behavior can be predicted based on one's beliefs in a personal threat, together with a belief in

the effectiveness of the proposed behavior, the benefits of engaging in healthy actions, and about the barriers to engaging in health behaviors <sup>(1)</sup>.

The main constructs of the Health Belief Model are the following: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers <sup>(3)</sup>. Each of these perceptions, separately or in combination, is used to explain health behaviors. Cues to action, self-efficacy and motivation factors are additional constructs that have been added to the Health Belief Model <sup>(3)</sup>. This study will be

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based on the first two main constructs of HBM.

Perceived susceptibility refers to beliefs about the likelihood of getting a disease or condition <sup>(4)</sup>. For example, college students must believe that there is a possibility of getting Type II diabetes if they do not practice healthy behaviors. Perception of susceptibility to any illness or disease varies among individuals <sup>(5)</sup>. There are some people who completely disagree with any possibility of getting the disease; however, other people might admit the possibility of acquiring the disease but believe that it is not likely to happen to them <sup>(1)</sup>. According to HBM, the more susceptible a person feels, the greater the likelihood of taking preventative action <sup>(1)</sup>.

## Method

Instruments for this study were found through an exhaustive search on EBSCO and other library databases. The first instrument to assess the diabetes knowledge was a 17-item Type II Diabetes Knowledge Questionnaire which consisted of 17 items relevant to five central areas of Type II diabetes knowledge that included dietary knowledge, epidemiology knowledge, medical knowledge, risk factors knowledge, and Type II diabetes symptoms knowledge questions. The questionnaire was adapted from the DKQ "Diabetes Knowledge Questionnaire" <sup>(7)</sup>. The second instrument was a 24-item Health Belief Related to Type II Diabetes Scale <sup>(8)</sup>; from which 9 questions were used to assess perceived susceptibility and severity. Finally, a 12-item personal demographic variable and risk prediction questionnaire was developed by the researcher. Demographic items were adapted from the Youth Risk Behavior Survey and the National College Health Assessment Survey. Questions No. 7 through 11 were selected for this survey to assess the current risk of Type II Diabetes

among college students and their family history to the chronic diseases.

Upon Human Subjects Approval from the Institutional Review Board, data collection for this study began during the spring semester 2014 at Southern Illinois University Carbondale (SIUC) – United States. Undergraduate courses were selected in a convenient non-random way (HED-100 level class was selected to administer the survey). Some researchers show that using convenience samples are useful when the research or issue has not been previously examined or evaluated <sup>(10)</sup>.

## Result

The response rate was 98%. About Fifty nine percent (59.37%) of the participants (n = 133) were female. The distribution of participants' ages was as follows: (see Table 1).

Regarding participants' knowledge, result revealed that 44.1% of the questions were answered correctly; 24.7% of the questions were answered incorrectly; 30.7% were answered with "do not know". The mean for the total knowledge score was 7.49 out of 17, standard deviation was 2.80, and the range was between 1 and 15 (see Table 2). All knowledge questions were divided into dietary, signs and symptoms, risk factors, and medical knowledge's questions. Among these knowledge subscales, a little over five percent (5.3%) of the participants answered all dietary questions correctly (n=12); 1.8% of the participants answered all signs and symptoms questions correctly (n=4); 41% of the participants answered all the risk factor knowledge questions correctly (n=92); 38% of the participants answered half or more of the medical questions correctly (n=90). Generally, 48% of the dietary questions were answered correctly with an overall mean score of 1.44 out of three, and a standard deviation of 0.69; 62 % of the signs and symptoms knowledge questions were answered correctly with an overall mean score of 0.85 out of two and the

standard deviation of 0.66; 28.4% of the risk factor- items were answered correctly with a mean score of 1.24 out of three and a standard deviation of 0.72; and finally,

44% of the medical knowledge- items were answered correctly with a mean score of 3.96 out of 9 and a standard deviation of 1.86 (see Table 2).

**Table 1.** Demographic Characteristics (N= 223)

Category	Demographic Variables	Frequency (n)	Percentage (%)
Gender	Male	91	40.63
	Female	132	59.37
Age	18 – 20	188	83.92
	21 – 23	28	12.5
	24 – 26	1	0.45
	≥ 27	6	3.13
Race/ Ethnicity	White	104	46.4
	African American	90	40.2
	Hispanic/ Latino	13	5.8
	Asian	8	3.6
	Pacific Islander	2	0.9
	Other	6	3.3

Mean Age=19.67; SD=3.65; Median Age=19; Mode=18; Range=18–29.

**Table 2.** Frequencies and percentages of responses to knowledge items (N= 223)

Items	Correct Answer N (%)	Incorrect answer N (%)	Don't know N (%)
<b>Dietary Knowledge</b>			
Eating too much sugar and other sweet foods is a cause of diabetes.	29 (12.9)	174 (77.7)	20 (8.9)
A diabetic diet consists mostly of special foods.	98 (44.1)	67 (29.9)	57 (25.4)
The way I prepare my food is as important as the foods I eat.	196 (87.5)	16 (7.1)	11 (4.9)
<b>Risk Factors Knowledge</b>			
If I am diabetic, my children have a higher chance of being diabetic.	172 (76.8)	14 (6.3)	35 (15.6)
Regular exercise will increase the need for insulin or other diabetic medication.	106 (47.3)	40 (17.9)	76 (33.9)
<b>Sign and Symptoms Knowledge</b>			
Diabetes can cause loss of feeling in my hands, fingers and feet	144 (64.3)	22 (9.8)	58 (25.9)
Shaking and sweating are signs of high blood sugar	21 (9.4)	114 (50.9)	87 (38.8)
Frequent urination and thirst are signs of low blood sugar.	26 (11.6)	99 (44.2)	98 (43.8)
<b>Medical Knowledge</b>			
The usual cause of diabetes is lack of effective insulin in the body	173 (77.2)	13 (5.8)	38 (17)
Diabetes is caused by failure of the kidneys to keep sugar out of the urine	53 (23.7)	62 (27.7)	109 (48.7)
Kidneys produce insulin	54 (24.1)	56 (25)	113 (50.4)
In untreated diabetes, the amount of sugar in the blood usually increases	124 (55.4)	47 (21)	51 (22.8)
Diabetes can be cured	132 (58.9)	37 (16.5)	54 (24.1)
Diabetes often causes poor circulation	139 (62.1)	16 (7.1)	69 (30.8)
Cuts and abrasions on diabetes heal more slowly	108 (48.2)	24 (10.7)	92 (41.1)
Diabetics should take extra care when cutting their toenails	90 (40.2)	25 (11.2)	107 (47.8)
Diabetes can damage my kidneys	13 (5.8)	115 (51.3)	95 (42.4)

**Note:** Overall knowledge score mean = 7.49; Standard Deviation = 2.80; Range 1-15.

Perceived susceptibility subscale measured participants' belief about their susceptibility for having Type II diabetes, the greater the score, the greater the tendency to feel susceptible to getting Type II diabetes. The grand mean of perceived susceptibility construct was 1.85 out of four and the standard deviation was 0.60. This indicates that the majority of participants did not feel susceptible to Type II diabetes. (see Table 3).

Perceived severity subscale measured participants' beliefs about the seriousness of Type II diabetes, with higher scores indicating a greater perception of the seriousness to Type II diabetes. As shown in Table 3, the grand mean of the severity construct was 2.10 out of four and the standard deviation was 0.50. This indicates that half of the participants believed in the seriousness of Type II diabetes.

For the health belief subscales, means of perceived susceptibility and perceived severity of Type II diabetes were higher ( $1.91 \pm 0.58$  and  $2.57 \pm 0.60$ , respectively) among participants who have a family history of diabetes than among those who do not. As well, perceived susceptibility of having Type II diabetes was higher ( $1.89 \pm 0.58$ ) among participants who exercised less than recommended or did not exercise than

among those who exercised as recommended; however, perceived severity was higher ( $2.74 \pm 0.57$ ) among participants who do exercise as recommended than those who do not exercise or do exercise less than recommended.

Multiple linear regressions was calculated in order to find out which personal variable (gender, lifestyle risk, family history, race/ethnicity, BMI, and exercise level) is the best predictor of the health belief on perceived susceptibility and severity to Type II diabetes among participants. Perceived susceptibility and perceived severity were set as dependent variables and gender, lifestyle risk, family history, race/ethnicity, BMI, and exercise level were set as independent variables. Stepwise method was used as a way of regression analysis with probability of F to enter  $\leq 0.05$  and probability F to remove  $\geq 0.10$ . The correlation between perceived susceptibility/ perceived severity and other variables (independent variables) were  $R = 0.459 \pm 2.69$  and  $R = 0.218 \pm 0.11$ , respectively. The Analysis of Variance (ANOVA) was calculated as a conjunction to regression analysis showed that there is a statistical significance of using this model ( $F(1, 187) = 49.778$ ,  $P \text{ value} < 0.05 = 0.000$ ).

**Table 3.** Participants perceived susceptibility regarding Type II diabetes (N=223)

Items	SD N (%)	D N (%)	A N (%)	SA N (%)	Mean	Standard Deviation
It is likely that I will suffer from <b>Type II Diabetes</b> in the future	68 (30.4)	117 (52.5)	36 (16.1)	2 (0.9)	1.87	0.69
My chances of suffering from <b>Type II Diabetes</b> in the next few years are great	97 (43.5)	109 (48.9)	149 (6.3)	3 (1.3)	1.65	0.66
I feel I will have <b>Type II Diabetes</b> sometimes during my life	76 (34.1)	114 (51.1)	32 (14.3)	1 (0.4)	1.81	0.69
Having <b>Type II Diabetes</b> is currently a possibility for me	77 (34.5)	93 (41.7)	51 (22.9)	2 (0.9)	1.90	0.78
I am concerned about the likelihood of having <b>Type II Diabetes</b> in the near future	61 (27.4)	107 (51.6)	46 (20.6)	9 (0.4)	2.01	0.80
Perceived Susceptibility's	Grand	Mean	$=1.85$ ;			
			standard	deviation	$=0.60$ .	

**Table 4.** Participants perceived severity regarding Type II diabetes (N=223)

Items	SD N (%)	D N (%)	A N (%)	SA N (%)	Mean	Standard Deviation
Having <b>Type II Diabetes</b> will threaten my relationship with my significant other	61 (28.5)	121 (56.5)	27 (12.6)	5 (2.3)	1.89	0.70
My whole life would change if I had <b>Type II Diabetes</b>	14 (6.5)	62 (29.0)	100 (46.7)	38 (17.8)	2.76	0.82
Having <b>Type II Diabetes</b> will would have a very bad effect on my sex life	40 (18.7)	142 (66.3)	25 (11.7)	7 (3.3)	2.00	0.66
If I have <b>Type II Diabetes</b> I will die within 10 years	71 (33.2)	129 (60.3)	12 (5.6)	2 (0.9)	1.74	0.60

Perceived Severity's Grand Mean = 2.10; Standard Deviation = 0.50

For perceived susceptibility, out of seven independent variables, family history ( $t(187) = 7.055$ ,  $P \text{ value} < 0.05 = 0.000$ ) was identified as a statistically significant individual predictor of perceived susceptibility among participants. The unstandardized coefficient (B) for the statistically significant variable (family history) was 0.938 (see Table 3). As it shown in Table 4 the only significant predictor was the family history; thus, family history ( $\beta = 0.459$ ) was the best predictor of perceived susceptibility among the participants. It accounted for 21 ( $R^2$ ) of the variation in perceived susceptibility from one participant to another. Statistically, 21% of the perceived susceptibility can be predicted from participants' family history. The unstandardized regression equation is  $y = 7.906 + 0.938$  (family history).

For perceived severity, out of seven independent variables, there were no variable that was statistically significant with perceived severity to Type II diabetes. Perceived severity was not predicted by any variables from this study.

## Discussion

Overall knowledge among study participants was low as only 44.1% of the participants answers the questions correctly with a range of 1- 15 out of 17. The relating low number of questions answered correctly corresponds with the

findings of Al Wadaani and his colleagues' study <sup>(1)</sup>. Their study showed that final year students in medical school were in need of improvement in their knowledge regarding diabetes. Another study also showed that university students' knowledge of Type II diabetes was limited, and the study suggested the need to communicate the severity of the disease, and the risk factors <sup>(12)</sup>. Other studies showed the same results, such as Mufunda and his colleagues' study <sup>(13)</sup> and Hu and his colleagues' study <sup>(14)</sup>. However, some studies show an opposite finding to this study. Lujan's study <sup>(15)</sup>, Gonzalez and his colleagues' study <sup>(16)</sup>, and Perera and his colleagues' study <sup>(17)</sup> demonstrated relatively high diabetes knowledge among their studies' participants. Each of the above studies focused on different populations, which may account for the differences.

Among the knowledge subscales, this study shows that the students in this study have a low dietary knowledge (48%) regarding Type II diabetes. Studies around the world show limited diet and nutrition knowledge regarding diabetes <sup>(22)</sup>. For the current study, 77.7% of participants thought that eating too much sugar and/or other sweet foods is a cause of diabetes, which emphasizes a lack of adequate nutritional knowledge among most of the participants <sup>(18)</sup>. However, most of the participants in this study (87.5%) knew that the way of preparing their food is

important as the food they eat, therefore, healthy eating interventions in a university specific setting aim to improve students' skill on preparing food is highly recommended <sup>(19)</sup>.

Risk factors' knowledge regarding Type II diabetes was high among undergraduate students, which corresponds with the findings of previous studies among youth population <sup>(20)</sup>. In contrast, other studies from around the world show a reverse finding to this study; in other words, a lack of risk factors' knowledge of type II diabetes was found in other populations from other countries <sup>(21)</sup>.

Study participants' knowledge on risk factors to develop Type II diabetes was low (28.4%); this might be due to a lack of awareness of the disease. There are studies that show that not only youth, but also elderly people have a lack of risk factor knowledge regarding chronic disease, especially diabetes <sup>(21)</sup>. Therefore, raising knowledge regarding risk factors of developing chronic diseases among youth especially college students is necessary.

Study participants' medical knowledge related to Type II diabetes was low (44%). Sisson & Bertram <sup>(22)</sup> state in their study that medical college students had a lack of medical knowledge about diabetes prior to medical training but their knowledge was increased during their training. For the current study, since data were collected early in the semester, participants may not yet have been exposed to information about Type II diabetes.

Perceived susceptibility to Type II diabetes was low, which means that these undergraduate students did not feel susceptible to getting Type II diabetes; this finding is consistent with pervious research <sup>(20,22)</sup>. Low perceived susceptibility to Type II diabetes may indicate a lack of awareness among this sample; besides, the less the susceptible they believe they are to the disease, the less the chance they will take preventive

measures to avoid that disease. These undergraduate students indicated they believe there is a small possibility of getting sick at young age, and that might be a reason for having a low perceived susceptibility to having a disease.

Perceived severity to Type II diabetes was low (see Table 4), which means that students in this sample did not take the disease seriously. White and his colleagues (2007) and Morovati & Rouhanis' (2011) studies show a similar result to this study. The lower the perceived severity to a disease among college students, the less likely they will have a perception of the seriousness of the disease <sup>(20)</sup>. Raising knowledge and awareness regarding Type II diabetes among college students is important, and thus might increase their perception to take chronic diseases, especially Type II diabetes, seriously.

## Conclusion

Participants' perceived susceptibility to Type II diabetes was best predicted by family history, meaning participants who have immediate relatives with diabetes had higher level of perceived susceptibility to Type II diabetes. There was no statistically significant predictor for perceived severity to Type II diabetes; stress level was the best predictor of perceived benefits of engaging in healthy behaviors. The higher the level of stress among participants, the less the likelihood to engage in healthy actions. Perceived barriers to engage in healthy actions were best predicted by level of exercise. Thus, those who engaged in higher level of exercise were more likely to perceive barriers to engaging in healthy behaviors. In other words, high prevalence barriers to engaging in healthy behaviors were not associated with exercise.

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