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ORIGINAL RESEARCH

Determinant Factors of Diabetes Prevention Behavior in Students with Diabetes Mellitus Risk

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Abstract

Background: The trend of diabetes cases has shifted to younger ages, starting at the age of 15 years old, due to unhealthy lifestyles. Researchers have discovered that health students also tend to have a poor lifestyle. Students are associated with emotional activity and busyness, but no research has examined the relationship between these conditions and diabetes prevention behavior.
Purpose: This study examined determinant factors affecting diabetes prevention behavior in college students with diabetes mellitus risk.
Methods: This study used a cross-sectional design, utilizing random sampling to gather data from 209 college students with diabetes risk. The instruments used in this study included adaptations of the Diabetes Prevention Behavior questionnaire, the modified Diabetes Management Time Questionnaire (DMTQ), the Perceived Behavioral Control, and the Trait Emotional Intelligence Questionnaire. Data analysis encompassed One-way ANOVA, Mann-Whitney, Kruskal-Wallis, Spearman's rank, and multiple linear regression.
Results: The study found a significant relationship between diabetes management time (p=0.001) and emotional intelligence (p=0.000) with diabetes prevention behavior. Emotional intelligence emerged as the dominant influencing factor (B=0.332). Conversely, no significant relationships were observed between perceived behavior control (p=0.223), class (p=0.734), gender (p=0.231), study major (p=0.263), age (p=0.064), and diabetes mellitus risk (p=0.664) with diabetes prevention behavior.
Conclusion: This study revealed a significant relationship between diabetes management time, emotional intelligence, and diabetes prevention behavior. Emotional intelligence emerged as the key factor affecting diabetes prevention behavior, highlighting the need for focused interventions to enhance emotional intelligence and improve diabetes management among college students.

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1. Introduction

Diabetes Mellitus (DM) is a progressive chronic disease that can cause microvascular and macrovascular complications to the risk of death. Cases of death due to DM until now have reached 6% of the total death cases in the world. Indonesia, as the most significant contributor to diabetes cases in Southeast Asia, experiences an increase in DM cases, reaching 0.5% every year. In addition, there has been a shift in the trend of sufferers aged 15 years and over (Ministry of Health, Republic of Indonesia, 2020; Isnanda, 2019). This condition is also supported by a statement from the United Nations Children's Fund (UNICEF) about increased diabetes risk factors in the form of obesity over the past two decades in Indonesia (Karana, 2021; Suminar et al., 2020).

Adolescents at risk of diabetes include those with a family history of diabetes, obese adolescents, or those with both factors. Diabetes risk can be prevented and managed by adopting specific prevention behaviors, such as regular health check-ups, attending diabetes-related education, engaging in vigorous physical activity or exercise for at least 30 minutes per day four times a week, maintaining a diet rich in fiber and fruits, and avoiding smoking (Beigrezaei et al., 2019; Hamasaki, 2016; Magliano et al., 2020; Suminar et al., 2020). Adolescents generally have a good perception of the importance of diabetes prevention behavior, but obstacles make it difficult for them to implement these behaviors (Lestari et al., 2018). This statement is supported by several studies which show an increase in eating frequency, reduced physical activity, and poor

weight control in the community, especially at a young age (Atmadja et al., 2020; Suminar et al., 2020). Another study by Finurillah (2021) on 376 students in a public university in Indonesia reported that 51.3% had a moderate eating pattern and only 42.3% had high physical activity. Not practicing diabetes prevention behaviors from a young age can increase the risk of developing DM in later years (Feldman et al., 2017; Huang & Goran, 2003).

Understanding human behavior involves numerous influencing factors. One of the theories Ajzen (2020) put forward is linked to planned behavior, commonly referred to as the theory of planned behavior. According to Ajzen (2020), perceived behavior control is a factor that helps individuals control behavior. Individuals with high perceived behavior control are motivated and encouraged to continue trying to overcome their difficulties (Mahyarni, 2013). In addition, internal factors also contribute to influencing the appearance of behavior. Internal factors such as emotional intelligence are a person's ability to manage emotions so that they can determine the right behavior to appear. Individuals with high emotional intelligence have a better quality and wellbeing of life (Goleman, 2006; Pérez-Fernández et al., 2021; Trigueros et al., 2019). The next factor related to obstacles in generating behavior is the improvement of time constraints (Lestari et al., 2018). Time management is an individual's ability to manage time so that they can organize activities, especially in maintaining health (Nakao et al., 2020; Wolters & Brady, 2021). Good time management is known to improve self-care in diabetes patients who are still productive at work (Summers-Gibson, 2021).

Based on the planned behavioral theory of Ajzen and Fishbein, the researchers conducted a preliminary study on students from health science programs in a public university in Indonesia in August 2021. The focus on this cohort stemmed from their transition from late adolescence to adulthood, where age-related changes impact behavior and lifestyle (González-Valero et al., 2020; Pigaiani et al., 2020). Previous research by Choi (2020) showed increased eating behavior due to perceived stressors, while the study by Multazami (2022) contradicted this, finding no direct link between stress and student eating behavior. Lestari et al. (2018) identified time constraints as a key obstacle for students in adopting diabetes preventive measures. However, no specific study has investigated student time management concerning diabetes prevention behavior, revealing a significant research gap in this area.

The preliminary study involved 10 students with a history of DM. The findings indicated that 80% of respondents had low levels of diabetes prevention behavior, yet 51.75% exhibited high levels of perceived behavior control. In addition to questionnaire data, open interviews were conducted to better understand respondents' perceptions of barriers to implementing diabetes prevention strategies. The majority of participants highlighted time and workload constraints, although the completion rate for the time management questionnaire was approximately 60%, indicating strong time management skills among respondents. Furthermore, the emotional intelligence survey showed that 50% of participants exhibited moderate emotional intelligence.

The low diabetes prevention behavior among health science students with a family history of diabetes, coupled with research gaps and unexplored factors, motivated the researchers to investigate the determinant factors influencing diabetes prevention behavior in college students at risk of diabetes mellitus. This study aimed to address this gap by identifying the primary factors influencing diabetes prevention behavior in this specific group.

2. Methods

2.1. Research design

This quantitative study employed a cross-sectional design to look for relationships between variables and find those that dominantly influence diabetes prevention behavior.

2.2. Setting and samples

This study was conducted at a public university in Central Java, Indonesia. Data collection was completed in March 2022. The inclusion criteria comprised college students having a risk of DM, such as a family history of DM and/or obesity, and being willing to participate. The exclusion criteria included students who were unreachable for contacts or did not fully complete the questionnaire. The initial population consisted of 363 students who either have obesity or a parental history of DM. Subsequently, a sample calculation was conducted employing the Slovin formula, accounting for a 5% margin of error and an estimated dropout rate of 10%, resulting in a determined sample size of 209. Respondents from this sample were selected using

randomization techniques employing an Excel formula. The data were sorted from the smallest to the largest based on the generated random numbers.

2.3. Measurement and data collection

This study employed four questionnaires for data collection. The first questionnaire, initially developed by Ajzen (2029), was the Perceived Behavioral Control questionnaire. This tool measures individuals' perceptions regarding their ability to perform crucial behaviors in managing diabetes. Comprising two domains, the questionnaire consists of six items each for control beliefs and power of control. Questions inquire about confidence levels (ranging from very not confident=1 to very confident=4) for control beliefs and the assessment of impact size (ranging from very small=1 to very large=4) for the power of control. The unfavorable question components were assessed inversely for each section. The researcher then multiplied the items in questionnaire parts 1 and 2, totaling six items for each part. The resulting multiplication from the six items was summed up, generating a single score for Perceived Behavior Control. The resulting scores ranged from 6 to 96 on an interval data scale. In this study, the Indonesian version of the Perceived Behavioral Control questionnaire by Ulfah (2018) was used, displaying validity scores of 0.393–0.773 for control beliefs dimensions and 0.417–0.867 for power of control dimensions, with a reliability value of 0.913.

The second questionnaire in this study was the Diabetes Time Management Questionnaire (DMTQ), developed by Nakao et al. (2020) to measure time allocation and management concerning diabetes care activities. Originally in English, this questionnaire consists of four dimensions, each containing four favorable items, summing up to 16 questions. These dimensions cover job adjustment (items 1 to 4), time control (items 5 to 8), goal setting and behavior aligned with personal values (items 9 to 12), and adjustment of the rhythm of life (Items 13 to 16). Utilizing a Likert scale ranging from 0 (strongly disagree) to 5 (strongly agree), the questionnaire generates results from 0 to 80, representing a ratio data scale. The original questionnaire showed the goodness of fit index (GFI) of 0.876 and a Cronbach alpha of 0.896. For this study, the researchers adapted the questionnaire by translating and subjecting it to testing with three experts who are lecturers in surgical medical nursing, focusing on diabetes-related health matters. The expert test and Content Validity Index (CVI) were administered. The expert test evaluated item clarity on a scale of 1 (unclear) to 4 (clear, no need for revision). Meanwhile, the CVI measured relevance, ranging from 1 to 4, resulting in 0 for scores of 1 to 2 and 1 for scores of 3 to 4. Cumulative scores were tallied to derive the final CVI value, which indicated a CVI of 1 (valid) for all items.

The third questionnaire, the diabetes prevention behavior used assess the behaviors that individuals adopt to prevent the onset or progression of diabetes, was adopted from Anggraini's (2016) study. It comprises 21 items divided into three sub-questions rated on a Likert scale. The favorable responses include "routinely" (3), "often" (2), "sometimes" (1), and "never" (0), while unfavorable responses are rated inversely: "routinely" (0), "often" (1), "sometimes" (2), and "never" (3). The scoring ranges from a minimum of 0 to a maximum of 63. This questionnaire consists of three dimensions. The first relates to health control, involving favorable items from 1 to 4. The second pertains to diet, including favorable components in items 7, 9, 10, 11, and 14, while unfavorable elements are evident in items 5, 6, 8, 12, 13, and 15. The third dimension focuses on sports, with favorable components spanning items 16 to 20 and unfavorable components in item 21. The diabetes prevention behavior questionnaire exhibited a CVI validity test result of 0.83, with a Cronbach's alpha of 0.737 (Anggraini, 2016).

The fourth questionnaire was the Indonesian version of the Trait Emotional Intelligence Questionnaire-Adolescent Short Form (TEIQue-ASF), adopted from previous studies by Musyarrafah (2016) and Gandhi (2015). This questionnaire assesses individuals' emotional intelligence traits concerning diabetes management. It consists of four dimensions: wellbeing, emotionality, self-control, and sociability, comprising a total of 30 items. The questionnaire uses a Likert scale, ranging from choices 1 to 7 for favorable responses, while unfavorable responses are assessed differently. The scoring generates an interval data scale, resulting in a score range of 10 to 70. The validity and reliability of this questionnaire were examined with r = 0.285–0.536 and a Cronbach alpha of 0.83 (Musyarrafah, 2016).

The data collection was conducted using a Google Form. Respondents randomly selected through an Excel table were personally contacted to inquire about their willingness to participate and were asked to fill out the questionnaire using the Google Form.

2.4. Data analysis

The data analysis in this study, which consisted of univariate, bivariate, and multivariate analyses, was conducted using the SPSS application. Univariate analysis employed frequency distribution and measures of central tendency, meanwhile, bivariate analysis utilized one-way ANOVA, Mann-Whitney, Kruskal-Wallis, and Spearman rank tests. The findings of the bivariate analysis with $p<0.25$ were considered for inclusion in the multivariate analysis, employing the multiple linear regression test with the backward method.

2.5. Ethical considerations

This study obtained ethical approval from the Health Research Ethics Committee of the Faculty of Health Sciences, Universitas Jenderal Soedirman (number 666/EC/KEPK/II/2022). The applied ethical principles included respect for persons, which involved introducing the researcher's identity and research purpose and seeking the respondent's consent to participate. Respect for privacy and confidentiality ensured that all information obtained in the research process remained undisclosed, whether in public or private domains. Respect for justice entailed equal treatment of all respondents, providing them with the same instrument and explanations, irrespective of their religion, ethnicity, race, or culture. Beneficence and non-maleficence were upheld by ensuring that the research did not cause harm, whether material or physical, to the respondents. Additionally, all respondents signed informed consent for their participation.

3. Results

3.1. Respondent characteristics, emotional intelligence, diabetes time management, perceived behavior control, and diabetes prevention behavior

Table 1 indicates that the majority of respondents were from the Department of Nutrition (34%), class of 2021 (34.4%), and females (78.9%). Most respondents, with a median age of 19, often inherited the risk of DM from their parents (60.8%). Their observed diabetes prevention behavior was notably lower, with a median score of 26 within a range of 0 to 63. However, emotional intelligence and diabetes time management showed promising scores, with median values of 47 and 57, respectively. Conversely, perceived behavior control displayed lower scores, with a median of 38 within a range of 6 to 96.

Table 1. Description of class, majors, gender, DM risk, age, emotional intelligence, diabetes time management, perceived behavior control, and diabetes prevention behavior

Variables	Frequency	Percentage (%)	Median (Min-Max)	Range
Class				
2018	33	15.8		
2019	45	21.5		
2020	59	28.2		
2021	72	34.4		
Major				
Public health	21	10		
Nursing	53	25.4		
Nutrition science	71	34		
Pharmacy	37	17.7		
Physical education	27	12.9		
Gender				
Man	44	21.1		
Woman	165	78.9		
DM Risk				
Parental History	127	60.8		
Obesity	39	18.7		
Parental history and obesity	43	20.6		
Age			19 (17 – 22)	
Emotional intelligence			47 (15 – 70)	10 – 70
Diabetes Time management			57 (15 – 80)	0 – 80
Perceived behavior control			38 (17 – 84)	6 – 96
Diabetes prevention behavior			26 (8 – 49)	0 – 63

3.2. Relationship between respondent characteristics, emotional intelligence, diabetes time management, perceived behavior control with diabetes prevention behavior

Table 2 shows no relationship between class (p=0.734) and majors (p=0.263) with diabetes prevention behavior. There was no significant relationship between gender (p=0.231), DM risk (p=0.664), age (p=0.064), and perceived behavior control (p=0.223) with diabetes prevention behavior. However, there was a relationship between emotional intelligence (p=0.000) and diabetes time management (p=0.001) with diabetes prevention behavior.

Table 2. Relationship between class, majors, gender, DM risk, age, emotional intelligence, diabetes time management, and perceived behavior control with diabetes prevention behavior

Variables	Diabetes Prevention Behavior			R	*p* value
	Mean (SD)	Median (Min–Max)	95% CI (Min – Max)		
Class****					
2018	26.82(6.33)		24.57 – 29.07		0.734
2019	27.04(5.96)		25.25 – 28.84		
2020	26.03(6.15)		24.43 – 27.64		
2021	25.85(6.90)		24.22 – 27.47		
Major**					
Public health		25 (12 – 39)			0.263
Nursing		26 (8 – 40)			
Nutrition science		26 (15 – 49)			
Pharmacy		25 (13 – 39)			
Physical education		29 (20 – 35)			
Gender*					
Man	114.69(6.03)		25.44 – 29.11		0.231
Woman	102.42(6.47)		25.06 – 27.05		
DM Risk**					
Parental history		26 (8 – 41)			0.646
Obesity		26 (12 – 41)			
Parental history and obesity		26 (15 – 49)			
Age***				0.128	0.064
Emotional intelligence***				0.285	0.000
Diabetes time management***				0.234	0.001
Perceived behavior control***				0.085	0.223

Note: *Mann-Whitney **Kruskal-Wallis ***Rank Spearman ****One-way ANOVA

3.3. Dominant factors related to diabetes prevention behavior in students with diabetes risk

In this study, variables with p<0.25 and numerical data scales, such as age (p=0.064), emotional intelligence (p=0.000), diabetes time management (p=0.001), and perceived behavior control (p=0.233), underwent multivariate analysis. The multivariate analysis involved multiple linear regression tests using the backward method. Table 3 reveals that variables with p>0.05 were excluded from the model due to their lack of association with diabetes prevention behavior, namely diabetes time management (p=0.304), perceived behavior control (p=0.168), and age (p=0.201).

The analysis results of the coefficient of determination in Table 3 show that the collective impact of the independent variables could explain 11.3% of diabetes prevention behavior. The regression model equation can be presented as: Diabetes prevention behavior = 16.286+0.213*EI. The positive constant value of 16.286 signifies the positive effect of the independent variable on emotional intelligence. The EC regression coefficient of 0.213 indicates that for every one-unit increase in KE, the Diabetes prevention behavior will increase by 0.213. Table 3 shows that the emotional intelligence variable has the most influence on diabetes prevention behavior, with a correlation coefficient (Beta) of 0.332.

Table 3. Dominant factors related to diabetes prevention behavior

Variables	B	Std. Error	Beta	T	*p*	R^2
Constant	16.286	2.024	-	8.045	0.000	0.113
Emotional intelligence	0.213	0.042	0.332	5.061	0.000	
Age	0.466	0.363	0.08	1.282	0.201	
Perceived behavior control	0.503	0.363	0.091	1.384	0.168	
Diabetes time management	0.038	0.037	0.075	1.030	0.304	

4. Discussion

This study investigated determinant factors influencing diabetes prevention behavior in college students with diabetes mellitus risk. The findings indicated a significant relationship between diabetes management time and emotional intelligence with diabetes prevention behavior. In contrast, no significant relationships were observed between perceived behavior control, class, gender, study major, age, and diabetes mellitus risk with diabetes prevention behavior. Emotional intelligence emerged as the most dominant influencing factor.

4.1. Respondent characteristics, emotional intelligence, diabetes time management, perceived behavior control, and diabetes prevention behavior

The majority of respondents in this study were from the 2021 class and majored in nutrition, yet these factors did not correlate with diabetes prevention behavior. This lack of distinction might be due to shared knowledge among students, which is in line with prior studies showing that most students have good knowledge of diabetes (Finurillah, 2021; Kharono et al., 2017). Knowledge plays a role in decision-making, as noted by Hailu et al. (2019), linking knowledge about diabetes to individual efforts in prevention. However, in this study, knowledge did not correlate, possibly because all students were health science majors. Also, the quota for new student admissions increased by 10% in the 2021/2022 period, thereby increasing the proportion of respondents from the 2021 batch. Additionally, the dominance of respondents from the Department of Nutrition is estimated to be related to their cooperative willingness to become respondents.

Concerning gender, this study revealed that most respondents were women. This aligns with the research of Antwi et al. (2020), indicating that the majority of respondents with diabetes risk are female. The hormonal influence of the monthly cycle makes the accumulation of body fat easier, increasing the risk of diabetes, particularly obesity, in women (Chen et al., 2023). In this research, gender did not correlate with diabetes prevention behavior, possibly because gender is known to have no direct effect on behavior (Venkataramani et al., 2019).

The respondents' ages in this study ranged from 17 to 22 years, with a median of 19, categorizing them as young adults, according to Dyussenbayev (2017). This result is in line with a study by Rao et al. (2017) regarding diabetes prevention behavior among health science students in India, in which the majority of respondents were at a young age, ranging from 17 – 35 years, with a median of 24.5. In this study, age did not show a relationship with diabetes prevention behavior, possibly because all respondents fell within the young age range. This is commonly associated with a low-risk perception among young individuals, potentially leading to neglect of diabetes prevention behavior (Antwi et al., 2020; Lestari et al., 2018).

Furthermore, the majority of respondents in this study had a risk of DM which was inherited from their parents. While this risk is associated with an increased likelihood of developing the condition, it does not directly affect behavior (Sirait et al., 2015). In this study, diabetes risk did not correlate with prevention behavior. This could be linked to individuals' varying levels of awareness regarding their risks and knowledge about appropriate preventive measures for diabetes (Ali et al., 2019; Mongiello et al., 2016; Setyopranoto et al., 2021).

This study observed a median value of 47 for the emotional intelligence variable, ranging from 15 to 70. According to the two-category formula by Azwar (2012), this emotional intelligence value is considered good as it surpasses the cut-point value. The dimension of sociability, highlighting social interaction abilities, had the highest value. This shows the good ability of respondents to socialize, contributing to increased self-confidence. This aligns with a previous study by Trigueros et al. (2019) that found that the most influential factor for emotional intelligence is social support in the form of peer interaction. Strong social support helps individuals get through times of crisis

and stress, thereby increasing self-confidence, which is a part of emotional intelligence that influences the implementation of diabetes prevention behaviors (Hill-Briggs et al., 2021; Lopez-Zafra et al., 2019).

The diabetes time management variable in this study exhibited a median value of 57, ranging from 15 to 80, which, based on Azwar's two-category formula (2012), indicates good time management as it surpasses the cut point value. Notably, the diabetes time management dimension with the highest score is goal setting and behavior that is consistent with personal values. This illustrates that the majority of respondents already have life goals and values to be achieved in the form of education, health, and overall life goals. The research of Alshutwi et al. (2019) also indicates that the majority of students maintain a daily priority record. Humans move on the basis of goals to be achieved. The ability to set goals affects time management, especially in daily health-related behavior, such as nutritional fulfillment and diabetes self-care (Indreica, 2019; Summers-Gibson, 2021).

The perceived behavior control variable in this study demonstrated a median value of 38, ranging from 17 to 84. It indicates low control according to the two-category formula by Azwar (2012) because the value is smaller than the cut-point value. The item in the perceived behavior control scoring highest was related to the "go green campus policy," which acted as a driving factor for implementing diabetes prevention behavior. This corresponds with Antwi et al.'s findings (2020), indicating students' relatively low perception of diabetes risks, with 30% uncertain about adopting healthy lifestyles, particularly for preventing type-2 diabetes mellitus.

Regarding diabetes prevention behavior, the variable showed a median value of 26, ranging from 8 to 49, falling into the low category based on Azwar's two-category formula (2012). Respondents indicated a preference for packaged drinks over water, and few engaged in health checks. Similarly, Finurillah (2021) also highlighted low diabetes prevention behavior among college students, with 158 respondents exhibiting poor dietary habits and 141 showing low levels of physical activity. This could be attributed to varying levels of awareness, which research has shown plays a pivotal role in adopting preventive behaviors against diseases (Abrignani et al., 2019; Mongiello et al., 2016; Setyopranoto et al., 2021). Implementing strategies such as a ten-week SMS reminder system for routine blood sugar checks and educational programs on diabetes prevention may help raise awareness among students (Damayanti et al., 2021). In addition, health services can also provide education with a self-instructional training system through experience-based health education (Wahyuni et al., 2021).

4.2. The relationship between emotional intelligence and diabetes prevention behavior

This study found that emotional intelligence correlated with diabetes prevention behavior. This finding is in line with a study by Pérez-Fernández et al. (2021), reporting that emotional intelligence helps individuals manage themselves related to diabetes. This is thought to be related to the respondent's ability to manage stress. Uncontrolled stress can increase blood sugar levels and reduce a person's ability to carry out daily activities, especially in maintaining their health (Sarrionandia & Mikolajczak, 2020). Based on multivariate analysis, emotional intelligence became the dominant factor influencing diabetes prevention behavior in this study. Previous research has stated that emotional intelligence helps people control their emotions, reduce anxiety, and adapt to social environments. This ability is certainly needed by every individual, especially among young people in implementing diabetes prevention behavior. Emotional intelligence helps a person consistently behave in various situations (Zeidner et al., 2012).

The level of emotional intelligence of respondents in this study is good but is at the lower limit, so it needs to be increased. Social support and knowledge can increase a person's emotional intelligence (Lolaty et al., 2014). Social support may come from family or peers, but at a young age, peer support is more dominant (Trigueros et al., 2019). Increasing peer influence can be done through collaboration with campus communities and organizations (Sabbah et al., 2020). Health activities involving communities and student organizations can reach young participants so that health promotion related to diabetes can be more targeted (Kristjansson et al., 2020). In addition, knowledge also affects a person's level of emotional intelligence, especially in determining decisions (Venkatesh & Fischer, 2019). Good knowledge of diabetes helps a person understand the risks that trigger the disease so that he realizes the need to carry out preventive behavior (Kharono et al., 2017; Shiferaw et al., 2020).

4.3. The relationship between diabetes time management and diabetes prevention behavior

The statistical results in this study showed a significant relationship between diabetes time management and diabetes prevention behavior. The strength of the correlation is weak with a positive direction of the relationship. This finding aligns with a previous study by Summers-Gibson (2021), which stated that time management helps individuals manage their diabetes. This study shows that most respondents could take the time to manage their health and manage time for the things they wanted. Previous research stated that the ability to set goals and maintain interpersonal relationships helps individuals have clear targets, especially for health (Mohammadkarim et al., 2015; Nakao et al., 2020).

The time management of respondents in this study is at a good level, so it needs to be maintained. In line with another study by Alshutwi et al. (2019), the majority of students have activity records and assist in time management during lectures. This helps students manage college activities, health, and personal desires (Chanie et al., 2020; Hassanzabeh & Ebadi, 2007). Other research also shows that assertiveness is needed to help someone focus on targets and maximize time according to their goals (Moneva & Bolos, 2020). A person with good assertiveness is able to reject things that are not in line with his goals in a wise way (Larijani et al., 2017). Increasing assertiveness can be done by counseling to increase self-esteem and active empowerment (Oducado, 2021).

4.4. The relationship between perceived behavior control and diabetes prevention behavior

The statistical results in this study showed no significant relationship between perceived behavior control and diabetes prevention behavior. The strength of the correlation is very weak with a positive direction of the relationship. This result is not in line with a study by Isnanda (2019), which found that perceived behavior control correlated with preventive behavior for type-2 diabetes. This difference is thought to be due to the absence of measurements related to anxiety in diabetes prevention behavior. Perceived behavior control is a construct that is widely used to measure a person's psychological condition (Mardiyono et al., 2011). In this study, perceived behavior control focuses on measuring perceived perceptions, types of support, and barriers that influence diabetes prevention behavior in respondents. Other research states that barriers are factors that cause diabetes prevention behavior in students to be challenging to raise, one of which is a sense of laziness (Al-Harbi, 2017; Lestari et al., 2018). Laziness acts as an inhibiting factor that cannot be controlled. Laziness arises because of a person's low motivation (Mauliya et al., 2020). Meanwhile, motivation can be increased by establishing a supportive environment (Hill-Briggs et al., 2021). Social support can be done by involving the community in forming attractive health promotions and activities, as well as involving policy makers in making rules and providing awards (Busse & Miranda, 2018; Kristjansson et al., 2020). The low perceived behavior control in this study is estimated to be related to the respondent's age. All respondents are in the same age range, namely young age. Someone at a young age has a low awareness of the dangers of diabetes, so they tend to enjoy life in inappropriate ways despite having good knowledge about diabetes (Antwi et al., 2020; Mongiello et al., 2016). Raising awareness needs to be done by empowering individuals in various activities related to diabetes management (Lin et al., 2020).

5. Implications and limitations

This study provides substantial implications for nursing, particularly concerning the young adult population susceptible to diabetes mellitus. The identified significant relationship between diabetes management time, emotional intelligence, and diabetes prevention behavior highlights the pivotal role of emotional intelligence in influencing preventive actions against diabetes. This underscores the urgency for targeted interventions to enhance emotional intelligence and fortify diabetes management practices among college students. Nurses can use this insight to drive further research on diabetes prevention behavior in young adults. This involves exploring emotional intelligence enhancement methods and creating interventions suitable for this group's specific needs. By leading research efforts in this area, nurses can significantly advance our understanding of effective diabetes prevention strategies. In addition, educational institutions can develop programs by collaborating with campus groups or organizations to improve diabetes mellitus prevention activities.

The researchers are aware that this study has limitations. It used a cross-sectional research design, allowing observation of conditions only at that specific time. To mitigate bias, the researchers expanded the sample size appropriately and randomized the selection of respondents.

6. Conclusion

This study found no correlation between class, major, gender, age, diabetes mellitus risk, and perceived behavior control with diabetes prevention behavior. However, it revealed a significant relationship between emotional intelligence and diabetes time management with prevention behavior. Emotional intelligence emerged as the dominant factor influencing diabetes prevention behavior among at-risk students. Future research could examine student activities and emotional management strategies to comprehend their impact on supporting diabetes prevention behavior more effectively.

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Author contribution

Yolanda Sri Bhunga (YSB), Arif Setyo Upoyo (ASU), and Nuriya Nuriya (NN) have a mutually supportive role in making this research publication. YSB and ASU contributed to the study's design and conception, while NN aided in manuscript preparation. YSB took the lead in writing the final draft and conducting data analysis.

Conflict of interest

The researcher states that there is no conflict of interest in this study.

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