Predictors of Type-2 Diabetes Self-Screening: The Impact of Health Beliefs Model, Knowledge, and Demographics

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Abstract: *Background*: Diabetes mellitus (DM) is a global health concern, and the intention to undergo diabetes self-screening among patients varies based on demographics and the Health Belief Model (HBM).

Objective: This study aimed to identify the factors associated with the intention to engage in DM self-screening.

Methods: This study included 404 participants with a 99% response rate. Saudi Arabian residents from the Jazan region, all diagnosed with type 2 diabetes, were enrolled. A validated, Arabic-translated, and structured questionnaire was used to collect data on demographics, family history, chronic disease status, DM knowledge, HBM constructs, and DM screening behavior. The study methods adhered to the STROBE Checklist for clear and reliable reporting.

Results: The study found that 24.5% of the participants were in the 35-44 age group and 67.3% were male. Regarding education, 52.2% had university-level education and 79.7% had no family history of DM. Among the participants, 62.1% reported no chronic disease. The mean knowledge score was 6.44 (SD = 2.01). The study revealed that 56.9% of the respondents intended to engage in DM screening. Factors associated with intention included age (65 and over had lower odds), gender (females had slightly higher odds), and education (school qualification had higher odds). Family history and chronic disease status did not significantly affect intention. Among the HBM constructs, higher perceived susceptibility increased the odds, higher perceived severity decreased the odds, and perceived benefits and barriers had no significant associations with intention.

Conclusions: This study provides valuable insights into the factors influencing the intention to engage in DM self-screening among diabetic patients. This understanding can guide targeted interventions to promote DM self-screening and enhance diabetes care outcomes.

Keywords: Diabetes Mellitus, Health Belief Model (HBM), Jazan Region, Saudi Arabia, Screening.

1. INTRODUCTION

Diabetes mellitus (DM) is a persistent metabolic dysfunction characterized by high blood sugar levels (hyperglycemia) that results from problems in the secretion and action of insulin or both [1,2]. This chronic disease affects millions of people globally and presents an enormous public health burden, with significant economic and social implications. According to estimates from the International Diabetes Federation (IDF), 537 million adults between the ages of 20 and 79 years had diabetes in 2021; by 2045, this figure is expected to increase to 783 million [3]. Therefore, there is an urgent need for effective strategies to prevent, manage, and control diabetes [4].

In Saudi Arabia, more than a quarter of adults are diagnosed with diabetes, which is considered a very high prevalence rate [5]. Rapid urbanization, changes in lifestyle, and genetic predisposition are the main factors responsible for this high prevalence rate. As diabetes is becoming increasingly prevalent in Saudi Arabia, it has major implications for the healthcare system since it leads to an increase in complications associated with heart disease, stroke, loss of sight, and kidney failure. Consequently, these complications not only affect individuals' health but also exert great pressure on health care facilities [1,6,7].

The Health Belief Model (HBM) is one of the most widely used theoretical frameworks to explain or predict behaviors. It states that people's willingness to engage in various types of conduct related to their well-being depends on their perceived susceptibility, severity, benefits, and barriers concerning such conduct [8,9]. HBM has been successful when applied to many health behaviors including diabetes self-management programs. For instance, in terms of diabetes screening, the HBM suggests that people are more likely to take part if they perceive they are at risk of developing the condition (high perceived susceptibility), believe it is a serious condition (high perceived severity), see value in early detection and prevention through tests such as screening(high perceived benefits), do not think there are many obstacles if any to testing(low perceived barriers), and have been advised by a healthcare provider, family, or friends to be screened (strong cues to action) [9-11]. By understanding the factors that influence individuals' perceptions and beliefs related to

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diabetes screening, health care professionals and researchers can develop interventions that effectively promote screening behaviors and improve early detection rates [12,13].

Within the field of DM screening behavior in diabetic patients, the HBM is essential for comprehending health-related behaviors [10]. The HBM is well-known for forecasting health behaviors, its use to screening behaviors in various populations seems to need for further improvement. This recognition emphasizes the need of customizing the HBM to the particular setting of diabetes screening for diabetic patients [10,11]. A more customized assessment of the components—such as perceived susceptibility to diabetes, perceived severity of the condition, perceived benefits of screening, perceived barriers to screening, cues to action for screening, and self-efficacy in engaging in screening activities—is essential to improve the relevance of the model in elucidating screening behaviors inside this demographic. By means of improved application of the HBM in the framework of diabetes screening behavior among diabetic patients, researchers can acquire deeper understanding of the elements influencing proactive engagements, so opening the path for more successful interventions aiming at supporting diabetes screening and preventive health measures among diabetic patients [9,14,15].

Timely intervention through early diagnosis is crucial to prevent complications associated with DM [16]. However, despite the high prevalence of diabetes in Saudi Arabia [1,6], as well as the potential use of HBM in promoting screening behaviors, there is little information on how the HBM constructs affect diabetes screening behaviors in this specific population [12,17]. The Asir study [18] focused on self-management among diagnosed type 2 diabetics within a single diabetes center, while our research addresses self-screening behavior in a community-based setting, providing broader insights. Unlike the Asir study, we applied the Health Belief Model (HBM) to examine psychological motivators like susceptibility and barriers, measured diabetes-related knowledge, and targeted early detection to encourage preventive healthcare. These distinctions make our study crucial for understanding and promoting self-screening behaviors, complementing the findings of the Asir study while addressing gaps in early intervention and broader community outreach. Therefore, this study aimed to address this knowledge gap by assessing how HBM constructs predict diabetes screening behaviors among diabetic adults in Saudi Arabia. This research provides valuable insights into what motivates individuals to undergo diabetes screening, enabling the development of culturally informed strategies for encouraging early detection and improving diabetes management in such populations.

2. METHODS

Study Design and Area and Participants

This study was conducted on participants from the Jazan region of Saudi Arabia following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines [19]. A convenience sample of adults aged > 18 years was selected from different sites within the Jazan region, such as community centers, primary health care units, and universities. The aim of this study was to explore self-screening practices among diabetic patients in a location characterized by high levels of prevalence and limited research. Participants with reported diabetes diagnoses, elevated fasting blood glucose levels, or documented use of antidiabetic medications were included. The use of the STROBE criteria ensured clear reporting, enhanced quality, and improved reliability of the results obtained during this research [19].

Sample Size

The sample size for this study was calculated based on the following assumptions: medium effect size of 0.3, power of 0.8, and alpha level of 0.05. Using a previous study's reported variance for diabetes screening intention and the sample size formula, a sample size of 404 participants was determined to be necessary to achieve sufficient statistical power to detect a significant relationship between HBM constructs and diabetes screening intention. Including a 10% non-response rate, 445 participants constituted the initial sample size.

Data Collection Process

To cover a wide range of the adult population, convenience sample technique targeted persons over 18 years from several sites, including community centers, main health care units, and universities. Potential volunteers were given comprehensive information on the goals of the research to enable wise decisions. Those qualified and interested were included after their adult condition in Jazan was verified. Face-to--face interviews conducted by qualified Arabic-speaking research assistants in strategic sites such residences or community centers helped participants to be ready for answering a questionnaire. Before data collecting, signed informed permission was sought from every participant to create a trustworthy and respectful atmosphere fit for accurate and reliable replies. Confidentiality was ensured.

Inclusion and Exclusion Criteria

Participants included in this study from the Jazan region of Saudi Arabia were adults over 18 years who were diagnosed with diabetes and provided informed consent, while those without self-reported diabetes, normal fasting blood glucose levels, or no documented use of antidiabetic medications were excluded. Verification of diabetic status in the Jazan region was required for inclusion, with the study adhering to the STROBE guidelines to ensure clear reporting and reliability.

Study Measures

This questionnaire included sections on demographic information (age, gender, education level, income level, family history of diabetes, and personal history of chronic conditions), knowledge of diabetes (assessed through true/false statements), HBM constructs (measuring perceived susceptibility, perceived benefits, perceived severity, cues to action, perceived barriers, and self-efficacy related to diabetes screening), and diabetes screening intention (a single item asking participants to indicate their intention to engage in self-screening behaviors). Each statement of the HBM construct was rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Participants' knowledge scores were determined by assessing their responses to true and false statements. The cumulative score for the ten items on the knowledge scale was obtained by adding the number of correct answers. A score of 10 indicated good knowledge, while a score of zero indicated a lack of knowledge. The mean score was calculated for the HBM constructs. This model includes perceived severity, susceptibility, barriers, benefits, cues to action, and self-efficacy. The mean score provides an average representation of participants' beliefs and attitudes towards health behaviors, allowing researchers to assess their overall perceptions and motivations. Constructs of the HBM were extracted from previous studies [9,11,12,15,20,21].

Quality Control and Pilot Study

A two-week interval was given to a subgroup of 25 randomly nominated respondents to retake the survey to evaluate the questionnaire's test-retest reliability. Test-retest reliability of a questionnaire evaluates the consistency of responses from the same individuals when the questionnaire is administered twice. It measures the stability and consistency of results over time, crucial for ensuring the questionnaire's reliability. The required adjustments were made: some questions were reworded, others were dropped, and the instruments were put back together and operated. The necessary modifications included a combination of rewording certain questions, omitting others that posed issues, and reconstructing and reactivating the instruments for the study. These changes were implemented to enhance clarity, address any ambiguities, and ensure the overall effectiveness of the research instruments. To assure content validity, expert reviews were conducted to ensure that the questionnaire items comprehensively captured the relevant constructs under investigation. The primary study sample did not include a pilot sample. Cronbach's alpha, a measure of internal consistency, was used to determine reliability. Alpha coefficients of 0.70 or greater were regarded as satisfactory [22]. The Cronbach's alpha indicated that the instrument's overall reliability was 0.95.

Data Analysis

Statistical Package for Social Sciences (SPSS) version 26 was used to revise, code, and analyze the data. Participants' beliefs and attributes were characterized using frequencies (percentages) and means (±SD), as appropriate. The demographic characteristics and knowledge levels of the participants were summarized using descriptive statistics. Inferential statistics were assessed using Student's t-test and one-way ANOVA tests. The relationship between the HBM constructs and self-screening intention was investigated using logistic regression analysis. To be more precise, multiple linear regression was implemented to ascertain the degree to which the HBM constructs predicted the screening intention of individuals, while accounting for demographic variables and knowledge scores. The crude odds ratio (OR) was calculated by incorporating each variable individually into the logistic regression models. Statistical significance was determined for values less than 0.05.

Ethical Considerations

The Standing Committee for Scientific Research, Jazan University (HAPO-10-Z-001), Saudi Arabia approved the study and was conducted in accordance with the Declaration of Helsinki (reference Number: REC-44/06/463).

3. RESULTS

A total of 404 participants were included in this study. The response rate was found to be 99%. Table **1** presents the descriptive statistics of the demographic variables. The table includes information on the number (N) and percentage (%) of participants in the different categories. For the variable "Age," participants were grouped into six categories, with the highest percentage in the 35-44 age group (24.5%) and the lowest in the 18-24 and 25-34 age groups (both 13.4%). The "Gender" variable shows that 67.3% of participants were male, while 32.7% were female. In terms of "Education," the majority of participants had a university-level education (52.2%), followed by a school qualification (31.4%), post-graduate education (9.7%), and a smaller proportion were illiterate (6.7%). The variable "Family History of DM" indicated that 79.7% of participants had no family history of diabetes mellitus, while 20.3% reported a positive family history. Regarding "chronic diseases," 62.1% of participants reported having no Chronic Disease, while 37.9% reported having one or more chronic diseases.

Table **1** compares the knowledge scores across various factors in the study. These factors included

Table 1: Descriptive Statistics and of the Demographic Variables and Comparison of the Knowledge Score between these Factors

Variables	N	%	Knowledge Score
Age			
18-24	54	13.4	6.74±1.81
25-34	54	13.4	6.74±1.63
35-44	99	24.5	6.02±2.12
45-54	72	17.8	6.31±2.08
55-64	64	15.8	6.39±1.82
65 and over	61	15.1	6.78±2.31
Gender			
Male	272	67.3	6.51±1.98
Female	132	32.7	6.29±2.06
Education			
Illiterate	27	6.7	6.25±1.58
School Qualification	127	31.4	6.39±1.87
University Level	211	52.2	6.54±2.14
Post-graduate	39	9.7	6.17±1.98
Family History of DM			
No	322	79.7	6.47±2.00
Yes	82	20.3	6.29±2.06
Chronic Disease			
No	251	62.1	6.39±1.89
Yes	153	37.9	6.52±2.19
Willingness to participate in diabetes screening			
No	174	43.1	6.45±2.10
Yes	230	56.9	6.42±1.94
Total	404	100	6.44±2.01

N: Number; %: Percentage; DM: Diabetes mellitus. Comparison was conducted using Student-t and One-way ANOVA tests.

age, gender, education level, family history of DM, and chronic disease status. The table presents the mean knowledge score and standard deviation for each factor. No significant differences were found in the knowledge scores of the different factors examined. The overall mean knowledge score of the total sample was 6.44 with a standard deviation of 2.01. Table **1** displays the extent of the intention to engage in diabetes screening behaviors among the participants. The data shows that 174 participants, accounting for 43.1% of the total sample, responded "No" to the question. On the other hand, 230 participants, making up 56.9% of the total sample, responded "Yes."

Table **2** presents the descriptive statistics for the HBM constructs. The table includes the number of observations (N), minimum and maximum values, means, and the SD (SD) for each HBM construct. The construct of Perceived Susceptibility had a mean of 2.90 with an SD of 1.00. The perceived Severity had a mean of 3.11, with an SD of 1.50. Perceived Benefits had a mean of 3.28 with an SD of 1.00. Perceived Barriers had a mean of 3.87 with an SD of 2.33. Cues to Action had a mean of 3.90 with an SD of 2.67. Additionally, the construct of self-efficacy is provided with a mean of 3.64 and an SD of 2.00. The analysis of HBM constructs in Table **2** revealed significant differences across demographic variables. Gender significantly influenced perceived severity, benefits, and barriers, with females reporting higher severity and barriers, while males reported higher benefits. Education was a strong predictor across several constructs; higher education levels were associated with increased perceived susceptibility, fewer barriers, and higher self-efficacy, while illiterate participants reported higher cues to action. Family history of DM

Table 2: Descriptive Statistics and of the Demographic Variables and Comparison of the HMB Constructs between these Factors

Variables	Perceived Susceptibility	Perceived Severity	Perceived Benefits	Perceived Barriers	Cues to Action	Self-Efficacy
Mean±standard deviation						
Age	2.67±1.06	3.15±0.67	3.18±0.92	3.85±0.56	3.88±0.42	3.74±0.59
18-24	3.17±0.92	2.92±0.76	3.45±0.91	3.85±0.56	3.90±0.41	3.49±0.77
25-34	2.88±1.02	3.07±0.69	3.38±0.87	3.87±0.53	3.90±0.42	3.55±0.69
35-44	2.97±0.99	3.12±0.70	3.28±0.89	3.91±0.52	3.96±0.34	3.69±0.68
45-54	2.83±1.00	3.20±0.70	3.19±0.92	3.82±0.58	3.91±0.40	3.67±0.66
55-64	2.89±0.97	3.20±0.70	3.13±0.98	3.91±0.51	3.81±0.46	3.73±0.61
65 and over	2.67±1.06	3.15±0.67	3.18±0.92	3.85±0.56	3.88±0.42	3.74±0.59
Gender						
Male	2.95±1.03	3.00±0.71*	3.42±0.89*	3.82±0.56*	3.89±0.41	3.64±0.69
Female	2.79±0.93	3.33±0.64	2.98±0.89	3.98±0.48	3.90±0.40	3.63±0.65
Education						
Illiterate	2.61±1.09	3.11±0.64	3.37±0.79	3.64±0.65*	4.04±0.30	3.81±0.50
School Qualification	2.95±1.00	3.06±0.72	3.35±0.90	3.94±0.45	3.91±0.42	3.55±0.76
University Level	2.87±1.01	3.11±0.70	3.27±0.92	3.84±0.57	3.87±0.40	3.65±0.64
Post-graduate	3.06±0.84	3.23±0.73	3.01±0.94	3.91±0.49	3.87±0.45	3.77±0.61
Family History of DM						
No	2.89±1.01	3.09±0.69	3.32±0.89	3.90±0.52*	3.93±0.38*	3.66±0.65
Yes	2.95±0.97	3.16±0.75	3.13±0.98	3.73±0.58	3.74±0.48	3.57±0.76
Chronic Disease						
No	2.78±1.04	3.11±0.68	3.29±0.88	3.83±0.57	3.93±0.39*	3.67±0.67
Yes	3.09±0.89	3.10±0.74	3.26±0.96	3.93±0.48	3.83±0.43	3.59±0.68
Total	2.90±1.00 (1.00, 4.00)	3.11±1.50 (1.50, 4.00)	3.28±1.00 (1.00, 4.50)	3.87±2.33 (2.33, 4.33)	3.90±2.67 (2.67, 4.67)	3.64±2.00 (2.00, 4.50)

N: Number; %: Percentage; DM: Diabetes mellitus. Comparison was conducted using Student-t and One-way ANOVA tests. *Significant at 0.05.

showed less overall significance but was associated with slightly higher perceived susceptibility. These findings highlight the importance of tailoring interventions to demographic characteristics to improve diabetes screening behaviors.

The table displays the Pearson correlation coefficients among HBM constructs, highlighting significant relationships. Perceived susceptibility negatively correlates with perceived severity ($r = -0.502$, $p < 0.01$) and self-efficacy ($r = -0.348$, $p < 0.01$) but positively correlates with perceived benefits ($r = 0.388$, $p < 0.01$) and barriers ($r = 0.247$, $p < 0.01$). Perceived severity has a strong negative correlation with perceived benefits ($r = -0.834$, $p < 0.01$) and a weak positive correlation with perceived barriers ($r = 0.159$, $p < 0.01$). Perceived benefits positively correlate with cues to action ($r = 0.244$, $p < 0.01$) but negatively correlate with barriers ($r = -0.200$, $p < 0.01$). Perceived barriers negatively correlate with self-efficacy ($r = -0.231$, $p < 0.01$). Cues to action and self-efficacy showed no significant strong correlations with other constructs, indicating more isolated relationships. These findings emphasize the interplay among HBM constructs, informing targeted interventions for promoting health behaviors.

Table **4** shows the results of a multivariate logistic regression analysis examining the predictors of intention to engage in self-screening behavior. The table includes crude odds ratios, 95% confidence intervals, adjusted odds ratios, and their respective confidence intervals for each predictor variable. The predictor variables analyzed in the study included age, gender, education level, family history of DM, chronic disease status, perceived severity, perceived susceptibility, perceived benefits, perceived barriers, cues to action, self-efficacy, and knowledge score. For the age category, compared to the reference group (18-24), the odds ratios indicate that individuals in the 25-34, 35-44, 45-54, and 55-64 age groups did not show significant differences in their adjusted odds of intention to engage in diabetes screening behaviors. However, individuals aged 65 and over had significantly lower adjusted odds (0.48) than the reference group. In terms of gender, females had an adjusted odds ratio of 1.25, indicating a slightly higher likelihood of intending to engage in diabetes screening behaviors compared to males, although the difference was not statistically significant. Regarding education level, individuals with a school qualification had significantly higher adjusted odds (3.24) of intention to engage in diabetes screening behaviors than illiterate individuals. However, there were no significant differences in intentions observed for those with a university level or postgraduate education. Family history of DM and chronic disease status were not significantly associated with the intention to engage in diabetes screening behaviors. Among the perceived HBM constructs, perceived susceptibility had a significant positive association with intention, with an adjusted odds ratio of 4.67. Perceived severity showed a significant negative association (adjusted odds ratio of 0.40), indicating that individuals with higher perceptions of severity were less likely to intend to engage in diabetes screening behaviors. Perceived benefits were not significantly associated with intention, whereas perceived barriers showed a significant negative association (adjusted odds ratio of 0.49), suggesting that higher perceived barriers were associated with lower intention. Cues to action and self-efficacy did not show significant associations with intention, and the knowledge score did not have a significant association.

4. DISCUSSION

Continuous screening of diabetes is crucial for timely initiation of treatment and prevention of disease progression. Although diabetes programs have shown

Table 3: Pearson Correlation Matrix for Health Belief Model (HBM) Constructs

Constructs	Perceived Susceptibility	Perceived Severity	Perceived Benefits	Perceived Barriers	Cues to Action	Self-Efficacy
Perceived Susceptibility	1					
Perceived Severity	-0.502**	1				
Perceived Benefits	0.388**	-0.834**	1			
Perceived Barriers	0.247**	0.159**	-.200**	1		
Cues to Action	0.018	-0.110*	.244**	-.199**	1	
Self-Efficacy	-.348**	0.006	-0.051	-.231**	-0.083	1

*Significant at 0.05. **Significant at 0.01.

Table 4: Multivariate Logistic Regression

Predictors	Crude Odd Ratio	95% Confidence Interval		Adjusted Odd Ratio	95% Confidence Interval	
		Lower	Upper		Lower	Upper
Age						
18-24 (Reference group)						
25-34	2.21	1.00	4.87	0.90	0.31	2.63
35-44	1.26	0.65	2.45	0.83	0.32	2.11
45-54	1.30	0.64	2.65	0.79	0.28	2.22
55-64	1.12	0.54	2.32	0.88	0.32	2.45
65 and over	0.90	0.43	1.87	0.48	0.17	1.36
Gender						
Male (Reference group)						
Female	0.69	0.45	1.05	1.25	0.64	2.44
Education						
Illiterate (Reference group)						
School Qualification	**2.44***	1.05	5.68	3.24	0.93	11.29
University Level	1.39	0.62	3.11	1.27	0.38	4.30
Post-graduate	1.80	0.67	4.84	1.49	0.35	6.45
Family History of DM						
No (Reference group)						
Yes	0.958	0.588	1.562	0.94	0.45	1.94
Chronic Disease						
No (Reference group)						
Yes	1.35	0.90	2.03	0.99	0.55	1.76
Perceived Susceptibility	**4.59***	3.43	6.14	**4.67***	3.19	6.85
Perceived Severity	**0.16***	0.11	0.24	**0.40***	0.18	0.88
Perceived Benefits	**2.95***	2.25	3.85	1.33	0.79	2.23
Perceived Barriers	0.97	0.67	1.40	**0.49***	0.28	0.87
Cues to Action	0.91	0.56	1.48	0.48	0.23	1.00
Self-Efficacy	**0.67***	0.50	0.91	1.22	0.74	2.01
Knowledge score	0.99	0.90	1.09	1.11	0.95	1.25

*Significant at 0.05. Dependent variable: intention to engage in diabetes self-screening behaviors.

feasibility and can be implemented by various agencies and groups, a significant challenge has been the lack of standardized screening tests and interpretation guidelines [17,23]. This study aimed to identify the predictors of intention to engage in self-screening behaviors among diabetic patients. The findings contribute to a better understanding of the factors influencing individuals' intentions and can inform efforts to promote the continuous monitoring and prevention of diabetes.

The results presented in Table **1** compare knowledge scores across several factors in the study, including age, gender, education level, family history of DM, and chronic disease status. These outcomes demonstrate that these factors have little effect on participants’ knowledge scores. The lack of significant differences implies a similarity in levels of diabetes-related knowledge between individuals across different demographic and health backgrounds. With a mean knowledge score of 6.44 among the entire sample, it showed an average level of understanding among the study respondents (SD=2.01). A low standard deviation could imply uniformity in scores. This finding has implications for interventions and educational programs directed at enhancing diabetes awareness. A generalized approach to diabetes education might be effective irrespective of demographic or health-related differences, as no significant variations were observed based on the examined factors. Nevertheless, it is important to note that this finding is specific to the sample used; therefore, further research should be conducted in order to ascertain if these results hold true across other populations. Similar results have been reported in the USA [24,25], Ghana [26], and Saudi Arabia [1,6,7].

The results shown in Table **1** show that the study participants positively intend to engage in diabetes screening activities. This points to a positive attitude toward awareness of the need for diabetes screening and proactive health actions. Self-reported intentions may not always match behavior. More studies are required to evaluate the actual consumption of diabetes screening and investigate possible influences on the behavior of possible barriers or incentives. These results imply the use of the HBM to better grasp and remove obstacles and encourage diabetes screening. Our study findings on diabetes knowledge and screening intention align with the global need for proactive management of DM [2,4]. With millions of people affected by DM and its potential life-threatening complications, it is crucial to prioritize early detection and effective management. Our study emphasizes the importance of promoting diabetes-screening behaviors [16]. Overall, our study contributes to the broader context of proactive diabetes detection.

Several studies have investigated various aspects of diabetes self-management and the influence of HBMs on patient behavior [6,8-10,12,27,28]. Alanazi *et al*. (2024) examined the empowerment of adult patients with diabetes in their role as health educators within their families [6]. Ayele *et al*. (2012) focused on self-care behavior among patients with diabetes in Harari, Eastern Ethiopia [8]. Bett and Ade-Oshifogun (2024) conducted a study of Kenyan adults with T2DM and observed an increase in diabetic knowledge and self-efficacy levels after an educational program [27]. Dehghani-Tafti *et al*. (2015) identified the determinants of self-care in diabetic patients based on the HBM [28]. Gillibrand and Stevenson (2006) explored the application of an extended HBM to the experience of diabetes in young people [10]. Harvey and Lawson (2009) emphasized the importance of HBMs in determining self-care behaviors in diabetes [9]. Melaniani (2018) evaluated the effect of diabetes self-management education based on HBM on psychosocial outcomes in Indonesian patients [29]. Nejadsadeghi *et al*. (2024) investigated the impact of theory-based education on promoting urinary tract infection prevention behaviors in elderly women with diabetes [30]. These comprehensive studies delve into various facets of diabetes self-management and the impact of HBMs on patient behavior, shedding light on topics such as empowerment in patient education, self-care behaviors, and the influence of HBMs on different dimensions of diabetes care, collectively enriching our understanding of how HBMs shape and influence diabetes self-care behaviors and patient outcomes.

The multivariate logistic regression analysis's findings shown in Table **4** help to clarify the DM self-screening intention prediction factors. Among the factors under investigation, age turned out to be a major predictor; those 65 years of age and beyond showed less probabilities of intention than the reference group (18–24 age range). By contrast, variables like gender, education level, family history of diabetes mellitus (DM), and chronic illness status did not reveal significant correlations with intention for diabetes screening. Especially, intention was positively correlated with perceived susceptibility, indicating that those who felt more likely to have diabetes were more likely to plan to get screened. On the other hand, intention showed a negative correlation with perceived severity, meaning that individuals who saw diabetes as less severe were more likely to indicate intention for screening. Moreover, intentions were shown to be inversely correlated with perceived obstacles, indicating that larger reported hurdles hampered people's intentions for diabetes screening. In this study, meanwhile, signals to action, self-efficacy, and knowledge scores showed no significant correlation with intention. These results highlight the importance of age, perceived sensitivity, perceived severity, and reported hurdles in determining people's inclinations to engage in diabetes screening programs.

The findings from the preceding research are consistent with our findings on the importance of addressing barriers to optimizing diabetes screening tests among DM patients. This study underscores that perceived barriers constitute a significant factor influencing test usage and intention to screen for diabetes [14]. Another study found that individuals' intention to undergo diabetes testing is influenced by their perception of susceptibility to the disease [31]. One study discovered that individuals who lacked a perception of the seriousness of diabetes were more likely to exhibit poor behaviors related to the prevention of complications associated with the disease [13]. One study found that the essential elements of the HBM influenced health-related behavior, and that the variance in measured health-related behavior accounted for by the perceived benefits and barriers was small (< 10.0%) [11].

5. LIMITATIONS

However, this study has some limitations, including the use of a convenience sample, self-report data collected, cross-sectional design, single-item measure of screening intention selected, and its limited geographic scope. Therefore, these factors can restrict generalization and establish causes between constructs related to the HBM and screening behaviors of DM. Further research using strict methodologies is required to validate our findings in different population groups.

6. CONCLUSION

Finally, this research clarifies the complex dynamics influencing diabetes screening behavior among 404 DM patients. Demographic analysis revealed a predominantly male, university-educated population with a low family history of diabetes and chronic disorders. Awareness levels were similar across groups, yet over half expressed an intention for DM self-screening. Correlation analysis demonstrated significant relationships among Health Belief Model (HBM) constructs. Perceived susceptibility was particularly influential among older individuals and those with lower education levels, as logistic regression highlighted age and education as critical determinants of screening behavior. Notably, perceived benefits were strongly associated with cues to action, emphasizing the importance of actionable health information in promoting screening. These findings underline the necessity of tailored interventions that address perceived obstacles, enhance self-efficacy, and emphasize susceptibility and benefits to motivate screening. Educational strategies should focus on reducing perceived severity and barriers, especially for populations with limited education, while promoting cues to action to foster proactive health behaviors. The results validate the critical role of HBM constructs in shaping screening intentions and provide a roadmap for designing effective, culturally sensitive interventions aimed at advancing diabetes screening and education.

ETHICAL APPROVAL

The study was conducted in accordance with the Declaration of Helsinki and was approved by the Standing Committee for Scientific Research, Jazan University (HAPO-10-Z-001), Saudi Arabia. (Reference No.: REC-44/06/463).

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Ahmed S. Alamer: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data curation, Resources, Supervision, Writing - original draft, Writing - review & editing, Project administration.

COMPETING INTERESTS

The author declares that they have no competing interests.

FUNDING

NIL.

ACKNOWLEDGEMENTS

NA.

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Received on 15-12-2024 Accepted on 10-01-2025 Published on 13-02-2025

https://doi.org/10.6000/1929-6029.2025.14.05

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