

Determination of Cardiovascular Risk Awareness and Related Factors in Patients with Diabetes Mellitus: A Mixed-Method Study

Diabetes Mellitus Hastalarında Kardiyovasküler Risk Farkındalığı ve İlişkili Faktörlerin Belirlenmesi: Karma Yöntem Araştırması

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Abstract

Objective: The study aimed to determine cardiovascular risk awareness and related factors in patients with diabetes mellitus.

Materials and Methods: The study was conducted between March 15, 2025, and December 2, 2025, using a mixed-methods design (descriptive, correlational, and phenomenological). A total of 154 patients participated in the quantitative phase, and 12 patients participated in the qualitative phase. The "Patient Information Form, Cardiovascular Risk Awareness Scale, and Semi-Structured Interview Form" were used for data collection. The study was conducted in two parts: a questionnaire was administered in the first, and interviews were conducted in the second. Data were collected through face-to-face interviews. SPSS 25 was used for the analysis of quantitative data, and MAXQDA 24 was used for the study of qualitative findings.

Results: The average cardiovascular risk awareness of the patients was 29.88±7.03. According to regression analysis, the independent variables predicted cardiovascular risk awareness with 21.5 percent accuracy (F = 6.982, p < 0.001). Cardiovascular risk awareness was directly affected by gender, occupation, marital status, treatment compliance, smoking, and exercise or walking (p < 0.005). The qualitative findings consisted of the main theme "disease management" and the subthemes "awareness, lack of knowledge, and fatalism."

Conclusion: The cardiovascular risk awareness of the patients was low. Individual factors significantly affected awareness. Eliminating patients' lack of knowledge may increase their understanding and prevent fatalistic tendencies.

Keywords: Diabetes mellitus, cardiovascular disease, risk, awareness

Öz

Amaç: Çalışma Diyabetes Mellitus'lu hastaların kardiyovasküler risk farkındalıklarının ve ilişkili faktörlerin belirlenmesi amacıyla yapıldı.

Materyal ve Metot: Çalışma 15 Mart 2025 ve 2 Aralık 2025 tarihleri arasında karma desen türünde (tanımlayıcı, ilişki arayıcı ve fenomenolojik tür) yapıldı. Nicel kısma 154 nitel kısma 12 hasta katıldı. Verilerin toplanmasında "Hasta tanıtım formu, kardiyovasküler risk farkındalığı ölçeği ve yarı yapılandırılmış soru formu" kullanıldı. Çalışma iki kısımda yürütüldü birinci kısımda anket yapıldı ikinci kısımda röportaj yapıldı. Veriler yüz yüze görüşme tekniği ile toplandı. Nicel verilerin analizinde SPSS 25, Nitel bulguların analizinde MAXQDA 24 programı kullanıldı.

Bulgular: Hastaların kardiyovasküler risk farkındalığı ortalamaları 29,88±7,03'tür. Regresyon analizine göre kardiyovasküler risk farkındalığını bağımsız değişkenler %21,5 oranında yordamaktadır (F=6,982, p<0.001). Kardiyovasküler risk farkındalığını, cinsiyet, meslek, medeni durum, tedavi uyumu, sigara kullanımı, egzersiz ya da yürüyüş yapma doğrudan etkilemektedir (p<0.005). Nitel bulgular ise "hastalık yönetimi" ana teması, "farkındalık, bilgi eksikliği ve kadercilik" alt temalarından oluşmuştur.

Sonuç: Hastaların kardiyovasküler risk farkındalığı düşüktür. Farkındalığı bireysel faktörler önemli oranda etkilemektedir. Hastaların bilgi eksikliğinin giderilmesi onların farkındalığını artırabilir ve kaderci yaklaşımlarını önleyebilir.

Anahtar Kelimeler: Diabetes mellitus, kardiyovasküler hastalık, risk, farkındalık

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INTRODUCTION

Diabetes Mellitus (DM) is one of the chronic health problems of our century that threatens the health and lives of individuals.¹ According to the most recent data from the International Diabetes Federation, there are 589 million adults with diabetes worldwide, and this number is estimated to rise to 853 million in 2050.² In Türkiye, the number of adults with diabetes was 9.6 million in 2024, and this figure is projected to reach 14.1 million by 2050.²

In individuals with diabetes, many complications develop in the long term due to the condition. The most important of these are complications that affect the cardiovascular system.³ In these patients, coronary artery disease and subsequent heart failure caused by rapidly progressing atherosclerosis constitute the leading causes of diabetes-related morbidity and mortality.⁴ According to data from the World Health Organization (WHO), cardiovascular diseases (CVD) caused by atherosclerosis in diabetes mellitus rank first among chronic diseases and are among the top 10 causes of death in both developed and developing countries.⁵

In a global study conducted in 133 countries with a total of 12,695 individuals living with Type 2 DM to determine knowledge and awareness regarding CVD and related risk factors, it was found that nearly all participants had at least one CVD risk factor, and approximately 28 percent had a history of one or more cardiovascular events.⁴ In most studies in the literature concerning CVD risk factors among patients with diabetes, it was observed that patients lacked sufficient knowledge regarding CVD risk factors.^{3,6} Additionally, it was determined that the majority of diabetic patients had not received assistance from a specialist concerning their CVD risks.⁴

According to the literature, understanding the cardiovascular disease (CVD) risk factors in diabetic patients and assessing their awareness of these factors is extremely important for preventing CVD, identifying treatment gaps, and managing the disease. In this context, the aim of the study is to determine CVD risk awareness, views on the subject, and factors associated with CVD risk awareness among diabetic patients.

MATERIALS AND METHODS

Ethical Approval: Approval for the study was obtained from the ethics committee of Kahramanmaraş Sütçü İmam University (Date: 03.03.2025, decision no: 2025/08-10). Permission was obtained from the institution where the study was conducted. Informed consent was obtained from all participants in the study. Permission was obtained from the scale developers via e-mail. The study was conducted in accordance with the Helsinki Declaration.

Research Type: This study employs a mixed-methods approach, incorporating descriptive, correlational, and phenomenological characteristics. For reporting, the guidelines of the checklist developed for mixed-methods research methodology were used.⁷

Study Participants: Based on the study conducted by Karataş and Özdemir (2024), sample size estimation was performed using the mean scores of participants for “diabetes awareness and gender.” According to the analysis with a 5 percent margin of error, an 80 percent confidence level, and an effect size of 0.4615, the sample size was calculated to be 150 participants.⁸ The study was completed with 154 patients. Qualitative data were collected from 12 volunteer patients. For qualitative research, a sample of 10–15 individuals is sufficient for participation.⁹

Inclusion and Exclusion Criteria: Individuals aged 20 years and older, diagnosed with Type 2 DM for at least one year, with no communication barriers, and volunteers. Individuals who do not meet the inclusion criteria

Data Collection Tools

Patient Information Form: This form includes personal characteristics such as age, gender, educational status, and year of diagnosis. It was developed based on literature.^{8,10}

Cardiovascular Risk Awareness Scale: The scale was originally developed by Woringer et al.¹¹ The validity and reliability of the Turkish version were assessed by Vural et al.¹² The scale consists of 22 items. The first eight items measure knowledge level: each correct answer is worth 1 point, and incorrect or “I don't know” answers are worth 0 points. The first seven items are marked “correct,” and the eighth item is marked “incorrect.” The scale has three subdimensions: perceived heart attack/stroke risk, perceived benefits and intentions for change, and healthy eating intentions. It is scored using a 4-point Likert response (1= strongly disagree to 4= strongly agree). Higher scores on the scale and subdimensions indicate greater awareness regarding cardiovascular diseases. The Cronbach alpha coefficient of the scale is $\alpha = 0.80$. In the present study, the Cronbach alpha value was 0.88.

Semi-Structured Questions: The researchers developed these questions based on the items of the scale. They are evaluation-type questions. Support was obtained from four experts to develop the questions. One expert was from the field of educational sciences, and the remaining three were nursing experts. The questions were used to better understand participants' diet adherence and their perceptions regarding disease risk factors:

1. To what extent do you follow your DM diet?

2. How regularly do you take your medications?
3. If you do not follow your diet, how do you think your vessels and heart may be affected?

Data Collection: After obtaining consent, patients diagnosed with DM and meeting the inclusion criteria were asked the questionnaire items using a face-to-face interview technique. Their responses were recorded. For qualitative data, open-ended questions were asked of the 12 patients who agreed to participate in interviews. Their responses were recorded in written form.

Limitations: The study findings cannot be generalized to all diabetic patients due to the sample size (despite having sufficient power). In order to generalize these findings, studies on larger sample groups are needed. The lack of laboratory measurements is another limitation. Patients were only evaluated in a hospital setting, and long-term follow-up was not possible. The findings are limited to patient statements. Another limitation is the possibility that patients may have given biased answers due to social acceptability concerns. However, the use of both qualitative and quantitative assessments in the same study is a significant strength of the study.

Data Analysis: Quantitative data were analyzed using IBM SPSS 25.0. Numbers, percentages, means, standard deviations, etc., were used in the evaluation of the data. Normal distribution was assessed using skewness and kurtosis, accepting the range of -2 to $+2$. Pearson correlation analysis and linear regression analysis were performed. The variance inflation factor was kept below 5 in the regression model. A significance level of $p < 0.05$ was used. For qualitative analysis, content analysis was used. Interviews with patients were transcribed and decoded. After decoding, coding was performed, categories were formed, and data analysis was carried out through thematic analysis. MAX Qualitative Data Analysis Analytics Pro 2024 software was used. To ensure rigor and reflectivity, triangulation and validation were performed. The lead researcher conducted the analysis. Other expert readers reviewed all stages of the analysis to ensure the highest data quality, took notes, verified each other's notes, and validated the analysis. This stage ensured the reliability of the analysis. It verified that the data was correctly coded. In this way, the credibility, transferability, and suitability of the data were tested.

RESULTS

The participants' mean age was 50.44 ± 16.22 years. 50% were 51 years and above, 56.5% were female, 81.8% were married, 35.1% had secondary education, 46.1% were housewives, and 62.3% were unemployed. 47.4% of participants had been diagnosed with the disease 1 to 4 years prior, 71.4% had a first-degree relative with diabetes, 37.7% were being treated with oral tablets, 50% showed moderate adherence to treatment, 70.8% regularly monitored their blood sugar, 68.8% did not smoke, 92.9% did not consume alcohol, 54.5% had an additional chronic disease, 68.8% did not eat regularly, 92.2% did not exercise or walk, and 55.2% did not sleep regularly (Table 1).

Table 1. Descriptive characteristics of the participants.

| Variables | Data | |
|------------------------------|---------------------------|-----------|
| Age, Mean \pm SD (Min-Max) | 50.44 \pm 16.22 (20-86) | |
| Age, n (%) | 50 and below | 76(49.4) |
| | 51 and above | 78(50.6) |
| Gender, n (%) | Male | 67(43.5) |
| | Female | 87(56.5) |
| Marital status, n (%) | Married | 126(81.8) |
| | Single | 28(18.2) |
| | Widow | 0(0) |
| Education Status, n (%) | Literate | 27(17.5) |
| | Primary school graduate | 45 (29.2) |
| | Secondary school graduate | 54(35.1) |
| | Higher education graduate | 28(18.2) |
| Employment Status, n (%) | Yes | 58(37.7) |
| | No | 96(62.3) |
| Occupation, n (%) | Retired | 25(16.2) |
| | Housewife | 71(46.1) |
| | Self-employed/Worker | 36(23.4) |
| | Officer | 22(14.3) |

Continuation of **Table 1**

| Variables | | Data |
|--|---------------------------------------|-----------|
| DM diagnosis duration, n (%) | 1–4 years | 73(47.4) |
| | 5–9 years | 39(25.3) |
| | 10 years and above | 42(27.3) |
| Presence of DM history in first-degree relatives, n (%) | Yes | 110(71.4) |
| | No | 44(28.6) |
| Type of DM treatment, n (%) | Diet | 32(20.8) |
| | Oral antidiabetic tablets | 58(37.7) |
| | Insulin | 43(27.9) |
| | Oral antidiabetic tablets and insulin | 21(13.6) |
| How do you evaluate your treatment adherence? , n (%) | Good | 58(37.7) |
| | Moderate | 77(50.0) |
| | Poor | 19(12.3) |
| Regular blood glucose monitoring, n (%) | Yes, I do | 109(70.8) |
| | No, I do not | 45(29.2) |
| Smoking status | Yes | 48(31.2) |
| | No | 106(68.8) |
| Alcohol, n (%) | Yes | 11(7.1) |
| | No | 143(92.9) |
| Presence of additional chronic diseases, n (%) | Yes | 70(45.5) |
| | No | 84(54.5) |
| Regular nutrition, n (%) | Yes | 48(31.2) |
| | No | 106(68.8) |
| Exercise, n (%) | Yes | 12(7.8) |
| | No | 142(92.2) |
| Sleep regularity, n (%) | Yes | 69(44.8) |
| | No | 85(55.2) |

The participants' total score on the Cardiovascular Risk Awareness Scale was 29.88 ± 7.03 , the total score on the knowledge subscale was 4.50 ± 2.66 , the total score on the perceived heart attack/stroke risk subscale was 12.50 ± 2.86 , the total score on the healthy nutrition intention subscale was 9.01 ± 2.13 , and the total score on the perceived benefit and intention subscale was 3.84 ± 1.57 (Table 2).

Table 2. Total Scale and Subscale Scores.

| Scales and Subscales | Data |
|--|---------------------------|
| Cardiovascular Risk Awareness Scale total score, mean \pm SD (Min-Max) | $29.88 \pm 7.03(14 - 48)$ |
| Knowledge subscale total score, mean \pm SD (min-max) | $4.50 \pm 2.66(0 - 8)$ |
| Perceived heart attack/stroke risk subscale total score, mean \pm SD (min-max) | $12.50 \pm 2.86(7 - 24)$ |
| Healthy nutrition intention subscale total score, mean \pm SD (min-max) | $9.01 \pm 2.13(5 - 16)$ |
| Perceived benefit and intention subscale total score, mean \pm SD (min-max) | $3.84 \pm 1.57(2 - 8)$ |

There was a weak positive correlation between the total score of the Cardiovascular Risk Awareness Scale and marital status ($r = 0.164$, $p < 0.05$), a weak negative correlation between the total scale score and treatment adherence ($r = -0.213$, $p < 0.05$), a weak positive correlation between the total scale score and smoking status ($r = 0.235$, $p < 0.05$), a weak positive correlation between the total scale score and performing exercise or walking ($r = 0.227$, $p < 0.05$), and a weak positive correlation between the total scale score and regular nutrition ($r = 0.227$, $p < 0.05$). All results are statistically significant. (Table 3).

Table 3. Correlations Between Cardiovascular Risk Awareness and Individual Characteristics.

| | | |
|--|---|--------------|
| 1. Cardiovascular Risk Awareness Scale total score | r | 1 |
| | p | - |
| 2. Marital status | r | 0.164 |
| | p | 0.042 |
| 3. Treatment adherence | r | -0.213 |
| | p | 0.008 |
| 4. Smoking status | r | 0.235 |
| | p | 0.003 |
| 5. Exercise or walking | r | 0.227 |
| | p | 0.005 |
| 6. Regular nutrition | r | 0.242 |
| | p | 0.003 |

r: correlation coefficient, p < 0.05, Pearson correlation analysis.

The regression model for the independent variables affecting cardiovascular risk awareness was significant (F = 6.982, p < 0.001), explaining 21.5% of the variance. Cardiovascular risk awareness was directly influenced by gender, occupation, marital status, treatment adherence, smoking status, and engaging in exercise or walking (p < 0.005) (Table 4).

Table 4. Regression analysis of independent variables affecting cardiovascular risk awareness.

| Variables | β_0 (95% CI) | SD | β_1 | t | p | VIF |
|---------------------|--------------------------|-------|-----------|--------|--------------|-------|
| Fixed | 12.426 (2.094 – 22.757) | 5.228 | | 2.377 | 0.019 | |
| Gender | -2.306 (-4.573 – -0.039) | 1.147 | -0.163 | -2.011 | 0.046 | 1.283 |
| Occupation | 1.239 (0.114 – 2.364) | 0.569 | 0.162 | 2.177 | 0.031 | 1.080 |
| Marital status | 3.385 (0.733 – 6.037) | 1.342 | 0.186 | 2.523 | 0.013 | 1.063 |
| Treatment adherence | -2.557 (-4.111 – -1.004) | 0.786 | -0.241 | -3.253 | 0.001 | 1.069 |
| Smoking status | 2.443 (0.102 – 4.784) | 1.184 | 0.161 | 2.063 | 0.041 | 1.194 |
| Exercise or walking | 5.868 (1.661-10,076) | 2,129 | 0,224 | 2,757 | 0,007 | 1,292 |
| Regular nutrition | 1.900 (-0.905 – 4.706) | 1.420 | 0.126 | 1.339 | 0.183 | 1.715 |

F= 6,982; p< 0,001; Adjust R²= %21.5. SD: Standard Deviation. p<0.05.

In this study, one main theme, three subthemes, and 7 codes were identified. The code enabled the creation of sub-themes, and within those sub-themes, the main theme was created. The main theme was determined as “Disease Management,” and the subthemes were “Awareness, Lack of Knowledge, and Fatalism”. Patients' statements regarding cardiovascular diseases are presented in Table 5.

Table 5. Patient opinions regarding the sub-themes of awareness, lack of information, and fatalism under the theme of disease management.

| DISEASE MANAGEMENT | |
|--------------------|---|
| AWARENESS | P2 “I never eat harmful things such as bread, cake, or pastries. I walk every day and sleep at the same time. I do whatever my doctor and nurse tell me. I never skip my medications. I go for checkups continuously. As a result, this illness does not bother me much. I can comfortably carry out my daily tasks. I even work, contribute to my economy, and meet with friends. If you do what the doctor and nurses say and stay careful, managing this illness is not that difficult.” |
| | P3 “The doctor said, "If you don't pay attention to your diet, don't take your medication regularly, and don't walk, your arteries will become clogged, and you will have a heart attack.” |
| | P4 “This illness made me a high blood pressure patient.” |
| | P5 “I do not consume carbohydrates at all because they raise my blood sugar. If it stays high continuously, sugar clogs my blood vessels, and then I will experience vascular insufficiency. If it blocks my heart vessels, I will have a heart attack. I saw and heard all of this on television, Instagram, and videos. For this reason, I am scared, and I do not consume carbohydrates at all.” |
| | P6 “The doctor told me that if I do not have snacks, do not walk, and do not sleep regularly, this illness could damage my organs, cause a heart attack, or leave me paralyzed.” |
| | P7 “I absolutely do not eat harmful foods such as cakes, pastries, and snacks that raise my blood sugar. My blood sugar rises suddenly. If my blood sugar stays high continuously, sugar gets stored as fat in my body. It harms my vessels and heart. I could even have a heart attack. That is why I do not consume such harmful things.” |
| | P9 “I heard from my doctor that high blood sugar causes cholesterol. Increasing cholesterol apparently weakens and blocks the vessels. He told me these things. But nothing bad has happened to me so far.” |

P: Participants.

Continuation of **Table 5**

| | | |
|-------------------|---|--|
| LACK OF KNOWLEDGE | P1 | <i>"I do not believe in dieting. I take my medication after meals. I believe that it protects me."</i> |
| | P3 | <i>"The doctor said, 'If you do not pay attention to your diet, do not take your pills regularly, and do not walk, your vessels will get blocked, and you will have a heart attack.' But despite that, I still continue my habits as before."</i> |
| | P6 | <i>"I do not eat extremely harmful things like pastries and desserts. However, I do not consume fruits either. I do not have the habit. I never have snacks; I always forget and skip them. I never walk."</i> |
| | P7 | <i>"I cannot follow my diet, I am overweight because I love eating. Sometimes I feel chest pain. But I do not know how this illness affects my heart or whether this chest pain is related to it. I have not gone to the doctor, and I did not wonder."</i> |
| | P8 | <i>"Diabetes was inherited from my mother. I do not think it is related to eating. I do not believe in dieting, and I don't diet. I do not think foods raise cholesterol. And I do not believe they harm the heart. I think it is completely related to my genetics and not related to eating and drinking."</i> |
| | P10 | <i>"When I do not follow my diet, I certainly feel my blood sugar rising, and it disturbs me. Does this situation harm my vessels? I do not know anything about this and have never heard of it. My cholesterol is always high. But honestly, I never pay attention. I do not have time to walk either. Besides, I already do housework all the time, so I think I am active. I believe that this level of activity is enough for me."</i> |
| | P11 | <i>"When I go to the doctor, they take my blood and check my cholesterol. They say, 'Your blood sugar is high' and give me medication. I do not know why it rises. I never wondered or asked."</i> |
| | P12 | <i>"As women, we have gatherings. There are many pastries, cookies, and stuffed dishes. I cannot resist, and I eat them. Then I immediately feel sick and my sugar rises. Does my high sugar harm my vessels? I do not know at all. But I feel very uncomfortable. Does my heart get affected by this? I do not know about that either."</i> |
| | P1 | <i>"Almost everyone in my family had diabetes. My mother, aunt, and so on. They never dieted. They did not die from this illness; they passed away when their time came. I do not believe in dieting either."</i> |
| | P3 | <i>The doctor said, 'If you don't pay attention to your diet, take your medication regularly, and walk, your arteries will become clogged, and you will have a heart attack.' But despite that, I'm still doing the same old thing, continuing with my habits. I'm not paying attention."</i> |
| | P4 | <i>"This illness made me hypertensive. It has weakened my vessels and increased my cholesterol. There is nothing to do. I say it is God's will. I continue living the same way for however many days I have left. I do not pay attention to dieting."</i> |
| | P8 | <i>"Diabetes was inherited from my mother. I do not think it is related to eating. I do not believe in dieting, and I do not diet."</i> |
| P10 | <i>"I never diet for diabetes because I do not believe in it. As elders say, 'life comes from the throat,' so I eat everything without restricting myself."</i> | |

P: Participants.

DISCUSSION AND CONCLUSION

Cardiovascular diseases caused by atherosclerosis due to diabetes mellitus rank first among the top 10 causes of death listed by the World Health Organization.⁵ Therefore, knowing cardiovascular risk awareness in patients with DM, clarifying incorrect or missing aspects, and presenting relevant solutions are highly important. The findings of the present study are discussed below, supported by relevant literature.

The mean age of the patients in this study was 50.44 ± 16.22 , 56.5 percent were female, and 47.4 percent had been diagnosed with DM for 1 to 4 years. Advanced age and female gender are risk factors for the development of DM. There are studies in the literature supporting our findings and perspective. For example, one study reported that individuals over the age of 35 and females are at risk for DM.¹² In another study, the descriptive characteristics were similar, and it was reported that DM increases with advanced age and affects women the most.¹³ In this context, individual characteristics have a significant role in the management of DM. Patients should recognize their own characteristics and understand that these characteristics significantly contribute to the development of cardiovascular risk.

In the present study, patients had low cardiovascular risk awareness. Similarly, another study conducted with DM patients reported that patients had insufficient knowledge regarding cardiovascular diseases.¹³ In another study conducted with individuals with type 2 diabetes, it was reported that although the level of knowledge about cardiovascular diseases was above average, their levels of physical activity were inadequate.¹⁴ Knowing cardiovascular diseases while not implementing it is also not correct. Knowledge may not be meaningful unless it is applied. It was considered that adequate risk awareness had not been formed in these patients. Therefore, patients may have been unable to recognize the life-threatening risks awaiting them.

In the present study, cardiovascular risk awareness was positively correlated with occupation, marital status, smoking status, engaging in exercise or walking, and following a regular nutrition regimen. These factors positively affected cardiovascular risk awareness. The regression analysis confirmed this at a rate of 21 percent. In the regression analysis, gender and treatment adherence had a negative impact on cardiovascular risk awareness. These two factors negatively influenced cardiovascular risk awareness. This was attributed to females having lower treatment adherence than males. Because the majority of the participants were females, and based on the

descriptive characteristics, treatment adherence was inadequate (only 37.7 percent of the participants had good adherence).

To achieve cardiovascular risk awareness and successful disease management, having positive individual characteristics is highly important. A randomized controlled study showed that a 12-week structured exercise program effectively reduced insulin resistance in patients with type 2 diabetes, improved quality of life, increased functional capacity, and improved glycemic control.¹⁵ Although regular eating habits increased the predictor's share in the regression analysis, they did not directly affect people's awareness. Because the rate of irregular eating habits was 68.8%. However, nutrition is very important in diabetes management. For example, A randomized controlled study on nutrition in patients with DM reported that carbohydrate restriction provided metabolic benefits.¹⁶ In an experimental study examining the relationship between DM and smoking, smoking was reported as one of the significant triggers for the development of DM.¹⁷ In a meta-analysis, individuals living alone were found to have a significantly higher risk for DM.¹⁸ These examples from the literature reveal the importance of positive individual characteristics in stabilizing glucose profiles.

Cardiovascular risk awareness helps individuals exhibit positive health behaviors. The patients' statements under the "Awareness" subtheme support this view. Patients emphasized the importance of adhering to a healthy diet, exercising regularly, and getting sufficient sleep for effective disease management. They also highlighted that disease management becomes easier when they comply with the education provided by doctors and nurses. Because they could manage their illness, they were able to continue working and maintain their economic stability. One study reported that the higher an individual's awareness level, the higher their level of healthy behaviors.¹¹ Similarly, another study measuring DM risk and awareness reported that individuals who are aware of risk can protect themselves better¹⁹ It has been reported that patients with DM who are active in working life accept their illness more easily, take precautions against potential risk factors, and continue their lives more comfortably.²⁰

To achieve cardiovascular risk awareness, the knowledge deficits of patients should be addressed.²¹ In the qualitative findings, under the "Lack of Knowledge" subtheme, patients were unaware that their behaviors were incorrect and harmful to them. They considered their lack of knowledge fatalistic. In the "Fatalism" subtheme, they believed that this illness was their destiny. One study reported that an increase in fatalistic beliefs raised patients' blood glucose levels and HbA1c levels.²² Another study reported that nutrition literacy has a positive effect on patients' self-care behaviors.²³ Increasing health literacy is necessary to reduce fatalistic beliefs. Otherwise, inadequate health literacy may be associated with an increase in risky behaviors, a poor health profile, insufficient self-management, and higher hospitalization rates.²⁴ For these reasons, diabetes nursing coaches should be assigned to patients with DM. These coaches should continuously support patients with education in their personal, health, and social lives, motivate them, instill awareness of life-threatening risks, and regularly follow them. In this way, patients' self-efficacy and self-management may increase, and patients may develop healthy lifestyle choices. They may also recognize what awaits them.

In conclusion, cardiovascular risk awareness of DM patients is low. Individual characteristics significantly affect risk awareness. Community-based education and counseling services provided by nurses, combined with close monitoring through developed mobile applications, can increase patient awareness and adherence to treatment. An increased level of awareness may support positive lifestyle changes. Thus, patients may protect themselves from the fatal complications caused by diabetes mellitus and move away from fatalistic beliefs.

Ethical Approval: Approval for the study was obtained from the ethics committee of a Kahramanmaraş Sütçü İmam University (Date: 03.03.2025, decision no: 2025/08-10). Permission was obtained from the institution where the study was conducted. Informed consent was obtained from all participants in the study. Permission was obtained from the scale developers via e-mail. The study was conducted in accordance with the Helsinki Declaration.

Conflict of Interest: No conflict of interest was declared by the authors.

Author Contributions: Concept – AS, AS; Supervision – AS, AS; Materials – AS, AS; Data Collection and Processing – AS; Analysis and Interpretation – AS; Writing – AS, AS.

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Other Information: The quantitative findings of the study were presented as an abstract at the 3rd International Congress of Internal Medicine Nursing.

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