

ZDRAVSTVENA PISMENOST OBOLJELIH OD DIABETES MELLITUS-A NA PODRUČJU REGIJE PRIJEDOR

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Primljen: 03.06.2026.

Prihvaćen: 23.06.2026.

APSTRAKT

Uvod. Zdravstvena pismenost predstavlja sposobnost pojedinca da pristupi, razumije i koristi zdravstvene informacije radi donošenja odgovarajućih odluka o zdravlju. Kod osoba oboljelih od diabetes mellitusa ona ima poseban značaj zbog složenosti samokontrole bolesti, pridržavanja terapije i prevencije komplikacija. Cilj ovog rada bio je ispitati nivo zdravstvene pismenosti kod osoba oboljelih od diabetes mellitusa i utvrditi povezanost između sociodemografskih karakteristika i zdravstvene pismenosti.

Materijal i metode. Istraživanje je sprovedeno kao studija presjeka u periodu od 1. aprila do 1. juna 2025. godine među 61 članom Udruženja dijabetičara Prijedor. Za procjenu zdravstvene pismenosti korišten je standardizovani upitnik DKQ-24, koji obuhvata pet domena: etiologiju i simptome

HEALTH LITERACY AMONG PATIENTS WITH DIABETES MELLITUS IN THE PRIJEDOR REGION

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Received: June 3, 2026

Accepted: June 23, 2026

ABSTRACT

Introduction. Health literacy refers to an individual's ability to access, understand, and utilize health-related information in order to make appropriate decisions regarding their health. Among individuals with diabetes mellitus, health literacy is of particular importance due to the complexity of disease self-management, treatment adherence, and prevention of complications. Objective. To assess the level of health literacy among individuals with diabetes mellitus and to examine the association between sociodemographic characteristics and health literacy. Material and methods. A cross-sectional study was conducted between April 1 and June 1, 2025, among 61 members of the Diabetes Association of Prijedor. Health literacy was assessed using the standardized Diabetes Knowledge Questionnaire (DKQ-24),

dijabetesa, srednji nivo njege, komplikacije dijabetesa, dijetu i tretman te osnovnu njegu. Podaci su analizirani primjenom deskriptivne statistike, χ^2 testa, Studentovog t-testa i ANOVA testa, uz nivo statističke značajnosti $p < 0,05$.

Rezultati. Uzorak je činilo 36,1% muškaraca i 63,9% žena, prosječne starosti 55,26 godina. Najveći nivo znanja ispitanici su pokazali u domenu osnovne njege ($Me=2,90$), dok je najniži nivo znanja zabilježen u domenu srednjeg nivoa njege ($Me=0,87$). Statistički značajna razlika prema polu utvrđena je samo u domenu osnovne njege, pri čemu su žene ostvarile bolje rezultate ($p=0,012$). Nisu utvrđene statistički značajne razlike u zdravstvenoj pismenosti u odnosu na mjesto stanovanja, nivo obrazovanja i starosnu dob ($p > 0,05$). U odnosu na tip dijabetesa, značajna razlika zabilježena je u domenu dijetu i tretmana ($p=0,042$), gdje su ispitanici sa dijabetesom tipa 2 pokazali viši nivo znanja.

Zaključak. Ispitanici su pokazali zadovoljavajući nivo znanja o osnovnoj njezi dijabetesa, dok su nedostaci uočeni u segmentu srednjeg nivoa njege. Pol i tip dijabetesa predstavljaju faktore povezane sa pojedinim aspektima zdravstvene pismenosti, dok mjesto stanovanja, obrazovanje i starosna dob nisu pokazali značajan uticaj. Rezultati ukazuju na potrebu za kontinuiranom i ciljano usmjerenom edukacijom osoba oboljelih od dijabetesa.

Ključne riječi: zdravstvena pismenost, diabetes mellitus, samoupravljanje bolešću, edukacija pacijenata, hronične bolesti.

which comprises five domains: etiology and symptoms of diabetes, intermediate level of care, diabetes-related complications, diet and treatment, and basic care. Data were analyzed using descriptive statistics, the chi-square test, Student's t-test, and one-way analysis of variance, with the level of statistical significance set at $p < 0.05$.

Results. The study sample consisted of 36.1% men and 63.9% women, with a mean age of 55.26 years. Participants demonstrated the highest level of knowledge in the domain of basic care (Mean = 2.90), whereas the lowest level of knowledge was observed in the intermediate care domain (Mean = 0.87). A statistically significant gender difference was identified only in the domain of basic diabetes care, with women achieving better results than men ($p = 0.012$). No statistically significant differences in health literacy were observed according to place of residence, educational level, or age ($p > 0.05$). Regarding diabetes type, a significant difference was found in the diet and treatment domain ($p = 0.042$), where participants with type 2 diabetes demonstrated higher levels of knowledge.

Conclusion. Participants demonstrated a satisfactory level of knowledge regarding basic diabetes care, whereas deficiencies were identified in the domain of intermediate care. Gender and type of diabetes were associated with specific aspects of health literacy, while place of residence, educational attainment, and age showed no significant influence. The findings highlight the need for continuous and targeted educational interventions for individuals living with diabetes.

Keywords: health literacy, diabetes mellitus, disease self-management, patient education, chronic diseases.

UVOD

Svjetska zdravstvena organizacija je zdravstvenu pismenost definisala kao kognitivne i socijalne vještine i kapacitete potrebne za pristup, razumijevanje i korišćenje informacija na način koji promoviše i štiti dobro zdravlje. Ukratko se može definisati kao sposobnost donošenja adekvatnih odluka, koje se tiču zdravlja u svakodnevnom životu [1,2]. Zdravstvena pismenost je termin od sve većeg značaja u zdravstvenoj zaštiti i javnom zdravlju, a uveden je sedamdesetih godina prošlog vijeka. Ona predstavlja ne samo pozicioniranje vlastitog zdravlja, nego i zdravlja porodice i zajednice, kao i faktora koji utiču na zdravlje. Što je osoba zdravstveno pismenija, ima veću sposobnost da preuzme odgovornost za lično zdravlje, zdravlje porodice i zdravlje šire okoline. Brojne studije su pokazale da je nizak nivo zdravstvene pismenosti usko povezan sa učestalijim pozivima hitne službe, većom upotrebom lijekova, povećanim rizikom za hospitalizaciju, većim stopama smrtnosti starijih osoba, kao i slabijom sposobnošću upravljanja hroničnim bolestima kao što je diabetes mellitus [3]. Diabetes mellitus (šećerna bolest), danas predstavlja jednu od najrasprostranjenijih hroničnih bolesti savremenog doba, s konstantnim porastom prevalencije širom svijeta uključujući Bosnu i Hercegovinu i Republiku Srpsku. Karakteriše je poremećaj metabolizma, ugljenih hidrata, masti i proteina, uslijed apsolutnog ili relativnog nedostatka inzulina. Bolest se svrstava među vodeće javnozdravstvene izazove današnjice zbog svoje visoke prevalencije, progresivne prirode i ozbiljnih komplikacija koje značajno utiču na morbiditet, mortalitet i kvalitet života oboljelih [4]. Upravo zbog visokog stepena složenosti, liječenje podrazumijeva i ospežnu edukaciju o samonjezi i samoupravljanju bolešću. Zahtjevi koji se postavljaju pred osobe sa dijabetesom dodatno su otežani činjenicom da se samonjega često zasniva na štampanim edukativnim materijalima i usmenim uputstvima, te zahtijeva

INTRODUCTION

The World Health Organization (WHO) has defined health literacy as the cognitive and social skills and capacities required to access, understand, and use information in ways that promote and maintain good health. In brief, it can be defined as the ability to make appropriate health-related decisions in everyday life [1,2]. Health literacy is a term of increasing importance in healthcare and public health, having been introduced in the 1970s. It encompasses not only an individual's own health but also the health of their family and community, as well as the factors that influence health. The more health literate a person is, the greater their ability to take responsibility for their own health, the health of their family, and the health of the wider community. Numerous studies have shown that low levels of health literacy are closely associated with more frequent emergency service utilization, increased medication use, a higher risk of hospitalization, higher mortality rates among older adults, and poorer ability to manage chronic diseases such as diabetes mellitus [3]. Diabetes mellitus (DM) is currently one of the most widespread chronic diseases of modern times, with a continuously increasing prevalence worldwide, including in Bosnia and Herzegovina and Republika Srpska. It is characterized by disturbances in the metabolism of carbohydrates, fats, and proteins due to an absolute or relative deficiency of insulin. The disease is considered one of the leading public health challenges today because of its high prevalence, progressive nature, and serious complications that significantly affect morbidity, mortality, and the quality of life of affected individuals [4]. Due to its high level of complexity, treatment also requires extensive education on self-care and self-management. The demands placed on individuals with diabetes are further complicated by the fact that self-care is often based on printed educational materials and verbal instructions, requiring well-developed health literacy skills [4]. Previous research has shown that health literacy is an important predictor of successful

razvijene vještine zdravstvene pismenosti [4]. Dosadašnja istraživanja pokazuju da je zdravstvena pismenost važan prediktor uspješnog upravljanja hroničnim bolestima, uključujući diabetes mellitus. Nizak nivo zdravstvene pismenosti povezan je sa slabijom kontrolom bolesti, češćim hospitalizacijama, većim rizikom od komplikacija i lošijim zdravstvenim ishodima. Osobe sa dijabetesom svakodnevno donose odluke vezane za ishranu, terapiju i samokontrolu bolesti, što zahtijeva adekvatno razumijevanje zdravstvenih informacija. Iako je značaj zdravstvene pismenosti u liječenju dijabetesa dobro prepoznat, podaci o njenom nivou među oboljelima u lokalnoj zajednici i dalje su ograničeni. Zbog toga je opravdano sprovesti ovo istraživanje kako bi se procijenio nivo zdravstvene pismenosti i znanja o dijabetesu te identifikovale oblasti u kojima je potrebno unaprijediti edukativne intervencije i podršku pacijentima. Cilj istraživanja je bio da se ispita zdravstvena pismenost oboljelih od diabetes mellitus-a, te da se ispita povezanost između sociodemografskih karakteristika i nivoa zdravstvene pismenosti.

MATERIJAL I METODE

Istraživanje je sprovedeno kao studija presjeka, u periodu od 1.4. 2025. do 1.6.2025. godine. Studijom je obuhvaćen 61 član Udruženja dijabetičara Prijedor. Kriterijumi za uključivanje u studiju su bili: Dijagnostikovan DM tip 1 ili tip 2, starost 20 i više godina, oba pola, sposobnost da razumije pitanja u upitniku i da dobrovoljno učestvuju u istraživanju. Kriterijumi za neuključivanje su bili: Osobe koje nisu u mogućnosti da samostalno popune upitnik (kognitivna i mentalna oštećenja), osobe mlađe od 20 godina i osobe zdravstvene struke. U istraživanju je korišten DKQ-24 standardizovani upitnik (Diabetes Knowledge Questionnaire) sačinjen od 24 pitanja zatvorenog tipa. To je standardizovani instrument za procjenu znanja osoba o dijabetes melitusu. Sastoji se od 24 pitanja zatvorenog tipa, pri čemu ispitanici biraju tačan

management of chronic diseases, including diabetes mellitus. Low levels of health literacy are associated with poorer disease control, more frequent hospitalizations, a greater risk of complications, and worse health outcomes. Individuals with diabetes make daily decisions regarding diet, therapy, and disease self-monitoring, all of which require an adequate understanding of health information. Although the importance of health literacy in diabetes management is well recognized, data on its level among individuals with diabetes in the local community remain limited. Therefore, it is justified to conduct this study in order to assess the level of health literacy and diabetes-related knowledge and to identify areas in which educational interventions and patient support should be improved. The aim of this study was to examine the health literacy of individuals with diabetes mellitus and to investigate the association between sociodemographic characteristics and the level of health literacy.

MATERIALS AND METHODS

This study was conducted as a cross-sectional study during the period from April 1, 2025, to June 1, 2025. The study included 61 members of the Diabetics Association of Prijedor. The inclusion criteria were: diagnosed type 1 or type 2 diabetes mellitus, age 20 years or older, both sexes, ability to understand the questionnaire items, and willingness to participate voluntarily in the study. The exclusion criteria were: inability to complete the questionnaire independently (due to cognitive or mental impairments), age below 20 years, and healthcare professionals. The standardized DKQ-24 (Diabetes Knowledge Questionnaire) was used in this study. The questionnaire consists of 24 closed-ended questions and is a standardized instrument for assessing individuals' knowledge of diabetes mellitus. Respondents select the correct answer from the offered options. The questionnaire is divided into several thematic domains covering key aspects of diabetes knowledge, including disease etiology and symptoms, basic care, intermediate-level care, complications, dietary regimen, and therapeutic

odgovor među ponuđenim opcijama. Upitnik je podijeljen u više tematskih oblasti koje obuhvataju ključne aspekte znanja o dijabetesu, uključujući etiologiju i simptome bolesti, osnovnu njegu, srednji nivo njege, komplikacije, dijetetski režim i terapijski pristup. Domena osnovne njege odnosi se na znanja neophodna za svakodnevno upravljanje dijabetesom i održavanje optimalne kontrole bolesti. Ova oblast procjenjuje koliko ispitanici razumiju osnovne principe samonjege, uključujući redovno praćenje zdravstvenog stanja, značaj održavanja odgovarajuće tjelesne težine, pravilnu higijenu, njegu stopala i prepoznavanje ranih znakova pogoršanja bolesti. Poseban naglasak stavlja se na preventivne mjere koje doprinose smanjenju rizika od razvoja komplikacija. Znanje iz ove domene smatra se temeljem uspješnog samoupravljanja dijabetesom, jer omogućava pacijentima da aktivno učestvuju u kontroli svoje bolesti i unapređenju kvaliteta života. Domena srednjeg nivoa njege obuhvata složenija znanja potrebna za adekvatno upravljanje dijabetesom izvan osnovnih svakodневnih aktivnosti. Ona uključuje razumijevanje postupaka vezanih za kontrolu glikemije, prepoznavanje i pravilno reagovanje na hipoglikemiju i hiperglikemiju, značaj redovnih medicinskih kontrola, laboratorijskog praćenja vrijednosti glukoze i glikoziliranog hemoglobina (HbA1c), kao i prilagođavanje terapije i životnih navika prema preporukama zdravstvenih radnika. Ova domena procjenjuje sposobnost ispitanika da primijene stečena znanja u različitim situacijama koje zahtijevaju viši nivo razumijevanja bolesti i donošenja odluka vezanih za njeno liječenje. Na osnovu ključa upitnika, tačan odgovor je bodovan sa jednim bodom, a netačan odgovor je dobio nula bodova. U ponuđenim odgovorima je bio i odgovor „Ne znam“ koji je bodovan sa nula bodova, ukoliko je ispitanik odabrao taj odgovor. Maksimalni skor upitnika je 24. Veći skor ukazuje na veći nivo znanja o dijabetesu, dok niži skor ukazuje na slabije poznavanje bolesti, njenog liječenja i samokontrole [5]. Pored validiziranog

approaches. The basic care domain refers to the knowledge necessary for the daily management of diabetes and the maintenance of optimal disease control. This area assesses the extent to which respondents understand the fundamental principles of self-care, including regular health monitoring, the importance of maintaining appropriate body weight, proper hygiene, foot care, and recognition of early signs of disease deterioration. Particular emphasis is placed on preventive measures that contribute to reducing the risk of complications. Knowledge within this domain is considered the foundation of successful diabetes self-management, as it enables patients to actively participate in controlling their disease and improving their quality of life. The intermediate-level care domain includes more advanced knowledge required for appropriate diabetes management beyond basic daily activities. It encompasses understanding procedures related to glycemic control, recognizing and appropriately responding to hypoglycemia and hyperglycemia, the importance of regular medical check-ups, laboratory monitoring of blood glucose and glycated hemoglobin (HbA1c) levels, as well as adjusting therapy and lifestyle habits according to healthcare professionals' recommendations. This domain assesses respondents' ability to apply acquired knowledge in various situations requiring a higher level of disease understanding and decision-making related to treatment. According to the questionnaire scoring key, each correct answer was awarded one point, while incorrect answers received zero points. The response option "I don't know" was also scored as zero points if selected by the respondent. The maximum possible score was 24. Higher scores indicate a greater level of diabetes knowledge, whereas lower scores indicate poorer understanding of the disease, its treatment, and self-management [5]. In addition to the validated questionnaire, a sociodemographic questionnaire consisting of six questions was developed, two of which were open-ended (age and duration of disease). Statistical data analysis was performed using the SPSS statistical software package (version 23.0). Descriptive

upitnika, sačinjen je sociodemografski upitnik od 6 pitanja od čega su 2 pitanja otvorenog tipa (godine starosti i dužina trajanja bolesti). Statistička obrada podataka je urađena pomoću SPSS softverskog statističkog paketa (verzija 23.0). Za statističku analizu korištene su metode deskriptivne statistike (Mean), χ^2 test, student t test. Kao nivo statističke značajnosti razlika, uzeta je uobičajena vrijednost $p < 0,05$.

REZULTATI

Tabela 1 prikazuje deskriptivnu statistiku zdravstvene pismenosti ispitanika u pet domena DKQ-24 upitnika, na uzorku od $N = 61$ ispitanika. Za svaki domen prikazani su srednja vrijednost (Mean), standardna devijacija (SD), kao i minimalna i maksimalna ostvarena vrijednost. Najviši prosječan rezultat zabilježen je u domenu etiologija i simptomi dijabetesa ($M = 3,70$; $SD = 1,39$), što ukazuje da su ispitanici najbolje poznavali osnovne uzroke i simptome bolesti. Sljedeći po prosječnoj vrijednosti je domen osnovna njega ($M = 2,90$; $SD = 0,30$), gdje je ujedno uočen i najmanji raspon varijabilnosti, što ukazuje na relativno ujednačeno znanje ispitanika u ovom segmentu. Domen komplikacije dijabetesa pokazuje srednji nivo znanja ($M = 2,80$; $SD = 0,48$), dok je niži nivo znanja prisutan u domenima dijeta i tretman ($M = 1,84$; $SD = 0,45$) i posebno u srednjem nivou njege ($M = 0,87$; $SD = 0,69$), koji predstavlja najslabije rezultate među svim ispitivanim oblastima. Ovi nalazi ukazuju da ispitanici imaju veće znanje o osnovnim aspektima bolesti, dok su složeniji segmenti samoupravljanja, poput terapijskih postupaka i detaljnijih preporuka o liječenju, slabije savladani. Standardne devijacije pokazuju da je najveća varijabilnost prisutna u domenu etiologije i simptoma, što znači da su ispitanici u ovom segmentu imali najrazličitije nivoe znanja. Nasuprot tome, najmanja varijabilnost uočena je u domenu osnovne njege, što ukazuje na relativno homogeno znanje ispitanika u toj oblasti. Minimalne i maksimalne vrijednosti dodatno potvrđuju raspon postignutih

statistical methods (mean), the chi-square (χ^2) test, and Student's t-test were used for statistical analysis. A p-value of less than 0.05 ($p < 0.05$) was considered statistically significant.

RESULTS

Table 1 presents the descriptive statistics of respondents' health literacy across the five domains of the DKQ-24 questionnaire in a sample of $N = 61$ participants. For each domain, the mean (M), standard deviation (SD), and minimum and maximum values are shown. The highest average score was recorded in the domain of diabetes etiology and symptoms ($M = 3.70$; $SD = 1.39$), indicating that respondents were most knowledgeable about the basic causes and symptoms of the disease. The next highest mean score was observed in the basic care domain ($M = 2.90$; $SD = 0.30$), which also demonstrated the smallest variability, indicating relatively consistent knowledge among respondents in this area. The diabetes complications domain demonstrated a moderate level of knowledge ($M = 2.80$; $SD = 0.48$), whereas lower levels of knowledge were observed in the diet and treatment domain ($M = 1.84$; $SD = 0.45$) and particularly in the intermediate-level care domain ($M = 0.87$; $SD = 0.69$), which showed the poorest results among all assessed areas. These findings indicate that respondents possessed greater knowledge of the fundamental aspects of the disease, while more complex elements of self-management, such as therapeutic procedures and detailed treatment recommendations, were less well understood. The standard deviations show that the greatest variability was present in the etiology and symptoms domain, suggesting substantial differences in respondents' knowledge levels in this area. In contrast, the smallest variability was observed in the basic care domain, indicating relatively homogeneous knowledge among respondents. The minimum and maximum values further confirm the range of achieved scores in each domain. Notably, no respondent achieved the maximum score across all domains, particularly in the intermediate-level care and diet and treatment domains, highlighting

rezultata u svakom domenu, pri čemu se vidi da nijedan ispitanik nije ostvario maksimalan skor u svim segmentima, posebno u domenima srednjeg nivoa njege i dijete i tretmana, što dodatno ukazuje na prostor za unapređenje zdravstvene pismenosti u ovim oblastima.

Tabela 1. Deskriptivna statistika zdravstvene pismenosti ispitanika u domenima DKQ-24 upitnika

Domeni zdravstvene pismenosti					
	Etiologija i simptomi dijabetesa	Srednji nivo njege	Komplikacije dijabetesa	Dijeta i tretman	Osnovna njega
N	61	61	61	61	61
Mean	3.70	0.87	2.80	1.84	2.90
SD	1.39	0.69	0.48	0.45	0.30
Min	.00	.00	1.00	.00	2.00
Max	6.00	3.00	3.00	2.00	3.00

Za procjenu razlika u zdravstvenoj pismenosti između grupa (po polu), korišten je nezavisni t-test za svaki od pet segmenata DKQ-24 upitnika: etiologija i simptomi, srednji nivo njege, komplikacije dijabetesa, dijeta i tretman, i osnovna njega. Pretpostavka o jednakosti varijansi testirana je Levene-ovim testom. Rezultati su prikazani u nastavku (tabela 2). Na osnovu rezultata nezavisnog t-testa (tabela 2), razlika u zdravstvenoj pismenosti između posmatranih grupa nije bila statistički značajna u četiri od pet segmenata upitnika. Statistički značajna razlika je utvrđena jedino u domenu osnovne njege dijabetesa, gdje osobe ženskog pola pokazuju viši nivo znanja ($p = 0.012$).

Tabela 2. Razlike u zdravstvenoj pismenosti prema polu u domenima DKQ-24 upitnik

Segment DQK-24	t(df)	p
Etiologija i simptomi	-0,476 (59)	0,636
Srednji nivo njege	0,721 (59)	0,474
Komplikacije dijabetesa	-1,756 (26,27)	0,091
Dijeta i tretman	1,908 (54,54)	0,062
Osnovna njega	2,629 (38)	0,012

considerable room for improvement in health literacy within these areas.

Table 1. Descriptive Statistics of Participants' Diabetes Knowledge Across the DKQ-24 Questionnaire Domains

Health literacy domains					
	Etiology and Symptoms of Diabetes	Intermediate-Level Care	Diabetes Complications	Diet and Treatment	Basic Care
N	61	61	61	61	61
Mean	3.70	0.87	2.80	1.84	2.90
SD	1.39	0.69	0.48	0.45	0.30
Min	.00	.00	1.00	.00	2.00
Max	6.00	3.00	3.00	2.00	3.00

To assess differences in health literacy between groups according to sex, an independent-samples t-test was performed for each of the five domains of the DKQ-24 questionnaire: etiology and symptoms, intermediate-level care, diabetes complications, diet and treatment, and basic care. The assumption of homogeneity of variances was tested using Levene's test. The results are presented in Table 2. Based on the results of the independent-samples t-test (Table 2), differences in health literacy between the observed groups were not statistically significant in four of the five questionnaire domains. A statistically significant difference was identified only in the domain of basic diabetes care, where female participants demonstrated a higher level of knowledge than male participants ($p = 0.012$).

Table 2. Differences in Health Literacy According to Sex Across the DKQ-24 Questionnaire Domains

DKQ-24 Domain	t (df)	p
Etiology and Symptoms	-0.476 (59)	0.636
Intermediate-Level Care	0.721 (59)	0.474
Diabetes Complications	-1.756 (26.27)	0.091
Diet and Treatment	1.908 (54.54)	0.062
Basic Care	2.629 (38)	0.012

Tabela 3 prikazuje rezultate t-testa za nezavisne uzorke kojim su ispitane razlike u zdravstvenoj pismenosti između muškaraca i žena u pet domena DKQ-24 upitnika. Dobijeni rezultati pokazuju da ne postoje statistički značajne razlike između polova u većini ispitivanih domena, jer su sve p-vrijednosti veće od 0,05. To se odnosi na domene etiologija i simptomi ($p = 0,588$), srednji nivo njege ($p = 0,956$), komplikacije dijabetesa ($p = 0,695$) i osnovna njega ($p = 0,756$). Ovi nalazi ukazuju na to da su muškarci i žene imali približno isti nivo znanja o osnovnim i složenijim aspektima dijabetesa. U domenu dijeta i tretman zabilježena je tendencija ka statističkoj značajnosti ($t = -1,803$; $p = 0,076$), ali razlika nije dostigla prag statističke značajnosti ($p < 0,05$). To može ukazivati na moguće blage razlike u znanju o ishrani i terapijskim mjerama između muškaraca i žena, ali one nisu dovoljno izražene da bi se statistički potvrdile. Sveukupno posmatrano, rezultati ukazuju da je zdravstvena pismenost u ispitivanom uzorku relativno ujednačena između polova, bez značajnih razlika u većini domena DKQ-24 upitnika.

Tabela 3. Razlike u zdravstvenoj pismenosti prema polu u domenima DKQ-24 upitnika

Segment DQK-24	t(df)	P
Etiologija i simptomi	-0,545 (59)	0,588
Srednji nivo njege	0,055 (59)	0,956
Komplikacije dijabetesa	0,394 (59)	0,695
Dijeta i tretman	-1,803 (59)	0,076
Osnovna njega	0,312	0,756

Za ispitivanje razlika u zdravstvenoj pismenosti u odnosu na nivo obrazovanja (osnovna škola, srednja stručna sprema, viša i visoka stručna sprema) sprovedena je jednofaktorska analiza varijanse (ANOVA) za pet domena DKQ-24 upitnika. Rezultati su pokazali da ne postoje statistički značajne razlike u prosečnim rezultatima između grupa u nijednom od domena, što je predstavljeno u Tabeli 4. Ovi rezultati ukazuju da nivo obrazovanja ispitanika ne utiče značajno na njihove rezultate u okviru zdravstvene pismenosti za ispitane domene.

Table 3 presents the results of an independent-samples t-test examining differences in health literacy between men and women across the five domains of the DKQ-24 questionnaire. The findings indicate that there were no statistically significant sex differences in most of the examined domains, as all p-values exceeded 0.05. This applied to the domains of etiology and symptoms ($p = 0.588$), intermediate-level care ($p = 0.956$), diabetes complications ($p = 0.695$), and basic care ($p = 0.756$). These findings suggest that men and women had comparable levels of knowledge regarding both the basic and more complex aspects of diabetes. In the diet and treatment domain, a trend toward statistical significance was observed ($t = -1.803$; $p = 0.076$), although the difference did not reach the conventional threshold for statistical significance ($p < 0.05$). This may indicate slight differences in knowledge related to dietary management and therapeutic measures between men and women; however, these differences were not sufficiently pronounced to be statistically confirmed. Overall, the results suggest that health literacy within the studied sample was relatively similar between sexes, with no significant differences across most DKQ-24 domains.

Table 3. Differences in Health Literacy According to Sex Across the DKQ-24 Questionnaire Domains

DKQ-24 Domain	t(df)	P
Etiology and Symptoms	-0.545 (59)	0.588
Intermediate-Level Care	0.055 (59)	0.956
Diabetes Complications	0.394 (59)	0.695
Diet and Treatment	-1.803 (59)	0.076
Basic Care	0.312	0.756

To examine differences in health literacy according to educational level (primary school, secondary education, college degree, and university degree), a one-way analysis of variance was conducted for the five domains of the DKQ-24 questionnaire. The results showed no statistically significant differences in mean scores between educational groups in any of the examined domains, as presented in Table 4. These findings indicate that participants' educational

Tabela 4. Razlike u zdravstvenoj pismenosti prema nivou obrazovanja u domenima DKQ-24 upitnika

Segment DQK-24	F(df= 3,57)	p
Etiologija i simptomi	0,818	0,489
Srednji nivo njege	0,045	0,987
Komplikacije dijabetesa	0,978	0,410
Dijeta i tretman	0,359	0,783
Osnovna njega	0,804	0,497

U tabeli 5 su prikazani rezultati hi-kvadrat testa nezavisnosti, kojim je ispitivana povezanost između starosne dobi ispitanika (mlađa, srednja i starija dob) i nivoa zdravstvene pismenosti u pet segmenata DKQ-24 upitnika. Dobijene p-vrednosti ukazuju da nema statistički značajnih razlika u nivou zdravstvene pismenosti među ispitanicima različitih starosnih kategorija niti u nijednom od ispitivanih domena ($p > 0,05$). Najniža p-vrijednost iznosila je 0,518 u segmentu „Dijeta i tretman“, što takođe nije statistički značajno.

Tabela 5. Razlike u zdravstvenoj pismenosti prema mjestu stanovanja u domenima DKQ-24 upitnika

Segment DQK-24	X ²	Df	p
Etiologija i simptomi	10,891	12	0,538
Srednji nivo njege	3,955	6	0,683
Komplikacije dijabetesa	2,197	4	0,700
Dijeta i tretman	2,923	4	0,518
Osnovna njega	2,197	4	0,700

U tabeli 6 je prikazano poređenje nivoa zdravstvene pismenosti između ispitanika sa tipom 1 i tipom 2 dijabetesa, korištenjem nezavisnog t-testa za svaki od pet segmenata upitnika DKQ-24. Leveneov test homogenosti varijansi pokazao je da za segmente „Komplikacije dijabetesa“, „Dijeta i tretman“ i „Osnovna njega“ varijanse nisu homogene ($p < 0,05$), zbog čega su za ove segmente korišteni rezultati t-testa bez pretpostavke jednake varijanse. Rezultati t-testa ukazuju da postoji statistički značajna razlika samo u segmentu „Dijeta i tretman“ ($t(59) = -2,077$, $p = 0,042$), gdje ispitanici sa tipom 1 dijabetesa pokazuju nešto niži prosjek u odnosu na tip 2. Za ostale segmente razlike nisu bile statistički značajne ($p > 0,05$). Ovi nalazi sugerišu da tip dijabetesa

attainment did not significantly influence their health literacy scores across the assessed domains.

Table 4. Differences in Health Literacy According to Educational Level Across the DKQ-24 Questionnaire Domains

DKQ-24 Domain	F(df= 3.57)	p
Etiology and Symptoms	0.818	0.489
Intermediate-Level Care	0.045	0.987
Diabetes Complications	0.978	0.410
Diet and Treatment	0.359	0.783
Basic Care	0.804	0.497

Table 5 presents the results of the chi-square test of independence used to examine the association between participants' age group (younger, middle-aged, and older adults) and the level of health literacy across the five DKQ-24 domains. The obtained p-values indicate that there were no statistically significant differences in health literacy among participants from different age categories in any of the examined domains ($p > 0.05$). The lowest p-value was observed in the Diet and Treatment domain ($p = 0.518$), which was also not statistically significant.

Table 5. Differences in Health Literacy According to Place of Residence Across the DKQ-24 Questionnaire Domains

Segment DQK-24	X ²	Df	p
Etiology and Symptoms	10.891	12	0.538
Intermediate-Level Care	3.955	6	0.683
Diabetes Complications	2.197	4	0.700
Diet and Treatment	2.923	4	0.518
Basic Care	2.197	4	0.700

Table 6 presents a comparison of health literacy levels between participants with type 1 and type 2 diabetes, using an independent-samples t-test for each of the five DKQ-24 questionnaire domains. Levene's test for homogeneity of variances indicated that the assumption of equal variances was violated for the domains of Diabetes Complications, Diet and Treatment, and Basic Care ($p < 0,05$). Therefore, the t-test results without the assumption of equal variances were used for these domains. The t-test results showed a statistically significant difference

generalno ne utiče na nivo zdravstvene pismenosti u većini domena, osim u segmentu vezanom za dijetu i tretman.

Tabela 6. Razlike u zdravstvenoj pismenosti prema tipu dijabetesa u domenima DKQ-24 upitnika

Segment DQK-24	t	df	p
Etiologija i simptomi	0,82	59	0,415
Srednji nivo njege	1,34	59	0,187
Komplikacije dijabetesa	-1,61	59	0,112
Dijeta i tretman	-2,08	59	0,042
Osnovna njega	-1,27	59	0,209

DISKUSIJA

U uzorku od 61 ispitanika, većinu su činile žene (63,9%), dok je najzastupljenija starosna grupa bila između 36 i 60 godina. Pretežni dio uzorka dolazio je iz ruralnih sredina (60,7%), što je značajno sa aspekta dostupnosti zdravstvenih informacija i edukacije. Prosječno trajanje bolesti je bilo 6,3 godine, a većina ispitanika bolovala je od dijabetesa tipa 2 (72,1%). Rezultati su pokazali da su ispitanici najbolje poznavali domen osnovne njege (Me=2,90), a najmanje domen srednjeg nivoa njege (Me=0,86). To ukazuje da osnovni pojmovi i svakodnevne radnje vezane za dijabetes, poput kontrole šećera, apliciranja insulina i osnovne higijene, jesu poznati većini ispitanika. S druge strane, nedostatak znanja u domenu srednjeg nivoa njege može ukazivati na slabu edukaciju kada su u pitanju složeniji aspekti samopomoći, kao što su interpretacija glikemijskih vrijednosti i donošenje odluka u kriznim situacijama. Razlike prema polu za zdravstvenu pismenost bile su statistički značajne jedino u domenu osnovne njege, gdje su žene pokazale veći nivo znanja ($p=0,012$). Ovaj nalaz može se objasniti činjenicom da žene tradicionalno češće preuzimaju aktivnu ulogu u brizi o vlastitom zdravlju, ali i zdravlju članova porodice, zbog čega su više izložene zdravstvenim informacijama i edukativnim sadržajima. Takođe, žene češće koriste preventivne zdravstvene usluge, redovnije odlaze na ljekarske preglede i pokazuju veću spremnost za usvajanje preporuka zdravstvenih radnika, što može doprinijeti boljem poznavanju

only in the Diet and Treatment domain ($t(59) = -2.077$, $p = 0.042$), where participants with type 1 diabetes demonstrated a slightly lower mean score compared with those with type 2 diabetes. No statistically significant differences were observed in the remaining domains ($p > 0.05$). These findings suggest that the type of diabetes generally does not influence health literacy levels across most domains, with the exception of the domain related to diet and treatment.

Table 6. Differences in Health Literacy According to Type of Diabetes Across the DKQ-24 Questionnaire Domains

DKQ-24 Domain	t	df	p
Etiology and Symptoms	0.82	59	0.415
Intermediate-Level Care	1.34	59	0.187
Diabetes Complications	-1.61	59	0.112
Diet and Treatment	-2.08	59	0.042
Basic Care	-1.27	59	0.209

DISCUSSION

Among the 61 participants included in the study, the majority were women (63.9%), while the most represented age group was between 36 and 60 years. Most participants resided in rural areas (60.7%), which is an important consideration in terms of access to health information and educational resources. The mean duration of diabetes was 6.3 years, and the majority of participants had type 2 diabetes (72.1%). The results showed that participants demonstrated the highest level of knowledge in the domain of basic care (Me = 2.90), whereas the lowest level of knowledge was observed in the domain of intermediate-level care (Me = 0.86). These findings suggest that most participants were familiar with the basic concepts and routine practices related to diabetes management, such as blood glucose monitoring, insulin administration, and basic hygiene. Conversely, the limited knowledge observed in the intermediate-level care domain may indicate insufficient education regarding more complex aspects of self-management, including the interpretation of blood glucose values and decision-making in emergency situations. Gender differences in health literacy were statistically significant only in

aspekata osnovne njege. Ovaj podatak je u skladu sa studijom AlSayyad i Abdulrahman [6], koji ističu da žene češće učestvuju u zdravstvenim edukacijama i pokazuju veću zainteresovanost za očuvanje zdravlja. Autori navode da su žene u njihovom istraživanju bile sklonije pohađanju savjetovališta i edukativnih programa, što je rezultiralo višim nivoom zdravstvene pismenosti i boljim razumijevanjem preporuka vezanih za samonjegu i kontrolu bolesti. Veća uključenost žena u procese zdravstvene edukacije može imati značajnu ulogu u sticanju i održavanju znanja potrebnih za svakodnevno upravljanje hroničnim bolestima kao što je dijabetes. Istraživanje koje su sprovedi Santos i saradnici [7] takođe je pokazalo viši nivo znanja kod žena, iako razlike između polova nisu bile statistički značajne u većini ispitivanih domena. Ovakvi rezultati ukazuju na to da pol sam po sebi možda nije presudan faktor zdravstvene pismenosti, ali da određene socijalne i bihevioralne karakteristike koje se češće povezuju sa ženama mogu doprinijeti boljem razumijevanju zdravstvenih informacija. S obzirom na to da je statistički značajna razlika u ovom istraživanju utvrđena samo u domenu osnovne njege, može se pretpostaviti da muškarci i žene imaju sličan nivo opšteg znanja o dijabetesu, dok se razlike najviše ispoljavaju u segmentima koji se odnose na svakodnevnu brigu o zdravlju, preventivne aktivnosti i primjenu preporuka u svakodnevnom životu. Ovi nalazi ukazuju na potrebu za dodatnim edukativnim aktivnostima usmjerenim prema muškarcima, kako bi se unaprijedilo njihovo znanje i aktivnije učešće u samoupravljanju bolešću. Zanimljivo je da mjesto stanovanja nije imalo statistički značajan uticaj na zdravstvenu pismenost. Ispitanici iz ruralnih i urbanih sredina pokazali su sličan nivo znanja u svim ispitivanim domenima, što ukazuje da dostupnost informacija i razumijevanje zdravstvenih sadržaja ne zavise isključivo od mjesta stanovanja. Ovakav nalaz je posebno značajan jer se tradicionalno smatra da stanovnici urbanih sredina imaju bolji pristup zdravstvenim ustanovama, specijalističkim službama, edukativnim programima i različitim izvorima zdravstvenih informacija. Međutim,

the domain of basic care, where women demonstrated a higher level of knowledge than men ($p = 0.012$). This finding may be explained by the fact that women traditionally assume a more active role in managing both their own health and the health of their family members, resulting in greater exposure to health information and educational materials. In addition, women are more likely to utilize preventive healthcare services, attend regular medical check-ups, and adhere to healthcare professionals' recommendations, all of which may contribute to a better understanding of basic diabetes care. These findings are consistent with the study by AlSayyad and Abdulrahman [6], who reported that women participate more frequently in health education programs and show greater interest in maintaining their health. The authors found that women in their study were more likely to attend counseling sessions and educational programs, resulting in higher levels of health literacy and a better understanding of recommendations related to self-care and disease management. Greater involvement of women in health education activities may therefore play an important role in acquiring and maintaining the knowledge required for the effective daily management of chronic diseases such as diabetes. Similarly, the study conducted by Santos et al. [7] demonstrated higher levels of knowledge among women, although gender differences were not statistically significant across most of the domains examined. These findings suggest that gender itself may not be a decisive determinant of health literacy; however, certain social and behavioral characteristics more commonly associated with women may contribute to a better understanding of health information. Given that the present study identified a statistically significant gender difference only in the domain of basic care, it may be assumed that men and women possess comparable overall knowledge of diabetes, while the greatest differences are observed in aspects related to everyday self-care, related to daily health management, preventive behaviors, and the implementation of health recommendations in everyday life. These findings highlight the need for

savremeni načini komunikacije i dostupnost digitalnih izvora informacija mogu djelimično objasniti izostanak razlika između ruralne i urbane populacije. Razvoj interneta, društvenih mreža i elektronskih medija omogućio je lakši pristup zdravstvenim informacijama bez obzira na geografsku udaljenost od zdravstvenih centara. Takođe, aktivnosti primarne zdravstvene zaštite, patronažnih službi i porodične medicine mogu doprinijeti ravnomjernijoj dostupnosti zdravstvenog obrazovanja stanovništvu u različitim sredinama. Ovi rezultati su u skladu sa studijom Cicolini i saradnika [8], koja pokazuje da zdravstvena pismenost nije nužno određena geografskom lokacijom, već nizom individualnih i socijalnih faktora. Autori ističu da na nivo zdravstvene pismenosti značajno utiču motivacija pojedinca, sposobnost razumijevanja zdravstvenih informacija, podrška porodice, socioekonomski status, prethodna iskustva sa bolešću i učestalost kontakta sa zdravstvenim radnicima. Osobe koje su aktivno uključene u proces liječenja i koje imaju razvijenu mrežu podrške često postižu viši nivo zdravstvene pismenosti bez obzira na mjesto stanovanja. Dodatno, kod osoba oboljelih od dijabetesa važnu ulogu imaju trajanje bolesti i kontinuirana edukacija tokom liječenja. Pacijenti koji duže žive sa dijabetesom imaju više prilika da kroz kontakte sa zdravstvenim radnicima steknu znanja o samokontroli bolesti, pravilnoj ishrani, terapiji i prevenciji komplikacija. Zbog toga se razlike koje bi eventualno proizlazile iz mjesta stanovanja mogu umanjiti ili potpuno izgubiti pod uticajem drugih faktora koji snažnije određuju nivo zdravstvene pismenosti. Nalazi ovog istraživanja ukazuju da intervencije usmjerene na unapređenje zdravstvene pismenosti ne bi trebalo planirati isključivo prema geografskim karakteristikama stanovništva, već uzimajući u obzir individualne potrebe pacijenata, njihov nivo obrazovanja, motivaciju za učenje i dostupnost kontinuirane edukativne podrške. Takav pristup može biti efikasniji u unapređenju znanja i vještina potrebnih za uspješno upravljanje dijabetesom. Kada se razmatra uticaj nivoa obrazovanja, u ovom istraživanju nisu utvrđene

additional educational interventions targeting men in order to improve their knowledge and encourage more active participation in diabetes self-management. Interestingly, place of residence did not have a statistically significant impact on health literacy. Participants from rural and urban areas demonstrated similar levels of knowledge across all assessed domains, suggesting that access to health information and the understanding of health-related content are not determined solely by place of residence. This finding is particularly important because it has traditionally been assumed that urban residents have better access to healthcare facilities, specialist services, educational programs, and various sources of health information. However, modern communication technologies and the widespread availability of digital information resources may partly explain the absence of differences between rural and urban populations. The development of the internet, social media, and electronic media has enabled easier access to health information regardless of geographical distance from healthcare centers. Furthermore, the activities of primary healthcare services, community nursing services, and family medicine may contribute to more equitable access to health education across different communities. These findings are consistent with the study by Cicolini et al. [8], which demonstrated that health literacy is not necessarily determined by geographical location but rather by a range of individual and social factors. The authors emphasized that health literacy is strongly influenced by individual motivation, the ability to understand health information, family support, socioeconomic status, previous experience with illness, and the frequency of contact with healthcare professionals. Individuals who actively participate in their treatment and have a well-developed support network often achieve higher levels of health literacy regardless of where they live. In addition, among individuals with diabetes, disease duration and continuous education throughout treatment play an important role. Patients who have lived with diabetes for a longer period have more opportunities to acquire knowledge about disease self-management, proper

statistički značajne razlike u zdravstvenoj pismenosti među ispitanicima različitog obrazovnog nivoa. Ovakav nalaz je donekle neočekivan, s obzirom na to da se obrazovanje u literaturi često navodi kao jedan od najvažnijih prediktora zdravstvene pismenosti. Viši nivo obrazovanja obično se povezuje sa boljim sposobnostima pronalaženja, razumijevanja, procjene i primjene zdravstvenih informacija, kao i sa većom sposobnošću donošenja informisanih odluka o vlastitom zdravlju. Rezultati ovog istraživanja razlikuju se od nalaza Gazmararian i saradnika [9], koji su utvrdili jasnu povezanost između višeg nivoa formalnog obrazovanja i višeg nivoa zdravstvene pismenosti. Prema njihovim nalazima, osobe sa višim stepenom obrazovanja lakše razumiju medicinsku terminologiju, bolje se snalaze u zdravstvenom sistemu i efikasnije koriste dostupne zdravstvene informacije. Međutim, iako formalno obrazovanje može predstavljati važan faktor, ono ne garantuje nužno i visok nivo zdravstvene pismenosti, naročito kada je riječ o specifičnim znanjima vezanim za određenu bolest, kao što je dijabetes. Jedno od mogućih objašnjenja za izostanak statistički značajnih razlika jeste struktura uzorka ispitanika. U istraživanju je dominirala grupa ispitanika sa srednjom stručnom spremom, dok je broj ispitanika sa višim i visokim obrazovanjem bio relativno mali. Takva neravnomjerna raspodjela ispitanika može smanjiti statističku moć analize i otežati otkrivanje stvarnih razlika između grupa. Kada su pojedine kategorije zastupljene malim brojem ispitanika, mogućnost dokazivanja statističke značajnosti postaje ograničena čak i kada određene razlike postoje. Pored toga, zdravstvena pismenost nije isključivo rezultat formalnog obrazovanja, već na nju utiču i brojni drugi faktori, uključujući iskustvo života sa hroničnom bolešću, učestalost kontakta sa zdravstvenim radnicima, pristup edukativnim programima, motivaciju za sticanje novih znanja i podršku porodice. Osobe sa nižim nivoom formalnog obrazovanja koje duži niz godina boluju od dijabetesa mogu kroz kontinuiranu edukaciju i praktično iskustvo steći visok nivo znanja o bolesti i njenom liječenju. S druge strane, viši nivo formalnog

nutrition, treatment, and the prevention of complications through regular interactions with healthcare professionals. Consequently, differences that might otherwise arise due to place of residence may be reduced or even eliminated by the influence of other factors that more strongly determine the level of health literacy. The findings of the present study suggest that interventions aimed at improving health literacy should not be planned solely according to the geographical characteristics of the population. Instead, they should take into account patients' individual needs, educational level, motivation to learn, and access to continuous educational support. Such an approach may be more effective in improving the knowledge and skills required for effective diabetes self-management. When considering the impact of educational level, no statistically significant differences in health literacy were identified among participants with different levels of formal education. This finding is somewhat unexpected, given that education is frequently cited in the literature as one of the most important predictors of health literacy. Higher educational attainment is generally associated with better abilities to access, understand, evaluate, and apply health information, as well as with an increased capacity to make informed decisions regarding one's own health. The findings of the present study differ from those reported by Gazmararian et al. [9], who demonstrated a clear association between higher levels of formal education and higher levels of health literacy. According to their findings, individuals with higher educational attainment have a better understanding of medical terminology, navigate the healthcare system more effectively, and make more efficient use of available health information. However, although formal education may represent an important determinant of health literacy, it does not necessarily guarantee a high level of health literacy, particularly with regard to disease-specific knowledge, such as that required for diabetes management. One possible explanation for the absence of statistically significant differences is the composition of the study sample. Participants with secondary education constituted the

obrazovanja ne mora nužno značiti i veće interesovanje za zdravstvene teme ili bolje razumijevanje specifičnih aspekata samokontrole dijabetesa. Dobijeni rezultati stoga sugerišu da formalno obrazovanje samo po sebi možda nije dovoljan pokazatelj zdravstvene pismenosti kod osoba sa dijabetesom. Mnogo važniju ulogu mogu imati kontinuirana edukacija pacijenata, kvalitet komunikacije sa zdravstvenim radnicima i aktivno uključivanje oboljelih u proces liječenja. Zbog toga bi programe unapređenja zdravstvene pismenosti trebalo usmjeriti na sve osobe sa dijabetesom, bez obzira na njihov stepen obrazovanja, kako bi se obezbijedilo adekvatno znanje i vještine potrebne za uspješno upravljanje bolešću. U segmentu „dijeta i tretman“ utvrđena je statistički značajna razlika u korist oboljelih od dijabetesa tip 2 ($p=0,042$). Ovakav nalaz može se objasniti specifičnostima liječenja i edukacije koje prate dijabetes tip 2. Naime, kod dijabetesa tip 2 osnovu liječenja često čine promjene životnog stila, uključujući pravilnu ishranu, redukciju tjelesne mase, povećanje fizičke aktivnosti i redovno praćenje glikemije. Zbog toga su pacijenti od samog postavljanja dijagnoze izloženi intenzivnijim edukativnim aktivnostima koje se odnose upravo na dijetu i svakodnevno upravljanje bolešću. Tokom redovnih kontrola zdravstveni radnici značajan dio vremena posvećuju savjetovanju o izboru namirnica, rasporedu obroka, kontroli unosa ugljenih hidrata i značaju zdravih životnih navika. Pored toga, dijabetes tip 2 se najčešće dijagnostikuje u srednjoj ili starijoj životnoj dobi, kada su osobe već duži niz godina u kontaktu sa zdravstvenim sistemom zbog drugih zdravstvenih problema. Takvi pacijenti često imaju više prilika da učestvuju u edukativnim programima, savjetovalištim i preventivnim aktivnostima, što doprinosi boljem poznavanju preporuka vezanih za ishranu i liječenje. Takođe, kod mnogih pacijenata sa tipom 2 bolest traje duže prije uključivanja u istraživanje, pa su tokom vremena imali mogućnost da steknu iskustvo i usvoje znanja potrebna za svakodnevnu kontrolu bolesti. Nalaz je u skladu sa istraživanjem Fransen i saradnika [10], koji navode da su osobe sa dijabetesom tip 2 češće izložene

largest proportion of the sample, whereas relatively few participants had college or university education. Such an uneven distribution of participants may reduce the statistical power of the analysis and limit the ability to detect true differences between educational groups. When certain categories are represented by only a small number of participants, demonstrating statistical significance becomes difficult even when actual differences exist. Furthermore, health literacy is not determined solely by formal education but is influenced by numerous other factors, including experience of living with a chronic disease, the frequency of contact with healthcare professionals, access to educational programs, motivation to acquire new knowledge, and family support. Individuals with lower levels of formal education who have lived with diabetes for many years may acquire a high level of knowledge about the disease and its treatment through continuous education and practical experience. Conversely, a higher level of formal education does not necessarily imply greater interest in health-related topics or a better understanding of the specific aspects of diabetes self-management. Therefore, the findings of the present study suggest that formal education alone may not be a sufficient indicator of health literacy among individuals with diabetes. Continuous patient education, the quality of communication with healthcare professionals, and the active involvement of patients in the treatment process may play a much more important role. Consequently, health literacy improvement programs should be directed toward all individuals with diabetes, regardless of their level of formal education, in order to ensure that they acquire the knowledge and skills necessary for effective disease self-management. In the "Diet and Treatment" domain, a statistically significant difference was observed in favor of participants with type 2 diabetes ($p = 0.042$). This finding may be explained by the specific treatment approaches and educational interventions associated with type 2 diabetes. The cornerstone of type 2 diabetes management typically consists of lifestyle modifications, including a healthy diet, weight

edukaciji usmjerenoj na promjenu životnih navika i samoupravljanje bolešću. Za razliku od njih, osobe sa dijabetesom tip 1 često od početka liječenja najveću pažnju usmjeravaju na insulinsku terapiju, izračunavanje doza insulina i kontrolu glikemije. Iako i oni dobijaju edukaciju o ishrani, fokus liječenja je u većoj mjeri usmjeren na pravilnu primjenu insulina i prevenciju akutnih komplikacija. Zbog toga se može pretpostaviti da pacijenti sa tipom 2 razvijaju detaljnije znanje upravo u segmentima koji se odnose na dijetu i nefarmakološke mjere liječenja. Međutim, pri tumačenju ovih rezultata potrebno je uzeti u obzir i strukturu uzorka. Ukoliko je broj ispitanika sa dijabetesom tip 1 bio značajno manji od broja ispitanika sa tipom 2, to je moglo uticati na dobijene rezultate. Takođe, razlike u dužini trajanja bolesti, učestalosti kontrola i dostupnosti edukativnih programa mogu djelimično objasniti uočene razlike između dvije grupe. Starosna dob nije imala statistički značajan uticaj na nivo zdravstvene pismenosti ni u jednom od ispitivanih segmenata. Ovaj nalaz ukazuje da mlađi i stariji ispitanici posjeduju sličan nivo znanja o dijabetesu, njegovom liječenju i samokontroli bolesti. Iako se često pretpostavlja da mlađe osobe lakše usvajaju nove informacije i efikasnije koriste savremene izvore znanja, rezultati ovog istraživanja pokazuju da starosna dob sama po sebi nije bila presudan faktor za nivo zdravstvene pismenosti. Jedno od mogućih objašnjenja pružaju Bailey i saradnici [11], koji navode da određene kognitivne funkcije povezane sa obradom i razumijevanjem novih informacija mogu opadati sa starenjem. Međutim, istovremeno stariji pacijenti raspolažu značajnim iskustvom stečenim tokom dugotrajnog života sa bolešću. Dugogodišnje praćenje terapije, redovni kontakti sa zdravstvenim radnicima i suočavanje sa svakodnevnim izazovima koje dijabetes nosi omogućavaju im da razviju praktična znanja i vještine koje nadoknađuju eventualne poteškoće u usvajanju novih informacija. Osim toga, osobe koje duže boluju od dijabetesa često imaju više prilika za edukaciju i ponavljanje ključnih informacija o bolesti. Tokom godina liječenja one usvajaju određene obrasce ponašanja, razvijaju rutine

reduction, increased physical activity, and regular blood glucose monitoring. Consequently, from the time of diagnosis, patients are exposed to more intensive educational interventions focusing specifically on dietary management and the day-to-day management of their disease. During routine follow-up visits, healthcare professionals devote considerable time to counseling patients regarding appropriate food choices, meal planning, carbohydrate intake, and the importance of maintaining healthy lifestyle habits. Moreover, type 2 diabetes is most commonly diagnosed during middle or older adulthood, when individuals have often already been in contact with the healthcare system for many years because of other medical conditions. These patients therefore have more opportunities to participate in educational programs, counseling sessions, and preventive activities, which contributes to a better understanding of recommendations related to nutrition and treatment. Furthermore, many patients with type 2 diabetes have lived with the disease for a longer period before participating in the study, allowing them to gain practical experience and acquire the knowledge necessary for effective daily disease management. This finding is consistent with the study by Fransen et al. [10], who reported that individuals with type 2 diabetes are more frequently exposed to educational interventions focused on lifestyle modification and diabetes self-management. In contrast, individuals with type 1 diabetes tend to focus primarily on insulin therapy, insulin dose calculation, and glycemic control from the very beginning of treatment. Although they also receive dietary education, the primary emphasis of their treatment is placed on the correct administration of insulin and the prevention of acute complications. Consequently, it may be assumed that patients with type 2 diabetes develop more comprehensive knowledge in areas related to diet and non-pharmacological treatment strategies. Nevertheless, the interpretation of these findings should also take the sample structure into account. If the number of participants with type 1 diabetes was substantially smaller than the number with type 2 diabetes, this

u vezi sa ishranom, terapijom i samokontrolom glikemije, te stiču iskustva koja doprinose održavanju adekvatnog nivoa zdravstvene pismenosti. Zbog toga se razlike koje bi mogle nastati usljed starosti često ublažavaju uticajem iskustva i dugotrajnog kontakta sa zdravstvenim sistemom. Dobijeni rezultati sugerišu da zdravstvenu pismenost kod osoba sa dijabetesom vjerovatno više određuju faktori kao što su trajanje bolesti, učestalost edukacije, motivacija za učenje i aktivno učešće u liječenju nego sama životna dob. Stoga bi edukativne intervencije trebalo planirati prema individualnim potrebama pacijenata, a ne isključivo prema njihovoj starosti. Generalno, rezultati ove studije su u skladu sa većinom literature, iako se u pojedinim segmentima razlikuju, što može biti posljedica uzorka, konteksta lokalne zdravstvene zaštite i pristupa edukaciji. Rezultati potvrđuju značaj kontinuirane i ciljano usmjerene edukacije za osobe sa dijabetesom, pri čemu treba uzeti u obzir pol, tip bolesti, kao i pristup zdravstvenim uslugama.

ZAKLJUČAK

Dobijeni rezultati ukazuju na značaj razvoja i sprovođenja kontinuiranih, ciljano usmjerenih edukativnih programa čiji je cilj unapređenje zdravstvene pismenosti i vještina samoupravljanja bolešću kod osoba oboljelih od dijabetes melitusa. Ispitanici su pokazali relativno dobar nivo znanja o dijabetes melitusu, pri čemu su najbolji rezultati ostvareni u domenu osnovne njege. S druge strane, niži nivo znanja zabilježen je u domenu srednjeg nivoa njege, što ukazuje na potrebu za dodatnom edukacijom pacijenata o složenijim aspektima samokontrole i upravljanja bolešću. Pol je bio značajan faktor samo u domenu osnovne njege, gdje su žene pokazale statistički značajno viši nivo znanja u odnosu na muškarce ($p = 0,012$). U ostalim domenima zdravstvene pismenosti nisu utvrđene statistički značajne razlike između muškaraca i žena. Mjesto stanovanja nije imalo značajan uticaj na zdravstvenu pismenost ispitanika. Osobe iz ruralnih i urbanih sredina ostvarile su slične rezultate u svim analiziranim domenima, što ukazuje da geografska pripadnost nije bila presudan faktor za nivo znanja o

imbalance may have influenced the results. Furthermore, differences in disease duration, frequency of follow-up visits, and access to educational programs may partially explain the observed differences between the two groups. Age was not significantly associated with health literacy in any of the domains examined. This finding indicates that younger and older participants possessed comparable levels of knowledge regarding diabetes, its treatment, and disease self-management. Although it is often assumed that younger individuals acquire new information more easily and make more effective use of modern sources of information, the findings of the present study indicate that age itself was not a determining factor influencing the level of health literacy. One possible explanation is provided by Bailey et al. [11], who reported that certain cognitive functions involved in processing and understanding new information may decline with advancing age. However, older patients simultaneously possess substantial experience acquired through many years of living with the disease. Long-term adherence to treatment, regular contact with healthcare professionals, and continuous exposure to the daily challenges of diabetes enable them to develop practical knowledge and skills that may compensate for potential difficulties in acquiring new information. Furthermore, individuals who have lived with diabetes for a longer period often have more opportunities to receive education and reinforce essential knowledge about their condition. Over the course of treatment, they establish behavioral patterns and routines related to diet, therapy, and blood glucose self-monitoring while accumulating practical experience that contributes to maintaining an adequate level of health literacy. Consequently, differences that might otherwise arise as a result of age are often attenuated by the influence of experience and prolonged interaction with the healthcare system. The findings of the present study suggest that health literacy among individuals with diabetes is likely to be influenced more strongly by factors such as disease duration, the frequency of educational interventions, motivation to learn, and

dijabetesu. Nivo obrazovanja nije pokazao statistički značajnu povezanost sa zdravstvenom pismenošću ispitanika. Ovaj nalaz sugerira da formalno obrazovanje samo po sebi nije dovoljno za razvijanje znanja potrebnih za uspješno upravljanje dijabetesom, te da važnu ulogu imaju iskustvo sa bolešću, kontinuirana edukacija i podrška zdravstvenih radnika. Utvrđena je statistički značajna razlika prema tipu dijabetesa u domenu „dijeta i tretman“, pri čemu su ispitanici sa dijabetesom tipa 2 pokazali viši nivo znanja u odnosu na ispitanike sa dijabetesom tipa 1 ($p = 0,042$). Ovaj nalaz može se povezati sa većom izloženošću osoba sa dijabetesom tipa 2 edukativnim programima usmjerenim na ishranu i promjenu životnih navika. Starosna dob nije imala statistički značajan uticaj na nivo zdravstvene pismenosti ni u jednom od pet analiziranih domena, što ukazuje da su mlađi i stariji ispitanici posjedovali sličan nivo znanja o dijabetesu i njegovom liječenju.

active participation in treatment than by chronological age alone. Therefore, educational interventions should be tailored to the individual needs of patients rather than being based solely on age. Overall, the findings of this study are consistent with most of the existing literature, although discrepancies were observed in certain domains. These differences may be attributable to the characteristics of the study sample, the local healthcare context, and the availability and delivery of educational interventions. The results confirm the importance of continuous and targeted education for individuals with diabetes, while emphasizing that gender, type of diabetes, and access to healthcare services should all be considered when designing educational strategies aimed at improving health literacy and supporting effective diabetes self-management.

CONCLUSION

The findings of this study highlight the importance of developing and implementing continuous, targeted educational programs aimed at improving health literacy and disease self-management skills among individuals with diabetes mellitus. Participants demonstrated a relatively good level of diabetes-related knowledge, with the highest scores achieved in the Basic Care domain. In contrast, lower levels of knowledge were observed in the Intermediate-Level Care domain, indicating a need for additional patient education regarding more complex aspects of disease self-management and self-monitoring. Sex was a significant factor only in the Basic Care domain, where women demonstrated significantly higher levels of knowledge than men ($p = 0.012$). No statistically significant sex differences were identified in the remaining health literacy domains. Place of residence did not significantly influence participants' health literacy. Individuals from rural and urban areas achieved similar results across all analyzed domains, indicating that geographical location was not a decisive factor in diabetes-related knowledge. Educational level was not significantly associated with health literacy. This finding suggests

that formal education alone may not be sufficient for developing the knowledge required for successful diabetes management and that experience with the disease, continuous education, and support from healthcare professionals play equally important roles. A statistically significant difference according to diabetes type was identified in the Diet and Treatment domain, where participants with type 2 diabetes demonstrated higher levels of knowledge than those with type 1 diabetes ($p = 0.042$). This finding may be related to the greater exposure of individuals with type 2 diabetes to educational programs focusing on nutrition and lifestyle modification. Age was not significantly associated with health literacy in any of the five analyzed domains, indicating that younger and older participants possessed similar levels of knowledge regarding diabetes and its management. These findings emphasize the need for ongoing educational interventions tailored to the specific needs of people with diabetes in order to improve health literacy, promote effective self-management, and ultimately enhance health outcomes.

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