Savjetovanje, životne navike i lipidni status u bolesnika s hiperlipidemijom nakon koronarografije

Counseling, Lifestyle Habits, and Lipid Status in Patients With Hyperlipidemia After Coronary Angiography

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SAŽETAK: *Uvod*: hiperlipidemija je važan promjenjivi čimbenik kardiovaskularnog rizika. Kontrola lipidnoga statusa ovisi o liječenju, životnim navikama, znanju i pridržavanju terapije, pri čemu medicinska sestra može imati važnu edukacijsku ulogu. Svrha je ovog istraživanja ispitati povezanost životnih navika, pridržavanja propisane terapije, znanja o hiperlipidemiji te stavova o sestrinskom savjetovanju u bolesnika s dijagnosticiranom hiperlipidemijom koji su podvrgnuti koronarografiji. *Bolesnici i metode*: provedeno je presječno opažajno istraživanje na Odjelu za kardiologiju Kliničke bolnice Merkur. Uključeno je 29 bolesnika. Podatci su prikupljeni anonimnim upitnikom i podatcima kontrolnog lipidograma 3 – 6 mjeseci nakon koronarografije. Povezanosti su ispitane Pearsonovim koeficijentom korelacije uz $p < 0,05$. *Rezultati*: prosječna dob ispitanika bila je 63,17 ± 10,83 godina, a 82,8 % bili su muškarci. Prosječni LDLkolesterol iznosio je 2,08 ± 1,03 mmol/L. Najviši prosječni rezultati zabilježeni su za stavove prema sestrinskom savjetovanju (4,77 ± 0,27) i pridržavanje terapije (4,65 ± 0,53), dok su niži rezultati zabilježeni za znanje o hiperlipidemiji (3,49 ± 0,95) i prehrambene navike (3,43 ± 0,76). Samo je 27,6 % ispitanika prethodno primilo sestrinsko savjetovanje. Nisu utvrđene statistički značajne povezanosti pojedinih područja upitnika s LDLkolesterolom ni ne-HDL kolesterolom. Utvrđena je pozitivna povezanost znanja o hiperlipidemiji i prehrambenim navikama ($r = 0,584$; $p < 0,001$). *Zaključak*: ispitanici su pokazali izrazito pozitivne stavove prema sestrinskom savjetovanju, iako ga je prethodno primio tek manji dio ispitanika. Nalazi upućuju na prostor za daljnje istraživanje strukturirane i individualizirane edukacije i sestrinskog savjetovanja u skrbi za bolesnike s hiperlipidemijom.

SUMMARY: *Introduction:* Hyperlipidemia is an important modifiable cardiovascular risk factor. Lipid control depends on pharmacological treatment, lifestyle habits, disease-related knowledge, and medication adherence, with nurses potentially playing an important educational role. This study aimed to investigate the associations between lifestyle habits, adherence to prescribed therapy, knowledge of hyperlipidemia, and attitudes toward nurse-led counseling in patients with diagnosed hyperlipidemia who underwent coronary angiography. *Patients and Methods*: A cross-sectional observational study was conducted at the Department of Cardiology, Merkur University Hospital, Zagreb, Croatia. A total of 29 patients were included. Data were collected using an anonymous questionnaire and follow-up lipid profile results obtained 3–6 months after coronary angiography. Associations were assessed using Pearson's correlation coefficient, with statistical significance set at $p < 0.05$. *Results*: The mean age of participants was 63.17 ± 10.83 years, and 82.8% of participants were men. The mean low-density lipoprotein cholesterol (LDL-C) level was 2.08 ± 1.03 mmol/L. The highest mean scores were observed for attitudes toward nurse-led counseling (4.77 ± 0.27) and medication adherence (4.65 ± 0.53), whereas lower scores were recorded for knowledge of hyperlipidemia (3.49 ± 0.95) and dietary habits (3.43 ± 0.76). Only 27.6% of participants had previously received nurse-led counseling. No statistically significant associations were found between the questionnaire domains and LDL-C or non-high-density lipoprotein cholesterol (non-HDL-C) levels. A positive association was identified between knowledge of hyperlipidemia and dietary habits ($r = 0.584$; $p < 0.001$). *Conclusion*: Participants demonstrated highly positive attitudes toward nurse-led counseling, although only a minority had previously received such counseling. These findings indicate the potential value of further research on structured, individualized patient education and nurse-led counseling in the care of patients with hyperlipidemia.

KLJUČNE RIJEČI: hiperlipidemija, LDL kolesterol, sestrinsko savjetovanje, pridržavanje terapije, koronarografija.

KEYWORDS: hyperlipidemia, LDL cholesterol, nurse counseling, adherence, coronary angiography.

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UVOD

Hiperlipidemija je važan promjenjivi čimbenik rizika za razvoj aterosklerotskih kardiovaskularnih (KV) bolesti.[1,2] U kliničkoj se praksi ona ne promatra samo kao odstupanje laboratorijskih vrijednosti nego kao stanje koje dugoročno može pridonijeti razvoju i napredovanju KV bolesti.[2] Povišene koncentracije aterogenih lipoproteina, osobito LDL kolesterola (LDL), imaju važnu ulogu u nastanku i progresiji ateroskleroze.[3,4] Upravo zbog dobro utvrđene povezanosti LDL-a s aterosklerotskom bolešću njegova kontrola čini jedan od temelja KV prevencije.[3,4]

Kardiovaskularne bolesti i dalje su velik javnozdravstveni problem, kako globalno, tako i u Hrvatskoj.[5,6] Njihovo veliko zdravstveno opterećenje dodatno ističe važnost pravodobnog prepoznavanja i kontrole promjenjivih čimbenika rizika.[5,6] Ciljne vrijednosti LDL-a određuju se prema ukupnom KV riziku te su niže u bolesnika s velikim i vrlo velikim rizikom.[1,7] U takvih je bolesnika posebno važno promatrati liječenje kao dugotrajan proces koji uključuje farmakološku terapiju, promjenu životnih navika i redovito praćenje.[1,7]

Uspješnost liječenja stoga ne ovisi samo o propisanoj terapiji nego i o tome koliko je bolesnik može dugoročno uključiti u svoj svakodnevni život te provoditi preporučene promjene životnih navika.[1,7–9] Pridržavanje terapije složen je proces na koji mogu utjecati razumijevanje bolesti, motivacija, svakodnevne obveze i različite prepreke s kojima se bolesnik susreće.[8,9] Upravo zato edukacija ne bi trebala biti ograničena samo na davanje informacija, nego bi trebala pomoći bolesniku da preporuke razumije i primijeni ih u vlastitim životnim okolnostima.[8,9]

Medicinska sestra pritom može imati važnu ulogu u edukaciji, savjetovanju i praćenju bolesnika. Strukturirano savjetovanje može obuhvatiti objašnjenje lipidograma, razgovor o prehrani i tjelesnoj aktivnosti, procjenu pridržavanja terapije te prepoznavanje prepreka koje bolesniku otežavaju provođenje preporuka. Dosadašnja istraživanja pokazuju da sestrinske intervencije mogu pridonijeti boljoj kontroli KV čimbenika rizika.[10–12] Metaanaliza Yanga *i sur.* dodatno podupire moguću vrijednost sestrinski vođenih intervencija u bolesnika s koronarnom bolesti srca (KBS).[10] Važnost kontinuiranoga sestrinskog praćenja pokazana je i u istraživanju *NAILED-ACS*, u kojem je telefonsko praćenje bolesnika bilo povezano s boljom kontrolom KV čimbenika rizika tijekom duljeg razdoblja.[11] Istraživanje Ruiz-Bustillo *i sur.* također je pokazalo bolje postizanje lipidnih ciljeva uz intenzivniju intervenciju koju su koordinirale medicinske sestre.[12] Ovi nalazi ne znače da svako sestrinsko savjetovanje nužno dovodi do boljih lipidnih vrijednosti, ali pokazuju da medicinska sestra može imati aktivno mjesto u dugoročnoj skrbi i podršci bolesniku.[11,12]

Koronarografija je važna dijagnostička metoda u procjeni KBS-a.[13] Bolesnici koji prolaze takvu obradu čine kliničku skupinu u kojoj procjena i kontrola KV čimbenika rizika imaju posebnu važnost.[7,13]

Svrha je istraživanja bila ispitati povezanost životnih navika, pridržavanja propisane terapije, znanja o hiperlipidemiji i stavova o sestrinskom savjetovanju s lipidnim statusom bolesnika s hiperlipidemijom koji su podvrgnuti koronarografiji.

INTRODUCTION

Hyperlipidemia is an important modifiable risk factor for the development of atherosclerotic cardiovascular (CV) disease.[1,2] In clinical practice, it is not regarded simply as an abnormality in laboratory values but as a condition that may contribute to the development and progression of CV disease over the long term.[2] Elevated concentrations of atherogenic lipoproteins, particularly low-density lipoprotein cholesterol (LDL-C), play an important role in the development and progression of atherosclerosis.[3,4] Due to the well-established association between LDL-C and atherosclerotic disease, LDL-C control represents one of the foundations of CV prevention.[3,4]

Cardiovascular diseases remain a major public health issue worldwide, including in Croatia.[5,6] Their substantial health burden further emphasizes the importance of timely identification and management of modifiable risk factors.[5,6] LDL-C treatment targets are determined according to overall CV risk and are lower for patients at high and very high risk.[1,7] In such patients, it is especially important to approach treatment as a long-term process involving pharmacological therapy, lifestyle modification, and regular follow-up.[1,7]

Treatment success therefore depends not only on the prescribed therapy but also on the patient's ability to incorporate it into daily life over the long term and implement recommended lifestyle changes.[1,7-9] Medication adherence is a complex process that may be influenced by disease-related knowledge, motivation, daily responsibilities, and various barriers encountered by patients.[8,9] Therefore, patient education should not be limited to the provision of information, but should also help patients understand and apply the recommendations they receive in the context of their individual circumstances.[8,9]

As part of this process, nurses may play an important role in patient education, counseling, and follow-up. Structured counseling may include explaining lipid profile results, discussing dietary habits and physical activity, assessing medication adherence, and identifying barriers that make it difficult for patients to follow recommendations. Previous studies have shown that nurse-led interventions may contribute to improved control of CV risk factors.[10-12] The meta-analysis by Yang *et al.* further supports the potential value of nurse-led interventions in patients with coronary artery disease (CAD).[10] The importance of continuous nursing follow-up was also demonstrated in the NAILED-ACS study, in which telephone-based follow-up was associated with better control of CV risk factors over an extended period.[11] Similarly, Ruiz-Bustillo *et al.* reported improved attainment of lipid targets following a more intensive intervention coordinated by nurses.[12] These findings do not imply that every nurse-led counseling intervention necessarily results in improved lipid levels, but they do indicate that nurses can play an active role in long-term patient care and support.[11,12]

Coronary angiography is an important diagnostic procedure for the assessment of CAD.[13] Patients undergoing this procedure represent a clinical population in which the assessment and management of CV risk factors are particularly important.[7,13]

The aim of this study was to investigate the associations between lifestyle habits, adherence to prescribed therapy, knowledge of hyperlipidemia, and attitudes toward nurse-led counseling, and the lipid profiles of patients with hyperlipidemia who underwent coronary angiography.

BOLESNICI I METODE

Provedeno je presječno opažajno istraživanje na Odjelu za kardiologiju Kliničke bolnice Merkur u Zagrebu od 10. lipnja do 20. prosinca 2025. U istraživanje je uključeno 29 (od ukupno 60) punoljetnih bolesnika s hiperlipidemijom koji su podvrgnuti koronarografiji, imali dostupan lipidogram i pristali sudjelovati. Uzorak je bio prigodan. Isključeni su bolesnici s nedostupnim lipidogramom, nepotpuno ispunjenim upitnikom važnim za analizu, nemogućnošću razumijevanja upitnika te oni koji su odbili ili prekinuli sudjelovanje.

Podatci su prikupljeni anonimnim autorskim upitnikom „Sestrinsko savjetovanje u kontroli hiperlipidemije" i iz medicinske dokumentacije. Upitnik je izrađen za potrebe istraživanja, s namjerom da obuhvati više područja svakodnevnog života i liječenja važnih za kontrolu hiperlipidemije. Sadržavao je 28 tvrdnji na petostupanjskoj Likertovoj skali (1 = „uopće se ne slažem"; 5 = „potpuno se slažem") te pitanja o prethodnom iskustvu sa sestrinskim savjetovanjem. Tvrdnje su obuhvaćale prehrambene navike (6), tjelesnu aktivnost (5), pridržavanje terapije (4), znanje o hiperlipidemiji (5) i stavove o sestrinskom savjetovanju (8). Kod obrnuto formuliranih tvrdnji provedeno je obrnuto bodovanje. Za svaku su domenu izračunani zbroj i prosječni rezultat te ukupni rezultat svih 28 tvrdnji i njegov prosjek na skali od 1 do 5. Cjeloviti anketni upitnik dostupan je svim zainteresiranim istraživačima na zahtjev preko *e-maila*.

Analizirane su vrijednosti ukupnog kolesterola, HDL-a, LDL-a, triglicerida i ne-HDL kolesterola (ne-HDL) iz kontrolnog lipidograma 3 – 6 mjeseci nakon koronarografije, izražene u mmol/L. Ako ne-HDL nije bio dostupan, izračunan je kao ukupni kolesterol − HDL kolesterol. Laboratorijska vrijednost ne-HDL-a bila je dostupna za 25 ispitanika, a izračunana je za svih 29; u korelacijskoj analizi iskorištene su laboratorijske vrijednosti za 25 ispitanika.

Kategorijske varijable prikazane su frekvencijama i postotcima, a numeričke aritmetičkom sredinom i standardnom devijacijom. Povezanosti su ispitane Pearsonovim koeficijentom korelacije uz $p < 0,05$. Podatci su uneseni i obrađeni u programu Microsoft Excel.

Sudjelovanje je bilo dobrovoljno i anonimno, uz pravo ispitanika na odustajanje bez posljedica za daljnju skrb. Istraživanje je odobrilo Etičko povjerenstvo Kliničke bolnice Merkur 10. lipnja 2025.

Ovaj se rad temelji na istraživanju prethodno prikazanom u diplomskom radu „Sestrinsko savjetovanje u kontroli hiperlipidemije", obranjenom na Medicinskom fakultetu Sveučilišta u Zagrebu 2026. godine.[14] U ovom se članku rezultati istraživanja dodatno razmatraju u kontekstu životnih navika, lipidnoga statusa i uloge sestrinskog savjetovanja u skrbi za bolesnike s hiperlipidemijom.

REZULTATI

U istraživanju je sudjelovalo 29 ispitanika. Muškarci su činili većinu uzorka, odnosno 24 ispitanika (82,8 %). Prosječna životna dob svih ispitanika bila je 63,17 ± 10,83 godina.

Prosječni indeks tjelesne mase (ITM) svih ispitanika iznosio je 28,11 ± 4,02 kg/m². Prekomjernu tjelesnu masu (ITM 25 – 29,99 kg/m²) imalo je 14 ispitanika (48,3 %), dok je pretilost

PATIENTS AND METHODS

A cross-sectional observational study was conducted at the Department of Cardiology, Merkur University Hospital, Zagreb, Croatia, from June 10 to December 20, 2025. The study included 29 (out of a total of 60) eligible adult patients with hyperlipidemia who had undergone coronary angiography, had an available lipid profile, and agreed to participate. A convenience sampling method was used. Patients were excluded if their lipid profile was unavailable, if they had incompletely answered questionnaire items relevant to the analysis, if they were unable to understand the questionnaire, or if they declined or discontinued participation.

Data were collected using an anonymous, investigator-developed questionnaire entitled "Nurse-Led Counseling in Hyperlipidemia Management" and from information obtained from medical records. The questionnaire was developed specifically for this study with the goal of assessing several aspects of daily life and treatment relevant to hyperlipidemia management. It comprised 28 statements rated on a five-point Likert scale (1 = "strongly disagree"; 5 = "strongly agree") as well as questions regarding previous experience with nurse-led counseling. The statements covered dietary habits (6 items), physical activity (5 items), medication adherence (4 items), knowledge of hyperlipidemia (5 items), and attitudes toward nurse-led counseling (8 items). Reverse scoring was applied to negatively worded items. Sum scores and mean scores were calculated for each domain, as well as a total score for all 28 items and its corresponding mean on a scale ranging from 1 to 5. The complete questionnaire is available to interested researchers upon request by email.

Total cholesterol, high-density lipoprotein cholesterol (HDL-C), LDL-C, triglyceride, and non-HDL-C levels were analyzed using follow-up lipid profile results obtained 3–6 months after coronary angiography, with all values expressed in mmol/L. When a non-HDL-C value was unavailable, it was calculated as total cholesterol minus HDL-C. Laboratory-measured non-HDL-C values were available for 25 participants, whereas calculated values were obtained for all 29 participants; laboratory-measured values from the 25 participants were used in the correlation analysis.

Categorical variables were presented as frequencies and percentages, while numerical variables were summarized using means and standard deviations. Associations were assessed using Pearson's correlation coefficient, with $p < 0.05$ considered statistically significant. Data were collected and analyzed using Microsoft Excel.

Participation was voluntary and anonymous, and participants were free to withdraw without any consequences for their subsequent care. The study was approved by the Ethics Committee of the Merkur University Hospital on June 10, 2025.

This article is based on research previously presented in the master's thesis entitled "Nurse-Led Counseling in Hyperlipidemia Management," which was defended at the University of Zagreb School of Medicine in 2026.[14] In this article, the study findings are further examined in the context of lifestyle habits, lipid profiles, and the role of nurse-led counseling in the care of patients with hyperlipidemia.

RESULTS

A total of 29 participants were enrolled in the study. Men constituted the majority of the sample, accounting for 24 participants (82.8%). The mean age of the participants was 63.17 ± 10.83 years.

The mean body mass index (BMI) was 28.11 ± 4.02 kg/m². Overweight (BMI 25–29.99 kg/m²) was observed in 14 partici-

(ITM ≥ 30 kg/m²) zabilježena u 8 ispitanika (27,6 %). Preostalih 7 ispitanika (24,1 %) imalo je ITM niži od 25 kg/m².

Među ispitanicima bilo je 7 aktivnih pušača (24,1 %), 14 bivših pušača (48,3 %) i 8 nepušača (27,6 %). Pridružene kronične bolesti bile su prisutne u 21 ispitanika (72,4 %). Najčešća je bila arterijska hipertenzija, zabilježena u 19 ispitanika (65,5 %), dok je šećernu bolest tipa 2 imalo 11 ispitanika (37,9 %). Obje su bolesti istodobno bile prisutne u 9 ispitanika (31,0 %). Prosječne vrijednosti lipidnog profila prikazane su u **Tablici 1**.

Među promatranim područjima najviše su prosječne rezultate ispitanici ostvarili za stavove prema sestrinskom savjetovanju (4,77 ± 0,27) i pridržavanje terapije (4,65 ± 0,53). Prosječni rezultat za tjelesnu aktivnost iznosio je 3,83 ± 0,76, za znanje o hiperlipidemiji 3,49 ± 0,95, a za prehrambene navike 3,43 ± 0,76. Ukupni prosjek svih Likertovih tvrdnji iznosio je 4,07 ± 0,38 (**Tablica 2**).

Prema samoprocjeni, s tvrdnjom o redovitoj šetnji ili laganoj tjelesnoj aktivnosti od najmanje 30 minuta na dan složilo se ili potpuno složilo 23 ispitanika (79,3 %), dok se s tvrdnjom o umjerenoj ili intenzivnoj aktivnosti najmanje triput tjedno

pants (48.3%), whereas obesity (BMI ≥ 30 kg/m^2) was recorded in 8 participants (27.6%). The remaining 7 participants (24.1%) had a BMI below 25 kg/m^2.

Among the participants, 7 were current smokers (24.1%), 14 were former smokers (48.3%), and 8 had never smoked (27.6%). Comorbid chronic conditions were present in 21 participants (72.4%). The most common comorbidity was arterial hypertension, reported in 19 participants (65.5%), followed by type 2 diabetes mellitus, which was present in 11 participants (37.9%). Both conditions were present concurrently in 9 participants (31.0%). Mean lipid profile values are presented in **Table 1**.

Across the domains assessed, the highest mean scores were observed for attitudes toward nurse-led counseling (4.77 ± 0.27) and medication adherence (4.65 ± 0.53). The mean score for physical activity was 3.83 ± 0.76, followed by knowledge of hyperlipidemia (3.49 ± 0.95) and dietary habits (3.43 ± 0.76). The overall mean score across all Likert-scale items was 4.07 ± 0.38 (**Table 2**).

According to self-reported data, 23 participants (79.3%) agreed or strongly agreed with the statement that they reg-

TABLE 1. Selected characteristics and lipid profile of study participants.

Continuous characteristics		
Variable	**N**	**Mean ± SD**
Age, years	29	63.17 ± 10.83
BMI, kg/m²	29	28.11 ± 4.02
Categorical characteristics		
Characteristic	**n (%)**	
Male sex	24 (82.8)	
BMI < 25 kg/m²	7 (24.1)	
BMI 25.00–29.99 kg/m²	14 (48.3)	
BMI ≥ 30 kg/m²	8 (27.6)	
Other chronic diseases (any)	21 (72.4)	
Arterial hypertension	19 (65.5)	
Type 2 diabetes mellitus	11 (37.9)	
Both hypertension and type 2 diabetes	9 (31.0)	
Current smoker	7 (24.1)	
Former smoker	14 (48.3)	
Non-smoker	8 (27.6)	
Lipid profile		
Parameter	**N**	**Mean ± SD**
Total cholesterol, mmol/L	29	3.91 ± 1.26
HDL cholesterol, mmol/L	29	1.19 ± 0.44
LDL cholesterol, mmol/L	29	2.08 ± 1.03
Triglycerides, mmol/L	29	1.42 ± 0.73
Non-HDL cholesterol – laboratory value, mmol/L	25	2.66 ± 1.15
Non-HDL cholesterol – calculated value, mmol/L	29	2.72 ± 1.14

Continuous data are presented as mean ± standard deviation (SD); categorical data as n (%). Hypertension and diabetes may coexist; overlapping rows should not be summed. Calculated non-HDL cholesterol = total cholesterol − HDL cholesterol. BMI, body mass index; HDL, high-density lipoprotein; LDL, low-density lipoprotein.

TABLE 2. Questionnaire scores, self-reported physical activity, and nurse counseling.

Questionnaire domain scores		
Questionnaire domain	**N**	**Mean ± SD**
Dietary habits	29	3.43 ± 0.76
Physical activity	29	3.83 ± 0.76
Adherence to therapy	29	4.65 ± 0.53
Self-assessed knowledge about hyperlipidemia	29	3.49 ± 0.95
Attitudes toward nurse counseling	29	4.77 ± 0.27
Overall questionnaire mean score	29	4.07 ± 0.38
Self-reported physical activity – agreement with individual statements		
Physical activity statement	**n (%) agreeing***	
Walking or light activity ≥30 min/day	23 (79.3)	
Moderate or vigorous activity ≥3 times/week	14 (48.3)	
Regularly physically active	12 (41.4)	
Spend most of the day sitting	7 (24.1)	
Physical activity is important to my health	29 (100.0)	
Previous experience with nurse counseling		
Response	**n (%)**	
Yes	8 (27.6)	
No	20 (69.0)	
Do not remember	1 (3.4)	
Perceived usefulness of counseling among participants who had received counseling		
Variable	**N**	**Mean ± SD**
Perceived usefulness of counseling	8	4.25 ± 1.17

Questionnaire domains were scored from 1 to 5; higher scores represent more favorable self-assessed responses after reverse coding of negatively worded items. *Agreement denotes original responses 4 or 5 on the five-point scale (n = 29). Agreement with the sitting item refers to the original item response, not the reverse-scored value. The study-specific instrument was not validated; these results are descriptive, not a standardized physical activity classification.

složilo ili potpuno složilo 14 ispitanika (48,3 %). S tvrdnjom da se redovito bave tjelesnom aktivnošću složilo se ili potpuno složilo 12 ispitanika (41,4 %), a s tvrdnjom da većinu dana provode sjedeći 7 ispitanika (24,1 %). Svih 29 ispitanika (100,0 %) složilo se ili potpuno složilo s tvrdnjom da je tjelesna aktivnost važna za njihovo zdravlje. Sestrinsko je savjetovanje prethodno primilo 8 ispitanika (27,6 %), dok ga 20 ispitanika (69,0 %) nije primilo, a jedan ispitanik (3,4 %) nije se toga sjećao. Među ispitanicima koji su imali iskustvo sestrinskog savjetovanja njegova je prosječna korisnost procijenjena s 4,25 ± 1,17 od mogućih 5 bodova (**Tablica 2**).

U korelacijskoj analizi nisu utvrđene statistički značajne povezanosti pojedinih područja upitnika s LDL-om ni ne-HDL-om. Najizraženija negativna povezanost zabilježena je između ukupnog prosjeka upitnika i LDL-a (r = −0,301; p = 0,113) te između ukupnoga prosjeka upitnika i ne-HDL-a (r = −0,318; p = 0,121). Istodobno je između znanja o hiperlipidemiji i prehrambenih navika utvrđena statistički značajna pozitivna povezanost (r = 0,584; p < 0,001) (**Tablica 3**).

ularly walked or engaged in light physical activity for at least 30 minutes per day, whereas 14 participants (48.3%) agreed or strongly agreed that they engaged in moderate or vigorous physical activity at least three times per week. Twelve participants (41.4%) agreed or strongly agreed with the statement that they engaged in physical activity regularly, while 7 (24.1%) agreed or strongly agreed that they spent most of their days sitting. All 29 participants (100.0%) agreed or strongly agreed that physical activity was important for their health. Eight participants (27.6%) had previously received nurse-led counseling, whereas 20 (69.0%) had not, and 1 participant (3.4%) could not recall whether they had received it. Among participants with previous experience of nurse-led counseling, its perceived usefulness was rated at a mean of 4.25 ± 1.17 out of 5 (**Table 2**).

Correlation analysis revealed no statistically significant associations between the individual questionnaire domains and either LDL-C or non-HDL-C levels. The strongest negative correlations were observed between the overall mean questionnaire score and LDL-C (r = −0.301; p = 0.113) and between the overall mean questionnaire score and non-HDL-C (r = −0.318; p = 0.121). In contrast, a statistically significant positive correlation was identified between knowledge of hyperlipidemia and dietary habits (r = 0.584; p < 0.001) (**Table 3**).

TABLE 3. Pearson correlations involving questionnaire scores.

Correlations with LDL cholesterol			
Questionnaire score	**N**	**Pearson r**	**p value**
Dietary habits	29	-0.199	0.301
Physical activity	29	-0.078	0.686
Adherence to therapy	29	-0.292	0.124
Self-assessed knowledge about hyperlipidemia	29	-0.157	0.415
Attitudes toward nurse counseling	29	-0.274	0.151
Overall questionnaire mean score	29	-0.301	0.113
Correlations with non-HDL cholesterol			
Questionnaire score	**N**	**Pearson r**	**p value**
Dietary habits	25	-0.227	0.276
Physical activity	25	-0.118	0.573
Adherence to therapy	25	-0.295	0.153
Self-assessed knowledge about hyperlipidemia	25	-0.153	0.466
Attitudes toward nurse counseling	25	-0.268	0.195
Overall questionnaire mean score	25	-0.318	0.121
Correlation between questionnaire domains			
Variables	**N**	**Pearson r**	**p value**
Self-assessed knowledge about hyperlipidemia – Dietary habits	29	0.584	<0.001

N, number of participants included in the analysis. Values are Pearson correlation coefficients (r). A p value < 0.05 was considered statistically significant. Non-HDL correlations are based on laboratory values available for 25 participants. LDL, low-density lipoprotein; HDL, high-density lipoprotein.

RASPRAVA

Rezultati ovog istraživanja daju zanimljivu sliku odnosa između onoga što bolesnici znaju, kako procjenjuju vlastite navike i koliko su do sada bili uključeni u sestrinsko savjetovanje. Najviši prosječni rezultati utvrđeni su za stavove prema sestrinskom savjetovanju i samoprocjenu pridržavanja terapije, dok su rezultati za prehrambene navike i samoprocijenjeno znanje o hiperlipidemiji bili nešto niži. Unatoč izrazito pozitivnim stavovima prema sestrinskom savjetovanju, takvo je savjetovanje prethodno primilo samo 27,6 % ispitanika. Među onima koji su ga primili njegova je korisnost ocijenjena visoko. Ovakav nalaz upućuje na mogućnost da postoji interes bolesnika za ovakav oblik podrške, ali da on u promatranoj skupini još nije bio široko zastupljen.

Taj je nerazmjer jedan od klinički zanimljivijih nalaza istraživanja jer može upućivati na prostor za sustavnije uključivanje medicinskih sestara u edukaciju i praćenje bolesnika s hiperlipidemijom. Dosadašnja istraživanja, uključujući rad Yanga *i sur.,* pokazuju da strukturirane sestrinske intervencije mogu pridonijeti boljoj kontroli KV čimbenika rizika u bolesnika s KBS-om.[10–12] U kvalitativnom istraživanju Parvizey *i sur.* kao moguće strategije poboljšanja pridržavanja terapije izdvojeni su praćenje nakon otpusta, primjena podsjetnika, unaprjeđenje edukacije, jačanje podrške bolesnicima i organizacijske promjene u zdravstvenoj skrbi.[15] Navedeni pristupi mogu poslužiti kao polazište za razvoj strukturiranijih oblika sestrinskog savjetovanja prilagođenih potrebama bolesnika s hiperlipidemijom. Sličan je pristup primijenjen i u istraži-

DISCUSSION

The findings of this study provide an interesting picture of the relationship between patients' knowledge, their perceptions of their own lifestyle habits, and their previous exposure to nurse-led counseling. The highest mean scores were observed for attitudes toward nurse-led counseling and self-reported medication adherence, whereas scores for dietary habits and self-assessed knowledge of hyperlipidemia were somewhat lower. Despite the highly positive attitudes toward nurse-led counseling, only 27.6% of participants had previously received such counseling. Among those who had received it, perceived usefulness was rated highly. These findings suggest that patients may be interested in this form of support, support, although only a minority had previously received such counseling.

This discrepancy represents one of the more clinically relevant findings of the study, as it may indicate an opportunity for more systematic involvement of nurses in the education and follow-up of patients with hyperlipidemia. Previous research, including the study by Yang *et al.*, has shown that structured nurse-led interventions may contribute to improved control of cardiovascular (CV) risk factors in patients with coronary artery disease (CAD).[10-12] In a qualitative study, Parvizey *et al.* identified post-discharge follow-up, the use of reminders, improved patient education, enhanced patient support, and organizational changes in healthcare delivery as potential strategies for improving medication adherence.[15] These approaches may provide a basis for developing

vanju *NAILED-ACS*. Huber *i sur.* već su nakon jednogodišnjega sestrinski vođenog telefonskog praćenja opisali povoljne rezultate u području sekundarne prevencije.[16] Kasnije praćenje iste skupine pokazalo je bolju kontrolu LDL kolesterola i krvnoga tlaka tijekom duljeg razdoblja.[11] Istraživanje Ruiz-Bustillo *i sur.* također je pokazalo bolje postizanje lipidnih ciljeva uz intenzivniju sestrinsku intervenciju.[12] Sestrinski vođene prehrambene intervencije dodatno su razmatrali Yar *i sur.*, koji u sustavnom pregledu i metaanalizi izvješćuju o povoljnim promjenama lipidnoga profila i pridržavanja prehrambenih preporuka u bolesnika s KBS-om.[17] Njihovi nalazi dodatno naglašavaju važnost prehrambene edukacije, osobito s obzirom na to da su rezultati za prehrambene navike u promatranom uzorku bili niži od rezultata za pridržavanje terapije i stavove prema sestrinskom savjetovanju. Ipak, navedena su istraživanja uključivala intervencije, zbog čega se njihovi učinci ne mogu izravno uspoređivati s rezultatima provedenoga opažajnog istraživanja.

Domaća istraživanja također upućuju na izazove u kontroli lipidnoga statusa. Pintarić *i sur.* opisali su poteškoće u postizanju ciljnih vrijednosti LDL kolesterola u bolesnika vrlo visokog i ekstremnog KV rizika.[18] Jurišić *i sur.* upozorili su na nedostatke u provođenju sekundarne prevencije tijekom prve godine nakon infarkta miokarda.[19] U europskom istraživanju *EUROASPIRE V* također su zabilježena odstupanja od preporučenih ciljeva prevencije u bolesnika s KBS-om.[20]

Sustavni pregled Ellis *i sur.* pokazao je da strukturirana edukacija bolesnika s KBS-om može pridonijeti boljem znanju i određenim zdravstvenim ishodima.[21] Metaanaliza Alzhanove *i sur.* također upućuje na moguću korist od sestrinski vođenih programa u kontroli pojedinih KV čimbenika rizika.[22] Takvi nalazi pružaju dodatnu znanstvenu podlogu za razmatranje edukacijske uloge medicinskih sestara u skrbi za bolesnike s hiperlipidemijom.

Drugi nalaz koji zaslužuje pozornost jest statistički značajna pozitivna povezanost između samoprocijenjenog znanja o hiperlipidemiji i prehrambenih navika. Zbog presječnog ustroja istraživanja nije moguće zaključiti vodi li veće znanje boljim prehrambenim navikama ili bolesnici koji se više brinu o prehrani istodobno povoljnije procjenjuju svoje znanje o bolesti. Ipak, utvrđena povezanost daje dodatnu važnost edukacijskoj komponenti skrbi. U svakodnevnom radu to može značiti da razgovor o bolesti dobiva veću vrijednost kada se poveže s konkretnim i ostvarivim promjenama u prehrani i drugim životnim navikama.

Visoku samoprocjenu pridržavanja terapije također treba promatrati s određenim oprezom. Ispitanici su vlastito ponašanje procjenjivali sami, pa na odgovore mogu utjecati netočno prisjećanje i želja da se vlastito ponašanje prikaže povoljnijim. Unatoč tomu, visok rezultat pridržavanja terapije vrijedan je podatak jer pokazuje kako ispitanici doživljavaju vlastito sudjelovanje u liječenju. Važnost dugoročnog pridržavanja terapije dodatno potvrđuje istraživanje Mazhara *i sur.*, provedeno na 20 490 bolesnika s KBS-om, u kojem je bolje pridržavanje terapije za snizivanje lipida bilo povezano s manjim rizikom od velikih KV događaja.[23] Za razliku od samoprocjene primijenjene u provedenom istraživanju, Mazhar *i sur.* pridržavanje su procjenjivali na temelju podataka o izdavanju lijekova.

Prosječna vrijednost LDL-a iznosila je 2,08 mmol/L, ali pojedinačnu vrijednost uvijek treba promatrati u kontekstu ukupno

more structured forms of nurse-led counseling tailored to the needs of patients with hyperlipidemia. A similar approach was implemented in the NAILED-ACS study. After as little as one year of nurse-led telephone follow-up, Huber *et al.* reported favorable outcomes in secondary prevention.[16] Subsequent follow-up of the same cohort demonstrated improved control of LDL-C and blood pressure over a longer period.[11] The study by Ruiz-Bustillo *et al.* also demonstrated higher rates of lipid target attainment following a more intensive nursing intervention.[12] Nurse-led dietary interventions were further examined by Yar *et al.*, whose systematic review and meta-analysis reported favorable changes in lipid profiles and adherence to dietary recommendations among patients with CAD.[17] These findings further emphasize the importance of dietary education, particularly given that the scores for dietary habits in the present sample were lower than those for medication adherence and attitudes toward nurse-led counseling. Nevertheless, these studies included interventions, and thus their effects cannot be directly compared with the findings of the present observational study.

Studies conducted in Croatia have also indicated challenges in achieving lipid control. Pintarić *et al.* described difficulties in attaining LDL-C target levels among patients at very high and extremely high CV risk.[18] Jurišić *et al.* identified shortcomings in the implementation of secondary prevention during the first year after myocardial infarction.[19] Additionally, the European EUROASPIRE V study also documented deviations from recommended prevention targets among patients with CAD.[20]

A systematic review by Ellis *et al.* demonstrated that structured education for patients with CAD may improve disease-related knowledge and certain health outcomes.[21] A meta-analysis by Alzhanova *et al.* also suggested potential benefits of nurse-led programs in controlling certain CV risk factors.[22] These findings provide further scientific support for considering the educational role of nurses in the care of patients with hyperlipidemia.

Another finding warranting attention is the statistically significant positive correlation between self-reported knowledge of hyperlipidemia and dietary habits. Given the cross-sectional study design, it is not possible to determine whether greater knowledge leads to healthier dietary habits or whether patients who pay greater attention to their diet also tend to assess their knowledge of the disease more favorably. Nevertheless, the observed association emphasizes the importance of the educational component of patient care. In clinical practice, this may mean that discussions about the disease may become more effective and valuable when linked to specific, achievable changes in diet and other lifestyle behaviors.

The high self-reported medication adherence score should also be interpreted with a certain amount of caution. Participants assessed their own behavior, and their responses may therefore have been influenced by recall bias or social desirability bias. Nevertheless, the high adherence score still represents valuable data because it shows how participants perceive their own involvement in treatment. The importance of long-term medication adherence is further supported by the study by Mazhar *et al.*, which included 20,490 patients with CAD and found that better adherence to lipid-lowering therapy was associated with a lower risk of major CV events.[23] Unlike the self-assessment approach used in the present study, Mazhar *et al.* assessed adherence using medication dispensing records.

pnog KV rizika i ciljeva liječenja za konkretnog bolesnika.[1,7] U provedenom istraživanju nisu utvrđene statistički značajne povezanosti područja upitnika s LDL-om ni ne-HDL-om. To ne znači da znanje, životne navike ili pridržavanje terapije nisu važni za kontrolu hiperlipidemije, nego da u ovom uzorku nije bilo moguće potvrditi njihovu statističku povezanost s promatranim lipidnim parametrima. Malen broj ispitanika, kao i brojni drugi čimbenici koji utječu na lipidni status, mogli su pridonijeti takvom rezultatu. Iako je većina korelacija bila negativnog smjera, taj se trend ne može tumačiti kao dokaz učinka promatranih čimbenika na lipidni status.

Važno je rezultate promatrati i u svjetlu ograničenja istraživanja. Uzorak je bio malen i prigodan, istraživanje je provedeno u jednom kliničkom središtu, a presječni ustroj ne omogućuje praćenje promjena tijekom vremena. Dio podataka temelji se na samoprocjeni, a upitnik izrađen za potrebe istraživanja nije zasebno psihometrijski validiran. Rezultate pojedinih područja stoga treba tumačiti oprezno. Osim toga, nisu provedeni intervencija ni mjerenje prije i nakon sestrinskog savjetovanja, zbog čega nije moguće procijeniti njihov izravan učinak. Dobiveni rezultati mogu poslužiti kao polazište za buduća prospektivna ili intervencijska istraživanja u kojima bi se strukturirano sestrinsko savjetovanje moglo pratiti kroz vrijeme i povezati s promjenama znanja, navika, pridržavanja terapije i lipidnoga statusa.

ZAKLJUČAK

Rezultati ovog istraživanja pokazuju izrazito pozitivne stavove bolesnika prema sestrinskom savjetovanju i visoku samoprocjenu pridržavanja terapije, ali je takav oblik savjetovanja prethodno primio tek manji dio ispitanika. Upravo taj nerazmjer pokazuje da postoji prostor za daljnje razmatranje uloge medicinske sestre u edukaciji i dugoročnom praćenju bolesnika s hiperlipidemijom.

Nije utvrđena statistički značajna povezanost promatranih domena upitnika s LDL i ne-HDL kolesterolom. Istodobno je između znanja o hiperlipidemiji i prehrambenih navika utvrđena pozitivna povezanost, što daje dodatnu vrijednost edukacijskoj komponenti skrbi, ali zbog ustroja istraživanja ne dopušta zaključivanje o uzročno-posljedičnom odnosu.

Dobiveni rezultati ne potvrđuju izravan učinak sestrinskog savjetovanja na lipidne vrijednosti, ali pokazuju da bolesnici takav oblik podrške prepoznaju i pozitivno prihvaćaju. Buduća bi istraživanja trebala ispitati može li strukturirano, individualizirano i kontinuirano sestrinsko savjetovanje pridonijeti boljem razumijevanju bolesti, povoljnijim životnim navikama i dugoročnoj kontroli hiperlipidemije.

The mean LDL-C level in the present study was 2.08 mmol/L, but individual values should always be interpreted in the context of the patient's overall CV risk and the treatment targets applicable to that particular patient.[1,7] In the present study, no statistically significant associations were identified between the questionnaire domains and either LDL-C or non-HDL-C levels. This does not mean that knowledge, lifestyle habits, or medication adherence are unimportant for hyperlipidemia management, but rather that their statistical associations with the lipid parameters examined could not be established in this sample. The small sample size, together with the numerous other factors that influence lipid levels, may have contributed to this finding. Although most correlations were negative, this trend cannot be interpreted as evidence that the factors examined affect lipid status.

The findings should also be considered in light of the study's limitations. The sample was small and based on convenience sampling, the study was conducted at a single clinical center, and the cross-sectional design did not allow changes over time to be assessed. Some data were self-reported, and the questionnaire developed specifically for this study had not undergone separate psychometric validation. Consequently, the domain scores should be interpreted with caution. Furthermore, no intervention was implemented, and no measurements were obtained before and after nurse-led counseling; therefore, its direct effect could not be evaluated. These findings may serve as a basis for future prospective or interventional studies in which structured nurse-led counseling would be evaluated over time, in order to determine its association with changes in knowledge, lifestyle habits, medication adherence, and lipid status.

CONCLUSION

The findings of this study show that patients had highly positive attitudes toward nurse-led counseling and high levels of self-reported medication adherence, although only a minority had previously received this form of counseling. This discrepancy clearly shows an opportunity for further evaluation of the role of nurses in patient education and the long-term follow-up of patients with hyperlipidemia.

No statistically significant associations were identified between the questionnaire domains and LDL-C or non-HDL-C levels. However, a positive correlation was observed between knowledge of hyperlipidemia and dietary habits, further supporting the value of patient education, although the study design does not permit conclusions regarding a causal relationship between the two.

The findings do not establish a direct effect of nurse-led counseling on lipid levels, but they show that patients recognize and respond positively to this form of support. Future studies should investigate whether structured, individualized, and continuous nurse-led counseling can contribute to improved disease-related knowledge, healthier lifestyle habits, and long-term control of hyperlipidemia.

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