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Assessment of Challenges Faced by Cardiovascular Patients in Quitting Smoking

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A B S T R A C T

Introduction: Smoking is one of the most important modifiable risk factors for cardiovascular diseases, and quitting is a complex and multidimensional process. Therefore, the present study aimed to identify the challenges faced by cardiovascular patients in the process of quitting smoking at Tohid Hospital, Sanandaj, in 2025.

Materials & Methods: This descriptive-analytical study was conducted on 317 cardiovascular patients using a simple random method. Inclusion criteria included age over 18 years and a history of at least one unsuccessful smoking cessation experience in the last 6 months, and the exclusion criterion was incomplete completion of the questionnaires. Data were collected using a demographic information form and a 15-item Smoking Cessation Challenges (CSS) questionnaire in two internal and external dimensions. Analysis was performed with linear regression tests and nonparametric tests in SPSS V.16.

Results: The mean total score of smoking cessation challenges was estimated to be 24.38±7.63. Dimensional analysis showed that the severity of internal challenges (23.37±4.71) was significantly higher than external challenges (14.86±6.05). The results of the multiple regression model showed that occupation, lack of regular exercise, longer duration of smoking, more frequent attempts to quit, and history of concurrent alcohol use were significant predictors of increased smoking cessation challenges ($p<0.05$). Also, increasing age was significantly associated with increased internal challenges, and a low income level was significantly associated with increased external challenges.

Conclusion: Internal challenges (personal and psychological) are the main obstacles for heart patients in the smoking cessation process, and factors such as advanced age, concurrent alcohol use, and heart failure exacerbate these challenges. Therefore, focusing solely on awareness is not enough, and it is necessary to shift treatment programs from recommendation-based approaches to comprehensive and individual-centered interventions, including management of withdrawal symptoms, promotion of self-efficacy, and specialized psychological support, in order to increase the success rate of sustainable cessation in these patients.

Keywords: Challenges of quitting smoking, Quitting smoking, Cardiovascular patients

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Introduction

Tobacco use is a serious threat to human health and kills millions of people worldwide every year. According to the World Health Organization, by 2020, more than 8.4 million people will have died from tobacco-related diseases (1, 2). The prevalence of smoking is significantly higher among unemployed or low-skilled workers (3). Smoking and tobacco use are the main factors in the development and progression of many diseases, such as cancer (especially head and neck and lung cancers), respiratory and cardiovascular diseases (CVD), and increased risk of infections (hepatitis, herpes, and tuberculosis) (4). Even non-smokers exposed to cigarette smoke are at risk of developing cardiovascular diseases and various cancers (5, 6).

In developed and developing countries, cardiovascular events caused by smoking account for about 50% of deaths (7). According to previous studies, 20% of deaths from cardiovascular events in the United States are due to smoking (8). Iran is also the leading cause of death from cardiovascular disease, accounting for 46% of all deaths in the country in 2015 (9). Among the many factors that cause and develop cardiovascular diseases, smoking plays a significant role in the development of coronary artery disease (CAD), myocardial infarction, sudden cardiac death (SCD), peripheral vascular disease, and congestive heart failure (CHF) (10).

According to studies, smoking in men and women under 50 years of age is strongly associated with the occurrence of acute myocardial infarction (11). Also, smoking, especially smoking during adolescence and young adulthood, is one of the main factors in the occurrence of cardiovascular diseases in middle age and is a major and common challenge in developed and developing countries (10, 12). Given the role of smoking in the development of cardiovascular diseases, quitting smoking can lead to improved heart function, lung regeneration, increased respiratory capacity, reduced blood pressure, and the risk of developing various cancers (4). However, quitting smoking is one of the most difficult treatment decisions, and only about 6% of smokers succeed in quitting permanently (13). However, it is considered one of the most effective measures to improve personal health. This decision can significantly improve heart and lung function, reduce the risk of chronic diseases, and ultimately improve the quality of daily life in terms of physical and mental aspects (14, 15). People face many challenges when quitting smoking. One of these challenges is nicotine withdrawal syndrome, which can have a negative impact on motivation to quit and treatment outcomes (14). On the other hand, one of the methods of quitting smoking is the use of nicotine replacement drugs; however, many smokers may not be able to afford the costs of this treatment, which is a serious challenge on the path to quitting. In addition, each of these medications has specific side effects that can make the treatment process difficult (10, 16). Another important challenge in the process of quitting smoking is the physical and psychological dependence on nicotine (10). This dependence can cause withdrawal symptoms such as depression, anxiety, irritability, restlessness, insomnia, anger, weight gain, and a strong desire to use again, each of which can be a serious challenge on the path to quitting smoking (17). Social and behavioral challenges that affect smoking cessation success include experiencing stressful events, lack of adequate support from the health system and family, concerns about harm to social relationships, easy access to cigarettes, exposure to environmental stimuli related to nicotine use that remind one of smoking, and encouraging others to resume or continue using and simultaneously using addictive substances such as alcohol and

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cannabis (15, 17). These factors create serious challenges in the quitting process by creating psychological stress, weakening the individual's motivation, and increasing the likelihood of relapse (18). Smoking cessation in cardiovascular patients is a complex and multidimensional process that is influenced by individual, psychological, social, and clinical factors. In addition to physiological dependence on nicotine, these patients face challenges such as stress caused by the disease, fear of relapse, false beliefs about the effect of smoking on cardiac symptoms, and environmental pressures (18). Previous studies have shown that the presence of these barriers can reduce the effectiveness of educational and therapeutic interventions. Therefore, accurate identification of internal and external challenges to smoking cessation in cardiovascular patients is a prerequisite for designing targeted interventions and the effective role of the treatment team, especially nurses, in supporting patients (19, 20).

Despite the development of various smoking cessation interventions, most studies have focused on the outcomes of the intervention and have less focused on the structured analysis of internal and external challenges affecting the failure of cessation in cardiovascular patients; this lack of analytical evidence has limited the design of interventions based on the real needs of these patients. Given the high rate of smoking among cardiovascular patients, as well as the limited domestic studies on the challenges of smoking cessation, especially in Iranian society, the present study was conducted with the aim of identifying the challenges faced by cardiovascular patients in the smoking cessation process.

Materials and methods

The present cross-sectional study was descriptive-analytical, aiming to determine the challenges facing cardiovascular patients in quitting smoking at Tohid Hospital in Sanandaj in 2025. All cardiovascular patients were referred to Tohid Hospital in Sanandaj from October 2025 to January 2025. The research setting included the heart clinic and patients hospitalized in the gynecological and male heart departments and the CCU of Tohid Hospital, and the inclusion criteria included willingness to participate in the study, cardiovascular patients over 18 years of age referring to Tohid Hospital in Sanandaj, at least one unsuccessful attempt to quit smoking in the last six months, and the exclusion criteria included incomplete completion of the questionnaires.

According to a similar study, which had an average challenge score of 24 with a standard deviation of 6.4, and based on the formula for estimating the mean in a limited population, considering a type 1 error of 0.05 and a test power of 80%, the required sample size was calculated to be 289 (17). Considering 10% of patients' non-cooperation in the study, the final sample size was 317. The method of selecting patients was also using a simple random method and based on different days of the week. In the first month of sampling, three different days of the week were randomly selected, and all patients admitted on those days entered the study. Again, in the second month, three more days of the week were selected by simple random method, and this type of sampling continued until the study sample was complete. Data collections were included below tools:

1. Demographic information form

It included variables such as gender, marital status, occupation, monthly income, place of residence, living situation, exercising for 30 minutes per day, smoking status, duration of smoking, number of cigarettes smoked per day, number of attempts to quit smoking, receiving education on smoking cessation, history of alcohol consumption, and duration of heart

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disease diagnosis. All information was collected through self-report from participants.

2. Smoking Cessation Tool (CSS)

This questionnaire was designed to investigate the challenges of quitting smoking in patients with cardiovascular disorders (18). This questionnaire consists of 15 items and two dimensions (internal and external) that are scored on a Likert scale of 1 to 4. The minimum score is 15 and the maximum score is 60, with higher scores indicating more challenges related to quitting smoking. The validity of the original version of this instrument was reported to be adequate, and its reliability using the internal consistency coefficient (Cronbach's alpha) was reported to be 0.740 (14). In Iran, the validity and reliability were also reported to be adequate, and its reliability using the internal consistency coefficient (Cronbach's alpha) was reported to be 0.840 (14). The reliability of the questionnaire in the present study was determined by providing the questionnaire to 30 participants who did not participate in the original study, using the internal consistency coefficient (Cronbach's alpha) method, which was reported to be 0.832.

Demographic information of the participants was examined using descriptive statistics (e.g., frequency distribution, percentage, mean, and standard deviation). To examine the effect of different variables on the overall challenges score of the study, a univariate linear regression model was used, and to examine the effect of different variables on the internal and external challenges score, nonparametric statistical tests Mann-Whitney and Kruskal-Wallis and Spearman correlation were used. On the other hand, in order to determine the effect of variables affecting the overall challenges score, all significant variables at the 0.2 error level were entered into the final and multivariate linear regression model. Data were analyzed with SPSS version 16 software at a significance level of less than 5%.

Results

According to Table 1, most of the participants were male, married, and urban residents, living mostly with their families, and had an average economic status. Behaviorally, the prevalence of smoking in the sample was high, and a significant proportion of patients had a history of long-term smoking, multiple attempts to quit, and insufficient physical activity. Also, about half of the patients had no history of receiving smoking cessation education, and a significant percentage reported concurrent alcohol consumption.

Table 1. Frequency distribution of patients participating in the study according to demographic variables.

Variables	Group	Frequency	Percentage
Gender	Male	255	80.44%
	Female	62	19.56%
Marital Status	Single	54	17.03%
	Married	232	73.19%
	Divorced/Widowed	31	9.78%
Occupation	Employee	53	16.72%
	Worker	17	5.36%
	Self-employed	173	54.57%
	Homemaker	27	8.52%
	Retired	28	8.83%
	Student/Unemployed	19	6.00%

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Monthly Income	Less than Needs	120	37.85%
	Equal to Needs	143	45.11%
	More than Needs	54	17.03%
Residence	Urban	271	85.49%
	Rural	46	14.51%
Living Status	Alone	74	23.34%
	With Family	243	76.66%
Daily 30-Minute Exercise	No Activity	104	32.81%
	1–2 Times per Week	95	29.97%
	3–4 Times per Week	118	37.22%
Smoking Cessation Education Received	Yes	152	47.95%
	No	165	52.05%
History of Alcohol Use	Yes	132	41.64%
	No	185	58.36%
Smoking Status	Current Smoker	156	49.21%
	Former Smoker	161	50.79%
Duration of Smoking	Less than 1 Year	8	2.52%
	1–5 Years	118	37.22%
	6–10 Years	95	29.97%
	More than 10 Years	96	30.28%
Cigarettes per Day	Less than 5 Cigarettes	49	15.46%
	5–10 Cigarettes	114	35.96%
	11–20 Cigarettes	106	33.44%
	More than 20 Cigarettes	48	15.14%
Number of Quit Attempts	One Time	94	29.65%
	Two Times	71	22.40%
	Three Times	62	19.56%
	Four Times	34	10.73%
Duration Since Heart Disease Diagnosis	Less than 1 Year	63	19.87%
	1 Year	63	19.87%
	2 Years	48	15.14%
	More than 2 Years	143	45.11%

The results of Table 2 showed that some demographic variables and factors related to health behavior had a statistically significant relationship with internal and external challenges to quitting smoking. Marital status (p=0.001) and occupation (p=0.03) were related to internal challenges. Also, monthly income (p=0.006) and place of residence (p=0.03) showed a significant relationship with external challenges. Smoking indicators, including duration of smoking (p=0.013), number of cigarettes smoked per day (p=0.004), and frequency of quitting attempts (p<0.001), were related to external challenges. The time since diagnosis of heart disease was related to both internal (p=0.035) and external (p=0.034) challenges. In addition, living situation (p=0.04), receiving smoking cessation education (internal challenge: p=0.027; external challenge: p=0.004), and history of alcohol use (internal challenge: p=0.002; external challenge:

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p<0.001) were associated with levels of challenges.

Table 2. Relationship between demographic variables and internal and external challenges to quitting smoking.

Variables	Group	n	Internal Challenges (Mean Rank / p)	External Challenges (Mean Rank / p)	Statistical Test
Marital Status	Single	54	46.12 / 0.001	—	Kruskal–Wallis
	Married	232	89.17 / —	—	
	Divorced/Widowed	31	18.14 / —	—	
Occupation	Employee	53	80.13 / 0.03	—	Kruskal–Wallis
Monthly Income	Less than Needs	120	—	59.18 / 0.006	Mann–Whitney U
Residence	Urban	271	—	41.15 / 0.03	Mann–Whitney U
Duration of Smoking	< 1 Year	8	—	31.79 / 0.013	Kruskal–Wallis
Cigarettes per Day	< 5 Cigarettes	49	—	49.15 / 0.004	Kruskal–Wallis
Number of Quit Attempts	One Time	94	—	59.13 / <0.001	Kruskal–Wallis
Duration Since Heart Disease Diagnosis	Less than 1 Year	63	31.14 / 0.035	52.15 / 0.034	Kruskal–Wallis
Living Status	Alone	74	—	178.09 / 0.04	Mann–Whitney U
Smoking Cessation Education Received	Yes	152	170.79 / 0.027	143.39 / 0.004	Mann–Whitney U
Alcohol Use	Yes	132	140.00 / 0.002	197.95 / <0.001	Mann–Whitney U

The results in Table 3 show that the overall quit challenges score across participants ranged from 15 to 60, with a mean of 24.38 and a standard deviation of 7.63, indicating that there was considerable variation in the experience of quit-related challenges in this sample. The minimum and maximum scores (15 and 60) indicate wide individual differences in the degree of difficulty and resistance to quitting. In more detailed analysis, internal challenges (range of scores 7 to 28) had a mean of 23.37 with a standard deviation of 4.71, indicating that most participants were at a moderate to low level of internal challenges. External challenges (range of scores 8 to 32) had a mean of 14.86 and a standard deviation of 6.05, indicating that there was greater variability and less severity than internal challenges in the study population. These findings suggest that smoking cessation challenges are influenced by different individual and environmental factors, and that separate assessment of internal and external challenges can be useful for designing targeted interventions.

Table 3. Overall scores of smoking cessation challenges, internal and external challenges from the perspective of participating heart patients.

Dimensions	Minimum	Maximum	Mean	Standard Deviation

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Total Score of Smoking Cessation Challenges	15	60	38.24	7.63
Internal Challenges	7	28	23.37	4.71
External Challenges	8	32	14.86	6.05

In Table 4, age was significantly associated with the total quit smoking challenges score variable (β = 0.117, 95% CI: 0.027–0.156, p = 0.005), such that each unit increase in age was associated with an average increase of 0.117 units in the dependent variable. A positive coefficient indicates a direct relationship, and this finding introduces age as a significant predictor of the studied variable. In addition, correlation analysis showed that age has a positive and significant relationship with internal challenges (r = 0.172, p = 0.002), meaning that with increasing age, the level of internal challenges of individuals increases on average. In contrast, age had no significant relationship with external challenges (r = -0.051, p = 0.369), indicating that age change does not have a significant effect on external challenges of individuals. These findings suggest that age can be an important predictor for understanding and managing internal challenges but does not play a similar role for external challenges.

Table 4. Relationship between internal and external challenges and the total score of smoking cessation challenges of patients participating in the study with age.

Variable	β	Total Smoking Cessation Challenges (Simple Linear Regression p-value)	Confidence Interval	Internal Challenges (Spearman Correlation)	External Challenges (Spearman Correlation)
Age	0.117	0.005	0.027–0.156	r = 0.172, p = 0.002	r = -0.051, p = 0.369

According to Table 5, in the multiple linear regression analysis, occupation, regular exercise, duration of smoking, frequency of quitting attempts, and history of alcohol consumption were significant predictors of the smoking cessation challenge score. Compared to the reference group, working (B=4.374, p=0.030), self-employed (B=2.603, p=0.020), and retired (B=4.212, p=0.010) individuals showed higher scores. Exercising 3–4 times a week was associated with a significant decrease in the challenge score (B=-2.247, p=0.029). Longer duration of smoking (p≤0.003) and more frequent quitting attempts (p=0.001) were associated with an increase in the challenge score. Also, history of alcohol consumption was associated with an increase in the challenge score (B = 3.205, p = 0.001). Gender and marital status did not have a significant effect in the final model.

Table 5. Results of multiple linear regression analysis to predict smoking cessation challenges score.

Variables	Group	N	Mean ± SD	B	Standard Error	p-value (Multiple Linear Regression)
Gender	Female	98	38.48 ± 5.98	0.299	1.082	0.782
Marital Status	Married	55	38.56 ± 7.55	2.143	1.150	0.063

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Occupation	Worker	201	40.41 ± 8.41	4.374	2.111	0.030
Occupation	Self-employed	104	38.64 ± 7.04	2.603	1.188	0.020
Occupation	Retired	97	40.25 ± 8.97	4.212	1.176	0.010
Exercise 30 min/day	1–2 times/week	27	37.73 ± 8.27	-1.917	1.077	0.076*
Exercise 30 min/day	3–4 times/week	59	37.40 ± 7.59	-2.247	1.021	0.029
Smoking Duration	5–10 years	93	37.16 ± 6.93	8.161	2.072	0.003
Smoking Duration	6–10 years	89	39.7 ± 7.2	10.2	2.74	0.001
Smoking Duration	>10 years	42	39.39 ± 7.42	10.39	2.74	0.001
Quit Attempts	4 times	31	38.7 ± 7.31	6.244	1.429	0.001
Quit Attempts	>4 times	23	42.80 ± 8.23	6.666	1.205	0.001
Alcohol Use History	Yes	46	40.11 ± 9.46	3.205	0.852	0.001

Discussion

The findings of the present study showed that cardiovascular patients face a moderate level of challenges in quitting smoking, with the mean total challenge score in these patients being 24.38±7.63 (range 15 to 60). A detailed analysis of the descriptive findings revealed that the severity of the challenges ahead is mostly due to individual and psychological dimensions, as the mean score of internal challenges (23.37±4.71) was significantly higher than external challenges (14.86±6.05). This numerical superiority indicates that for cardiac patients, mental and physiological barriers such as nicotine dependence and anxiety have created a greater barrier than environmental and economic factors. Despite these patients' awareness of the risks of smoking for heart health, the existence of these objective and mental challenges has caused the quitting process to remain a complex and multidimensional challenge, which is also consistent with the results of previous studies (21, 22).

One of the most important findings of this study was the dominance of internal challenges over external challenges of quitting smoking. Internal challenges included severe nicotine dependence, withdrawal symptoms, anxiety, restlessness, and inability to control cravings. This finding is consistent with several studies that have identified nicotine dependence and the severity of withdrawal symptoms as the most important factors in smoking cessation failure (23). From a neurobiological perspective, nicotine use is associated with activation of the brain reward system and dopamine release, and cessation of its use can lead to disruption of emotional balance and increased substance-seeking behaviors (24). Therefore, it is natural that heart patients, especially long-term users, experience more internal challenges.

In this study, older age was significantly associated with increased internal challenges of quitting smoking. This finding indicates that the process of quitting smoking becomes more

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difficult with increasing age. Previous studies have also shown that long-term smoking, the establishment of behavioral habits, and a deeper dependence on nicotine reduce the likelihood of successful cessation. In addition, older adults may have more negative beliefs about their ability to quit smoking or perceive quitting at an older age as less beneficial, which can reduce their self-efficacy (25). Marital status was also significantly associated with internal challenges to quitting smoking. Although marriage is expected to act as a source of social support, the findings of this study suggest that in some cases, family responsibilities, economic pressures, and role stress can make the quitting process more difficult. This finding is consistent with studies that have pointed to the dual role of family in smoking cessation, such that family support can both facilitate and hinder quitting, especially when other family members smoke (26, 27).

From a socio-economic perspective, the results showed that low income was significantly associated with increased external challenges to quitting smoking. This finding is consistent with extensive evidence that has identified low socioeconomic status as one of the strongest predictors of continued smoking (28, 29). Financial constraints can reduce patients' access to smoking cessation services, specialized counseling, and pharmacological treatments and thus exacerbate external barriers to quitting. Also, the interaction between economic and genetic factors in smoking behavior has been reported, indicating the complexity of this addictive behavior (30). The findings of this study showed that duration of smoking and number of cigarettes smoked per day were associated with increased challenges to quitting smoking. This result is consistent with several studies that have identified heavy smokers as being at risk for more severe dependence and withdrawal symptoms (14, 31). Also, the positive association between a high frequency of quitting attempts and increased challenges may reflect the experience of repeated failures and reduced confidence in the ability to quit; this phenomenon is referred to in the literature as reduced self-efficacy (25).

One of the notable findings of this study was the significant association of concurrent alcohol use with increased intrinsic and extrinsic challenges to quitting smoking. Previous studies have shown that concurrent alcohol and nicotine use, due to shared neural mechanisms, increase the likelihood of relapse and complicate the quitting process (32, 33). Alcohol use can impair impulse control and intensify cravings to smoke, especially in social situations (34). Therefore, ignoring alcohol use in smoking cessation programs may reduce the effectiveness of interventions.

In this study, patients with heart failure reported the highest levels of challenges to quit smoking. This finding is consistent with previous studies that have shown that heart failure patients are less successful in quitting despite awareness of the risks of smoking (35, 36). The severity of symptoms, physical limitations, prevalent depression, and pessimistic outlook on future health may reduce motivation to quit in these patients. However, some studies have suggested that the occurrence of acute cardiac events can act as a "teaching opportunity" for smoking cessation, provided that appropriate supportive interventions are provided (37). From a theoretical perspective, the findings of this study can be explained within the framework of Bandura's social cognitive theory. According to this theory, self-efficacy plays a key role in behavior change, and even in the case of high awareness of risks, low self-efficacy can prevent quitting unhealthy behaviors (38). The association between high internal challenges and smoking cessation failure in this study also supports this issue and is consistent with studies

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that have identified self-efficacy as an important predictor of smoking cessation (30, 37).

The findings of this study illustrate the fact that the challenges faced by heart patients to quit smoking go beyond a simple individual decision and are encompassed in a complex interplay of physiological (nicotine dependence), psychological (anxiety and reduced self-efficacy), and structural (economic constraints) factors. The significant dominance of internal challenges indicates that therapeutic interventions should not be focused solely on educational approaches but should be directed towards specialized treatments for managing withdrawal symptoms and cognitive restructuring. Also, the identification of more vulnerable groups (such as heart failure patients, alcohol users, and low-income individuals) reinforces the necessity of designing "specific support packages" and multilevel interventions. Finally, combining socioeconomic support with specialized treatment programs supervised by multidisciplinary teams (especially cardiac nurses) can significantly improve the chances of successful sustained cessation and improve the prognosis of cardiovascular patients by reducing perceived barriers (24, 39).

Conclusion

The present study showed that smoking cessation in cardiovascular patients is a process beyond a simple behavior change and is affected by complex internal and external challenges. Given the significant dominance of internal challenges (nicotine dependence and psychological barriers) over external challenges, purely educational interventions will not be sufficient for these patients. It is essential that smoking cessation programs in health centers shift from a "recommendation-based" approach to a "comprehensive and person-centered" approach. These interventions should be a combination of pharmacological management of withdrawal symptoms, specialized psychological support to promote self-efficacy, and consideration of support packages to reduce socio-economic barriers. Also, special attention to more vulnerable groups such as patients with heart failure and concurrent alcohol users in cardiac rehabilitation protocols can improve the success rate of sustainable cessation and ultimately the health prognosis of these patients.

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CRediT authorship contribution statement

Conceptualization, Methodology, Validation, Formal Analysis, Investigation, Resources, Software, Data Curation, Writing–Original Draft Preparation, Writing–Review & Editing, Visualization, Supervision, Project Administration: HT, MM, PM, AM, PS.

Conflict of interest

The authors declare no conflict of interest.

Ethical considerations

This study was approved by the Ethics Committee of Ilam University of Medical Sciences (Iran) (IR.MEDILAM.REC.2025.181). The authors avoided data fabrication, falsification, plagiarism, and misconduct.

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