OPEN ACCESS



Middle East Research Journal of Medical Sciences
ISSN: 2789-7699 (Print) & ISSN: 2958-2024 (Online)
Frequency: Bi-Monthly
DOI: https://doi.org/10.36348/merjms.2026.v06i06.001

KUWAIT SCHOLARS PUBLISHER
Website: http://www.kspublisher.com/
Email: office@kspublisher.com

Health Locus of Control According to Smoking Status and Cessation-Seeking Behavior: A Cross-Sectional Study

Hacer Yiğit[1*], Ismail Kasim[2], Erhan Simsek[1]
[1]MD. Ankara Yildirim Beyazit University Faculty of Medicine Department of Family Medicine Ankara, Turkey
[2]Prof. Family Medicine Clinic, Ankara City Hospital Ankara, Turkey

Abstract: ***Objective***: The concept of health locus of control refers to the beliefs that people hold regarding whether their health is mainly the result of their own actions, chance, or other influential people such as healthcare professionals. The purpose of this study was to look at the association between health locus of control, smoking status, and the behavior of seeking smoking. ***Methods***: The study was an observational, cross-sectional one. Data were obtained using a sociodemographic and smoking-related questionnaire, the Multidimensional Health Locus of Control Scale Form A, and, for participants who had attended the smoking cessation clinic, the Fagerström Test for Nicotine Dependence. ***Results***: There was a significant difference in internal health locus of control between the three groups (p=0.004). Similarly, there was a significant difference in the health locus of control among powerful others between the groups (p=0.002). Within the attendees of the smoking cessation clinic, those who intended to quit smoking had a significantly higher level of internal health locus of control (p=0.009). People who felt that they needed medical support had a higher health locus of control regarding Powerful Others (p=0.025). Among active smokers who were not attending the cessation clinic, having made previous attempts to quit was linked to higher Powerful Others scores (p=0.011). ***Conclusion***: When health locus of control is assessed together with nicotine dependence as well as readiness to quit, family physicians may be able to adapt their smoking cessation counseling to the individual characteristics of their patients.

Keywords: Health Locus of Control; Smoking, Smoking Cessation, Nicotine Dependence, Fagerström Test for Nicotine Dependence, Primary Care, Family Medicine.

Research Paper

***Corresponding Author:**
Hacer Yiğit
MD. Ankara Yildirim Beyazit University Faculty of Medicine Department of Family Medicine Ankara, Turkey

How to cite this paper:
Yiğit, H., Kasim, I., & Simsek, E. (2026). Health Locus of Control According to Smoking Status and Cessation-Seeking Behavior: A Cross-Sectional Study. *Middle East Res J. Med. Sci, 6*(6), 321-331. https://doi.org/10.36348/merjms.2026.v06i06.00X

Article History:
| Submit: 28.09.2026 |
| Accepted: 02.11.2026 |
| Published: 10.11.2026 |

Copyright © 2026 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution **4.0 International License (CC BY-NC 4.0)** which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

1. INTRODUCTION

Tobacco smoking continues to be a leading preventable cause of premature morbidity and death worldwide. Although significant progress has been made in tobacco control over recent decades, the global health burden attributable to smoking remains substantial. The Global Burden of Disease Study estimated that, in 2019, smoking was responsible for approximately 7.7 million deaths and 200 million disability-adjusted life-years worldwide, with more than one billion individuals continuing to use tobacco products [1]. Recent projections confirm that smoking is the foremost behavioral risk factor for death rates worldwide, and further reductions in smoking prevalence could result in substantial increases in life expectancy [2]. Despite the availability of effective pharmacological and behavioral treatments, many individuals find cessation challenging, suggesting that smoking behavior cannot be explained solely by nicotine exposure or physical dependence [3].

Psychological and cognitive qualities that influence individuals' perceptions of responsibility for their health may also affect health-related decision-making. Health locus of control (HLOC) is a construct particularly relevant in this context. HLOC refers to an individual's beliefs about the factors that determine

health outcomes. Within a multidimensional framework, these beliefs are commonly categorized as internal control, chance or external control, and control by powerful others. Individuals with a predominantly internal HLOC believe their health is largely determined by their own behaviors, choices, and efforts. Conversely, those with stronger chance or external control beliefs attribute health outcomes to luck, fate, or circumstances outside personal influence. The powerful others dimension reflects the belief that influential individuals, especially physicians and other health professionals, play a major role in determining health outcomes [4, 5].

These orientations are significant because perceptions of control are linked to engagement in health-promoting and risk-related behaviors. A systematic review of HLOC and health behaviors found that individuals with stronger internal control beliefs were generally more likely to adopt health-promoting behaviors [5]. Similarly, a recent systematic review of medical behavioral interventions reported that higher internal HLOC was frequently associated with behaviors conducive to favorable health outcomes. In contrast, a strong chance orientation was more frequently associated with less favorable preventive behaviors and reduced responsiveness to behavioral interventions [4]. Notably, the clinical implications of external control are not uniform. Belief in chance or fate is conceptually distinct from reliance on health professionals, with the latter potentially beneficial when medical guidance and therapeutic engagement are required. A systematic review of patient–provider communication demonstrated that locus-of-control orientations are associated with medical decision-making preferences, adherence, satisfaction with care, and patient–provider relationships. This suggests that assessing control beliefs may enable clinicians to customize communication to each individual patient's characteristics [6].

Health locus of control is therefore particularly relevant to tobacco use and smoking cessation. Decisions to continue smoking, attempt cessation, seek professional assistance, or persist after unsuccessful quit attempts entail varying degrees of perceived personal agency, motivation, and acceptance of external support. Recent research has identified associations between HLOC and tobacco-related behaviors. For example, a large cross-sectional study of adolescents found that external HLOC dimensions, especially chance-related beliefs, were associated with electronic cigarette use [7]. Additionally, an intervention study in Türkiye demonstrated that increasing internal health control through health education was linked to favorable changes in perceptions of smoking [8]. Collectively, these outcomes, along together with broader evidence on HLOC and health behavior, indicate that perceptions of personal responsibility and external influence may contribute to differences in smoking-related attitudes and behaviors. However, the relationship is unlikely to be unidirectional; individuals may simultaneously believe that personal effort is necessary to quit and that professional guidance is key for achieving cessation [4-6].

This distinction is particularly relevant in primary care settings. Primary care physicians regularly encounter individuals at various stages of tobacco use as well as readiness to quit. They are well positioned to identify smoking, initiate brief interventions, provide counseling, and refer patients for more intensive cessation treatment. Current evidence supports the effectiveness of these interventions. A systematic review of primary care strategies found that several approaches increased the provision of smoking cessation advice and support, with some interventions also associated with higher cessation rates [9]. Furthermore, a 2024 meta-analysis of over 26,000 participants showed that very brief cessation advice during clinical encounters significantly increased long-term tobacco abstinence [10]. These findings show the importance of the clinical encounter and suggest that patients may respond differently to physicians' advice depending on their perceptions of responsibility and control over health. Growing evidence for bespoke smoking cessation approaches suggests that accounting for individual characteristics and preferences may improve the effectiveness of cessation interventions [11].

Although there is theoretical relevance of HLOC to smoking behavior, there is limited contemporary evidence directly comparing health control beliefs among individuals who actively seek professional smoking cessation support, current smokers who do not seek such support, and individuals who have never smoked. Differentiating these groups may yield clinically important insights, as attending a smoking cessation clinic indicates both smoking status and an active health-seeking decision. Examining internal, external, and powerful-others control beliefs across these groups may therefore improve understanding of the psychological characteristics associated with smoking behavior and willingness to seek cessation support.

Accordingly, the present study aimed to examine the association between health locus of control and both smoking status and cessation-seeking behavior among adults attending family medicine and smoking cessation outpatient clinics. Specifically, internal, external, and powerful-others health locus of control dimensions were compared among individuals attending a smoking cessation clinic, current smokers who had not attended such a clinic, and individuals who had never smoked. Improved knowledge of these control orientations may assist family physicians in identifying differences in patients' perceptions of responsibility for health and provide a foundation for crafting more individualized approaches to smoking cessation counseling.

2. MATERIAL AND METHODS

2.1 Study Design and Setting

This study was designed as an observational, cross-sectional, questionnaire-based study. The study was conducted at the Family Medicine Outpatient Clinic and Smoking Cessation Outpatient Clinic of Ankara Bilkent City Hospital, Ankara, Türkiye, between June 6 and August 30, 2024. The target population consisted of adults aged 20–69 years attending these outpatient clinics during the study period. This age range was selected in accordance with the population in which the Turkish validity and reliability of the Multidimensional Health Locus of Control Scale Form A had been evaluated. Eligible patients waiting for consultation at the participating outpatient clinics were randomly approached and invited to participate in the study.

2.2 Ethical Considerations

Ethical approval for the study was obtained from the Ankara Bilkent City Hospital No. 1 Medical Research Scientific and Ethical Evaluation Board on June 5, 2024 (Decision No. TABED 1/287/2024). Participation was entirely voluntary. All participants were informed about the purpose and procedures of the study before enrollment, and written informed consent was obtained from each participant. Participants were informed that they could withdraw from the study at any stage without providing a reason and without any consequences regarding the healthcare services they received.

2.3 Study Population and Participant Groups

Participants were classified into three groups according to their smoking status and smoking cessation clinic attendance:

- Smoking cessation clinic group: current smokers aged 20–69 years who attended the Smoking Cessation Outpatient Clinic for professional support to quit smoking.
- Active smoker group: current smokers aged 20–69 years who had not attended the Smoking Cessation Outpatient Clinic and were not seeking professional smoking cessation support at the time of enrollment.
- Never-smoker group: individuals aged 20–69 years who reported that they had never smoked.
- Classification into smoking groups was based on participants' self-reported smoking history and smoking cessation clinic attendance.

2.4 Sample Size Calculation

An a priori sample size calculation was performed using G*Power version 3.1. For comparisons among three independent groups, the calculation was based on:

- A two-sided type I error probability of $\alpha = 0.05$,
- Statistical power of 95% ($1-\beta = 0.95$), and
- A medium effect size ($f = 0.25$).

The minimum required sample size was calculated as 251 participants. To compensate for potentially incomplete questionnaires and other possible data losses, the target sample size was increased by approximately 20%, and enrollment of at least 300 participants, with approximately 100 participants in each study group, was initially planned. During the study period, 390 eligible individuals were approached. Four individuals declined participation. Following the exclusion of questionnaires that were incomplete or unsuitable for analysis, the final study population consisted of 371 participants:

- 123 participants attending the smoking cessation clinic,
- 124 active smokers not attending the smoking cessation clinic, and
- 124 never-smokers.

2.1 Eligibility Criteria

Inclusion Criteria

Participants were eligible for the study if they:

- Had attended the Family Medicine Outpatient Clinic or Smoking Cessation Outpatient Clinic of Ankara Bilkent City Hospital;
- Were aged between 20 and 69 years;
- Had no condition that prevented effective communication;
- Had sufficient cognitive and linguistic ability to understand and answer the questionnaire;
- Were literate;
- Voluntarily agreed to participate in the study; and
- Provided written informed consent.

Exclusion Criteria

Participants were excluded if they:

- Were younger than 20 years or older than 69 years;
- Had a physical, cognitive, psychiatric, or communication-related condition that prevented them from understanding or completing the questionnaire;
- Were unable to read and understand the questionnaire;
- Were illiterate;
- Did not provide written informed consent; or
- Submitted a questionnaire with insufficient information for the required study variables or MHLC subscale scoring.

2.6 Data Collection Procedure

Data collection began after ethical approval had been obtained. All participants were interviewed by a member of the research team, and the questionnaire was completed under researcher supervision. Before completing the questionnaire, potential participants were informed about the study and those who agreed to participate provided written informed consent. The questionnaire was administered during the participants'

outpatient clinic visit. No intervention was performed, and all data were based on participants' responses to the study questionnaire. The study questionnaire consisted of two sections and 39 items in total.

2.7 Sociodemographic and Smoking-Related Questionnaire

The first section consisted of a 21-item questionnaire developed by the research team and finalized following review by the academic board of the Family Medicine Department.

This section collected information on:

- Age,
- Sex,
- Occupation,
- Marital status,
- Educational status,
- Place of residence,
- Income and expenditure status,
- Accessibility of healthcare services,
- Presence of chronic diseases, and
- Smoking status.

Participants who responded affirmatively to the question "Do you currently smoke?" were additionally asked about:

- Duration of smoking in years,
- Number of cigarettes smoked per day,
- Previous smoking cessation attempts, and intention to quit smoking.

Participants who reported an intention to quit were further asked whether they believed that they would need support from a physician during the smoking cessation process.

2.8 Multidimensional Health Locus of Control Scale Form A

The second section included the Turkish version of the Multidimensional Health Locus of Control Scale Form a (MHLC Form A). The Turkish validity and reliability study of MHLC Form A was conducted by Güzel *et al*., who demonstrated that the Turkish version had acceptable psychometric properties and was suitable for assessing health locus of control in Turkish-speaking populations [12]. Permission to use the Turkish version of the scale was obtained from the relevant author before the study. The MHLC Form A is an 18-item, six-point Likert-type instrument designed to assess beliefs concerning the factors responsible for determining an individual's health. Each item is rated from 1 to 6, with higher scores indicating stronger endorsement of the corresponding health locus of control dimension.

The scale consists of three independent six-item subscales:

- Internal Health Locus of Control (IHLC): represents the belief that one's health is largely determined by one's own behaviors and actions.
- Chance Health Locus of Control (CHLC): represents the belief that health outcomes are primarily influenced by chance, luck, or fate.
- Powerful Others Health Locus of Control (PHLC): represents the belief that health outcomes are substantially influenced by powerful other individuals, including healthcare professionals and other influential persons.

The item distributions for the three subscales were as follows:

- Internal HLOC: Items 1, 6, 8, 12, 13, and 17;
- Chance HLOC: Items 2, 4, 9, 11, 15, and 16;
- Powerful Others HLOC: Items 3, 5, 7, 10, 14, and 18.

Each subscale is scored independently and ranges from 6 to 36 points. Higher scores indicate a stronger orientation toward the corresponding locus of control dimension. The MHLC Form A does not generate an overall total score. Therefore, internal, chance, and powerful-others scores were analyzed separately throughout the study. No participant was categorized exclusively into a single locus-of-control type on the basis of an overall scale score; rather, the strength of each health locus of control dimension was evaluated according to its respective subscale score.

2.9 Fagerström Test for Nicotine Dependence

Nicotine dependence among participants attending the smoking cessation clinic was assessed using the Fagerström Test for Nicotine Dependence (FTND) [13]. The FTND is a widely used six-item questionnaire developed to assess the severity of physical dependence on nicotine among cigarette smokers. The Turkish version of the FTND has previously been evaluated for validity and reliability in Turkish smokers and has been considered suitable for assessing nicotine dependence in smoking cessation settings [14]. The six items are scored according to their predefined response categories. In the present study, nicotine dependence was classified according to the conventional five-category FTND scoring system as follows:

- 0–2 points: very low nicotine dependence;
- 3–4 points: low nicotine dependence;
- 5 points: moderate nicotine dependence;
- 6–7 points: high nicotine dependence; and
- 8–10 points: very high nicotine dependence.

2.10 Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 21.0 (IBM Corp., Armonk, NY, USA). Microsoft Excel 2007 was used for supplementary data organization and calculations. Categorical variables were summarized as numbers (n) and percentages (%). The distribution of continuous variables was evaluated using graphical methods and the

Shapiro–Wilk test. Continuous variables were presented as mean ± standard deviation (SD) and median (minimum–maximum), as appropriate. Comparisons of categorical variables across smoking-status groups were performed using the Pearson chi-square test, and the results were presented as frequencies and percentages. Because MHLC subscale scores did not meet the assumptions required for parametric comparisons, non-parametric statistical methods were used for between-group analyses. For variables with more than two independent groups, including smoking status, occupation, place of residence, educational status, income level, and healthcare accessibility, MHLC subscale scores were compared using the Kruskal–Wallis test. When an overall statistically significant difference was detected with the Kruskal–Wallis test, pairwise post-hoc comparisons were performed with Bonferroni adjustment to control for multiple testing. For variables consisting of two independent groups, including sex, presence of children, and chronic disease status, differences in MHLC subscale scores were assessed using the Mann–Whitney U test. Associations between continuous or ordinal variables were examined using Spearman's rank correlation coefficient (ρ). Correlation analyses included:

- Age,
- Duration of smoking,
- Number of cigarettes smoked per day, and
- Internal, chance, and powerful others hloc subscale scores.

All statistical tests were two-sided, and a p-value <0.05 was considered statistically significant.

3. RESULTS

3.1 Participant Characteristics and Smoking-Related Outcomes

The analysis included 371 participants, comprising 148 women (39.9%) and 223 men (60.1%). The mean age of the study population was 36.95 ± 11.52 years. Of the total, 247 participants (66.6%) were current smokers. Among current smokers, the mean duration of smoking was 16.38 ± 11.03 years, and the mean daily cigarette consumption was 20.34 ± 11.31 cigarettes. Selected sociodemographic characteristics by study group are summarized in Table 1.

Among current smokers, 75.7% (n=187) had previously attempted to quit, and 33.7% (n=63) of those reported receiving professional support during cessation attempts. The majority of participants (96.5%) identified smoking as a risk factor for multiple diseases, and 91.1% reported the presence of smokers in their close social environment. Smoking behaviors varied significantly between the two groups of current smokers. Those attending the smoking cessation clinic reported a longer duration of smoking (18.29 ± 10.51 years) compared to active smokers who had not attended the clinic (14.50 ± 11.25 years; p<0.001), and a higher mean daily cigarette consumption (23.82 ± 10.79 vs. 16.91 ± 10.79 cigarettes; p<0.001). Previous quit attempts were significantly associated with attendance at the smoking cessation clinic (χ^2 = 10.421, p = 0.001). Current intention to quit smoking differed significantly between the two groups (p<0.001), with a significantly higher proportion of smoking cessation clinic attendees indicating an intention to quit (Figure 1). Similarly, the apparent need for physician support during smoking cessation differed markedly between the two groups (p<0.001). Participants attending the smoking cessation clinic were considerably more likely to report a need for physician assistance (Figure 2).

3.2 Health Locus of Control by Smoking Status

Within the overall study population, the mean Internal Health Locus of Control (HLOC) score was 25.01 ± 5.74, the mean Chance HLOC score was 15.75 ± 6.17, and the mean Powerful Others HLOC score was 22.04 ± 6.45. The internal consistency coefficients for the three subscales ranged from 0.738 to 0.748 (Table 2). Health locus of control health locus of control varied by smoking status and smoking cessation clinic attendance. Internal HLOC scores differed significantly among the three groups (p=0.004), with the highest scores among smoking cessation clinic attendees. Post-hoc analysis showed a significant difference between clinic attendees and never-smokers. Similarly, Powerful Others HLOC scores differed substantially across groups (p=0.002), with clinic attendees scoring higher than both active smokers not attending the clinic and never-smokers. In contrast, Chance HLOC scores did not differ significantly among the groups (p=0.628). Detailed group comparisons are provided in Table 3.

3.3 Health Locus of Control and Smoking Cessation-Related Characteristics

Among smoking cessation clinic attendees, Internal HLOC scores differed substantially based on current intention to quit smoking (χ^2=9.416, p=0.009). Those intending to quit had substantially higher Internal HLOC scores than those without such intention (26.56 ± 5.27 vs. 14.75 ± 6.89; pairwise p < 0.05). Within the same group, Powerful Others HLOC scores differed according to perceived need for physician consultation for smoking cessation (χ^2=7.403, p=0.025). Participants reporting a need for physician support had higher Powerful Others HLOC scores than those not reporting such a need (24.13 ± 6.16 vs. 16.71 ± 6.92; pairwise p < 0.05). Among active smokers who had not attended the smoking cessation clinic, those with a previous quit attempt had significantly higher Powerful Others HLOC scores than those who had never attempted to quit (22.11 ± 7.15 vs. 19.22 ± 6.03; p=0.011). No significant differences in any of the three HLOC dimensions were observed by current intention to quit or perceived requirement for physician support within this group.

3.4 Correlates of Health Locus of Control

Among smoking cessation clinic attendees, Powerful Others HLOC scores were weakly but positively correlated with both age (ρ=0.269, p=0.003) and duration of smoking (ρ=0.246, p=0.006). No significant correlations were found between daily cigarette consumption and any HLOC dimension. Similar associations were observed among active smokers who had not attended the smoking cessation clinic. In this group, Powerful Others HLOC scores were positively correlated with age (ρ=0.301, p=0.001) and duration of smoking (ρ=0.256, p=0.004), whereas daily cigarette consumption was not associated with HLOC scores. Among never-smokers, increasing age was weakly associated with lower Chance HLOC scores (ρ=−0.208, p=0.020) and higher Powerful Others HLOC scores (ρ=0.242, p=0.007). Age was not significantly associated with Internal HLOC scores.

3.5 Nicotine Dependence in Smoking Cessation Clinic Attendees

Among the 123 participants attending the smoking cessation clinic, nicotine dependence, as assessed by the Fagerström Test for Nicotine Dependence (FTND), was predominantly in the higher dependence categories. In total, 55.3% of participants were classified as having high or very high nicotine dependence, 31.7% had very low or low dependence, and 13.0% had moderate dependence (Table 4).

Table 1: Selected Baseline Characteristics According to Study Group

Characteristic	Smoking cessation clinic (n=123)	Active smokers not attending clinic (n=124)	Never-smokers (n=124)	*p*
Age, median (min–max), years	35.0 (20–65)	30.5 (20–65)	40.0 (20–63)	**0.018**
Sex, n (%)				0.333
Female	45 (36.6)	47 (37.9)	56 (45.2)	
Male	78 (63.4)	77 (62.1)	68 (54.8)	
Education, n (%)				**<0.001**
Middle school or lower	17 (13.8)	6 (4.8)	3 (2.4)	
High school	44 (35.8)	15 (12.1)	12 (9.7)	
Bachelor's degree or higher	62 (50.4)	103 (83.1)	109 (87.9)	
Having children, n (%)	72 (58.5)	47 (37.9)	78 (62.9)	**<0.001**
Chronic disease, n (%)	41 (33.3)	24 (19.4)	30 (24.2)	**0.038**

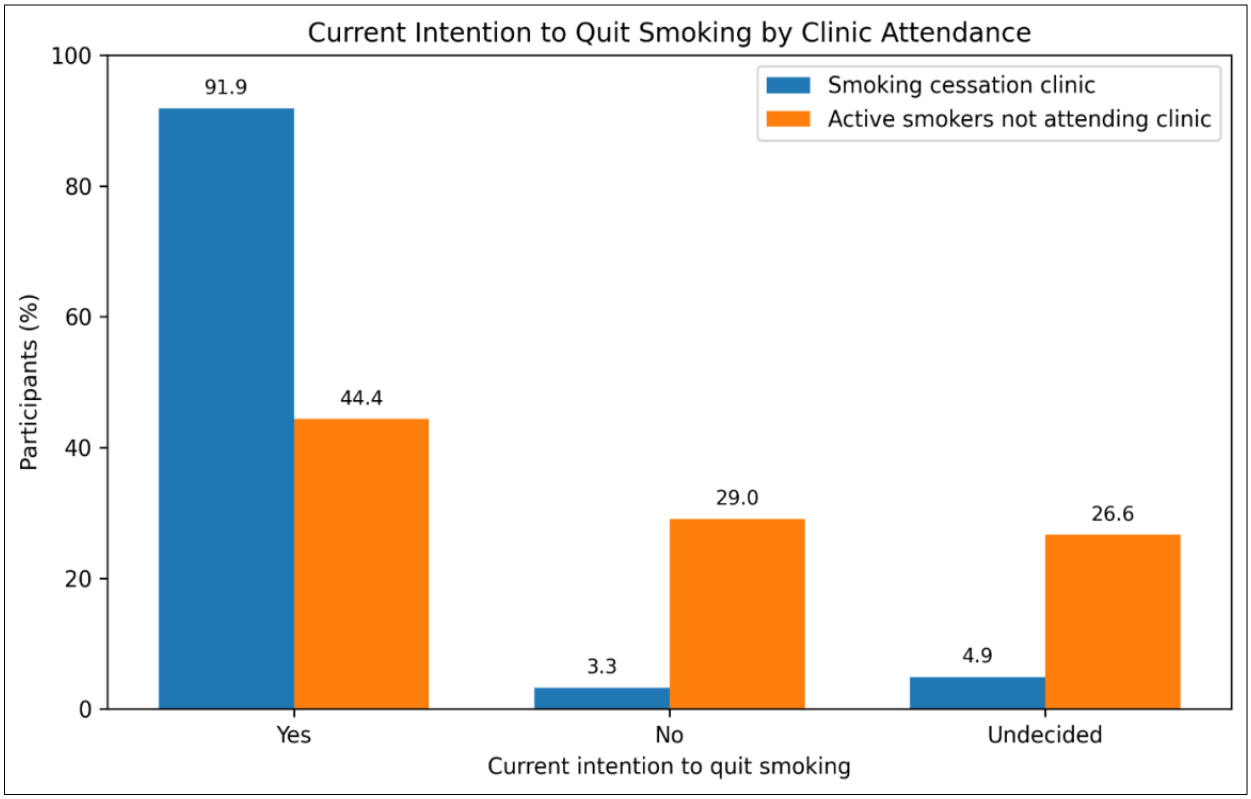


Figure 1: Current Intention to Quit Smoking by Clinic Attendance

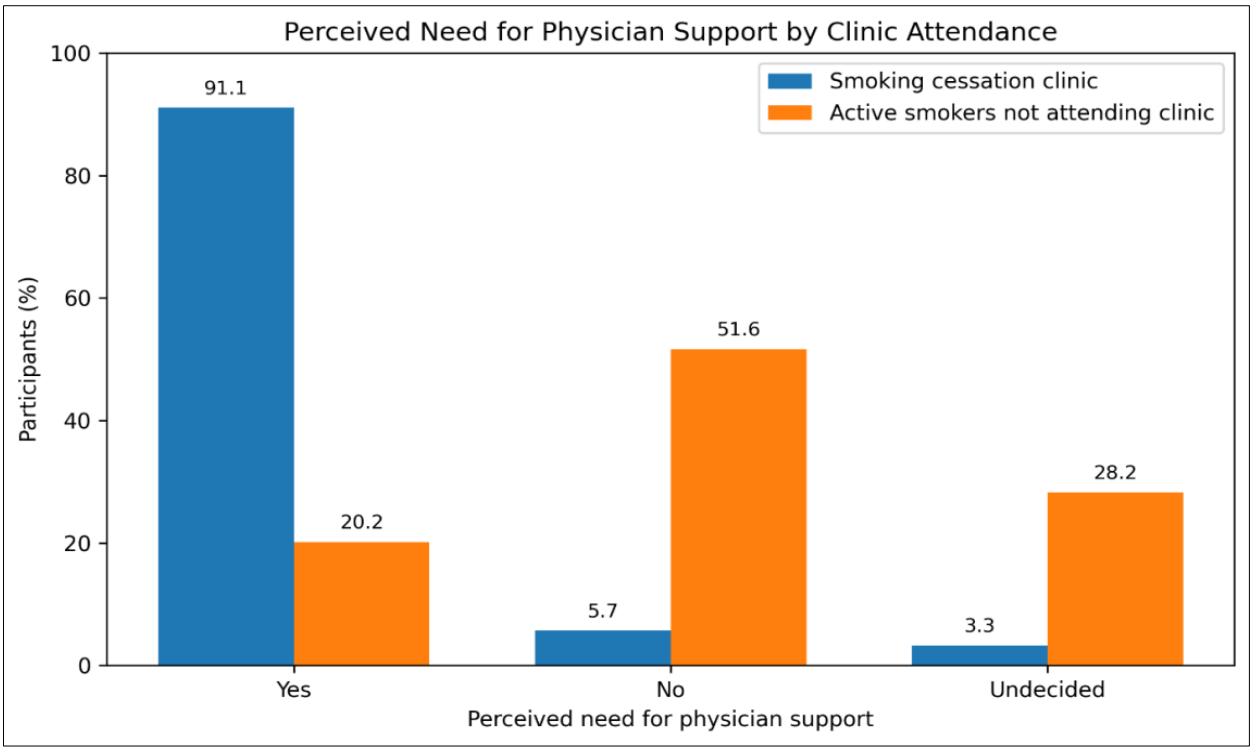


Figure 2: Perceived Need for Physician Support by Clinic Attendance

Table 2: Distribution and Internal Consistency of Multidimensional Health Locus of Control Subscale Scores *

MHLC subscale	Number of items	Mean ± SD	Median (min–max)	Cronbach's α
Internal HLOC	6	25.01 ± 5.74	26.00 (9–36)	0.738
Chance HLOC	6	15.75 ± 6.17	15.00 (6–36)	0.738
Powerful Others HLOC	6	22.04 ± 6.45	22.00 (6–36)	0.748

*HLOC, Health Locus of Control; MHLC, Multidimensional Health Locus of Control; SD, standard deviation. Each subscale ranges from 6 to 36, with higher scores indicating stronger endorsement of the corresponding control orientation.

Table 3: Comparison of Health Locus of Control Scores According to Smoking Status and Smoking Cessation Clinic Attendance

MHLC subscale	Smoking cessation clinic (n=123)	Active smokers not attending clinic (n=124)	Never-smokers (n=124)	Kruskal–Wallis χ^2	*p*
Internal HLOC	26.04 ± 5.72; 27.0 (9–36)[a]	24.99 ± 5.81; 24.5 (11–36)[ab]	23.99 ± 5.55; 25.0 (10–36)[b]	11.193	**0.004**
Chance HLOC	16.03 ± 6.84; 15.0 (6–34)	15.16 ± 5.46; 15.0 (6–29)	16.07 ± 6.16; 15.0 (6–36)	0.929	0.628
Powerful Others HLOC	23.63 ± 6.44; 24.0 (8–36)[a]	21.15 ± 6.91; 21.0 (6–35)[b]	21.36 ± 5.71; 21.5 (8–36)[b]	12.860	**0.002**

Values are presented as mean ± SD; median (minimum–maximum). Different superscript letters indicate statistically significant pairwise differences following Bonferroni-adjusted post-hoc comparisons ($p<0.05$). HLOC, Health Locus of Control; MHLC, Multidimensional Health Locus of Control.

Table 4: Distribution of Nicotine Dependence According to the Fagerström Test for Nicotine Dependence among Smoking Cessation Clinic Attendees

FTND dependence category	n (%)
Very low dependence	16 (13.0)
Low dependence	23 (18.7)
Moderate dependence	16 (13.0)
High dependence	32 (26.0)
Very high dependence	36 (29.3)
Total	**123 (100.0)**

4. DISCUSSION

The principal finding of this study is that health locus of control (HLOC) varies according to both smoking status and, more notably, smoking cessation–seeking behavior. Individuals attending the smoking cessation clinic exhibited the highest Internal HLOC scores, with a significant difference especially evident when compared to never-smokers. Additionally, Powerful Others HLOC was significantly higher among clinic attendees than among both active smokers who had not attended the clinic and never-smokers. In contrast, Chance HLOC did not differ notably across the three groups. Among clinic attendees, Internal HLOC was also markedly higher in those intending to quit, whereas Powerful Others HLOC was elevated among those viewing a need for physician support. Collectively, these results show that pursuing professional assistance for smoking cessation is characterized not by a simple transition from external to internal control, but by the coexistence of enhanced personal agency and increased recognition of the importance of clinical practitioners.

The observed association between Internal HLOC and cessation-related behavior is consistent with findings from the wider health psychology literature. A recent systematic review of 50 studies concluded that people with greater Internal HLOC are generally more likely to engage in behaviors associated with favorable health outcomes and to respond favorably to behavioral interventions. Conversely, weaker perceptions of personal control may limit engagement with preventive behaviors [4]. In this study, Internal HLOC was highest within participants who had actively sought smoking cessation treatment, and among clinic attendees, it was substantially higher in those currently intending to quit compared to those not intending to quit. This pattern is clinically plausible, as successful cessation requires individuals to believe that their own decisions and actions can determine future health outcomes. Notably, intervention studies suggest that HLOC is not a fixed trait; for example, a recent randomized controlled trial in Türkiye demonstrated that a structured health education intervention increased Internal HLOC and produced favorable changes in smoking-related perceptions [8]. These outcomes support Internal HLOC as a potentially relevant psychological target in cessation counseling. However, the cross-sectional design of this study precludes determining whether stronger internal control precedes the decision to quit or develops as individuals become more engaged in the cessation process.

The findings related to Powerful Others HLOC are similarly significant and may carry direct implications for primary care. Although Powerful Others HLOC is often categorized under “external control,” recent evidence suggests that its significance depends on the identity of the influential “other” and the clinical context [4]. When the powerful other is a physician or healthcare professional, this orientation may reflect greater trust in professional recommendations, increased willingness to accept guidance, and improved adherence, rather than passivity or fatalism. A 2023 systematic review reported that locus-of-control orientations are associated with patient–provider communication, medical decision-making preferences, adherence, satisfaction with care, and patient–provider rapport. Specifically, it noted that physician-related or Powerful Others orientations may be relevant to trust and following of medical recommendations [6]. This distinction corresponds to the present finding that Powerful Others HLOC was highest among smoking cessation clinic attendees and, within this group, was substantially higher among individuals who reported needing a physician's assistance to quit smoking.

These results additionally indicate that Internal and Powerful Others HLOC should not be regarded as mutually exclusive psychological models. The multidimensional HLOC framework conceptualizes control orientations as distinct dimensions, permitting individuals to believe both that successful cessation depends on personal effort and that professional guidance is essential [4]. In the context of smoking cessation, this combination may be especially helpful: internal control can promote motivation, persistence, and responsibility for behavioral change, whereas Powerful Others control may enhance acceptance of counseling, pharmacotherapy, follow-up, and professional support. Evidence from patient–provider research also suggests that assessing locus-of-control preferences enables clinicians to customize interaction and decision-making strategies, rather than applying a consistent approach to all patients [6]. Therefore, the higher scores for both dimensions among treatment-seeking smokers in this study may reflect complementary, rather than contradictory, forms of perceived control.

The same pattern was seen in active smokers who had not gone to the smoking cessation clinic. In this group, individuals who had earlier tried to quit had higher Powerful Others HLOC scores than those who had never tried to stop smoking. Yet there was no significant association between current intentions to quit and any of the HLOC dimensions. This result could suggest that past attempts to quit or prior exposure to health advice lead to a greater awareness of the role of professional or interpersonal support, even in smokers who are not at this moment seeking focused treatment. Clinical evidence shows that healthcare professionals serve an important role in either starting or strengthening smoking cessation behaviour. A 2024 meta-analysis of 13 randomized controlled trials with 26,437 participants found that giving very brief cessation advice during clinical visits increased long-term tobacco abstinence, the adjusted risk ratio for abstinence lasting six months or longer being 1.17 [10]. Broadly speaking, a 2024 overview of systematic reviews concluded that both behavioural interventions, such as advice from a doctor and counselling, and established pharmacological treatments improve smoking cessation outcomes in

adults [3]. This evidence underlines the importance of visits to primary care providers even for smokers who have not independently sought out specialized cessation services.

Compared with Internal and Powerful Others HLOC, Chance HLOC did not show any significant differences among the three groups studied. This is noteworthy since recent reviews have generally linked a stronger Chance HLOC with less favorable preventive health behavior and a poorer response to behavioral interventions [4]. The fact that there was no difference between the groups in the present study indicates that beliefs concerning luck, fate, or uncontrollable circumstances may not be the main HLOC dimension that distinguishes treatment-seeking smokers from neither treatment-seeking smokers nor never-smokers in this population. On the other hand, the differences found in our sample were focused on perceptions of personal control and the influence of powerful others. This result also shows how important it is to analyse the MHLC subscales separately rather than combining all forms of external control into a single construct, since Chance HLOC and Powerful Others HLOC may have very different behavioral implications [4-6].

The decision to seek professional help should be understood in the light of nicotine dependence. In our study, more than half of the people who attended the smoking cessation clinic—specifically 55.3%—were categorized as having either high or very high nicotine dependence, and these participants had a longer history of smoking and consumed a greater number of cigarettes each day compared to active smokers who had not gone to the cessation clinic. It therefore seems that attending a smoking cessation clinic indicates not only a psychological readiness to quit but also a greater difficulty in stopping smoking without having access to organized support. A recent study carried out in Turkey on patients visiting a smoking cessation outpatient clinic stressed the significance of continuous follow-up, sticking to the treatment, following behavioral recommendations, and receiving environmental support as key elements in achieving successful cessation and in avoiding relapse [15]. Contemporary reviews also support the idea of combining behavioural and pharmacological approaches in accordance with each patient's individual clinical situation rather than depending on a single cessation method [3]. These data indicate that assessment of HLOC should supplement, not replace, the standard clinical evaluation of nicotine dependence, previous quit attempts, withdrawal experiences, and treatment preferences.

The link between age and Powerful Others HLOC was another finding that was consistent. Among both those who attended smoking cessation clinics and those who were smokers but had not attended the clinic, Powerful Others HLOC increased only slightly with age, and the same pattern of association was seen among people who had never smoked. Recent research carried out on community-dwelling older adults has also found age to be one of the factors associated with Powerful Others HLOC [16]. Further studies concentrating on health-related behavior in later life show that beliefs about the influence of health professionals are relevant to adherence to doctors' recommendations, thus stressing the clinical significance of beliefs regarding external professional control as people get older [17]. Even though our correlations were weak and should not be over interpreted, the fact that the direction of the association was the same in all three groups suggests that age may affect how much individuals regard healthcare professionals as important determinants of their health.

The results have important practical value for the field of family medicine. Since family physicians are usually the first healthcare professionals to detect tobacco use, to assess a patient's readiness to quit, to give brief advice, to start pharmacological treatment and to arrange follow-up care, brief advice from doctors has significant effects on long-term quitting, and systematic reviews have still found that both behavioral and pharmacological cessation interventions are effective [3-10]. On the other hand, there is now growing attention being given to modifying smoking cessation interventions to the individual characteristics of the patient rather than applying the same strategy to all smokers; a systematic review and meta-analysis from 2024 found that properly tailored cessation interventions can lead to better quitting outcomes in certain groups of people [11]. Our data show that HLOC could offer an extra aspect to this kind of personalization. For people who have a relatively strong Internal HLOC, counselling should focus on personal capability, setting goals, self-monitoring and taking ownership of the quit attempt. By contrast, those with a stronger Powerful Others HLOC would benefit from more direct guidance from the physician, more structured follow-up and greater reinforcement of the therapeutic relationship. This method should not aim at making patients dependent on professional authority; instead, professional support should be used to improve personal agency and help individuals gradually build up their ability to maintain abstinence.

When drawing conclusions from the results, several limitations should be taken into account. In the first place, since the study was cross-sectional, it is not possible to determine causality; it therefore cannot be said that a higher level of Internal or Powerful Others HLOC causes attendance at smoking-cessation clinics or leads to an intention to quit. Secondly, the study was carried out in one tertiary hospital and this might mean that the results cannot be readily applied to community populations or to other primary care settings. Thirdly, information regarding smoking status, previous attempts to quit, intention to quit, and a number of other variables was provided by the participants themselves. Fourthly, the three groups in the study differed in a number of

sociodemographic features, such as age and educational level, and it is therefore possible that unmeasured confounding factors have affected the differences in HLOC that were observed. The analyses carried out were mainly univariate or bivariate; future research employing multivariable models would help to ascertain whether the associations between the various dimensions of HLOC and cessation-seeking behavior remain after taking into account age, education, nicotine dependence, chronic disease, socioeconomic status, and previous quit attempts. Lastly, as nicotine dependence was assessed only using the FTND among those who attended the smoking cessation clinic, it was not possible to make direct comparisons of nicotine dependence between the two groups of smokers based on FTND scores.

Even though there are some limitations, the study offers a clinically relevant comparison of three different groups: those who are smokers and actively looking for cessation treatment, those who are smokers but not seeking focused cessation assistance, and people who have never smoked. The results show that smoking cessation-seeking behavior is especially linked with Internal HLOC and Powerful Others HLOC, while Chance HLOC seems to be less discriminatory among this group. The strong association between Internal HLOC and the intention to quit accentuates the need to reinforce a sense of personal responsibility and perceived control. On the other hand, the connection between Powerful Others HLOC and physician support indicates that professional influence can also act as an adaptive asset during attempts to quit. In primary care, appraising these orientations together with nicotine dependence and preparation to quit could help family physicians give cessation counselling that is both better tailored to the individual and more in line with how patients see their own responsibility for their health.

Data Availability Statement

The datasets generated and analyzed during the current study are not publicly available due to patient privacy restrictions but are available from the corresponding author on reasonable request.

Author Contribution

Conceptualization: MFS, Data curation: SS, Formal analysis: MFS, SS, Funding acquisition: None, Investigation: MFS, SS, Methodology: SS, Project administration: MFS, Resources: SS, Software: SS, Supervision: MFS, Validation & Visualization: MFS, Critical revision with the introduction of valuable intellectual content: MFS, SS.

Funding: None

Declaration of Competing Interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. All authors have approved the manuscript and submission.

Patient and Public Involvement: Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

During the preparation of this work the author used AI technologies in order to improve readability and correct spelling errors. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the published article.

Ankara Yildirim Beyazit University Faculty of Medicine Department of Family Medicine Ankara, Turkey.

Ethical approval was obtained from Yildirim Beyazit University Faculty of Medicine Scientific Research Ethics Committee.

Financial Support Statement of Financial Support in the Form of Grants Equipment, Drugs Etc: None

Author Contribution:

Conceptualization: HY, IK Data curation: HY, IK Formal analysis: HY, I K Funding acquisition: None, Investigation: HY, ES Methodology: HY, ES Project administration: HY, IK, ES Resources: HY, Software: HY, Supervision: HY, ES, IK Validation & Visualization: HY, Critical revision with the introduction of valuable intellectual content: HY, IK, ES.

All authors have read and approve the final manuscript.

REFERNCES

1. Spatial, temporal, and demographic patterns in prevalence of smoking tobacco use and attributable disease burden in 204 countries and territories, 1990-2019: a systematic analysis from the Global Burden of Disease Study 2019. Lancet (London, England). 2021 Jun;397(10292):2337–60.
2. Bryazka D, Reitsma MB, Abate YH, Abd Al Magied AHA, Abdelkader A, Abdollahi A, et al. Forecasting the effects of smoking prevalence scenarios on years of life lost and life expectancy from 2022 to 2050: a systematic analysis for the Global Burden of Disease Study 2021. Lancet Public Heal [Internet]. 2024 Oct 1;9(10):e729–44. Available from: https://doi.org/10.1016/S2468-2667(24)00166-X
3. Hersi M, Beck A, Hamel C, Esmaeilisaraji L, Pussegoda K, Austin B, et al. Effectiveness of smoking cessation interventions among adults: an overview of systematic reviews. Syst Rev [Internet]. 2024;13(1):179. Available from: https://doi.org/10.1186/s13643-024-02570-9
4. Mozafari S, Yang A, Talaei-Khoei J. Health Locus of Control and Medical Behavioral Interventions: Systematic Review and Recommendations. Interact J Med Res. 2024 Oct;13:e52287.
5. Dogonchi M, Mohammadzadeh F, Moshki M. Investigating the Relationship between Health Locus of Control and Health Behaviors: A

Systematic Review. Open Public Health J. 2022 Sep 28;15.
6. Rodriguez A, Delbourgo Patton C, Stephenson-Hunter C. Impact of Locus of Control on Patient-Provider Communication: A Systematic Review. J Health Commun. 2023 Mar;28(3):190–204.
7. Duplaga M, Grysztar M. The Use of E-Cigarettes among High School Students in Poland Is Associated with Health Locus of Control but Not with Health Literacy: A Cross-Sectional Study. Vol. 10, Toxics. 2022. p. 41.
8. Sayar SE, Çapik C. The Effect of Health Belief Model-Based Creative Drama Education on Health Locus of Control and Smoking Perception in Adolescents: A Randomized Controlled Trial. Public Health Nurs. 2025;42(3):1343–53.
9. Tildy BE, McNeill A, Perman-Howe PR, Brose LS. Implementation strategies to increase smoking cessation treatment provision in primary care: a systematic review of observational studies. BMC Prim care. 2023 Jan;24(1):32.
10. Cheng CCW, He WJA, Gouda H, Zhang MJ, Luk TT, Wang MP, et al. Effectiveness of Very Brief Advice on Tobacco Cessation: A Systematic Review and Meta-Analysis. J Gen Intern Med. 2024 Jul;39(9):1721–34.
11. Leinberger-Jabari A, Golob MM, Lindson N, Hartmann-Boyce J. Effectiveness of culturally tailoring smoking cessation interventions for reducing or quitting combustible tobacco: A systematic review and meta-analyses. Addiction. 2024 Apr;119(4):629–48.
12. Güzel A, Turan S, Üner S. Turkish validity and reliability of Multidimensional Health Locus of Control Scale Form A. Int J Nurs Pract [Internet]. 2020 Oct 1;26(5):e12813. Available from: https://doi.org/10.1111/ijn.12813
13. Heatherton TF, Kozlowski LT, Frecker RC, Fagerström KO. The Fagerström Test for Nicotine Dependence: a revision of the Fagerström Tolerance Questionnaire. Br J Addict. 1991 Sep;86(9):1119–27.
14. Uysal MA, Öztuna D, Bahadır A, Görek Dilektaşlı A, Karşıdağ Ç, Horoz A, et al. Psychometric properties of the Turkish version of the Fagerström test for nicotine dependence. Tuberk Toraks. 2015;63(4):250–6.
15. Acar T, Gallagher C, Gören Y, Erbas B, Özkara A. Determinants of Smoking Cessation Outcomes and Reasons for Relapse in Patients Admitted to a Smoking Cessation Outpatient Clinic in Turkey. Int J Environ Res Public Health. 2024 Mar;21(3).
16. Deng M, Lv J, Guo C, Yang Y, Song H, Wang Z, et al. Health locus of control and associated factors among community-dwelling older adults: a cross-sectional descriptive study. Psychogeriatrics. 2025 Jan;25(1):e13228.
17. Dahal P, Kahana E. Following Physician's Advice in Late Life: The Roles of Health Beliefs and Health Status. Patient Prefer Adherence. 2024;18:217–26.