

# The relationship between smoking parents' belief about thirdhand smoke and their intention to quit smoking

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## Abstract

This study aimed to examine the relationship between smoking parents' beliefs about thirdhand smoke (THS) and their intentions to quit smoking. This descriptive correlational study was conducted with 276 smoking parents who had children aged 0–12 years. Data were collected through face-to-face interviews using the Descriptive Information Form, the Smoking Cessation Intention Scale, the Fagerström Test for Nicotine Dependence, and the Beliefs About Thirdhand Smoke Scale (BATHS). Analyses were performed using SPSS version 27.0. The mean total score for beliefs about THS was  $3.68 \pm 0.93$ , while the mean smoking cessation intention score was  $26.75 \pm 8.1$ . Although beliefs about THS did not differ significantly by sociodemographic characteristics, smoking cessation intention varied according to some demographic and smoking-related factors. A weak negative correlation was found between nicotine dependence and cessation intention, while a weak positive correlation emerged between beliefs about THS and cessation intention. Beliefs about THS explained 9.0% of the total variance in smoking cessation intention. Beliefs about THS contribute to smoking cessation intentions among parents who smoke. Increasing awareness of THS may help promote smoking cessation among parents.

**Keywords:** smokers, smoking cessation, thirdhand smoke, tobacco control, parents

## Main points

- Among smoking parents, the belief in the persistence of thirdhand smoke in the environment is lower than the belief in its health effects.
- Among smoking parents, stronger beliefs about thirdhand smoke were positively associated with greater smoking cessation intention.
- Regardless of nicotine dependence level, parents' beliefs about thirdhand smoke have a significant and positive effect on their intention to quit smoking.

## Introduction

Tobacco use remains a global public health concern that contributes significantly to both disability and mortality (Chen et al., 2025). Worldwide, one in every five individuals over the age of 15 uses tobacco (World Health Organization, 2023). Tobacco not only harms users but also severely affects those exposed to tobacco smoke (Flor et al., 2024). Children represent a particularly vulnerable group in terms of passive smoke exposure. It is well established that children whose parents smoke are more likely to be exposed to secondhand smoke (Jeong et al., 2021). Parental smoking cessation has been shown to have a positive impact on children's health

(Paraje & Valdés, 2021). Furthermore, children of smokers are at higher risk of becoming smokers themselves in the future (Alves et al., 2022; Kalousova, 2023). In this context, smoking parents constitute a priority group for smoking cessation interventions aimed at protecting both their own health and that of their children.

The intention to quit smoking is a key predictor of actual cessation behavior (Vangeli et al., 2011). One of the main determinants of this intention is the perception that smoking harms both the individual and those around them (Kaai et al., 2024). Individuals who recognize the serious health risks of

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secondhand smoke exposure are more likely to make plans to quit smoking or attempt cessation (Madewell, 2018). In recent years, thirdhand smoke (THS)—residual tobacco smoke pollutants that persist on surfaces even in the absence of active smoking—has emerged as an important public health threat. Beliefs about THS offer a novel dimension of risk perception that may influence parents' intentions to quit smoking.

Among adults, it has been shown that awareness of THS is significantly and positively associated with smoking cessation intentions (Özsarı & Kocadağ, 2023). However, no studies to date have specifically examined the relationship between beliefs about THS and smoking cessation intentions among parents who smoke. Notably, previous research has indicated that the internal conflict between the parental role and smoker identity can enhance motivation to quit (Friebely et al., 2013). In this context, the risk perception related to THS, when combined with the sense of parental responsibility to protect children's health, may serve to strengthen cessation intentions.

This study aims to contribute to the limited body of literature by examining the relationship between beliefs about THS and smoking cessation intentions among smoking parents. The findings are expected to inform new perspectives for protecting both parents and children from tobacco-related health risks. The research questions guiding this study are as follows:

- What is the level of beliefs about THS among smoking parents?
- What is the level of smoking cessation intention among smoking parents?
- Are beliefs about THS and smoking cessation intentions associated with sociodemographic and smoking-related characteristics?
- Is there a relationship between beliefs about THS and smoking cessation intentions among smoking parents?
- Do beliefs about THS predict smoking cessation intention among smoking parents?

## Methods

### Design

This study employed a descriptive and correlational research design. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist was used to guide the reporting of the study. Data were collected between April 7 and May 30, 2025, in the waiting areas of the pediatric outpatient clinics of a private hospital in Ankara, Türkiye.

### Sample

The target population consisted of smoking parents who presented to the pediatric outpatient clinic of a private hospital in Ankara. The sample included parents who met the inclusion

criteria and provided informed consent to participate in the study. To ensure a balanced representation of mothers and fathers, quota sampling was used. The required sample size for the correlation analysis was calculated using the G\*Power software. Based on a power analysis with a Type I error rate ( $\alpha$ ) of 0.05 and a statistical power ( $1 - \beta$ ) of 0.95, the minimum sample size needed to detect a medium effect size in a correlation analysis was determined to be 138 participants. Accordingly, quotas of at least 138 participants were set for both mothers and fathers, resulting in a total sample of 276 parents.

### Inclusion criteria:

- Smoking at least one cigarette per day
- Having at least one child aged 0–12 years

### Exclusion criteria:

- Having a communication barrier

### Data Collection

Data were collected by the researchers using Google Forms, including the "Descriptive Information Form," "Beliefs About Thirdhand Smoke Scale (BATHS)," "Smoking Cessation Intention Scale," and "Fagerström Test for Nicotine Dependence". Participants were invited face-to-face by the researchers while waiting in the outpatient clinic. Those who agreed to participate were provided access to the online survey via a QR code.

### Data Collection Tools

#### Descriptive Information Form

This form was developed by the researchers to collect sociodemographic and smoking-related information. It includes items on year of birth, gender, marital status, education level, employment status, income level, number and ages of children, total years of smoking, previous quit attempts, and smoking rules at home.

#### Beliefs About Thirdhand Smoke Scale-Turkish Version (BATHS)

The scale was developed to assess beliefs about thirdhand smoke (THS) (Haardörfer et al., 2017) and subsequently adapted and validated for use in Turkish. The scale consists of nine items and includes two subdimensions: "Persistence of THS in the Environment" and "Health Effects of THS." Exploratory factor analysis revealed factor loadings ranging from 0.52 to 0.87, while confirmatory factor analysis showed loadings between 0.60 and 0.93. The total score is obtained by calculating the average of all item scores. A score closer to

5 indicates stronger beliefs about the persistence and health effects of THS, whereas a score closer to 1 suggests lower levels of belief. The original Cronbach's alpha of the scale was 0.91 (Odacı & Kitiş, 2021) and it was calculated as 0.92 in the current study, indicating high reliability.

### **Smoking Cessation Intention Scale**

This scale was developed to assess smokers' intentions to quit smoking and has been validated in Turkish. It consists of eight items and is structured as a unidimensional, five-point Likert-type scale. The scale has a Cronbach's alpha of 0.94. The total score ranges from 8 to 40, with higher scores indicating stronger intentions to quit smoking (Söyler & Yorulmaz, 2024). In the current study, the Cronbach's alpha was also found to be 0.94.

### **Fagerström Test for Nicotine Dependence (FTND)**

This test was developed to determine the level of nicotine dependence (Heatherton et al., 1991). The Turkish validity and reliability of the test were established by Uysal et al., with a Cronbach's alpha of 0.56. The FTND consists of six items, with a total score ranging from 0 to 10. Scores of 0–2 indicate very low dependence, 3–4 low dependence, 5 moderate dependence, 6–7 high dependence, and 8–10 very high dependence (Uysal, 2004). In the current study, the Cronbach's alpha was calculated as 0.83.

### **Data Analysis**

Data were analyzed using IBM SPSS Statistics version 27.0. Descriptive statistics included frequency, percentage, arithmetic mean, standard deviation, minimum, and maximum values. Normality was assessed using skewness and kurtosis values. According to the literature, Skewness and Kurtosis values between  $\pm 1.5$  (Tabachnick & Fidell, 2019) or  $\pm 2.0$  (George & Mallery, 2010) are considered indicative of normal distribution. As the data were normally distributed, an independent samples t-test was used to compare two groups, and ANOVA was used for comparisons involving more than two groups. The relationship between subdimension scores of the same scale was evaluated using a paired samples t-test. Correlations between scales were analyzed using Pearson correlation analysis. Hierarchical multiple regression analysis was conducted to determine the predictive power of THS beliefs on smoking cessation intention. A significance level of  $p < 0.05$  was considered for all statistical tests.

### **Ethical Considerations**

The study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval was obtained from the Ethics Committee of a university prior to the initiation of the study (Approval No: 2024178, Date: 29.08.2024). In addition, written permission was granted by the hospital where the study was conducted. Informed consent was

obtained from all participants via Google Forms. Permission to use the scales was obtained from the original authors via e-mail.

## **Results**

The sample consisted of an equal number of mothers (50.0%) and fathers (50.0%). The mean age of participants was  $37 \pm 7.35$  years (range: 18–56). Most participants were married (92.4%) and had completed either high school (42.0%) or undergraduate education (39.1%). More than half (52.9%) reported having a moderate income level. Nearly half of the participants (48.9%) had school-aged children.

One-third of the participants (36.2%) had been smoking for more than 15 years, and more than half (62.7%) had previously attempted to quit smoking. A majority (69.6%) reported having partial smoking restrictions at home, and half (51.4%) stated that they never smoked in the presence of their children.

Nearly half of the participants (47.1%) were classified as having either very low (5.8%) or low (41.3%) levels of nicotine dependence. The sociodemographic and smoking-related characteristics of the participants are presented in Table 1.

The mean total score for participants' beliefs about THS was  $3.68 \pm 0.93$  (Min: 1, Max: 5). The mean score for the "Health Effects" subdimension was  $3.89 \pm 0.88$ , and for the "Environmental Persistence" subdimension, it was  $3.52 \pm 0.93$  (Min: 1, Max: 5 for both). A statistically significant difference was found between the subdimension scores ( $t = 9.608$ ;  $p < 0.001$ ). The mean total score for smoking cessation intention was  $26.75 \pm 8.1$  (Min: 8, Max: 40). The mean scores for the total and subdimensions of the scales, along with skewness and kurtosis values, are presented in Table 2.

The relationship between participants' scale scores and their descriptive characteristics is presented in Table 3. Smoking parents' beliefs about THS did not differ significantly according to sociodemographic characteristics ( $p > 0.05$ ). However, smoking cessation intention was significantly higher among parents with high perceived income compared to those with moderate income ( $p < 0.05$ ), and among parents of infants compared to those of preschool- and school-aged children ( $p < 0.01$ ). Intention to quit smoking was also greater among those who smoked more cigarettes per day ( $p < 0.05$ ), had a longer smoking duration ( $p < 0.001$ ), and had previous quit attempts ( $p < 0.001$ ). Moreover, parents who never smoked in the presence of their child reported higher cessation intention scores than those who smoked occasionally ( $p < 0.05$ ), while those living in households with strict smoking rules had higher scores compared to those with no rules ( $p < 0.05$ ). Nicotine dependence levels differed significantly according to education level, being higher among high school and graduate degree holders compared to those with a bachelor's degree ( $p < 0.05$ ). Dependence was also higher among parents with greater daily cigarette consumption ( $p < 0.05$ ) and longer smoking duration ( $p < 0.001$ ). Those without previous cessation attempts ( $p < 0.05$ ), those who smoked

**Table 1.** Sociodemographic and smoking-related characteristics of the parents (n = 276)

| Descriptive characteristics       | Groups                           | n   | %    |
|-----------------------------------|----------------------------------|-----|------|
| Parental role                     | Mother                           | 138 | 50   |
|                                   | Father                           | 138 | 50   |
| Marital status                    | Married                          | 255 | 92.4 |
|                                   | Single                           | 21  | 7.6  |
| Educational status                | Primary school graduate          | 14  | 5.1  |
|                                   | Middle school graduate           | 19  | 6.9  |
|                                   | High school graduate             | 116 | 42.0 |
|                                   | Bachelor's degree                | 108 | 39.1 |
|                                   | Graduate degree (Master's/PhD)   | 19  | 6.9  |
| Perceived income level            | Low                              | 64  | 23.2 |
|                                   | Moderate                         | 146 | 52.9 |
|                                   | High                             | 66  | 23.9 |
| Child's age group                 | Infant (0-1 years)               | 30  | 10.9 |
|                                   | Toddler (1-3 years)              | 44  | 15.9 |
|                                   | Preschool-aged child (3-6 years) | 67  | 24.3 |
|                                   | School-aged child (6-12 years)   | 135 | 48.9 |
| Cigarettes per day                | 10 or fewer                      | 62  | 22.5 |
|                                   | 11-20 cigarettes                 | 107 | 38.8 |
|                                   | 21-30 cigarettes                 | 107 | 38.8 |
|                                   | 31 or more                       | 0   | 0    |
| Smoking duration                  | Less than 1 year                 | 9   | 3.3  |
|                                   | 1-5 years                        | 40  | 14.5 |
|                                   | 6-10 years                       | 72  | 26.1 |
|                                   | 11-15 years                      | 55  | 19.9 |
|                                   | 16 years or more                 | 100 | 36.2 |
| Previous cessation experience     | Yes                              | 173 | 62.7 |
|                                   | No                               | 103 | 37.3 |
| Frequency of smoking around child | Never                            | 142 | 51.4 |
|                                   | Rarely                           | 69  | 25   |
|                                   | Occasionally                     | 29  | 10.5 |
|                                   | Frequently                       | 24  | 8.7  |
|                                   | Always                           | 12  | 4.3  |
| Home smoking rules                | Strict rule                      | 72  | 26.1 |
|                                   | Partial rule                     | 192 | 69.6 |
|                                   | No rule                          | 12  | 4.3  |
| Nicotine dependence level*        | Very low dependence              | 16  | 5.8  |
|                                   | Low dependence                   | 114 | 41.3 |
|                                   | Moderate dependence              | 43  | 15.6 |
|                                   | High dependence                  | 81  | 29.3 |
|                                   | Very high dependence             | 22  | 8    |

\*Grouping was conducted according to participants' scores on the Fagerström Test for Nicotine Dependence.

frequently or always around their child ( $p < 0.05$ ), and those living in households with no smoking rules ( $p < 0.05$ ) showed significantly higher nicotine dependence scores (Table 3).

The correlation analysis examining the relationships between parents' scores on all scales is presented in Table 4. A weak negative correlation was found between smoking cessation intention and nicotine dependence ( $r = -0.211$ ;  $p < 0.001$ ), while a weak positive correlation was observed between smoking cessation intention and beliefs about THS ( $r = 0.243$ ;  $p < 0.001$ ).

A hierarchical linear regression analysis was conducted to examine whether beliefs about THS predict smoking cessation intention when controlling for nicotine dependence.

In the first step of the hierarchical regression, only the control variable (nicotine dependence) was entered into the model. In the second step, the beliefs about THS variable was added to examine whether it significantly increased the overall explanatory power of the model.

As shown in Table 5, the first regression model, which included only nicotine dependence, significantly predicted smoking cessation intention ( $R^2 = .036$ ,  $F(1, 274) = 10.346$ ,  $p = .001$ ), explaining 3.6% of the variance in smoking cessation intention. According to this model, higher levels of nicotine dependence were associated with lower smoking cessation intention ( $\beta = -.191$ ,  $p = .001$ ).

In the second model, which included beliefs about THS as an additional independent variable, the model continued to significantly predict smoking cessation intention, and the overall explanatory power increased significantly compared to the first model ( $R^2 = .090$ ,  $F(2, 273) = 15.998$ ,  $p < .001$ ,  $\Delta F$   $p < .001$ ). This second model explained 9.0% of the variance in smoking cessation intention. In this model, nicotine dependence remained a significant negative predictor ( $\beta = -.175$ ,  $p = .003$ ), while beliefs about THS were found to significantly and positively predict smoking cessation intention ( $\beta = .231$ ,  $p < .001$ ).

The Variance Inflation Factor (VIF) values were found to be close to 1 and below 5, indicating no multicollinearity problem between the independent variables (nicotine dependence and THS beliefs) in the model.

**Table 2.** Parents' mean total and subscale scores on the measurement tools

| Measurements                                | N   | Mean  | SD   | Min. | Max. | Skewness | Kurtosis |
|---------------------------------------------|-----|-------|------|------|------|----------|----------|
| Total BATHS Score                           | 276 | 3,68  | 0,93 | 1    | 5    | -0,623   | 0,583    |
| Health Effects Subscale of the BATHS        | 276 | 3,89  | 0,88 | 1    | 5    | -0,914   | 0,953    |
| Environmental Persistence Subscale of BATHS | 276 | 3,52  | 0,93 | 1    | 5    | -0,462   | -0,099   |
| Smoking Cessation Intention Scale           | 276 | 26,75 | 8,1  | 8    | 40   | -0,255   | -0,535   |

**Table 3.** Associations between parents' scale scores and sociodemographic and smoking-related characteristics

| Descriptive characteristics    | n   | BATHS total | BATHS health effects | BATHS environmental persistence | Fagerström test for nicotine dependence | Smoking cessation intention scale |
|--------------------------------|-----|-------------|----------------------|---------------------------------|-----------------------------------------|-----------------------------------|
| <b>Parental role</b>           |     | Mean±SD     | Mean±SD              | Mean±SD                         | Mean±SD                                 | Mean±SD                           |
| Mother                         | 138 | 3,73±0,82   | 3,97±0,84            | 3,53±0,91                       | 4,89±1,92                               | 26,94±8,43                        |
| Father                         | 138 | 3,64±0,89   | 3,80±0,91            | 3,52±0,96                       | 4,80±1,78                               | 26,56±7,78                        |
| t=                             |     | 0,807       | 1,616                | 0,115                           | 0,421                                   | 0,393                             |
| p=                             |     | 0,421       | 0,107                | 0,908                           | 0,674                                   | 0,694                             |
| <b>Marital status</b>          |     | Mean±SD     | Mean±SD              | Mean±SD                         | Mean±SD                                 | Mean±SD                           |
| Married                        | 255 | 3,68±0,84   | 3,88±0,87            | 3,52±0,92                       | 4,88±1,84                               | 26,65±8,05                        |
| Single                         | 51  | 3,71±1,04   | 3,90±1,06            | 3,56±1,10                       | 4,43±2,01                               | 27,90±8,73                        |
| t=                             |     | -0,138      | -0,077               | -0,171                          | 1,067                                   | -0,679                            |
| p=                             |     | 0,890       | 0,939                | 0,865                           | 0,287                                   | 0,498                             |
| <b>Educational status</b>      |     | Mean±SD     | Mean±SD              | Mean±SD                         | Mean±SD                                 | Mean±SD                           |
| Primary school graduate        | 14  | 3,75±1,08   | 3,87±1,10            | 3,65±1,09                       | 5,64±1,69                               | 23,93±8,81                        |
| Middle school graduate         | 19  | 3,64±0,84   | 3,77±0,86            | 3,54±0,86                       | 4,63±1,49                               | 26,68±7,64                        |
| High school graduate           | 116 | 3,69±0,74   | 3,85±0,80            | 3,56±0,82                       | 5,13±1,80                               | 26,30±7,63                        |
| Bachelor's degree              | 108 | 3,66±0,91   | 3,93±0,91            | 3,45±1,01                       | 4,33±1,87                               | 27,59±8,16                        |
| Graduate degree (Master's/PhD) | 19  | 3,75±1,08   | 3,98±1,07            | 3,56±1,16                       | 5,63±1,86                               | 26,84±10,38                       |
| F=                             |     | 0,073       | 0,228                | 0,270                           | 4,510                                   | 0,804                             |
| p=                             |     | 0,990       | 0,923                | 0,897                           | 0,001                                   | 0,523                             |
| PostHoc=                       |     |             |                      |                                 | 3>4, 5>4 p<0,05                         |                                   |
| <b>Perceived income level</b>  |     | Mean±SD     | Mean±SD              | Mean±SD                         | Mean±SD                                 | Mean±SD                           |
| Low                            | 64  | 3,81±0,82   | 4,02±0,84            | 3,64±0,89                       | 5,06±1,95                               | 27,58±7,35                        |
| Moderate                       | 146 | 3,69±0,84   | 3,88±0,88            | 3,54±0,92                       | 4,71±1,85                               | 25,59±7,74                        |
| High                           | 66  | 3,55±0,91   | 3,78±0,92            | 3,38±1,00                       | 4,92±1,76                               | 28,52±9,19                        |
| F=                             |     | 1,416       | 1,283                | 1,288                           | 0,871                                   | 3,461                             |
| p=                             |     | 0,245       | 0,279                | 0,278                           | 0,420                                   | 0,033                             |
| PostHoc=                       |     |             |                      |                                 |                                         | 3>2 p<0,05                        |
| <b>Child's age group</b>       |     | Mean±SD     | Mean±SD              | Mean±SD                         | Mean±SD                                 | Mean±SD                           |
| Infant                         | 30  | 3,55±0,99   | 3,84±0,84            | 3,32±1,08                       | 4,87±2,14                               | 31,80±7,30                        |
| Toddler                        | 44  | 3,64±0,84   | 3,90±0,82            | 3,43±0,95                       | 5,32±1,89                               | 27,05±8,30                        |
| Preschool-aged child           | 67  | 3,71±0,82   | 3,92±0,88            | 3,54±0,87                       | 4,45±1,68                               | 26,87±7,70                        |
| School-aged child              | 135 | 3,72±0,86   | 3,87±0,90            | 3,59±0,93                       | 4,88±1,80                               | 25,47±8,02                        |
| F=                             |     | 0,367       | 0,074                | 0,854                           | 2,015                                   | 5,260                             |
| P=                             |     | 0,777       | 0,974                | 0,466                           | 0,112                                   | 0,002                             |
| PostHoc=                       |     |             |                      |                                 |                                         | 1>3, 1>4*<br>(p<0,05) *(p<0,01)   |
| <b>Cigarettes per day</b>      |     | Mean±SD     | Mean±SD              | Mean±SD                         | Mean±SD                                 | Mean±SD                           |
| 10 or fewer                    | 62  | 3,62±0,94   | 3,52±1,01            | 3,75±0,95                       | 5,19±1,83                               | 23,97±7,49                        |
| 11–20 cigarettes               | 107 | 3,66±0,75   | 3,49±0,84            | 3,87±0,77                       | 5,07±1,92                               | 26,94±7,74                        |
| 21–30 cigarettes               | 107 | 3,75±0,91   | 3,57±0,98            | 3,98±0,94                       | 4,41±1,73                               | 28,17±8,44                        |
| F=                             |     | 0,519       | 1,302                | 0,196                           | 4,970                                   | 5,501                             |
| P=                             |     | 0,595       | 2,274                | 0,822                           | 0,008                                   | 0,005                             |
| PostHoc=                       |     |             |                      |                                 | 1>3, 2>3 (p<0,05)                       | 1<3, 2<3 (p<0,05)                 |
| <b>Smoking duration</b>        |     | Mean±SD     | Mean±SD              | Mean±SD                         | Mean±SD                                 | Mean±SD                           |
| Less than 1 year               | 9   | 3,61±1,08   | 3,88±1,13            | 3,40±1,09                       | 4,22±2,72                               | 3,22±6,49                         |
| 1–5 years                      | 40  | 3,71±0,92   | 3,85±1,00            | 3,59±0,96                       | 3,93±1,52                               | 3,75±8,17                         |
| 6–10 years                     | 72  | 3,74±0,90   | 3,84±0,90            | 3,59±0,97                       | 4,61±1,83                               | 26,56±6,96                        |
| 11–15 years                    | 55  | 3,67±0,83   | 3,87±0,81            | 3,50±0,94                       | 5,47±1,93                               | 26,76±7,74                        |
| 16 years or more               | 100 | 3,65±0,80   | 3,87±0,85            | 3,47±0,90                       | 5,09±1,70                               | 24,70±8,40                        |
| F=                             |     | 0,154       | 0,083                | 0,262                           | 5,313                                   | 5,874                             |
| P=                             |     | 0,961       | 0,988                | 0,902                           | <0,001                                  | <0,001                            |
| PostHoc=                       |     |             |                      |                                 | 2<4*, 2<5<br>(p<0,05) *(p<0,01)         | 1>5, 2>5*<br>(p<0,05) *(p<0,01)   |

**Table 3.** Continued

| Descriptive characteristics       | n   | BATHS total | BATHS health effects | BATHS environmental persistence | Fagerström test for nicotine dependence | Smoking cessation intention scale |
|-----------------------------------|-----|-------------|----------------------|---------------------------------|-----------------------------------------|-----------------------------------|
| Previous cessation experience     |     | Mean±SD     | Mean±SD              | Mean±SD                         | Mean±SD                                 | Mean±SD                           |
| Yes                               | 173 | 3,71±0,79   | 3,93±0,81            | 3,54±0,87                       | 4,66±1,71                               | 28,25±7,68                        |
| No                                | 103 | 3,64±0,96   | 3,81±0,99            | 3,50±1,03                       | 5,15±2,04                               | 24,22±8,18                        |
| t=                                |     | 0,736       | 1,095                | 0,346                           | -2,094                                  | 4,112                             |
| p=                                |     | 0,462       | 0,275                | 0,730                           | 0,037                                   | <0,001                            |
| Frequency of smoking around child |     | Mean±SD     | Mean±SD              | Mean±SD                         | Mean±SD                                 | Mean±SD                           |
| Never                             | 142 | 3,74±0,87   | 3,92±0,89            | 3,59±0,83                       | 4,63±1,83                               | 28,54±7,82                        |
| Rarely                            | 69  | 3,68±0,64   | 3,87±0,71            | 3,52±0,75                       | 4,93±1,69                               | 26,46±7,22                        |
| Occasionally                      | 29  | 3,64±0,79   | 3,93±0,84            | 3,40±0,88                       | 4,72±1,86                               | 23,00±7,31                        |
| Frequently                        | 24  | 3,65±1,14   | 3,82±1,08            | 3,51±1,23                       | 5,42±2,16                               | 24,00±8,08                        |
| Always                            | 12  | 3,27±1,27   | 3,56±1,31            | 3,05±1,32                       | 6,08±1,92                               | 21,75±11,74                       |
| F=                                |     | 0,862       | 0,523                | 1,094                           | 2,467                                   | 5,434                             |
| P=                                |     | 0,487       | 0,719                | 0,360                           | 0,045                                   | <0,001                            |
| PostHoc=                          |     |             |                      |                                 | -                                       | 1>3 (p<0,05)                      |
| Home smoking rules                |     | Mean±SD     | Mean±SD              | Mean±SD                         | Mean±SD                                 | Mean±SD                           |
| Strict rule                       | 72  | 3,77±0,95   | 3,94±0,98            | 3,63±1,00                       | 4,14±1,63                               | 28,22±7,95                        |
| Partial rule                      | 192 | 3,68±0,78   | 3,89±0,80            | 3,51±0,88                       | 5,01±1,86                               | 26,48±7,93                        |
| No rule                           | 12  | 3,27±1,29   | 3,45±1,34            | 3,13±1,31                       | 6,42±1,44                               | 22,25±10,1                        |
| F=                                |     | 1,696       | 1,554                | 1,542                           | 11,012                                  | 3,198                             |
| P=                                |     | 0,185       | 0,213                | 0,216                           | <0,001                                  | 0,042                             |
| PostHoc=                          |     |             |                      |                                 | 1<2<3 (p<0,05)                          | 1>3 (p<0,05)                      |

**Table 4.** Correlations between parents' scores on all scales

| Scale name                                  |   | Smoking cessation intention scale | Fagerström test for nicotine dependence |
|---------------------------------------------|---|-----------------------------------|-----------------------------------------|
| Total BATHS score                           | r | 0,243*                            | -0,071                                  |
|                                             | p | <0,001                            | 0,241                                   |
| Health effects subscale of the BATHS        | r | 0,213*                            | -0,104                                  |
|                                             | p | <0,001                            | 0,84                                    |
| Environmental persistence subscale of BATHS | r | 0,241*                            | -0,038                                  |
|                                             | p | <,001                             | 0,528                                   |
| Fagerström test for nicotine dependence     | r | -0,211*                           | 1                                       |
|                                             | p | <,001                             |                                         |

**Table 5.** Hierarchical regression analysis of the effect of thirdhand smoke beliefs on smoking cessation intention

| Variable                  | R <sup>2</sup> | F      | B      | Standart error | Beta (β) | t      | p      | VIF   |
|---------------------------|----------------|--------|--------|----------------|----------|--------|--------|-------|
| MODEL 1                   | .036           | 10.346 |        |                |          |        | .001   |       |
| (Constant)                |                |        | 30.782 | 1.342          | -        | 22.937 | < .001 | -     |
| Nicotine dependence level |                |        | -1.379 | .429           | -.191    | -3.217 | .001   | 1.000 |
| MODEL 2                   | .090           | 13.455 |        |                |          |        | < .001 |       |
| (Constant)                |                |        | 22.430 | 2.463          | -        | 9.106  | < .001 | -     |
| Nicotine dependence level |                |        | -1.268 | 0.418          | -.175    | -3.030 | .003   | 1.004 |
| Thirdhand smoke beliefs   |                |        | 2.176  | 0.544          | .231     | 4.000  | < .001 | 1.004 |

## Discussion

This descriptive correlational study examined the relationship between smoking parents' beliefs about THS and their intention to quit smoking. The findings showed that as parents' beliefs regarding the harmful effects of THS increased, their intention to quit smoking also rose, and this positive association remained significant regardless of their level of

nicotine dependence. The study further revealed how smoking parents' THS beliefs and smoking cessation intentions differed according to their sociodemographic characteristics and smoking-related behaviors. In this section, the study findings are discussed in detail based on the research questions.

Nicotine dependence typically increases with the number of cigarettes smoked per day and the duration of smoking

(Liu et al., 2022). In the present study, nearly half of the participants (47.1%) had low levels of nicotine dependence, and their average smoking cessation intention scores were moderate. Contrary to expectations, parents who smoked one pack or fewer per day were found to have higher nicotine dependence levels than those who smoked more than one pack. This finding may be attributed to the fact that nicotine dependence is not solely determined by the quantity of cigarettes smoked, but is also determined by multidimensional factors such as the urgency of smoking the first cigarette upon waking, withdrawal symptoms, and psychological dependence (Heatherton et al., 1991).

Smoking cessation intention is known to be associated with smoking-related characteristics (Başer & Çevik, 2023). In this study, parents who smoked fewer than one pack per day reported lower smoking cessation intention than those who smoked more. Furthermore, individuals who had started smoking more recently were more likely to intend to quit than long-term smokers. Prior quit attempts have also been shown to be associated with higher cessation intention (Kaai et al., 2024). Similarly, in the present study, participants who had previously tried to quit smoking reported higher cessation intentions and lower levels of nicotine dependence. These findings align with existing literature demonstrating that nicotine dependence is negatively associated with the intention to quit smoking (Lin et al., 2021; Tarı Kasnakoğlu & Caner, 2024). Supporting parents with high nicotine dependence is important to enhance their chances of successful smoking cessation.

Parental behaviors aimed at protecting children from tobacco smoke exposure may positively influence cessation behavior (Nabi-Burza et al., 2021). In the current study, parents who reported never smoking in the presence of their children had higher smoking cessation intentions than those who smoked occasionally in front of their children. Household smoking rules were also found to be significantly associated with both nicotine dependence and cessation intention. Parents who implemented a complete smoking ban at home had higher cessation intentions compared to those with no rules. These findings suggest that promoting in-home smoking bans not only helps reduce children's exposure to secondhand smoke but also enhances parents' motivation to quit. Additionally, it is known that as nicotine dependence increases, household smoking rules tend to become more relaxed (Aslan & Acar, 2025).

This study also found that smoking cessation intention varied by the age group of the child. Specifically, parents with infants had higher intentions to quit smoking compared to those with preschool or school-aged children. Previous studies have shown that interventions targeting households with children under the age of five are more effective in reducing tobacco smoke exposure (Brown et al., 2015). These findings suggest that parents of younger children may be more sensitive to the negative health effects of tobacco use on child health. In a similar experimental study, the inclusion of messages about protecting children from secondhand smoke alongside standard cessation advice significantly increased

parents' intentions to quit (Sontag et al., 2020). These results underscore the potential effectiveness of multi-component interventions targeting parents, especially during the early stages of childhood.

The proportion of parents who believe that THS is harmful ranges from 42.0% to 91.0% (Vanzi et al., 2023). In this study, smoking parents showed moderate to high levels of belief in the harmful effects of THS. Participants were more aware of the health effects of THS than of its environmental persistence. These findings suggest that awareness of THS among parents is not yet fully established. A meta-analysis found that one in four parents does not believe that THS negatively affects children (Oktar et al., 2021). In particular, smoking parents tend to believe less in the harmfulness and environmental persistence of THS (Odacı & Kitiş, 2025). Therefore, awareness-raising interventions specifically emphasizing the environmental persistence of THS are needed for this population.

Belief in the health risks of secondhand smoke has been shown to be a key predictor of smoking cessation intention (Madewell, 2018). Similarly, beliefs about THS have also been found to influence cessation intention (Özsarı & Kocadağ, 2023). Consistent with these findings, the present study revealed that as parents' beliefs about THS increased, so did their intention to quit smoking. This was further supported by the regression analysis, which identified THS beliefs as a significant predictor of smoking cessation intention. However, the variance explained by the models was relatively low, which is a common finding in behavioral and social science research where complex health outcomes are influenced by multiple factors (Ozili, 2022). Given this limited predictive power, it is likely that additional factors contribute to parents' cessation intentions. Previous studies have shown that cessation intention is associated with prior quit attempts (Farran et al., 2024), public smoking restrictions (Kaai et al., 2024) and lower nicotine dependence (Dasgupta et al., 2021). Integrating content about the health effects and environmental persistence of THS into smoking cessation interventions has the potential to enhance parents' motivation to quit smoking.

### Limitations and Directions/Suggestions for Future Research

This study has several limitations that should be considered when interpreting the findings. First, its conduct in a private hospital setting may have restricted the socioeconomic diversity of the sample, potentially limiting generalizability. Second, given the descriptive nature of the research, the observed associations between variables cannot be interpreted as causal. Third, reliance on self-reported data may have led to under- or overestimation of cigarette consumption and cessation intentions, as participants might have responded in ways consistent with social norms, introducing social desirability bias.

The findings of this study provide important insights into the relationship between parents' beliefs about THS and

their intentions to quit smoking, and they are supported by predominantly recent literature. However, the fact that the sample was drawn from a single private hospital and is relatively small limits the generalizability of the findings. Future studies with larger and more diverse samples are important to validate these results. The results indicate that smoking parents do not hold sufficiently strong beliefs about THS, and their belief in its environmental persistence is lower than their belief in its health effects. Even after controlling for nicotine dependence, beliefs about THS were found to have a significant and positive effect on smoking cessation intention. As parents' belief in the harmful effects of THS increases, so does their intention to quit smoking. Based on these findings, it is recommended that educational programs aiming to increase awareness of THS be developed to encourage smoking cessation among parents. The lower cessation intentions observed among parents with high nicotine dependence highlight the need to prioritize this group in cessation interventions. Additionally, parents who reported never smoking in the presence of their children and maintaining a smoke-free home had higher cessation intentions. Therefore, interventions targeting parents should emphasize and promote the adoption of smoke-free home environments. Further studies might examine the effectiveness of targeted educational interventions designed to strengthen parents' beliefs about the harms and environmental persistence of THS.

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## Author contributions

Conception and design: N.O., K.A., M.N.Ç.; Data acquisition: N.O., K.A., M.N.Ç.; Data analysis: N.O., K.A., M.N.Ç.; Data interpretation: N.O., K.A., M.N.Ç.; Drafting of the manuscript: N.O., K.A., M.N.Ç.; Critical revision of the manuscript: N.O. All authors reviewed the results, approved the final version of the manuscript, and agreed to be accountable for all aspects of this study.

## Ethical approval

This study was approved by the Ethics Committee of Lokman Hekim University (Date: August 29, 2024, Decision/Protocol No: 2024178). Informed consent was obtained from all participants involved in this study.

## Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## Conflict of interest

The authors declare that this study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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## Generative AI statement

The authors declare that no generative AI or AI-assisted technologies were used in the writing or preparation of this study.

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