

# Evaluation of the Frequency and Awareness of Using Tobacco Products in Parents of Primary School and Preschool Students in Girne

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## Abstract

**BACKGROUND/AIMS:** In this study, we aimed to investigate the frequency of smoking and extent of awareness of second-hand smoke (SHS) among parents.

**MATERIALS AND METHODS:** This is a descriptive study. A total of 2,602 questionnaires were administered to the parents of students in 7 different schools. The questionnaire included 8 questions and collected demographic data. The findings were analyzed using appropriate statistical methods.

**RESULTS:** Participation rate was 61.9% among all parents. 23.2% of mothers and 43.1% of fathers were active smokers. 31% of mothers and 33.8% of fathers were aware of the fact that their children could have many diseases related to SHS. 98.6% of mothers and 98.8% of fathers did not want their children to be exposed to SHS. 60% of mothers and 54.5% of fathers who were active smokers thought that smoking outside the home did not harm their children. 90.9% of mothers (n=1162) and 91.5% of fathers (n=1129) wanted their children to receive education about the harms of tobacco products (HTPs). 60.9% of active smoker mothers, 69% of exsmoker, and 68.6% of never smoked mothers did not want to receive education about the HTPs (p=0.025). These rates were 63.2%, 75%, and 68.9% among fathers, respectively (p=0.002).

**CONCLUSION:** Childhood exposure to SHS in our study is similar to that of previous studies. We think that parents should be educated about SHS, and for those who refuse the education, the reasons behind this should be investigated.

**Keywords:** Secondhand smoking, exposure, children, parents

## INTRODUCTION

Second-hand smoking (SHS) refers to exposure to smoke emitted from the tip of a cigarette or smoke exhaled out by people who are smoking. SHS contains more than 4000 chemicals, such as insecticide dichloro-diphenyl-trichloroethane, nail polish remover (acetone), rat poison (cyanide), toilet cleaner (ammonia), and exhaust fumes (carbon monoxide).<sup>1,2</sup> This is a very dangerous situation for all age groups, and its negative effects on health have been proven by many studies.<sup>1-3</sup> SHS kills approximately 1.2 million people per year, and 65,000 of these

preventable deaths are seen in children under 15 years of age. Children with parents who are active smokers are nearly 70% more likely to attempt smoking by the age of 15.<sup>4</sup>

Although all age groups are affected, the most serious adverse effects are observed in infants and young children. The main reasons for this are summarized below. Due to the dynamics of developmental physiology, babies require more energy and breathe more frequently.<sup>4</sup> Thus, they are more affected by air pollution because 80% of the

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alveoli are formed after birth, and lung development continues during adolescence. The developing lung is extremely vulnerable to pollutants during the neonatal period. Due to the high respiratory rate and activity level, a large number of pollutants reaches the lungs of infants.<sup>5</sup>

Prenatal active smoking and SHS among women are the most common preventable causes of neonatal morbidity, prematurity, and low birth weight (LBW).<sup>6</sup> A recent study showed that the babies of women who smoked during pregnancy were 142 g lower than those of non-smokers.<sup>7</sup> The risk of LBW was 1.6 times higher in embryos exposed to cigarette smoke.<sup>7</sup> Because, carbon monoxide in cigarette smoke binds to hemoglobin and reduces the blood's oxygen-carrying capacity.<sup>8</sup>

Recent studies have shown an association between intrauterine and childhood SHS and an elevated risk of attention-deficit/hyperactivity disorder.<sup>9,10</sup> The U.S. The Environmental Protection Agency has declared that SHS increases the risk of lower respiratory tract infections, such as pneumonia and bronchitis. It is estimated that between 150,000 and 300,000 annual cases of lower respiratory tract infections in children aged 18 months can be attributed to exposure to SHS. Approximately 7,500-15,000 of these cases require hospitalization.<sup>11</sup> In addition, SHS is associated with school absenteeism among children with asthma because of increased respiratory problems.<sup>12</sup> Moreover, the likelihood of being an active smoker later in life, cancer and sleep breathing disorders are increased among children who were exposed to SHS.<sup>4,13,14</sup>

Studies have shown that parents' perceptions of exposure to SHS differ from one another.<sup>15-17</sup> Different perceptions of SHS exposure can explain parents' understanding of their children's health risks and, consequently, why they are smoking in the same environment with their children.<sup>18</sup>

One of the most striking issues of recent years is the increasing use of electronic cigarettes, which are becoming increasingly widespread worldwide. Efforts to combat the use of e-cigarettes and scientific articles on the subject are increasing daily. There are currently a multitude of both legitimate and illegitimate products on the market, offering over 8,000 different vape varieties whose additives have not been tested, reviewed, or regulated, and the safety-toxicity profile of which is unknown.<sup>19</sup> E-cigarettes are designed to heat nicotine and produce vapor that contains carcinogens and harmful toxins, including formaldehyde, acetaldehyde, and caroline. This vapor may also contain other substances such as aerosolized particles, polycyclic aromatic hydrocarbons, carbonyls, aldehydes, metals, volatile organic compounds, and tobacco-specific nitrosamines. Children and other non-users are at risk of inhaling this vapor.<sup>20</sup> *In vitro* studies have shown a dose-dependent reduction in the viability of normal human bronchial epithelial cells following exposure to vapor from vaping (e-cigarette) devices.<sup>19</sup>

We designed this study because there are no epidemiological data in North Cyprus regarding SHS exposure in children or parents' awareness of this issue.

## MATERIALS AND METHODS

This descriptive study was conducted between January 1, 2020 and January 30, 2020 in 7 schools including 5 primary schools (6-10 years old) and 2 pre-schools (3-5 years old) in the central and rural areas of

Girne. Written approval for the study was obtained from the Ministry of Education and the Ethics Committee of Dr. Burhan Nalbantoğlu State Hospital (approval number: YTK.1.01-EK 35/20, date: 16.07.2024).

## Questionnaire

The questionnaires were distributed to the classroom teachers by the school principals and to the parents via the students.

A total of 2100 questionnaires were distributed to 7 schools, and 1301 responses were received. Each questionnaire consists of 8 questions that should be answered separately by the mother and father, as well as the parents' age, occupation, comorbidity, tobacco product use history (conventional cigarettes, electronic cigarettes and other tobacco products), and whether the mother smoked during pregnancy. Six of the 8 questions were closed-ended and 2 were multiple-choice questions. The 8 questions answered separately by both mother and father answered separately were as follows:

1. Were you exposed to SHS when you were a child? (yes or no).
2. Do you accept the exposure of your child to tobacco smoke? (yes or no).
3. Do you accept the use of tobacco products by your child in the future? (yes or no).
4. What symptoms or diseases might develop in your child when exposed to tobacco smoke? Asthma/bronchitis, COPD (chronic asthma), Frequent respiratory infections, Snoring, Allergy, Otitis media, Leukemia, All.
5. Does smoking outside the home (balcony, garden, workplace) harm your child? (yes or no).
6. Does your child have any of the following? (You can select more than 1 option); Frequent respiratory tract infections, Frequent ear infections, Snoring, Allergy, Asthma, Sleep disorder, or restlessness/hyperactivity.
7. Would you like your child to be educated about the harmful effects of tobacco products? (yes or no).
8. Would you like to be educated about the harmful effects of tobacco products? (yes or no).

## Inclusion and Exclusion Criteria

The inclusion criteria are; (1) being literate in Turkish, (2) agreeing to fill out the questionnaire, (3) having no visual/reading/writing or comprehension impairments, (4) being over 18 years of age, (5) having a child studying at preschool or primary school.

Exclusion criteria are; (1) lack of literacy in Turkish, (2) not accepting to fill out the questionnaire, (3) visual, reading, writing, or comprehension disability, (4) age under 18.

## Statistical Analysis

The statistical analyses were performed using the Statistical Package for the Social Sciences Statistics software, version 23.0 (IBM Corp.; Armonk, NY, USA). In statistical analyses, categorical variables are presented as numbers and percentages, and continuous variables are presented as mean  $\pm$  standard deviation and median (minimum-maximum value)

for descriptive analyses. For data that did not fit the normal distribution, the Mann-Whitney U test was used for comparative analysis between the 2 independent groups, and the independent sample t-test was used for data that fit the normal distribution. One-Way ANOVA was used to compare these parameters among the smoking status (active smoker, exsmoker, never smoked) of the mothers and fathers. An overall p-value 0.05 was considered statistically significant.

## RESULTS

The participation rate was 61.9% (n=1301). Six questions in the mother section and 57 questions in the father section were unanswered because of death or divorce. The mean ages of the mothers and fathers were 36.4±5.3/year (23-50/year) and 40.3±5.6/year (26-65/year) respectively. The demographic data of the parents are presented in Table 1.

23.2% (n=302) of mothers and 43.1% (n=561) of fathers were active smokers. In 193 (15.3%) households, both mothers and fathers were active smokers. The frequency of respiratory tract infections (p<0.001), snoring (p=0.001) and allergies (p=0.001) were higher in the children of smokers than in non-smoking households. The rate of electronic cigarette usage was 3.4% (n=44). 5.3% (n=69) of the mothers had smoked during pregnancy. The frequency of respiratory infections (p<0.001), snoring (p<0.001), asthma (p<0.001) and hyperactivity (p<0.001) were higher in children whose mothers smoked during pregnancy.

31% of mothers (n=403) and 33.8% of fathers (n=440) thought that if their children were exposed to SHS, they could develop many diseases. Moreover, 98.7% of mothers (n=1258) and 98.4% of fathers (n=1194) did not want their children to be exposed to SHS. If their children were exposed to SHS, 81.7% (n=1063) of mothers thought that their children may have asthma, 56.9% (n=740) COPD, 66.8% (n=869) respiratory tract infections, 41.8% (n=544) snoring, 48.5% (n=631) allergy, 33.1% (n=430) otitis media, 37.4% (n=486) leukemia, and 31% (n=403) all of them. If their children are exposed to SHS, 76.5% (n=995) of fathers think that their children may have asthma, 55.3% (n=719) COPD, 64.6% (n=840) respiratory tract infections, 44.7% (n=569) snoring, 47.3% (n=615) allergy, 35.6% (n=463) otitis media, and 37.4% (n=486) leukemia.

64.2% (n=823) of mothers and 66.1% (n=412) of fathers were exposed to SHS when they were children. Of these, 5.1% (n=41) of mothers had asthma, 4.3% (n=35) hypertension, and 5.8% (n=47) other diseases. Of these, 2.4% (n=19) of fathers had asthma, 6.8% (n=53) hypertension, and 6.2% (n=48) other diseases.

Mothers' answers to the questionnaire are shown in Table 2. Most mothers who were active smokers (n=242, 78.8%) were exposed to SHS when they were children. Most mothers who were not exposed to SHS during childhood were non-smokers (p<0.001). Additionally, most mothers exposed to SHS during childhood were also non-smokers (p<0.001). Regardless of the smoking status, most mothers did not want their children to be exposed to SHS (0.019). Most mothers who were active smokers (n=177, 60%) believed that outside smoking would not harm children. This rate was higher among mothers who had never smoked (p=0.018). Furthermore, 90.9% of mothers (n=1162) wanted their children to receive education about the harms of tobacco products (HTP). This rate was higher among mothers who had never smoked, but the difference was not statistically significant (p=0.210). 9.1% of mothers (n=117) did not want their children to receive education about the HTP. This rate was higher in mothers who had never smoked than in those who did (p=0.470). Most mothers who were active smokers did not want to receive education about the harmful effects of smoking (p=0.025).

Fathers' answers to the questionnaire are shown in Table 2. The rate of active smoking was high among fathers who were exposed to SHS when they were children (p<0.001). Regardless of their smoking status, almost all fathers did not want their children to be exposed to SHS (p=0.149). Most fathers who were active smokers (n=301, 54.5%) thought that outside smoking would not harm their children. Fathers who had never smoked were more aware than others of the harms of outside smoking (p<0.001). Regardless of the smoking status, most fathers wanted their children to be educated about the harmful effects of smoking (p=0.173). Most fathers who did not want to receive education about the harms of smoking were active smokers (p=0.002). Mothers and fathers were similar in this respect.

**Table 1. Demographic characteristics of the mothers and fathers**

		Mother, (n=1295)	Father, (n=1244)
Situation during occupation	Not working	675 (51.9%)	27 (2.1%)
	Civil servant	69 (5.3%)	210 (16.1%)
	Private sector	440 (33.8%)	746 (57.3%)
	Other	100 (7.7%)	261 (20.1%)
Situation of tobacco products using	Never smoked	861 (66.2%)	481 (37%)
	Exsmoker	128 (9.8%)	217 (16.7%)
	Active smoker	302 (23.2%)	561 (43.1%)
Comorbidities	None	1079 (82.9%)	1053 (80.9%)
	Chronic lung disease	57 (4.4%)	28 (2.2%)
	Cardiovascular disease	55 (4.2%)	75 (5.8%)
	Other	79 (6.1%)	65 (5%)

**Table 2. Parents' answers to the questionnaires according to their smoking status**

		Never smoked	Exsmoker	Active smoker	p
<b>Mother</b>					
Did you become exposed to SHS at home as a child?	Yes	502 (61.4%)	79 (77.5%)	242 (78.8%)	<0.001
	No	315 (38.6%)	33 (22.5%)	65 (21.2%)	<0.001
Do you approve of your child being exposed to tobacco smoke?	Yes	7 (0.9%)	4 (3%)	6 (2.2%)	0.140
	No	810 (99.1%)	117 (97%)	267 (97.8%)	0.019
Does smoking outside the home (balcony, garden, workplace) harm your child?	Yes	527 (64.6%)	75 (60.5%)	118 (40%)	<0.001
	No	289 (35.4%)	49 (39.5%)	177 (60%)	0.018
Would you like your child to be educated about the harms of tobacco products?	Yes	766 (91.1%)	117 (92.9%)	279 (89.5%)	0.210
	No	75 (8.9%)	9 (7.1%)	33 (10.6%)	0.470
Would you like to learn more about the harms of tobacco products?	Yes	266 (31.4%)	40 (31%)	117 (39.1%)	0.013
	No	581 (68.6%)	89 (69%)	182 (60.9%)	0.025
<b>Father</b>					
Did you become exposed to SHS at home as a child?	Yes	278 (57.8%)	133 (64.3%)	391 (74.3%)	<0.001
	No	203 (42.2%)	74 (35.7%)	135 (25.7%)	<0.001
Do you approve of your child being exposed to tobacco smoke?	Yes	6 (1.3%)	1 (0.5%)	8 (1.5)	0.372
	No	456 (98.7%)	212 (99.5%)	526 (98.5%)	0.149
Does smoking outside the home (balcony, garden, workplace) harm your child?	Yes	316 (69.3%)	132 (67.7%)	251 (45.5%)	<0.001
	No	140 (30.7%)	63 (32.3%)	301 (54.5%)	0.034
Would you like your child to be educated about the harms of tobacco products?	Yes	424 (90.4%)	190 (92.2%)	515 (92.1%)	0.173
	No	45 (9.6%)	16 (7.8%)	44 (7.9%)	0.559
Would you like to learn more about the harms of tobacco products?	Yes	152 (31.1%)	54 (25%)	204 (36.8%)	0.033
	No	337 (68.9%)	162 (75%)	351 (63.2%)	0.002

SHS: Second-hand smoke.

**DISCUSSION**

The SHS exposure rate in children aged 11 years was 43.1%. In a study designed in 2013-2016 by measuring blood cotinine levels, it was determined that 35.4% of non-smoking children and adolescents in the USA were exposed to SHS.<sup>21</sup> In another study conducted in 2017, 36.3% of children aged between 7 and 12 years were exposed to SHS anywhere, 27% were exposed to SHS in public areas, and 23.8% were exposed at home.<sup>22</sup> In Oberg's study, which was conducted in 192 countries in 2004, the frequency of SHS exposure in children was found to be 40%.<sup>2</sup> In the study conducted by Kuntz and Lampert<sup>23</sup> on children who were 0-6, between 2003 and 2006, the rate of children whose at least one parent smoked was 49.8%. This rate was found to be 41.8% between 2009 and 2012. When we look at data from various countries, the frequency of exposure of children to SHS is similar around the world. The results of our study are consistent with worldwide data.

Another important issue is the mother's smoking habit during pregnancy. Smoking during pregnancy is associated with maternal, fetal, and infant morbidity and mortality. Pineles et al.<sup>24</sup> showed that smoking during pregnancy is associated with an increased risk of prenatal and perinatal death. In addition, it has been proven that smoking during pregnancy leads to telomere shortening. Telomere shortening is associated with many adverse outcomes, from cancer to type 2 diabetes, cardiovascular diseases, and Alzheimer's disease.<sup>25</sup> In the United States, the smoking rate in the last trimester of pregnancy is 12.8%, which is considered a very high rate.<sup>25</sup> In Switzerland, the rate of women smoking in pregnancy was 13%, indicating that 11,000 babies per year are exposed to fetal tobacco.<sup>26</sup> Smoking during pregnancy is

lower in low- and middle-income countries.<sup>27</sup> The mean prevalence of smoking among pregnant women worldwide is 1.7%. This rate is estimated to be highest in Europe (8.1%) and lowest in Africa (0.8%).<sup>27</sup> In our study, 5.9% of mothers who smoked in pregnancy was 5.9%. The intermediate frequency observed in our study is attributed to the heterogeneous population of our country.

There are only few studies on second-hand e-cigarette exposure in children. An experimental study suggested that both the alveolar areas of the lungs and total lung growth are impaired by exposure to e-cigarettes in neonatal mice<sup>28</sup> and that exposure to e-cigarettes during early life may cause persistent behavioral changes in adult mice.<sup>29</sup> In our study, we did not investigate whether e-cigarette exposure had a negative effect on children, but we contributed to the data on the frequency of e-cigarette use in students' homes. The sale of e-cigarettes is legal in our country, but despite this freedom, the rate of e-cigarette use among the parents in our study was only 3.4%. In America, where the sale of e-cigarettes is legal, the frequency of e-cigarette use in adults over the age of 18 years was 7.7%.<sup>30</sup> Garbutt et al.<sup>31</sup> administered a questionnaire to parents in 33 pediatric outpatient clinics and found that e-cigarettes were used in 1 in 8 homes, with 4% of parents using only e-cigarettes and 8.3% using both e-cigarettes and conventional cigarettes.

SHS exposure may cause some adverse health effects in children, such as asthma, coughing, wheezing, lower respiratory tract diseases, allergy, decreased lung function, middle ear disease, nasal irritation, sleeping disturbance, attention-deficit/hyperactivity disorder, leukemia, and obesity.<sup>25</sup> In our study, 1 in 3 of parents knew that their children would have chronic diseases due to SHS exposure. The most fundamental

issue affecting the prevention of SHS exposure in children is parental risk perception and awareness. In a study from Malaysia, 35.4% to 59.3% of parents knew that SHS exposure poses risks to child health.<sup>32</sup> In the study, 33.7% of parents considered smoking near their child while the balcony door open as “high-risk” and 35.4% as “extremely high-risk”.<sup>32</sup> In addition, 42.3% of parents considered smoking near their child in the playground to be a high-risk behavior, and 34.1% considered smoking outdoors at a distance from the child as high-risk.<sup>32</sup> In another study, approximately 52% of parents who were active smokers reported a lack of belief or awareness about the negative health effects of SHS exposure on children.<sup>33</sup> In our study, the rate of idea that outside smoking (balcony, garden, workplace) could be harmful to children was highest among fathers who never smoked fathers (n=316), lowest (n=132) in exsmoker. The frequency of idea that outside smoking could be harmful to children was highest among mothers who had never smoked and lowest among exsmokers. This finding is similar to that of fathers. Another important finding of our study was that 78.8% of active smoking mothers and 74.3% of fathers were exposed to SHS when they were children.

In our study, the proportion of fathers (n=1129, 91.5%) who wanted their children to be educated about the harms of smoking was similar to that of mothers (n=1162, 90.0%). The fathers who were active smokers emphasized the importance of education about the harms of smoking compared to the fathers who had never smoked. The situation was the opposite for mothers. We could not find any other study that examined parents by categorizing them according to their smoking status. Therefore, we cannot make comparative comments on these results. However, the reluctance of mothers who are active smokers to teach children about the harms of tobacco is surprising and a matter of research. Another surprising finding was that parents who were active smokers were less likely to be willing to receive education about the HTP than non-smokers. This is also a subject that deserves further research. These surprising results are open to interpretation. People's education level, health literacy, beliefs, and living conditions may affect these results.

This study is important because it is the first epidemiological data on SHS exposure in children aged 11 years in North Cyprus. The main results of our study are as follows; 1) SHS exposure in our region is similar to the world average; 2) awareness about the HTP on health varies depending on the parent's smoking status; 3) the frequency of chronic diseases in children who were exposed to SHS is similar to the literature; and 4) the proportion of parents who want to get education about the HTP varies according to their smoking status.

### Study Limitations

First, this study was conducted in a single region of the country and only in public schools. However, a new study will be conducted nationwide and in both private and public schools, which may affect some results in terms of awareness. Second, we asked a small number of questions to increase participants' participation. It is known that questionnaire participation rates decrease as the number of questions increases. Due to the small number of questions, we only had the opportunity to determine the situation; the reasons for the answers could not be questioned. The strengths of the study can be listed as follows; 1) the participation rate was relatively high; 2) the questions were answered by both mothers and fathers; and 3) parents were categorized according to their smoking status.

## CONCLUSION

This study not only revealed the health problems associated with SHS in children but also provided a different perspective on parents' exposure to SHS when they were children. In addition, parental awareness of the harmful effects of tobacco products was examined according to their smoking status. This is an important point. We believe that parents should receive training on SHS and, in those who do not want to receive training, the reason for this should be investigated.

## MAIN POINTS

- In this pilot study, the rate of SHS exposure among preschool and primary school children was similar to the global average.
- Parents' awareness of the health hazards of tobacco products varies according to their smoking status. Parents who have never smoked are more aware of the hazards of smoking.
- Most of the parents who are active smokers were exposed to SHS when they were children.
- The proportion of parents who want to be educated about the harmful effects of tobacco products varies according to their smoking status. Active smokers are less willing to be educated.

## ETHICS

**Ethics Committee Approval:** The study protocol was approved by Dr. Burhan Nalbantoğlu State Hospital Ethics Committee (approval number: YTK.1.01-EK 35/20, date: 16.07.2024).

**Informed Consent:** Written approval for the study was obtained.

## Footnotes

### Authorship Contributions

Surgical and Medical Practices: A.B., F.Y., Concept: A.B., F.Y., Design: A.B., F.Y., Data Collection and/or Processing: A.B., Analysis and/or Interpretation: A.B., Literature Search: A.B., F.Y., Writing: A.B.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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