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Relationship between Lifestyle Behaviors and Upper Respiratory Tract Infections

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ABSTRACT

Objectives: This study aims to investigate the relationship between the frequency and recovery time of upper respiratory tract infections (URTIs) and lifestyle behaviors.

Methods: This cross-sectional study was conducted in a tertiary family medicine outpatient clinic between November 2015 and June 2017. Voluntary individuals who applied to the clinic for any complaint between the ages of 18 and 45 years were included in this study. Of 384 participants, the sociodemographic characteristics, lifestyle behaviors, and information on URTIs they had for the last 1 year were collected and analyzed.

Results: The median total number of URTIs was 2.0 [interquartile range:3.0], and the median recovery time of URTIs was 5.0 [4.0] days. The frequency of URTIs in current smokers was 3.0 [2.5], while it was 2.0 [3.0] in non-smokers and 2.0 [2.0] in former smokers ($p=0.028$). Daily smoking exposure time of non-smokers, daily amount of fluid consumption and number of meals consumed fast-food per month were positively correlated with the frequency of URTIs ($p=0.017$, $p=0.037$ and $p=0.044$, respectively). The median number of URTIs was 2.0 [3.0] in those who ventilated their house every day, and 3.5 [3.3] in those who did not ($p=0.037$). The median recovery time of URTIs in females was 5.0 [3.0] days, while it was 5.0 [4.0] days in males ($p=0.017$). There were negative correlations between the median recovery time of URTIs and age and weekly exercise duration ($p=0.039$ and $p=0.039$, respectively).

Conclusion: This study shows that some lifestyle behaviors affect the frequency of URTIs and their recovery times.

Keywords: Family practice, lifestyle, smoking, respiratory tract infection



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INTRODUCTION

Upper respiratory tract infections (URTIs) are a general definition that includes colds, laryngitis, pharyngitis/tonsillitis, acute rhinitis, acute rhinosinusitis, and acute otitis media.^[1] URTI is the most common acute diagnosis in primary care.^[2] Approximately 25 million people with uncomplicated URTIs in the USA apply to family physicians every year.^[3] URTI is the leading cause of missed days at work or school.^[4] Twenty million days off work and 22 million days absent from school are attributable to URTIs each year, and its annual cost was 40 billion dollars in total.^[5,6]

Lifestyle factors can affect the frequency and severity of URTIs. For instance, smoking increases the incidence of URTIs, while moderate alcohol use decreases their frequency.^[7] Similarly, several studies have shown the relationship between sleep time, exercise, and vitamin use with URTI.^[8-15] Hand-washing habits and daily fluid consumption are other lifestyle variables that may affect the occurrence and severity of URTIs.^[16]

Although studies have investigated the relationship between lifestyle factors and URTIs one by one, few studies have evaluated several lifestyle factors together. In addition, more up-to-

date studies are required on the Turkish population regarding this topic. Thus, this study investigates the relationship between the frequency and recovery time of URTIs and lifestyle behaviors.

METHOD

This cross-sectional study was conducted in a tertiary family medicine outpatient clinic between November 2015 and June 2017. The sample was selected from individuals who applied to family medicine outpatient for any complaint. Voluntary individuals between the ages of 18 and 45 years were included in this study.

A questionnaire developed by the authors containing questions on the sociodemographic characteristics, lifestyle behaviors, and frequency of URTIs was employed using a face-to-face interview method.

Participants with any chronic illness, who were treated for major depression or psychotic disorder, who had influenza vaccination in the last year, and who had a body mass index of 30 kg/m² or more and pregnant women were excluded from this study.

The sample size was calculated as 384 using online OpenE-

pi Version 3.01 with a margin of error of 5% and confidence level of 95%.

All statistical analyses were performed using Statistical Package for the Social Sciences (IBM Corp., Armonk, NY, USA). For normally distributed numerical variables, the Kolmogorov–Smirnov test was used. Descriptive data were evaluated as frequency and percentage for categorical variable, and median and interquartile range for numerical variable. Relations between variables were examined using the Spearman correlation analysis, Mann–Whitney U-test, and Kruskal–Wallis test. A p value <0.05 was considered statistically significant.

RESULTS

A total of 384 participants were enrolled in the study and the median age of the participants was 23.0 [8.0] years. When the participants were asked how many times they had URTIs in the past year, 55 (14.3%) stated that they did not have URTI. The median of the total numbers of URTIs, doctor visits due to URTI symptoms, and URTIs that passed without referral to a doctor were 2.0 [3.0], 1.0 [2.0], 1.0 [3.0], respectively, while the median of URTIs' recovery time was 5.0 [4.0] days. Total number and recovery time of URTIs according to sociodemographic features are summarized in Table 1.

Table 1. Total number and recovery time of upper respiratory tract infections according to sociodemographic features

	n (%)	Total number of URTIs	p	URTIs' recovery time (days)	p
Gender					
Female	181 (47.1)	2.0 [3.0]	0.747*	5.0 [3.0]	0.017*
Male	203 (52.9)	3.0 [3.0]		5.0 [4.0]	
Marital status					
Married	103 (26.8)	2.0 [3.0]	0.091*	4.5 [4.0]	0.053*
Single	281 (73.2)	3.0 [3.0]		5.0 [3.0]	
Education					
Primary and lower	18 (4.7)	2.0 [2.5]	0.586†	4.0 [3.5]	0.151†
High school	40 (10.4)	2.0 [3.0]		4.0 [4.0]	
University	283 (73.7)	2.0 [3.0]		5.0 [3.7]	
Master/PhD	43 (11.2)	3.0 [3.0]		5.0 [4.0]	
Having children					
Yes	78 (20.3)	2.0 [3.0]	0.216*	4.0 [4.0]	0.107*
No	306 (79.7)	3.0 [3.0]		5.0 [3.0]	
Employment status					
Employed	155 (40.4)	2.0 [3.0]	0.302*	5.0 [4.0]	0.063*
Unemployed	228 (59.6)	3.0 [3.0]		5.0 [3.0]	
Living place					
Rural	66 (17.3)	2.0 [3.0]	0.794*	5.0 [4.0]	0.834*
Urban	316 (82.7)	2.0 [3.0]		5.0 [4.0]	

URTIs: Upper respiratory tract infections.

Data are presented as median [interquartile range].

*Mann Whitney U test, †Kruskal–Wallis test.

The total number of URTIs in the last year was higher in current smokers than in former smokers and in non-smokers than in former smokers ($p=0.006$ and $p=0.039$, respectively). However, this relationship was not significant between current smokers and non-smokers ($p=0.184$). Lifestyle behaviors and their relationship with the total number of URTIs and the URTIs' recovery time are shown in Table 2 and Table 3.

There was negatively relationship between age and recovery time of URTIs, although it was no found significant association age with the total number of URTIs ($r=-0.114$ and $p=0.039$; $p>0.05$). The relationship between the total number and recovery time of URTIs and lifestyle behaviors are summarized in Table 3.

DISCUSSION

This study was aimed to examine the relationship of lifestyle behaviors with the frequency of URTIs, and the duration of URTI recovery. According to the results of this study, the median frequency of URTIs was 2 times, and the median recovery time was 5 days. Other studies have observed that adults had approximately 1–3 URTIs per year, and this

result conforms to the result of this study.^[17-19] According to the annual report of the UK Royal College General Practice, Research and Surveillance Centre, the common cold was more common in the age range of 0–4 years than in other ages, and the frequency of colds was lower in males than in females.^[20] In this study, it was not observed a significant relationship between age and the frequency of URTIs. Furthermore, while the prevalence of URTIs was more common in females in some studies, no relationship was found between the total number of URTIs and gender in this study.^[21-22] However, it was found that younger individuals and women have longer URTI recovery times.

In this study, it was found that more cigarette exposure was related to more frequent URTIs. Moreover, it was observed that those who were smoking or never smoked have passed more URTIs than former smokers. According to World Health Organization 2015 data, 1.1 billion people in the world smoke.^[23] The prevalence of tobacco use among adults aged 15 years and above in Turkey is 27.1%.^[24] In this study, 16.9% of the participants were smoking. Since smok-

Table 2. Total number and recovery time of upper respiratory tract infections according to lifestyle behaviors

	n (%)	Total number of URTIs	p	Recovery time of URTIs (days)	p
Smoking status					
Non-smokers	280 (72.9)	2.0 [3.0]	0.028*	5.0 [4.0]	0.122*
Former smokers	39 (10.2)	2.0 [2.0]		4.0 [4.0]	
Current smokers	65 (16.9)	3.0 [2.5]		5.0 [6.7]	
Alcohol use status					
Yes	39 (10.2)	3.0 [3.0]	0.870†	7.0 [5.3]	0.258†
No	345 (89.8)	2.0 [3.0]		5.0 [4.0]	
Vitamin use status					
Yes	123 (32.2)	3.0 [4.0]	0.181†	5.0 [3.0]	0.034†
No	259 (67.8)	2.0 [3.0]		5.0 [4.0]	
Use of public transportation					
Never	30 (7.8)	2.0 [3.0]	0.304*	4.0 [4.0]	0.620*
Sometimes	114 (29.7)	2.0 [3.0]		5.0 [4.0]	
Often	121 (31.5)	2.0 [3.0]		5.0 [3.0]	
Every day	119 (31.0)	3.0 [3.0]		5.0 [3.7]	
House getting sunshine condition					
Yes	366 (95.3)	2.0 [3.0]	0.924†	5.0 [4.0]	0.547†
No	18 (4.7)	2.0 [4.0]		6.0 [5.5]	
House airing status every day					
Yes	350 (91.1)	2.0 [3.0]	0.037†	5.0 [4.0]	0.613†
No	34 (8.9)	3.5 [3.3]		5.0 [3.3]	

URTIs: Upper respiratory tract infections.

Data are presented as median [interquartile range].

*Kruskal–Wallis test, †Mann Whitney U test.

Table 3. The relationship between the total number and recovery time of upper respiratory tract infections and lifestyle behaviors

	Median [IQR]	Total number of URTIs		Recovery time of URTIs (days)	
		r	p	r	p
Smoking exposure of non-smokers daily (minutes)	10.0 [60.0]	0.135	0.017	0.044	0.472
Night sleep time (hours)	7.0 [2.0]	-0.030	0.555	0.046	0.403
Weekly exercise time (minutes)	10.0 [105.0]	-0.013	0.793	-0.114	0.039
Fluid consumption (liters)	2.3 [1.5]	0.107	0.037	0.091	0.101
Number of meals consumed fast-food per month	4.0 [8.0]	0.103	0.044	0.059	0.286
Number of meals consumed fruit per week	4.0 [5.0]	0.005	0.929	0.002	0.976
Number of daily handwashing	10.0 [9.0]	0.065	0.202	0.059	0.289

URTI: Upper respiratory tract infection.
Spearman correlation test.

ing interferes with the mechanisms that keep bacteria and their residues away from the lungs, smokers, or those who are exposed to cigarette smoke are more prone to respiratory diseases than nonsmokers.^[16] In a study, when people smoke, the frequency of colds increases.^[7] In this study, it was showed the same results that people with more cigarette exposure had more frequent URTIs. However, it was not found any significant difference in URTI recovery times when the participants were compared in terms of smoking status. In addition, it was found that smokers and non-smokers had more frequent URTIs than former smokers. The reason why people who have been smoking before is less likely to suffer from URTIs may be cause they are more conscious of their lifestyle behaviors.

In this study, more fluid intake and fast-food consumption were related to more frequent URTIs. Drinking at least eight cups of water a day is important for both hydration and the alleviation of mucus obstruction in people suffering from URTIs.^[17] Moreover, as the daily fluid intake increased, the frequency of URTIs increased. The reason for this contrast may be the sugary and caffeinated beverages consumed along with fast-food. The positive relationship between the number of fast-food meals consumed per month and the frequency of URTIs supports this thesis. Nieman et al. have found that the number of days of having symptoms of URTIs decreased in patients who consumed three or more fruits.^[10] In this study, it was not observed a significant positive relationship between fruit consumption, the total number of URTIs, and URTI recovery times. Furthermore, it was found that participants who take vitamin supplementation had longer URTI recovery times. Some studies show that vitamin supplementation shortens the symptom duration in patients

with URTIs.^[14,25] In this study, it was observed no significant relationship between the intake of vitamin supplements and the total number of URTIs; however, those who received vitamin supplementation recovered longer. The reason for this finding was thought to be that people who took vitamin supplementation were more sensitive to infections.

According to the results of this study, non-ventilation of houses was related to more frequent URTIs. The transmission of viruses that cause URTIs can be either directly or indirectly from peripheral surfaces, such as contact with secretions containing virus and contact with small particle aerosols that remain in the air for a long time.^[21] Particles dispersed by sneezing and coughing are suspended in the air for a long time and can be transmitted easily to other individuals. Especially, crowded and closed environments increase the risk of transmission. Therefore, ventilating enclosed environments frequently is important. In this study, people who ventilated their houses every day had fewer URTIs. Thus, ventilating our homes is recommended to pass fewer URTIs.

In addition, it was found that individuals with lower durations of exercise had longer URTI recovery times. Exercise has positive effects including improving muscle strength, flexibility, psychological status, and sleep quality; reducing weight, blood lipids, and glucose levels; decreasing the risk of some types of cancer, cardiovascular disease, and thrombosis; and increasing bone mineral density.^[26] Several studies have observed that exercise decreases the number of days with URTI symptoms and frequency of URTIs.^[10,27,28] In this study, it was observed that the recovery time was shorter as the amount of exercise increase. Therefore, exer-

cise could be recommended to shorten the recovery time of URTIs. However, a relationship between exercise and the total number of URTIs that passed within a year could not be found in our study.

In addition, several studies have found that the risk of colds decreased with moderate levels of alcohol consumption, and more frequent alcohol intake was associated with lower prevalence of colds.^[7,29] Moreover, as the duration of sleep decreased, the probability of URTI increased.^[8,9] In this study, no significant relationship was observed between alcohol use, sleep duration, the total number of URTIs, and URTI recovery times.

Although no significant relationship between the number of daily handwashing and the frequency of URTIs and time to recovery was found in this study, randomized controlled trials have suggested that especially in children, hygienic measures, such as handwashing, can prevent the spread of respiratory tract viruses.^[30]

The most important limitation of this study was that the study population consisted of only individuals who applied to the university hospital. Thus, attributing the findings of this study to the general population is difficult. Therefore, further studies involving a larger number of participants are needed. Another limitation is that data on the diagnosis of URTIs were not evaluated using health records, but rather considering the participants' own statements. This limitation can be overcome by conducting prospectively designed studies including data obtained from patient follow-ups.

CONCLUSION

URTIs are a remarkable issue because they are one of the most common infectious diseases in the general population and among the most common causes of referral to a primary care. In this study, it was revealed that some lifestyle behaviors were associated with the frequency of URTIs and its recovery time.

Disclosures

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Authorship Contributions: Concept – B.A.Y., T.S.; Design – B.A.Y., T.S.; Supervision – T.S.; Materials – B.A.Y.; Data collection &/or processing – B.A.Y.; Analysis and/or interpretation – T.S., C.Y.; Literature search – B.A.Y., C.Y.; Writing – B.A.Y., C.Y.; Critical review – B.A.Y., T.S., C.Y.

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