

# PREVALENCE AND INFLUENCING FACTORS OF SELF-MEDICATION WITH ANALGESICS AMONG ADULTS: AN OBSERVATIONAL STUDY

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## Abstract

Analgesics has been used to relieve pain since the discovery of pain killers and humankind is searching ways to alleviate pain. Self-medication practice (SMP) is common among the society. Irrational SMP could be prevented by pharmacist interventions. This study aims to evaluate the self-medication behaviours and related factors of analgesics use. Online questionnaire was disseminated between February-July 2020 in this observational study. The survey was structured into 2 sections demographics (11 items) and analgesic use behaviour (14 items). A binary logistic regression model has been conducted for the evaluation of the related factors for SMP. The mean age of 376 individuals was  $32.5 \pm 13.8$ . Majority of the participants (89.6%) indicated that they used analgesics without a prescription. Most common reasons for analgesics use were headache (46.3%), stomach-ache (13.8%), toothache (6.4%) and menstrual pain (5.8%). Out of 18 predictors, six were found statistically significant. The influencing factors for SMP were being employed (OR: 2.968; 95% CI: 1.073-8.125;  $p = 0.036$ ), lack of health insurance (OR: 4.312; 95% CI: 1.034 - 17.975;  $p = 0.045$ ), recommending analgesic to others (OR: 3.446; 95% CI: 1.41 - 8.40;  $p = 0.006$ ). This study highlighted the high rate of SMP and related factors.

## Rezumat

Acest studiu evaluează comportamentele de automedicație și factorii legați de utilizarea analgezicelor. Un chestionar online a fost diseminat în perioada februarie-iulie 2020 în cadrul acestui studiu observațional. Chestionarul a fost structurat în 2 secțiuni: date demografice (11 întrebări) și comportamentul de utilizare a analgezicelor (14 întrebări). Un model de regresie logistică binară a fost realizat pentru a evalua factorii legați de practica automedicației. Vârsta medie a celor 376 de persoane a fost de  $32,5 \pm 13,8$  ani. Majoritatea participanților (89,6%) au indicat că au utilizat analgezice fără prescripție medicală. Cele mai frecvente motive pentru utilizarea analgezicelor au fost durerile de cap (46,3%), durerile de stomac (13,8%), durerile de dinți (6,4%) și durerile menstruale (5,8%). Dintre cei 18 factori luați în considerare, șase s-au dovedit a fi semnificativi din punct de vedere statistic. Factorii de influență pentru SMP au fost statutul de angajat (OR: 2,968; 95% CI: 1,073 - 8,125;  $p = 0,036$ ), lipsa asigurării de sănătate (OR: 4,312; 95% CI: 1,034 - 17,975;  $p = 0,045$ ), recomandarea analgezicelor altora (OR: 3,446; 95% CI: 1,41 - 8,40;  $p = 0,006$ ). Acest studiu a evidențiat rata ridicată de automedicație și factorii asociați.

**Keywords:** self-medication, analgesics, over the counter medicine, health behaviour

## Introduction

Pain has been described in different ways over the years. The International Pain Organization defines pain as an unpleasant emotional sensation related to subjective, protective and primitive human experiences and strong tissue damage originating from a specific part of the body [1-3]. Because pain affects a person's physical, social and mental state, it is crucial to control the pain to relax the individual, increase the quality of life, reduce complications and minimize the length of stay in the hospital [4].

Over-the-counter (OTC) drug use such as analgesics is quite common among the population, especially in patients with primary headache disorders [5]. These patients frequently self-medicate with OTC analgesics.

According to the World Health Organization, self-medication is when individuals choose and use drugs to treat their disease and symptoms [6]. As a result of self-medication, patients contribute to health-related decision-making [7, 8]. Self-medication includes behaviours such as purchasing OTC drugs, sharing drugs with social circles and using drugs found at home. Knowing when professional care is unnecessary, as well as one's responsibilities in disease treatment, also constitute the concept of self-medication [9].

In countries with low economies and insufficient health resources, self-medication may provide certain benefits such as saving money, reducing the wait time to see a health care professional and decreasing the demand for medical services [10, 11]. However, it is

important to note that self-medication is not without risks and can cause problems in some cases, particularly in developing countries with limited access to health care [12]. This practice is usually cheaper than the price of health care. One of the major factors in self-medication is financial constraints [13]. Self-medication ensures that health problems that people frequently encounter and that do not require medical attention are resolved through their planned care. For this practice to be conducted reliably and accurately, OTC drugs should use in limited situations. It also requires a certain level of knowledge which could be provided by pharmacist [14].

The reasons for self-medication may vary according to sociocultural characteristics. Reasons for self-medication include online drug sales, access to information about pharmaceutical products through media, the availability of OTC drugs, a decrease in the number of drugs covered by reimbursement, the high cost of physician visits, long waiting times for the examination, health problems considered minor, chronic diseases, prior experience with medication and socioeconomic factors such as income, education level and lack of health insurance. Self-medication usually is the first method used when faced with health problems in the low-income population [13]. Consciously applied self-medication can save time, provide an easy solution for acute diseases, save lives in urgent situations, and contribute economically to the healthcare system as well as to the individual. Pharmacist could provide sophisticated services to patients which are categorised as cognitive pharmacy services.

Today, analgesics represent one of the leading self-medication drug categories. Although studies have found a growing need for consumer awareness of risks presented by OTC drugs such as analgesics, optimizing self-medication remains a challenge [15]. Nonsteroidal anti-inflammatory drugs (NSAIDs) are frequently used over the counter for pain management. Although they may seem harmless, they can cause serious health problems, including acute kidney injury. However, this risk can be avoided by identifying high-risk patients and providing counselling on the appropriate use of these drugs [16].

According to one study, more than half of the participants (66.3%) stated that they would consult a health care professional only when self-treatment was ineffective. Specifically, 22.5% of the participants would immediately consult a general practitioner, whereas only 9% of the participants consult a pharmacist [16]. Efforts to raise consumer awareness and facilitate more informed treatment options can ensure consumers make informed decisions about their health and to seek medical advice when necessary. This may include educating consumers about the potential risks and benefits of self-medication, the importance of seeking medical advice and resources available for obtaining reliable information about health and medication use [15].

Pharmacists provide accurate information about OTC drugs and evaluate their patients' conditions to provide guidance about treatment options for pain control. Pharmacists help patients make informed decisions about the potential risks and benefits of treatment options [17, 18]. This may include providing information about nonpharmacological methods to manage pain and creating a customised treatment plan that considers the cost of these options. By following this plan and the recommendations of providers, patients also have a role in the treatment process. Together, pharmacists and patients can ensure the safe and effective use of OTC medications.

This study aimed to investigate the individual's self-medication behaviours for pain management. In the light of this information, it will be determined and evaluated to what extent the patients exhibit a healthy drug use behaviour.

## Materials and Methods

### *Design, sample size and subjects*

This descriptive, observational study was carried out between February 2020 and July 2020 in Turkey. Without any defined inclusion/exclusion criteria for gender or age, all research participants were chosen based on their willingness to respond to the study's questions. This study has been approved by the Bezmialem Vakif University, Turkey, Ethics Committee with the decision number of 01/08. An informed consent was obtained from all individual participants included in the study. All procedures performed in the study were in accordance with the ethical standards of the University of Siena and with the 1964 Helsinki Declaration and its later amendments.

The exponential non-discriminative snowball sampling method was used as the sampling method for this study.

$$n = \frac{Z^2 p(1-p)}{d^2}$$

According to the equation above, sample size calculation is determined. where  $n$  is the sample size. The  $p$ -value of the proportion is taken as 0.5. The margin of sampling error tolerated  $d$  is taken as 0.05 and  $Z$  is the standard normal value at a confidence interval of 95% = 1.96. Therefore,  $n = (1.96)^2 0.5(1 - 0.5)/(0.05)^2 = 345$ . To account for a 5% non-response rate in the total sample size, a minimum of 376 participants is required.

### *Questionnaire, survey distribution and data collection*

An online questionnaire was created with Google Forms to evaluate the analgesic use behaviour of individuals. The invitation to the survey was disseminated through direct messages and social network platforms containing a link and information regarding the present study. To increase participation, individuals were encouraged to forward the survey link to their social circle. The link to the survey was shared through social network platforms (e.g. WhatsApp Messenger<sup>®</sup>, Facebook, etc.). The survey consisted of 25 items

structured into 2 sections: demographics (11 items) and analgesic use behaviour (14 items). A written informative and approval form has been signed by each participant. Additionally, it was made sure that each response was given just once rather than several times. The option to fill out the Google form just once was enabled, although the patient names and identities were afterward cross-checked with physical forms. The dependent variable was the self-medication practice, which was assessed using a single item with binary variables (Self-medication practice “Yes” or “No”). On the other hand, the independent variables were employment status, gender, marital status, level of education, smoking, alcohol intake, health insurance, chronic diseases, when to take analgesics, who advised analgesics, do you need a second analgesic within the same day, do you do any other activities to relieve your pain apart from the use of analgesics, do you read the package insert of the analgesic you use, what was the reason for taking the last analgesic, was your last analgesic usage were prescribed, who advised your last analgesics, would you recommend someone else a analgesics, and how long do you use analgesics. A group of professionals (n = 4) assessed the survey's language design and provided feedback on the survey's questions, which were then updated in accordance with their suggestions. Twenty participants who weren't included in the first evaluation were asked to participate in pilot research to assess the survey's clarity and understandability, and changes were made based on their comments.

#### Data analysis

The Cronbach's alpha test and McDonald's omega test were used to assess the reliability of the questionnaire. The test for our study revealed that the survey tool has Cronbach's alpha and McDonald's omega test values of 0.476 and 0.542 respectively.

As descriptive statistics, mean, median, standard deviation and interquartile range [IQR] or count and percentages are given for continuous variables. The frequency and percentage are given for categorical variables. The normality of continuous variables was tested using the Kolmogorov-Smirnov test. The difference between groups was analysed with an independent t-test or Mann-Whitney U test. Chi-square tests are used to investigate the relationship between categorical variables. The univariate logistic regression analysis was used to determine which variable(s) are significant by using  $p < 0.20$ . The significant variables are included in the binary logistic regression analysis. Binary logistic regression analysis was carried out, and estimated risk values and confidence intervals were provided. This study was done to identify the variables that are useful in predicting the self-medication behaviours. The Nagelkerke R square value was used to assess the model's explanatory power, and the Hosmer and Lemeshow test was used to assess the model's fit. The missing data were excluded from the analysis. All the

data were statistically analysed by using Statistical Package for Social Science (SPSS) version 26<sup>®</sup> and Jamovi version 1.6 software. Univariate and multivariate logistic regression analysis was conducted to identify factors associated with the self-medication practice for pain management. Statistically, significance was set as  $p < 0.05$ .

## Results and Discussion

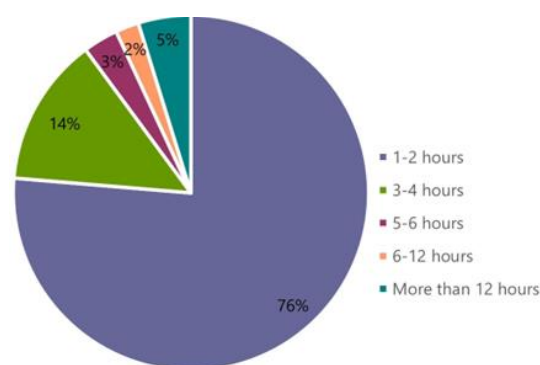
### *Socio-demographic characteristics of study participants and prevalence of self-medication*

In this study, 376 individuals were included with an average age of  $32.5 \pm 13.8$ . Majority of the participants (89.6%) indicated that they have been used analgesics without a prescription for self-medication purpose. The participants were primarily female (72.34%). More than half of the participants (56.38%) were single, 234 (88.82%) of the participants had some form of health insurance and 316 had undergone some education beyond high school (84.04%). The demographic characteristics among the sample of participants who use OTC analgesics and who does not, for self-medication purpose, are shown in Table I.

Among the participants, most common comorbidity was hypertension followed by diabetes and psychological problems and hyperlipidaemia.

### *Analgesic use behaviour and pain management*

122 of the participants had been used the last analgesic with a prescription while 254 had self-medicated. 97% of the participants prefer to use analgesics during pain and only 3% use before they feel pain. 79% of the participants stated that they did not need a second analgesic during the day, while 21% did. On the other hand, 27.8% of those who need a second analgesic they needed a second analgesic within 3 - 4 hours, 26.6% within 5 - 6 hours and 27.8% within 6 - 12 hours (as shown in Figure 1).



**Figure 1.**  
Need of a second analgesic within time

The rate of participants who needed analgesic within 1 - 2 hours was 13.9%. In addition, the rate of needing a second analgesic in more than 12 hours was 3%. These results indicate that the subjective pain intensity is mild or moderate. A large percentage (72.3%) of

participants prefer non-pharmacological methods for managing pain while a minority (27.7%) preferred to use only analgesics. About three-quarters of the

participants (78.5%) stated that they used analgesics until their complaint subsided. 21.5% use analgesics for as long as the physician recommends.

**Table I**

Sociodemographic characteristics of participants who self-medicate OTC analgesics

Parameter		Total N (%)	Self-Medicating N (%)	Non-Self-Medicating N (%)	p
<b>Participant Number</b>		376	337 (89.6)	39 (10.4)	< 0.001
<b>Age, Mean ± SD</b>		32.5 ± 13.8	31.4 ± 8	43.2 ± 18.4	< 0.001
	18 - 25 years	122 (32.44)	114 (93.44)	8 (6.56)	
	26 - 45 years	206 (54.78)	189 (91.74)	17 (8.26)	
	46 - 65 years	39 (10.37)	31 (79.48)	8 (20.2)	
	> 65 years	9 (2.39)	3 (33.33)	6 (66.67)	
<b>Gender</b>	Female	272 (72.35)	250 (91.91)	22 (8.09)	< 0.001
	Male	104 (27.65)	87 (83.65)	17 (16.35)	
<b>Marital Status</b>	Single	212 (56.38)	197 (92.92)	15 (7.08)	< 0.001
	Married	145 (38.56)	124 (85.51)	21 (14.49)	
	Divorced	19 (5.06)	16 (84.21)	3 (15.79)	
<b>Level of Education</b>	Primary School	11 (2.92)	5 (45.45)	6 (54.55)	< 0.001
	Secondary School	6 (1.59)	3 (50)	3 (50)	
	High School	43 (11.43)	34 (79.06)	9 (20.94)	
	Graduate	263 (69.94)	245 (93.15)	18 (6.85)	
	Postgraduate	53 (14.09)	50 (94.33)	3 (5.67)	
<b>Employment Status</b>	Employed	257 (68.35)	231 (89.88)	26 (10.12)	< 0.001
	Unemployed	119 (31.64)	106 (89.07)	13 (10.93)	
<b>Smoking</b>	Yes	112 (29.78)	102 (91.07)	10 (8.93)	< 0.001
	No	264 (70.21)	235 (89)	29 (11)	
<b>Alcohol</b>	Yes	158 (42.02)	150 (94.93)	8 (5.07)	< 0.001
	No	218 (57.97)	187 (85.77)	31 (14.23)	
<b>Health insurance</b>	Yes	334 (88.82)	299 (89.52)	35 (10.48)	< 0.001
	No	42 (11.17)	38 (90.47)	4 (9.53)	
<b>Chronic Disease</b>	Yes	48 (12.76)	39 (10.4%)	9 (2.4)	< 0.001
	No	328 (87.23)	298 (79.3)	30 (8)	

*Reason for self-medication practices*

The reason for self-medication and not consulting a physician were found mostly because participants had an experience with the drug they used (94%). Meanwhile, the minority (6%) stated that the reason for self-medication was due to their lack of time. Most common reason for analgesic use was headache (46.3%) which is followed by a stomachache (13.8%), toothache (6.4%) and menstrual pain (5.8%).

*Source of information about analgesic drugs for self-medication*

When asked about who's the advice they take when using analgesics, 49.2% (183) of the participant takes advice from a physician about analgesics. However, only 3.2% (12) take advice from the pharmacist. While 27.4% (103) of the participants take the advice of a family member and 9.8% (37) from friends. 9% (34) decide the drugs they will use based on their knowledge and experience.

On the other hand, during their last analgesic use, these rates vary. Even though the number of people who received a physicians advice remains high it decreased from 49.2% to 46.4%, While the number of people who consulted pharmacists increased more than twice of times, from 3.2 to 8.2 while it remained the last. The total of consultation with healthcare professionals

was similar in both cases. 25.1% consulted their acquaintances for analgesics while 20.2% choose them based on their own, with an increase of more than twice from 9%.

216 (57.4%) participants stated that they read the drug information sheets of the analgesics they used, 56 (14.9%) did not read it and 104 (27.7%) sometimes read it. Individuals who consult physicians were more willing to read more drug information sheets than those who consult pharmacists 66.5% and 30.8%.

More than half of the participants (55.1%) stated that they recommended analgesics to someone else. 59.1% of those who used OTC analgesics and 20.5% of those who did not use recommended analgesics to someone else, with a statistically significant difference (p < 0.001).

*Factors associated with self-medication practice*

Binomial logistic regression was performed to ascertain the effects of employment status, gender, marital status, level of education, smoking, alcohol intake, health insurance, chronic diseases, when to take analgesics, who advised analgesics, do you need the second analgesic within the same day, do you do any other activities to relieve your pain apart from the use of analgesics, do you read the package insert of the analgesic you use, what was the reason for taking the

last analgesic, was your last analgesic usage were prescribed, who advised your last analgesics, would you recommend someone else a analgesics, and how long do you use analgesics on the likelihood that participants have self-medication of analgesics. The logistic regression model was statistically significant,  $\chi^2(18) = 105.273$ ,  $p < 0.001$ . The model explained 50.9% (Nagelkerke  $R_2$ ) of the variance in self-medication and correctly classified 93.3% of cases. Sensitivity was 44.7%, specificity was 98.8%, positive predictive value was 44.7% and negative predictive value was 93.9%. The model reliability was tested with an omnibus ANOVA test for model coefficients ( $p < 0.001$ ) and Hosmer and Lemeshow Test ( $p = 0.965$ ). Out of the 18 predictor variables, only six were statistically significant: level of education, employment status, health insurance, who advised analgesics, was your last analgesic usage prescribed and would you recommend someone else an analgesic (as shown in Table II). Employed individuals had 2.968

times higher odds to exhibit self-medication than unemployed. An increasing level of education was associated with an increased likelihood of exhibiting self-medication. Individuals who lack health insurance had a higher intention to take analgesics without prescription (OR: 4.312, 95% CI: 1.034 - 17.975,  $p < 0.05$ ). On the other hand, taking advice from healthcare professionals had significant effects on self-medication as participants who took advice from a pharmacist were less likely to have the intention of self-medication (OR: 0.253, 95% CI: 0.093 - 0.685,  $p < 0.05$ ). According to the results of our investigations individuals whose last analgesic prescribed was less eager for self-medication (OR: 0.152, 95% CI: 0.061 - 0.379,  $p < 0.001$ ). The analgesic recommendation made by participants to someone else was found other significantly related to self-medication (OR: 3.446, 95% CI: 1.41 - 8.40,  $p = 0.006$ ).

**Table II**

Binary logistic regression analysis of Factors Related with intention to self-medication

Variables	Intention of Analgesics Self-Medication					
	Univariate analysis			Multivariate analysis		
	OR	95% CI for Odds Ratio	<i>p</i>	OR	95% CI for Odds Ratio	<i>p</i>
<b>Employment status</b>						
<b>Employed</b>	<b>4.210</b>	<b>1.19 - 14.89</b>	<b>0.026</b>	<b>2.968</b>	<b>1.073 - 8.215</b>	<b>0.036</b>
Unemployed	<i>Reference</i>					
<b>Gender</b>						
Male	1.468	0.51 - 4.21	0.475			
Female	<i>Reference</i>					
<b>Marital Status</b>						
Divorced	0.388	0.04 - 3.39	0.392			
Single	1.186	0.45 - 3.14	0.732			
Married	<i>Reference</i>					
<b>Level of Education</b>						
High School	0.346	0.05 - 2.5	0.293	0.355	0.064 - 1.966	0.236
Secondary School	0.971	0.07 - 14.25	0.983	0.597	0.058 - 6.137	0.664
<b>Graduate</b>	<b>0.059</b>	<b>0.01 - 0.51</b>	<b>0.010</b>	<b>0.088</b>	<b>0.016 - 0.481</b>	<b>0.005</b>
<b>Postgraduate</b>	<b>0.042</b>	<b>0 - 0.55</b>	<b>0.016</b>	<b>0.043</b>	<b>0.005 - 0.35</b>	<b>0.003</b>
Primary School	<i>Reference</i>					
<b>Smoking</b>						
No	1.027	0.34 - 3.14	0.963			
Yes	<i>Reference</i>					
<b>Alcohol</b>						
No	0.348	0.11 - 1.09	0.070			
Yes	<i>Reference</i>					
<b>Health insurance</b>						
<b>No</b>	<b>6.267</b>	<b>1.24 - 31.69</b>	<b>0.026</b>	<b>4.312</b>	<b>1.034 - 17.975</b>	<b>0.045</b>
Yes	<i>Reference</i>					
<b>Chronic Diseases</b>						
No	1.450	0.36 - 5.86	0.602			
Yes	<i>Reference</i>					
<b>When do you take analgesics?</b>						
Before pain started	0.770	0.08 - 7.33	0.820			
After pain started	<i>Reference</i>					
<b>Who advised analgesics?</b>						
Physician	<i>Reference</i>					
<b>Pharmacist</b>	<b>0.129</b>	<b>0.03 - 0.54</b>	<b>0.005</b>	<b>0.253</b>	<b>0.093 - 0.685</b>	<b>0.007</b>
Other	0.002	0.001 - 0.003	0.998	0.003	0.002 - 0.004	0.998

Variables	Intention of Analgesics Self-Medication					
	Univariate analysis			Multivariate analysis		
	OR	95% CI for Odds Ratio	p	OR	95% CI for Odds Ratio	p
<b>Do you need second analgesic within the same day?</b>						
No	0.813	0.24 - 2.76	0.739			
Yes	<i>Reference</i>					
<b>Do you do any other activities to relieve your pain apart from the use of analgesics?</b>						
No	1.723	0.56 - 5.26	0.340			
Yes	<i>Reference</i>					
<b>Do you read the package insert of the analgesic you use?</b>			0.172			
No	0.265	0.06 - 1.11	0.068			
Sometimes	0.300	0.07 - 1.38	0.122			
Yes	<i>Reference</i>					
<b>What was the reason for taking the last analgesic?</b>						
Headache	3.220	0.79 - 13.19	0.104			
Toothache	10.945	1.74 - 68.66	0.011			
Stomachache	1.115	0.1 - 12.74	0.930			
Menstrual pain	1.217	0.09 - 15.95	0.881			
Other	4.220	0.69 - 25.63	0.118			
Muscle Pain	<i>Reference</i>					
<b>Was your last analgesic usage were prescribed?</b>						
<b>Yes</b>	<b>0.164</b>	<b>0.04 - 0.69</b>	<b>0.013</b>	<b>0.152</b>	<b>0.061 - 0.379</b>	<b>&lt; 0.001</b>
<b>No</b>	<i>Reference</i>					
<b>Who advised your last analgesics?</b>		-	0.984			
Physician	0.365	0.03 - 4.22	0.420			
Pharmacist	1.369	0.17 - 10.98	0.768			
No one. took by him/herself	<i>Reference</i>					
<b>Would you recommend someone else an analgesic?</b>						
<b>Yes</b>	<b>5.108</b>	<b>1.62 - 16.03</b>	<b>0.005</b>	<b>3.446</b>	<b>1.41 - 8.40</b>	<b>0.006</b>
<b>No</b>	<i>Reference</i>					
<b>How long do you use analgesics?</b>						
Until pain relieves	2.075	0.69 - 6.2	0.191			
According to physician recommendation	<i>Reference</i>					

(Cox & Snell R square:0.245; Nagelkerke R Square: 0.509; Hosmer and Lemeshow Test p = 0.965; OR: Odds Ratio)

This study aimed to evaluate the prevalence and factors that are associated with self-medication for pain management among Turkish people. Our study results showed a high prevalence (89.6%) of history of self-medication for pain management in Turkish people and it is more frequent in young adults.

It is noted that the prevalence of self-medication in Turkey is higher than in other countries, such as Syria (67.3%), Jordan (42.5%), Brazil (16.1%) and Ethiopia (50.2%), but similar to rates found in Lebanon (79.1%), Palestine (87%), Egypt (73%), Vietnam (83.3%) and Pakistan (84.4%) [19-27]. Recollection intervals, health-care services, reimbursement strategies, the economic status, social and cultural variables might all contribute to the differences in self-medication rates among different countries. Other studies conducted in different areas of Turkey have found lower rates of self-medication practices, ranging from 31% to 58.9% [28, 29]. Hayran *et al.* reported a higher frequency of self-medication for pain management, with a prevalence

of 69.8% for headache, 41.0% for abdominal pain and 6.0% for chest pain [30].

*Risk factors for self-medication practice*

The results of a binary logistic regression analysis found that several factors were associated with self-medication for pain management among Turkish people. These factors included being employed (OR: 2.968; 95% CI: 1.073 - 8.125; p = 0.036), having either a bachelor's or post graduate degree (OR: 0.088; 95% CI: 0.016 - 0.481; p = 0.005 and OR: 0.043; 95% CI: 0.005 - 0.35; p = 0.003 respectively), lack of health insurance (OR: 4.312; 95% CI: 1.034 - 17.975; p = 0.045) taking advice from a pharmacist (OR: 0.253; 95% CI: 0.093 - 0.685; p = 0.007), use of the last analgesics without a prescription (OR: 0.152; 95% CI: 0.061 - 0.379; p < 0.001) and recommending analgesic to others (OR: 3.446; 95% CI: 1.41 - 8.40; p = 0.006) (Table II). These findings suggest that individuals who are employed, have higher levels of education, do not have health insurance, seek advice

from the pharmacists and use analgesics without a prescription may be more likely to engage in the self-medication for pain management. Additionally, individuals who recommend analgesics to others may also be more likely to practice self-medication.

Our results revealed that employed participants were more prone to using analgesics without prescriptions (OR: 2.968; 95% CI: 1.073 - 8.125;  $p = 0.036$ ). This situation could be explained by the lack of time available to visit and consult health care professionals due to long working hours. According to a study conducted in Spain, employed participants were 2.4 times more likely to conduct self-medication practices than unemployed ones. On the other hand, after regression analysis was conducted in the Spanish study, employment statuses were not found to be a predictive factor for self-medication practices in pain management [31]. Despite these differences, it is possible to say that the self-medication practices may be more common among employees due to the time-saving aspect of self-medication [32-34].

In our study, self-medication practices increased alongside participants' level of education (bachelor's degree OR: 0.088; 95% CI: 0.016 - 0.481;  $p = 0.005$  and post graduate degree OR: 0.043; 95% CI: 0.005 - 0.35;  $p = 0.003$  respectively). However, participants with a bachelor's degree were likelier to practice self-medication than participants with postgraduate degrees. Previous studies have found a variety of relationships between self-medication practices and educational status, and there is no clear consensus on this issue in the literature [31, 35, 36]. Some studies have shown that self-medication practices are more common among the individuals with higher levels of education, while others have found the opposite [32, 36-40]. In the Kingdom of Saudi Arabia, a study found that highly educated 1192 (70.3%) people with university degrees tended to practice self-medication with analgesics [41]. Studies have estimated that highly educated individuals may be more confident in their knowledge and likely to make their own decisions regarding self-medication, while less educated individuals may feel a greater need to visit a physician [42]. Differences between studies may be partly explained by population levels' differences in the healthcare system, culture, socioeconomic and educational levels.

Regardless of the education level of individuals who apply to community pharmacies, it is important to note that pharmacists can play a primary and crucial role in improving the benefits and reducing the misuse-associated risks associated with self-medication. Even though many analgesics are classified as OTC drugs, health insurance only reimburse patient for prescribed analgesics in Turkey. In our investigations, participants with health insurance were more likely to obtain a prescription from a physician for analgesics, while those without health insurance were more likely to self-medicate with analgesics (OR: 4.312; 95% CI:

1.034 - 17.975;  $p = 0.045$ ). Mabilika *et al.* reported that 81% of those who self-medicated did not have insurance [43]. The cost of analgesics being much lower than the cost of consulting a physician or going to a hospital may lead uninsured individuals to turn to self-medication for pain management [44].

The results indicate that individuals who seek advice from pharmacists on analgesic use were more likely to practice self-medication (OR: 0.253; 95% CI: 0.093 - 0.685;  $p = 0.007$ ). Likely due to the ease of accessibility and trust in pharmacists as a source of information [34, 45-48]. This is supported by the findings of a multicentre study conducted in France that suggests patients value pharmacists as a convenient and reliable source of information on drug use. Delouya *et al.* found that taking advice about drug use from a pharmacist was mostly associated with saving time and obtaining trusted information about medicines. Therefore, it is important to recognize the role and impact of the pharmacists on patients' self-medication practices.

Past experiences are well known to be important predictors of behaviours [34, 49, 50]. In our research, participants who had previously found self-medication with analgesics to be useful were likelier to use the analgesics without a prescription in the future (OR: 0.152; 95% CI: 0.061 - 0.379;  $p < 0.001$ ). This is supported by other research, which has found that individuals with previous experience with self-medication are approximately two times likelier to self-medicate in the future than those who did not have the same experience [51]. Individuals who have experience with self-medication feel that they have sufficient knowledge about the disease and treatment, leading them to feel more confident in their ability to self-medicate [41]. However, it is important to note that self-medication can carry risks, and it is always best to seek medical advice from a healthcare professional before taking any medication, even if it is available OTC.

Advising analgesics to others also related to past experiences with self-medication. In this study, the participants who had previously used analgesics without a prescription were likely to advise others about the use of analgesics (OR: 3.446; 95% CI: 1.41 - 8.40;  $p = 0.006$ ). A Colombian study also reported a linkage between recommending medication to others with self-medication, which increased by 1.6 [42]. They also commented that a favourable attitude toward the use of drugs without a prescription was associated with recommending medication to others. Overall, the results of this study demonstrate that past experiences with self-medication play a crucial role in shaping an individual's attitudes and actions towards advising others on medication, specifically with regard to analgesics, and suggest that caution should be exercised when seeking or giving self-medication advise.

Nonetheless, there were some limitations this research involved a relatively smaller number of participants.

However, the participants were from across the nation. Additionally, the use of an online survey for data collection may have introduced bias, as people with lower education levels may be less likely to use the internet and therefore less likely to be included in the sample. This could lead to underrepresentation of certain groups in the study [52]. Another possible limitation is generalizability, due to our sample was dominated by single women, with higher education, employed with health insurance. As a result, further research is required to learn more about males, lower education levels, unemployed and uninsured people as these results may not accurately reflect their opinions and behaviours. Furthermore, this study held during the winter-spring seasons that's why it is unable to evaluate how self-medication behaviours vary according to the season. Conducting surveys is dependent on self-reported data and is influenced by personal opinions. Additionally, the nature of the questionnaires may have made participants unwilling to acknowledge incorrect opinions; however, stressing the confidentiality of participants' names and data may have lessened this effect. Furthermore, the study concentrated on the three months before the interview, which can magnify the impact of recall bias.

### Conclusions

This study highlighted the high rate of self-medication practices of analgesics and related factors in Turkey. Headache, muscleache and abdominal pain were the most common conditions treated with self-medication. Being employed, lack of health insurance, prior experience with analgesic use and making analgesic recommendations to others were the most important factors related to self-medication. Self-medication practices were less common among participants with chronic diseases. The results of this study confirm our assumption that young, well-educated women complaining of mild pain, more often headache, will not go to a physician because they do not have time, and they have enough general knowledge to choose effective and safe drugs. In addition, most respondents stated that they read the information on proper analgesic use, safety and storage, but both physician and family turned out to be the main source of knowledge about drugs and self-medication. To promote more rational self-medication practices there is still need for the implementing patient health awareness initiatives, cognitive pharmacy services, continuing medical education programs for healthcare professionals and organised media interventions such as in newspapers, magazines and television.

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### Conflict of interest

The authors declare no conflict of interest.

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