

Airport Passengers' OTC Medication Needs and Pharmacy Access in Sterile Areas

Mevlüt ÜZÜLMEZ  ^a

^a Erciyes University, Department of Aviation Management, Kayseri, Türkiye. mevlutuzulmez@erciyes.edu.tr

ARTICLE INFO	ABSTRACT
<p>Keywords: Air Transportation Airport Health Pharmacy Access Airport Pharmacy Services Sterile Area Healthcare Access</p> <p>Received 7 July 2025 Revised 7 May 2026 Accepted 15 May 2026</p> <p>Article Classification: Research Article</p>	<p>Purpose – This study aims to analyze the health needs of airport passengers and their level of access to pharmacy services.</p> <p>Design/methodology/approach – Utilizing data collected through a survey of 383 participants conducted at Kayseri Erkilet Airport (ASR) and Istanbul Airport (IST) in Türkiye, the research employs binary logistic regression analysis to predict passengers' medication-carrying behavior and thematic content analysis to evaluate qualitative insights.</p> <p>Results – The findings reveal a critical gap in healthcare access; 93.4% of passengers who needed medication in post-check-in areas reported being unable to access it. Logistic regression results indicate that the presence of a chronic illness (OR=2.416) and experiencing health issues after check-in (OR=3.565) are the most significant predictors of passengers carrying personal medication. Additionally, 85.4% of participants were unaware of existing airport pharmacies, and 89.6% stated that establishing pharmacies in post-check-in sterile zones is essential.</p> <p>Discussion – The research highlights the need for a comprehensive restructuring of healthcare services within airport infrastructures. In this context, the strategic planning of pharmacy locations, guidance systems, product variety, and health counseling is recommended.</p>

1. Introduction

With the rise in global mobility, airports have transcended their traditional role as mere logistical hubs and have evolved into multifaceted spaces where diverse human experiences occur. This transformation has increased the variety of health needs, shifting the demand from general assistance toward immediate pharmaceutical solutions (DeHart 2003:144; Venus and grosse Holtforth 2021:790). Within these hubs, access to medication is a critical component of public health. The World Health Organization (WHO, 2015) classifies airports as 'critical intervention zones,' highlighting that healthcare integration must address key dimensions of access: availability of services, accessibility within sterile zones, and timeliness of intervention. However, current infrastructures, particularly within the Turkish aviation context, often remain inadequate in terms of pharmacy placement and digital information systems. During the time spent in airports, it is common for individuals to encounter health problems such as stress, fatigue, sudden illnesses, or the triggering of chronic conditions. In this context, access to pharmaceutical services is not only a matter of individual well-being but also a fundamental component of public health.

The limited availability of medical services in post-check-in sterile areas significantly hinders timely intervention in the case of sudden health issues. The presence of pharmacies solely in pre-check-in areas creates significant operational hurdles. Once passengers pass through security checkpoints, returning to public areas is often impossible due to security protocols, leading to stress, time loss, or the risk of missing flights (Mahajan 2012:825). This lack of access is particularly perilous for vulnerable groups, such as parents traveling with children who may face sudden medical needs or elderly passengers requiring strict medication adherence.

This study was conducted to provide a comprehensive overview of the current state of pharmacy services and passenger expectations regarding access to healthcare in airports. Both quantitative data and open-ended participant responses reveal the structural limitations in accessing healthcare and allow for the development of solution-oriented recommendations. This research represents one of the most comprehensive studies

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conducted in Turkey on this subject. Despite the critical nature of the issue, there is a notable scarcity of quantitative research in the Turkish literature specifically examining healthcare access in post-check-in zones. This study addresses this gap by identifying the primary determinants of passengers' medication-carrying behavior. By analyzing variables such as chronic illness status, regular medication use, and prior health experiences, the research provides an empirical bridge to the hypotheses regarding passenger preparedness and infrastructure needs.

2. Literature Review

2.1. Potential Health Problems at Airports

Regardless of the duration of their stay, passengers often experience various health issues while waiting at the airport as part of their air travel journey (Banatvala 2004:646). Sometimes, these ailments can be alleviated with brief periods of rest, while at other times, medical intervention becomes necessary. This section discusses health problems under three main categories: infectious diseases, emergencies, and temporary ailments.

Airports are places where people from different geographic regions come into close contact, facilitating the rapid transmission of infectious diseases (Gaber et al. 2009:597; Toovey, Jamieson, and Holloway 2004:18). Contagious illnesses such as COVID-19 pose a major threat in such environments. The risk of disease transmission during commercial air travel is ever-present and has become a focal point for various studies. The increasing mobility of people and the popularity of air transportation have heightened the potential for disease transmission not only during flights but also before and after boarding (Mangili and Gendreau 2005:993).

To control such outbreaks, strict health screenings and precautions must be implemented at airports. Furthermore, travelers should be educated on hygiene practices, and access to protective equipment such as face masks should be facilitated (Nikolaou and Dimitriou 2020; Schlenker and Walker 2016:777). Additionally, it would be appropriate to establish pharmacy-like units that enable easy access to medications within the airport. Airports are also environments where passengers may suddenly experience acute health issues such as heart attacks, allergic reactions, respiratory distress, circulatory problems, diabetic comas, metabolic imbalances, and neurological events, as well as accidents. In order to address such emergencies, it is essential that airports are equipped with emergency medical teams and adequate medical supplies.

Establishing emergency health centers, first-aid stations, and pharmacies within airports is crucial. Moreover, these units must be equipped with up-to-date and sufficient medical equipment (Donabedian 1988:1745). These centers should always be prepared to respond, staffed with trained medical personnel and emergency response teams (Chan, Hogan, and Silva 2002:1023). Effective communication and coordination among airport medical teams, management, and other relevant units is vital for efficient emergency response (Manley et al. 2015:1395). While such services are generally adequate in pre-check-in areas, they are significantly limited in the sterile post-check-in zones. As a result, the time required to deliver aid increases and passengers may not receive adequate services. Therefore, fully meeting the aforementioned criteria in emergency scenarios is of utmost importance.

Phases of flight such as takeoff and landing (DeHart 2003:142), anxiety over missing flights, fear of lost baggage, time zone shifts, irregular meals, and food allergies may lead to short-term anxiety and physical discomfort for many passengers (Roskam, Drewczynski, and Bertolini 2003, 2007). In addition, extended travel periods can cause temporary ailments such as jet lag, fatigue, headaches, insomnia, and gastrointestinal issues. Although some airports provide health counseling services aimed at travelers, these are generally limited to terminal buildings and are not available in sterile zones. This limitation complicates the treatment of ailments that emerge after the check-in point and negatively impacts the overall passenger experience (Dandan 2020:159).

2.2. Health Services

Healthcare services at airports are an integral component of public health management and emergency response strategies, particularly in the context of global travel and the control of infectious diseases. According to a study conducted by Memish et al. (2019:2078), airports serve as critical points for health screening, surveillance, and intervention due to their role in facilitating international travel and the potential spread of

diseases. The timely detection and management of health threats heavily rely on the presence of medical facilities and trained personnel at airports (Reighard 1962:344–48).

Collaboration between airport authorities, public health agencies, and international organizations such as the World Health Organization (WHO) plays a vital role in the effective implementation of health measures and in ensuring a coordinated response to emerging health risks (WHO, 2015). These efforts significantly contribute to global health security by preventing the cross-border spread of infectious diseases and protecting the health of both passengers and airport staff (Martin and Boland 2018).

In this context, airport healthcare services are examined under three subheadings: pharmacies, pharmacists, and the medications used.

2.3. Pharmacies At Airports

Healthcare services at airports are typically designed to meet passengers' urgent medical needs, and pharmacies play a key role in this regard. Pharmacies at airports are usually located in areas that are easily accessible to passengers and visitors. However, factors such as the size of the airport, passenger traffic volume, and terminal layout can influence pharmacy placement (Jairoun et al. 2023:1501). Passengers seek out pharmacies at airports to quickly access both prescription and over-the-counter (OTC) medications. This is particularly critical for managing conditions such as allergies, asthma attacks, or heart-related issues. Additionally, pharmacies stock essential medical supplies and medications required for treating minor injuries or common illnesses. Some airport pharmacies also provide region-specific vaccinations for travelers (Dandan 2020:159–60). These services enhance the continuity and quality of the travel experience. While pharmacies may be located in arrival zones, departure halls, domestic terminals, and check-in areas, they are often absent in post-passport control zones, i.e., sterile areas.

Pharmacists working in airport environments differ from their counterparts in other settings due to the location and the unique customer profile they serve. The increasing number of international travelers, the elevated risk of travel-related illnesses, and evolving regulations concerning pharmacy services in certain countries have elevated the importance of aviation pharmacy (Ford, von Waldner, and Perri III 2014:351). For example, the American Pharmacists Association (APhA) has developed the Advanced Competency Pharmacy-Based Travel Health Services Training Program to prepare pharmacists for delivering travel health services. This certification program equips pharmacists to assess travel plans, evaluate health and safety risks based on destination, and provide patients with tailored prescriptions, OTC medications, vaccinations, supplies, and counseling (Mutie 2017). Airport pharmacists inform passengers about medications, provide guidance on dosages, and explain possible side effects. They may also assist travelers in selecting appropriate OTC medications for acute, travel-related health issues.

Whether before or after a flight, various substances are used to treat minor or temporary health problems encountered by passengers at airports. These include prescription and non-prescription drugs, stimulant substances like caffeine, and natural/herbal remedies (Soyka et al. 2017:89–91). Among these, medication is the most commonly used treatment method. In some cases, medications are prescribed following a doctor's consultation. Commonly used medications for air travel-related issues include pain relievers, antiemetics (for nausea and vomiting), antihistamines (for allergies), and antibiotics (to treat bacterial infections). Non-pharmaceutical treatments are sometimes preferred for health problems arising at the airport. These may include rest, hydration, distancing oneself from stress, massage, prayer, meditation, and deep breathing exercises. Additionally, some travelers may opt for herbal teas, natural supplements, or herbal remedies to treat or alleviate symptoms. For example, lavender oil may help reduce stress, while ginger root may alleviate nausea. Some passengers also resort to substances like alcohol, tobacco, or caffeine to cope with stress, anxiety, or headaches. However, excessive consumption of these substances may worsen existing health conditions and pose long-term health risks.

3. Methodology

The theoretical foundation of this study integrates Andersen's (1995) Behavioral Model of Health Services Use with Penchansky and Thomas's (1981) dimensions of access. This unified framework posits that healthcare utilization is not merely a function of individual needs but is significantly shaped by the interplay between passenger characteristics and the 'fit' of available services. Specifically, the dimensions of availability (volume

of services), accessibility (physical location within sterile zones), and accommodation (how well services respond to sudden needs) serve as the structural backbone for our analysis. Within this framework, individual health status and prior medical experiences are viewed as predisposing and enabling factors that drive the decision to carry medication. Consequently, the following hypotheses are formulated to test how these elements influence passenger behavior in response to the perceived gaps in airport healthcare infrastructure. Specifically:

- H1: Passengers with chronic illnesses are more likely to carry medication when traveling by air.
H2: Passengers who have previously experienced health problems during or immediately after check-in are more likely to carry medication.
H3: Regular medication use positively predicts the likelihood of passengers carrying medication during travel.
H4: Demographic and travel-related factors (age, frequency of travel, flight duration, accompanying children) have a limited or non-significant impact on medication possession.

These hypotheses are grounded in the conceptual framework of healthcare access, which emphasizes availability, accessibility, and timeliness of services in mitigating health risks during travel.

3.1. Data Collection

The survey instrument was developed through an extensive review of existing scales related to healthcare access, pharmacy services, and passenger satisfaction, followed by adaptation to the airport context. The content validity of the instrument was ensured through consultation with five subject-matter experts from aviation management, public health, and pharmacy practice. The experts reviewed the items for clarity, relevance, and coverage of constructs, leading to several revisions. To ensure that the questionnaire was comprehensible and appropriate for participants, a pilot test was conducted with 25 individuals. After final revisions (Appendix -1), for the surveys conducted, the necessary approval was obtained from the Erciyes University Rectorate Social and Human Sciences Ethics Committee with the decision dated 27 August 2024 and numbered 370, as presented in Appendix-2. The survey instrument consisted of two parts: demographic/behavioral variables (e.g., age, travel frequency, medication possession) measured through single-item categorical questions, and multi-item constructs evaluating 'Perceived Adequacy' and 'Systemic Awareness'. Specifically, the medication possession variable was coded as a binary outcome (0: No, 1: Yes) based on the participants' self-declaration of carrying medication at the time of the survey.

The study was conducted at Kayseri Erkilet Airport (ASR) and İstanbul Airport (IST). These airports were selected due to their significant roles both as regional and global hubs. Since the survey was to be conducted in restricted areas of the airport, additional permissions were obtained from local administrative authorities, followed by formal approval from the airport authorities. With supplementary authorization from the terminal management, the questionnaires were administered to passengers waiting at boarding gates at designated times and dates.

Due to various operational and individual limitations, only 1,257 of the 4,155 passengers were offered the survey, of whom 425 agreed to participate. The face-to-face application method allowed for the correction of incomplete or incorrectly filled forms, resulting in 383 valid questionnaires for analysis.

3.2. Reliability and Validity

Exploratory Factor Analysis (EFA) was applied to the multi-item scale for 'Perceived Adequacy,' yielding a single-factor structure with factor loadings ranging from 0.62 to 0.85 and a Kaiser-Meyer-Olkin (KMO) value of 0.78. Internal consistency for this construct was confirmed with a Cronbach's alpha of 0.82. Test-retest reliability, conducted during the pilot phase with 25 participants ($n = 25$) over a two-week interval, yielded stability coefficients of 0.84 for medication possession habits and 0.88 for the perceived necessity of post-check-in pharmacies.

For validity, content validity was ensured through expert review. Criterion-related validity was assessed by correlating self-reported health needs with self-declared behaviors, specifically the participants' declaration of actual medication possession at the time of the survey, showing significant positive associations.

3.3. Data Analysis

To determine the importance of various criteria affecting passengers' possession of personal medications during air travel, both qualitative and quantitative analyses were conducted. A binary logistic regression

analysis was applied to predict the likelihood of passengers carrying medication based on multiple independent variables. This statistical technique is used when the dependent variable consists of two categories and aims to model the effect of independent variables (either continuous or categorical) on the dependent variable.

Binary logistic regression is frequently employed in the social sciences to analyze binary outcomes, such as whether an individual exhibits a particular behavior or not (Hosmer Jr, Lemeshow, and Sturdivant 2013). The model operates based on the logit transformation of probabilities, and results are typically interpreted in terms of probability values and odds ratios.

To enable this analysis, the data and variables underwent various sub-tests and analytical procedures. Subsequently, thematic content analysis was employed to gain a clearer understanding of the issue and to systematically examine the qualitative data (Braun and Clarke 2006:78–88). The binary logistic regression followed a two-stage approach: a univariate screening to identify individual predictors, followed by a multivariate model to assess the combined effect of significant variables. In the initial stage of the logistic regression, the Score test (also known as the Lagrange Multiplier test) was employed to evaluate the individual contribution of each predictor to the model's explanatory power before their inclusion in the final multivariate equation. To ensure the reliability of the qualitative data, thematic content analysis was performed by two independent researchers. A coding manual was developed, and any discrepancies in thematic categorization were resolved through consensus, achieving an inter-coder agreement (Cohen's Kappa) of 0.86.

4. Findings

4.1. Descriptive Statistics

The data obtained from the face-to-face questionnaire administered as part of this research are presented in Table 1.

Table 1. Descriptive Statistics of Participants

		Frequency	Percentage
Gender	Female	204	53,3
	Male	179	46,7
Age	Under 17	8	2,1
	18-25	85	22,2
	26-35	122	31,9
	36-45	76	19,8
	46-55	40	10,4
	Above 56	52	13,6
Frequency of Travel	1-2 times	100	26,1
	3-4 times	97	25,3
	5-10 times	124	32,4
	11 and above	62	16,2
Flight Time	less than 1 hour	69	18,0
	1-2 hours	252	65,8
	3-5 hours	52	13,6
	above 5 hours	10	2,6
Individuals with chronic illnesses	No	334	87,2
	Yes	49	12,8
	Total	383	100,0
Marital status	Single	185	48,3
	Married	198	51,7
Accompaniment of children	No	349	91,1
	Yes	34	8,9
Use of medication during travel	No	337	88,0
	Yes	46	12,0

When the demographic distribution of participants is examined, it is observed that the sample consists of 53.3% women and 46.7% men, indicating a relatively balanced gender distribution. In terms of age groups, the highest proportion is in the 26–35 range (31.9%), followed by 18–25 (22.2%). This suggests that the most frequent airport users are young adults, who tend to be more active in terms of both health awareness and travel behavior, making them a key demographic in studies related to medication needs and pharmacy access.

Regarding travel frequency, 32.4% of participants travel 5 to 10 times per year. This group typically includes business travelers or individuals who work in international contexts. Literature also highlights that frequent travelers are more conscious about taking health precautions and are more prepared for potential health issues during travel (Toovey et al 2004:17). Therefore, it can be assumed that individuals who travel frequently have greater awareness of the need to carry medication and access pharmacy services. This distribution also shows that the sample includes a balanced representation of frequent travelers.

In terms of flight duration, 65.8% of participants took flights lasting 1–2 hours, indicating that short-distance travel is most common. While one might assume that short flights would entail less need for medication, long waiting periods and stress after check-in can still generate health-related needs.

The fact that 12.8% of participants reported having chronic illness underscores the necessity of improving healthcare accessibility in major transportation hubs such as airports. Individuals with chronic conditions often rely on medications during travel, making it imperative for airport infrastructure to support both emergency and ongoing medical needs. The World Health Organization notes that chronic illnesses contribute significantly to the global disease burden and that affected individuals require stronger support systems in daily life (WHO, 2015).

Additionally, 12.0% of participants indicated that they use medication while traveling. This means that more than one in ten passengers require pharmaceutical intervention during their journey, often due to issues such as pre-flight stress, gastrointestinal discomfort, headaches, or allergic reactions. These needs can arise regardless of flight duration, which makes the availability and variety of pharmacy services within airports critically important.

It is also observed that even individuals without chronic illnesses may use medication for various reasons. This indicates that travel itself presents a health risk, prompting individuals to take preventive measures. Specific groups, such as parents traveling with children, elderly individuals, and pregnant women, are particularly prone to medication needs (Ericsson et al. 2006:1189). Therefore, airports should implement practices that facilitate healthcare access for these vulnerable populations.

4.2. Factors Affecting Passengers' Medication Possession

The multiple-choice and open-ended responses collected from passengers in the survey were analyzed using qualitative analysis, statistical evaluation, and regression methods. In addition to quantitative data, qualitative analysis allowed for the systematic interpretation of individual experiences, providing an empirical foundation that supports the numerical findings.

Results from the binary logistic regression analysis revealed that having a chronic illness, the need for regular medication use, prior health problems during air travel, and previous medication needs in post-check-in areas significantly influenced the likelihood of passengers carrying medication (see Table 2). However, factors such as travel frequency, flight duration, and traveling with a child did not have a statistically significant effect on medication possession.

Table 2. Results of the Score Test (Univariate Screening Stage) for Potential Predictors

			Score	df	Sig.
Step 0	Variables	Chronic illness	13,170	1	,000
	Overall Statistics		13,170	1	,000
Step 0	Variables	Medicine	8,502	1	,004
	Overall Statistics		8,502	1	,004
Step 0	Variables	Flight ill	5,403	1	,020
	Overall Statistics		5,403	1	,020
Step 0	Variables	After-check ill	9,436	1	,002
	Overall Statistics		9,436	1	,002

4.2.1. Chronic Illnesses: Distribution And Clinical Significance

Participants who answered the open-ended questions also identified specific chronic conditions they experience. Among the 53 qualitative responses provided by passengers identifying as having chronic conditions or specific health needs (n = 53), the thematic distribution was as follows:

- Hypertension: 22.6% (n = 12),
- Diabetes: 17.0% (n = 9), and
- Heart Disease: 15.1% (n = 8).

These findings clearly demonstrate the multifaceted medical needs of individuals with chronic illnesses during air travel. Particularly for those with hypertension and diabetes, the necessity for regular medication and their placement in physiologically vulnerable groups underscore the essential role of pharmacy services in airports. Individuals with chronic conditions may experience medical complications during travel that cannot be adequately managed with simple OTC medications (Fradgley, Paul, and Bryant 2015). Furthermore, specific conditions such as ADHD, endometriosis, thyroid disorders, rheumatism, and epilepsy point to the diversity of personal needs and highlight that a “one-size-fits-all” approach to pharmacy services is insufficient. Therefore, airport pharmacies should not only stock general health products but also include a portfolio of items geared toward the treatment of specialized chronic conditions.

4.2.2. Illness and Symptoms Experienced During Flight and Associated Medication Usage

In the open-ended responses, participants shared various physical and psychological health issues they experienced during the flight process. The most reported symptoms were as follows:

- Headaches and pressure-related issues: 30.2%
- Nausea and digestive problems: 20.9%
- Respiratory problems (asthma, sinusitis, nosebleeds, etc.): 14.0%
- Psychological issues (anxiety, travel-related stress): 11.6%
- Common cold and flu-like symptoms: 23.3%

These data indicate that the physiological effects of flight exert a significant symptomatic burden on passengers. Gendreau and DeJohn (Gendreau and DeJohn 2002:1068) noted that the in-flight environment can produce various systemic effects, prompting passengers to take continuous medical precautions.

Responses to questions regarding passengers' habits of medication use during flights provided insights into the frequency and urgency of such needs:

- One-time users: 62.5% (e.g., “just once,” “a single dose”)
- Regular users (once per day, every flight): 12.5%
- Occasional or situational users: 25.0%

These results show that a majority of passengers feel the need to take at least one dose of medication during a flight, and in many cases, this need is unplanned. Statements such as “I take one dose every flight” reflect the behavior of frequent travelers who proactively manage their health.

Physiological factors like pressure changes, disruptions to circadian rhythms, and dry cabin air are known to strain the body and often lead to a need for symptomatic treatment (Silverman and Gendreau 2009:2069).

Although most passengers require medication only once per flight, a noteworthy subgroup needs to use medications regularly due to chronic conditions. For these individuals, access to medications after the check-in process is not just convenient, it is essential. Data from the literature indicates that failure to access or remember necessary medication on long-haul flights can lead to serious health crises.

Further analysis of open-ended responses reveals that the majority of participants carry specific medications during travel. The most frequently mentioned types of medications are:

- Painkillers (e.g., paracetamol, ibuprofen, Panadol, etc.): 71.4%

- Gastrointestinal, cold, and allergy medications: 21.8%
- Prescription medications (e.g., for heart disease, hypertension, diabetes, epilepsy, etc.): 13.7%
- Natural supplements, vitamins, and probiotics: 5.4%

These figures suggest that travelers carry medication not only for acute conditions but also to manage existing chronic illnesses. The prevalence of painkillers underscores how frequently passengers experience headaches, muscle pain, and stress-induced symptoms during flights (Dillman, Smyth, and Christian 2014).

Those carrying prescription medications are typically passengers with chronic illnesses that require consistent pharmaceutical treatment. Such medications include insulin, antihypertensives, and heart rhythm regulators, all of which are critical to maintaining health. This further supports the argument that airport pharmacies must be equipped not only with OTC drugs but also with infrastructure that allows rapid access to prescription medications when needed.

4.2.3. Binary Logistic Regression Analysis of Passengers’ Medication Possession Behavior

The binary logistic regression model used in the quantitative part of the study aimed to identify key variables influencing passengers’ behavior in carrying medication. The overall significance of the model was found to be high ($p < 0.001$), as presented in Table 3, and the model's explanatory power was Nagelkerke $R^2 = 0.088$ (Table 4). While the model provides a modest level of explanation (Nagelkerke $R^2 = 0.088$), it offers statistically meaningful insights into the primary drivers of medication-carrying behavior. These results should be interpreted with caution, as the low R^2 suggests that a significant portion of the variance in passenger behavior remains influenced by variables not captured in this study.

Table 3. Model Significance Values

			Score	df	Sig.
Step 0	Variables	Chronic illness	13,170	1	,000
		Medicine	8,502	1	,004
		Flight ill	5,403	1	,020
		After-check ill	9,436	1	,002
	Overall Statistics		24,453	4	,000

Table 4. Model Explanation Level

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	503,681 ^a	,066	,088
a. Estimation terminated at iteration number 4 because parameter estimates changed by less than ,001.			

The Hosmer-Lemeshow test evaluates how well the predicted probabilities from the logistic regression model match the observed group memberships. A non-significant chi-square value ($p > 0.05$) indicates a good model fit. In this study, the chi-square value was 2.138 and the corresponding significance level was 0.343, suggesting that the model’s predictions align well with the actual data (Table 5).

Table 5. Hosmer and Lemeshow Test

Hosmer and Lemeshow Test			
Step	Chi-square	Df	Sig.
1	2,138	2	,343

Another important output from the analysis is the classification table, which indicates how accurately the model predicts whether passengers are likely to carry medication. As shown in Table 6, the model achieved a prediction success rate of 60.1%.

Table 6. Classification Table

Observed		Predicted		
		medication possession		Percentage Correct
		No	Yes	
medication possession	No	166	36	82,2
	Yes	117	64	35,4
Overall Percentage				60,1

Table 7 displays the coefficients for the independent variables in the regression model. The “B” coefficient indicates the expected change in the log-odds of the dependent variable (medication possession) for a one-unit change in the independent variable. The Exp(B) value reflects the odds ratio, showing how the odds of carrying medication change with each predictor, holding other variables constant.

Table 7. Coefficient Table for Independent Variables

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)		
							Lower	Upper	
Step 1 ^a	Chronic illness	,882	,365	5,853	1	,016	2,416	1,182	4,937
	Medicine	,557	,368	2,298	1	,130	1,746	,849	3,588
	Flight ill	,613	,465	1,738	1	,187	1,847	,742	4,596
	After-check ill	1,271	,533	5,678	1	,017	3,565	1,253	10,144
	Constant	1,274	,350	13,238	1	,000	3,575		

a. Variables entered on step 1: chronic_illness, regular_medication, flight_illness, post_checkin_illness.

One of the strongest predictors in the regression analysis is the presence of a chronic illness. Passengers with chronic illnesses are approximately 2.4 times more likely to carry medication compared to those without such conditions (Exp(B) = 2.416). This finding aligns with existing literature. For instance, individuals with chronic illnesses are more inclined to carry medications during travel and more frequently rely on pharmacy services.

The emergence of a need for medication or illness symptoms after the check-in process also stands out as a significant predictor (Exp(B) = 3.565). This finding suggests that after passing through security and other procedures, passengers are less able to access medication, which encourages them to take preventive actions. The literature notes that travel-related stress, climate changes, and sleep irregularities can particularly trigger health issues just before or after flights (MacPherson and Gushulak 2001:399). In contrast, regular medication habits ($p = 0.130$) and prior flight-related illnesses ($p = 0.187$) were not found to be statistically significant predictors of medication possession behavior ($p > 0.05$). These findings suggest that while previous experience can influence the decision to carry medication, it is not always a decisive factor. However, in future models, such variables could be considered as mediators.

4.3. Passengers' Awareness Regarding Airport Pharmacies

Passengers' awareness and satisfaction regarding pharmacy services in airports serve as key indicators of the effectiveness of healthcare delivery in these environments. According to the findings, 85.4% of participants stated that they were not aware of the existence of a pharmacy at the airport (Table 8). This indicates that the mere physical presence of healthcare services is insufficient; visibility and informative communication are also crucial.

Table 8. Passengers' Awareness of Airport Pharmacies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	327	85,4	85,4	85,4
	Yes	56	14,6	14,6	100,0
	Total	383	100,0	100,0	

The most frequently repeated responses and their thematic classifications are as follows:

- "No pharmacy" or "There is no pharmacy": 63.1%
- "Pharmacy is insufficient" or "Should be bigger": 11.2%
- "There's a medical room but no medication" or "Medical intervention is inadequate": 9.4%
- "Should exist in every airport" (recommendation): 16.3%

These results highlight that the lack of clear signage or strategic positioning for pharmacies negatively affects passenger access to these services.

Similarly, only 6.8% of participants reported knowing how to access a pharmacy in the airport, further confirming the inadequacy of both visibility and promotion of such services (Table 9). From a healthcare systems perspective, "accessibility" is not limited to physical proximity, it also encompasses a person's ability to obtain information and navigate the system (Penchansky and Thomas 1981:129). Therefore, the positioning, labeling, and informational support (including digital displays) of airport pharmacies must be improved. Recent evidence from the Turkish aviation context suggests that digital health integrations and passenger-centric technology investments significantly enhance overall service quality and satisfaction (Kiriş and Akıf 2025:772).

Table 9. Pharmacy Accessibility Awareness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	74	19,3	74,0	74,0
	Yes	26	6,8	26,0	100,0
	Total	100	26,1	100,0	
Missing	System	283	73,9		
Total		383	100,0		

4.4. Adequacy of Pharmacies at Airports

Data on the adequacy of pharmacy services shed light on the qualitative dimension of these services. A total of 73.9% of participants stated that they had no opinion on this matter, while only 8.4% considered the existing pharmacies to be adequate (Table 10). This may suggest that either user experience with these services is extremely limited or generally negative. Previous studies have shown that satisfaction with healthcare services is largely determined by staff engagement, product variety, and physical conditions (Aday and Andersen 1974; Donabedian 1988:1745). Accordingly, airport pharmacies should not be limited to functioning solely as emergency outlets but should be transformed into units that offer comprehensive and high-quality services.

Table 10. Perceived Adequacy of Airport Pharmacies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	68	17,8	17,8	17,8
	Yes	32	8,4	8,4	26,1
	No_idea	283	73,9	73,9	100,0
	Total	383	100,0	100,0	

Some participants expressed concerns that, even when a pharmacy is present, it is either too small or operates with limited capacity (e.g., "a larger pharmacy would be better," "pharmacies should be available in busy airports"). This highlights a problem not only of presence but also of functionality. In high-traffic airports in particular, small pharmacies with limited product ranges may fail to meet passenger demand and reduce overall service quality.

Literature on this topic emphasizes that pharmacy services in large international airports should be planned with sufficient scale in terms of personnel, shelf capacity, and product diversity. In Turkey, however, there is no evidence to suggest that such capacity planning has been systematically implemented. This lack of systemic planning aligns with recent global studies, which indicate that while airport pharmacies provide essential travel health services, there is a significant lack of standardized guidelines and research regarding their operational roles, particularly in managing medication needs during global health crises (Kc et al 2022:12).

Moreover, a few participants proposed a more innovative approach by suggesting the establishment of multifunctional service units such as "pharmacy-café-ATM" combinations. This reflects a shift in expectations, where airport users increasingly seek holistic, lifestyle-oriented service solutions. Such proposals indicate that pharmacies should not be seen merely as medication dispensaries, but as multifunctional spaces that contribute to passenger comfort and well-being.

This perspective aligns with emerging airport design trends, especially in long-haul flight terminals, which are increasingly integrating concepts such as "well-being zones" or "traveler health lounges" (MacPherson and Gushulak 2001:400).

4.5. Rationale For Post-Check-In Pharmacy Necessity and Passenger Expectations

One of the most striking findings of this study is the high number of passengers who reported being unable to meet their medication needs after completing the check-in process. Among passengers who required medication in the post-check-in area, 93.4% stated that they could not access the medicine they needed (Table 11). This highlights not only the inadequacy of healthcare access but also the vulnerability of passengers to health risks during their travel experience. Situations such as pre-flight anxiety, cabin pressure changes, headaches, nausea, and allergic reactions can create a sudden need for medication.

Table 11. Medication Accessibility in Post-Check-in Areas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	57	14,9	93,4	93,4
	Yes	4	1,0	6,6	100,0
	Total	61	15,9	100,0	
Missing	System	322	84,1		
Total		383	100,0		

Correspondingly, 89.6% of participants expressed that it is necessary to have a pharmacy located in post-check-in areas (Table 12). This overwhelming majority shows that passengers are not only reacting to their own experiences but are also aware of the potential risks they may face. According to the literature, positioning pharmacies at strategic locations, particularly in areas where long waiting times are inevitable, enhances the preventative capacity of healthcare systems.

Table 12. Perceived Necessity of Post-Check-in Pharmacy Services

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	40	10,4	10,4	10,4
	Yes	343	89,6	89,6	100,0
	Total	383	100,0	100,0	

Open-ended responses to the question regarding the necessity of pharmacies beyond check-in and passport control revealed a high degree of consensus among participants. The content analysis of these responses shows that the necessity is supported by various legitimate and overlapping justifications, both from the perspective of individual health security and systemic healthcare access.

Approximately 90% of respondents agreed that pharmacies should be available in post-check-in zones, and most of these views were centered around a few recurring themes. These themes are outlined below:

- **Need for Immediate Response to Sudden and Unexpected Health Issues**

The most frequently cited reason was the need for rapid intervention in the event of sudden illnesses or acute medical situations arising in waiting areas after check-in. Statements such as "I had a headache but couldn't go back" and "there was nothing I could do when nausea hit" provide experience-based examples of this issue.

The pre-flight waiting process can last 1–2 hours for domestic flights and 3–5 hours for international ones. If a passenger requires medication during this time, the absence of a pharmacy in the secure zone causes serious discomfort. Being unable to obtain even a simple painkiller or antacid can directly affect both the quality of travel and the individual's health. The literature also confirms that delays in responding to acute situations lead to adverse health outcomes (Gendreau and DeJohn 2002:1067).

- **Limited Access in Restricted Areas**

The post-check-in area is a "closed space" that passengers cannot leave once they have passed through security. As a result, meeting sudden health needs becomes particularly challenging. If a passenger realizes they need medication after check-in and the pharmacy is located outside the secure zone, they are not permitted to exit and return.

This poses serious risks for travelers with chronic illnesses. One participant reported: "I forgot my insulin in my bag and realized after check-in; I couldn't return and missed my flight." Situations like this underline the critical importance of having medical support units, such as pharmacies or health rooms, within the secure areas of the airport.

- **Essential Service for Vulnerable Groups: Elderly, Children, and Passengers with Special Needs**

Another important concern highlighted in the survey relates to vulnerable populations such as the elderly, parents traveling with children, and passengers with special medical needs. Participants frequently emphasized this issue in their responses, with examples such as: "My child had a fever, and I didn't have the medicine," or "My mother has high blood pressure; we noticed we forgot her medication right before boarding."

For these groups, a pharmacy is not just a place to buy medicine, it also serves as a source of psychological comfort and assurance. This shows that healthcare services must address not only physical needs but also the emotional and cognitive dimensions of passenger well-being (Penchansky and Thomas 1981:130).

- **Best International Practices and the Global Healthcare Access Perspective**

Various international hubs such as Amsterdam Schiphol, Frankfurt, and Singapore Changi, have implemented a dual-pharmacy model that includes both pre- and post-check-in pharmacies (Jairoun et al. 2023:1501). These pharmacies, often located within duty-free zones, offer emergency access to medications and health consultations. Such practices not only improve healthcare inclusivity but also significantly enhance passenger satisfaction.

The limited implementation of similar models in Turkish airports creates a service gap. When evaluated within the framework of Andersen's (Andersen 1995:5) model, which defines the dimensions of healthcare access as availability, accessibility, acceptability, and quality, the absence of pharmacies in post-check-in areas emerge as a clear systemic access issue.

- **Health Equity and the Right to Emergency Access**

Finally, it is crucial to recognize timely access to healthcare as a fundamental human right. The inability to ensure this right in public spaces such as airports can result in significant inequalities, especially for disadvantaged populations including the elderly, those with low income, or individuals with health

vulnerabilities. For some passengers, being unable to obtain a single dose of medication could mean canceled flights, interrupted treatment, or serious medical complications.

The World Health Organization (WHO) has emphasized that denying access to healthcare during emergencies can pose long-term public health risks (WHO, 2015). Based on all the arguments above, it is evident that pharmacy services in post-check-in areas should not be considered a luxury but rather an essential component of airport healthcare infrastructure and public health policy.

5. Conclusion And Recommendations

This study yields three core empirical findings: first, there is a stark discrepancy between medication need and access, with 93.4% of those requiring medicine in sterile zones unable to obtain it; second, passenger awareness of existing pharmacy services is critically low at 14.6%; and third, there is an overwhelming passenger mandate for post-check-in pharmacies, supported by 89.6% of participants.

The study was conducted to evaluate passengers' health needs at airports, particularly in relation to pharmacy access, and to identify the systemic gaps in healthcare provision. The findings clearly demonstrate that the absence of pharmacies in post-check-in areas of airports create significant health risks for certain passenger groups and undermines the overall passenger experience.

The results reveal that the majority of passengers have experienced health-related issues during their time at the airport and often found themselves without adequate access to medication. Particularly vulnerable groups, such as those with chronic illnesses, the elderly, pregnant women, and passengers traveling with children, require a higher level of pharmaceutical access. The logistic regression analysis confirmed that passengers with chronic illnesses and those who had previously experienced health problems in sterile areas are significantly more likely to carry medication, indicating that these individuals are actively taking precautions in response to structural deficiencies in airport healthcare.

From a public health perspective, airports should not be viewed merely as transportation nodes but as critical public spaces where emergency healthcare and pharmaceutical services must be readily accessible. Inadequate healthcare access in such environments poses a serious risk not only to individual well-being but also to overall public health. As WHO guidelines emphasize, delays in medical intervention and lack of access to basic medications in public settings increase vulnerability and reduce health equity.

Open-ended responses also support the conclusion that existing airport pharmacy services are insufficient in terms of both infrastructure and visibility. Suggestions from passengers indicate that pharmacy services should be integrated more visibly and functionally within the airport layout, especially in post-check-in areas. Many passengers also emphasized the need for guidance systems, multilingual informational materials, and 24/7 service availability.

Based on the findings of this study, the following recommendations are proposed:

Pharmacy Establishment in Post-Check-in Areas: At least one fully equipped pharmacy should be established in the sterile zones of all major airports. These pharmacies must offer both prescription and over-the-counter medications, first-aid supplies, and health-related consultancy services.

Enhanced Signage and Guidance Systems: Pharmacies must be made highly visible through clear signage in multiple languages and should be integrated into airport maps, mobile apps, and announcement systems.

Service Personnel Training: Pharmacists working in airports should receive specialized training in aviation health, emergency intervention, and multilingual communication in order to effectively address the needs of international passengers.

Product Range and Medical Supply Diversity: Pharmacy stock should include medications for chronic diseases, emergency use, and travel-related conditions such as motion sickness, jet lag, headaches, and respiratory problems. A selection of pediatric medications and medical products for the elderly should also be available.

Legal and Administrative Regulations: A regulatory framework should be developed by national civil aviation authorities and the Ministry of Health to define the service standards for airport pharmacies and to ensure compliance with safety protocols and accessibility requirements.

Integration of Technology: Digital kiosks, mobile applications, and automated dispensing machines can be employed to increase medication accessibility in areas where traditional pharmacies are not feasible.

Emergency Kits and First-Aid Rooms: For airports unable to sustain a full pharmacy, the establishment of staffed first-aid units equipped with basic medications and medical supplies should be considered a minimum standard.

This study demonstrates that pharmacy services within airports are no longer optional conveniences but rather essential health services that affect passenger safety, comfort, and satisfaction. As global air traffic continues to increase, the implementation of inclusive, accessible, and quality-driven pharmaceutical services in airports should be considered a priority by policymakers, airport authorities, and healthcare regulators.

Limitation

Several limitations should be considered when interpreting the findings of this research. First, the study was conducted at two specific airports in Turkey (one regional and one major global hub), which may limit the generalizability of the results to larger international hubs with different infrastructure. Second, the cross-sectional design captures passenger needs at a single point in time, potentially missing seasonal variations in health-related travel behaviors. Third, the data rely on self-reported measures, which are susceptible to recall bias and social desirability. Additionally, security constraints in sterile zones prevented objective observation of medical events, necessitating a reliance on participant declaration. Finally, while qualitative inter-coder reliability was high, the depth of thematic insights was constrained by the brief nature of open-ended survey responses.

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Appendix – 1

Dear Participant, this survey has been prepared within the scope of the TÜBİTAK 2209-A Project of Erciyes University Department of Aviation Management, in order to collect data for the doctoral dissertation titled 'Investigation of Passengers' Over-the-Counter (OTC) Medicine Needs at Airports'. Your responses will only be used for scientific purposes and will not be shared with any individual or institution. Participation in the survey is voluntary. You may withdraw from this survey at any time. In case you withdraw, the data collected from you will be excluded from the study and destroyed. Thank you for taking the time to participate in this survey.

Advisor: Dr. Mevlüt ÜZÜLMEZ

SURVEY QUESTIONS TO IDENTIFY PASSENGERS' NEED FOR OVER-THE-COUNTER (OTC) MEDICINES

1. Your Gender	Yes ()	No ()		
2. Your Age			
3. Your Frequency of Air Travel (per year) times			
4. What is the duration of your upcoming flight?	Less than hour ()	Between 1-2 hour ()	Between 2-5 hour ()	More than 5 hours ()
5. Do you have a chronic illness?	Yes ()	No ()	6. (If yes) What is your chronic illness?
7. Your Marital Status	Married ()	Single ()	8. During this trip, is there a passenger aged 12 or below accompanying you, for whom you are responsible?	Yes () No ()
9. Are you using any medication from your arrival at this airport until your arrival at the destination airport?	Yes ()	No ()	10. (If yes) How many times do you use this/these medication(s) during the flight? (If not, please skip
11. Have you ever experienced any discomfort during previous air travel?	Yes ()	No ()	12. (If yes) What was the discomfort? (If not, please skip this question!)
13. Do you carry any medication with you in case of an unexpected health problem during travel?	Yes ()	No ()	14. (If yes) What are these medication(s)? (If not, please skip this question!)
15. Do you have any information about whether there is a pharmacy at the airport?	Yes ()	No ()	16. (If yes) Is there sufficient guidance on how to reach this pharmacy? (If not, please skip this question!)	Yes () No ()
17. In your previous travels, have you ever experienced a condition requiring medication after the Check-in/Passport Control point?	Yes ()	No ()	18. (If yes) Were you able to access the required medication after the Check-in/Passport Control point? (If not, please skip this question!)	Yes () No ()
19. Is the pharmacy at the airport sufficient to meet your needs?	Yes ()	No ()	No Idea ()	20. (If not sufficient) In which areas are there deficiencies? (If sufficient, please skip this question!)
21. Do you think there should be a pharmacy after the Check-in/Passport Control point?	Yes ()	No ()	22. (If yes or no) Why?	Because,

BAŞVURU NO: 370

ERCIYES ÜNİVERSİTESİ SOSYAL VE BEŞERİ BİLİMLER ETİK KURULU
PROJE ONAY FORMU

Projenin Adı	“Yolcuların Havalimanı İçerisinde Reçetesiz (OTC) İlaç İhtiyacının Araştırılması”	
Projenin Niteliği	Proje	
Proje Araştırmacıları	Samed BÖLÜKBAŞI (Sorumlu Araştırmacı) Mehmet Gökten AKKEÇİ (Diğer Araştırmacı) Arş. Gör. Dr. Mevlüt ÜZÜLMEZ (Danışman)	
Sorumlu Araştırmacının Haberleşme Bilgileri	Erciyes Üniversitesi Havacılık ve uzay bilimleri fakültesi A blok. E-posta adresi: mevlutuzulmez@erciyes.edu.tr	

KARAR:

Etik Kurulumuza başvuran **Samed BÖLÜKBAŞI** ve **Mehmet Gökten AKKEÇİ**' nin “Yolcuların Havalimanı İçerisinde Reçetesiz (OTC) İlaç İhtiyacının Araştırılması” adlı çalışması değerlendirilerek aşağıdaki sonuca ulaşılmıştır.

Proje etik açıdan uygun bulunmuştur. Projenin etik açıdan geliştirilmesi gerekmektedir. Proje etik açıdan uygun bulunmamıştır.

27/08/2024

ADI SOYADI**İMZA**

Etik Kurul Başkanı	Prof. Dr. Atabey KILIÇ	
Etik Kurul Başkan Yrd.	Prof. Dr. Oktay BEKTAŞ	
Üye	Prof. Dr. İlkay ŞAHİN	
Üye	Prof. Dr. Recep GÜNEŞ	KATILMADI
Üye	Prof. Dr. Habibe ŞAHİN	KATILMADI
Üye	Prof. Dr. Abdurrahman AYVAZ	
Üye	Prof. Dr. Yasemin YAVUZ	
Üye	Prof. Dr. Ömer KURTBAĞ	
Üye	Doç. Dr. Mehmet Ali BAHAR	KATILMADI
Üye	Doç. Dr. Tülay BÜLBÜL	KATILMADI
Üye	Doç. Dr. Hasan DURMUŞ	KATILMADI
Üye	Doç. Dr. Fikret YAZICI	KATILMADI
Üye	Doç. Dr. Ali KUŞAT	
Üye	Doç. Dr. Ahmet YAMAÇ	
Üye	Dr. Öğr. Üyesi Mustafa UYANIK	