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Demographic Characteristics of Patients Registering To The Emergency Department

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ARTICLE INFO	ABSTRACT
  Corresponding Author(s) Ferhat Baş **E-mail:** drferhatbas@gmail.com 	The aim of this article is to examine the causes and consequences of overcrowding in emergency departments. Particularly, it seeks to investigate how the surge in admissions, especially post-COVID-19 pandemic, has intensified the density in emergency department. The study focuses on analyzing one-year patient admissions at a training and research hospital in Turkey, considering seasonal variations as well. Additionally, the article aims to highlight the impact of emergency department crowding on healthcare quality and patient satisfaction, and proposes recommendations to mitigate this issue. Ultimately, the article aims to provide a comprehensive understanding of emergency department overcrowding and contribute scientifically towards potential policy interventions This study examined one-year patient admissions at the Emergency Department of Yenimahalle Training and Research Hospital. Data were collected from October 2021 to September 2022. Demographic characteristics of patients, timing of visits, waiting times, and reasons for admission were analyzed. Data analysis was conducted using MS Excel and subjected to statistical evaluation. This study examined overcrowding in the emergency department at a training and research hospital, identifying unnecessary visits, staff shortages, and the impact of the Covid-19 pandemic as key factors. Recommendations to mitigate overcrowding include improving outpatient services, increasing healthcare personnel and resources, and educating the public on appropriate emergency care use. Implementing these measures will help reduce overcrowding in emergency departments and ensure that patients receive faster and more effective healthcare services

1. Introduction

The aim of this study is to examine the emergency department admissions whose crowdedness is increasing due to the density of admissions especially after the Covid-19 disease and to investigate the causes of crowding. For this purpose, one-year patient admissions to the emergency department of a training and research hospital affiliated to the Ministry of Health between October 2021 and September 2022 were examined. Overcrowding of the emergency departments (ED) has been a pain point in hospitals around the world. The "frequent-flyer," which visits the emergency services at a much higher-than-average rate, accounts for almost a third of emergency services visits, even though they represent only a small fraction of all emergency services patients (Shehada et al., 2019).

Emergency departments are the departments that serve on a 24-hour basis and treat acute health problems such as accidents, gunshot wounds, heart attacks, strokes, traumas, poisonings and many more. In the Ministry of Health circular 2012/10; Trauma cases of any size, cases hospitalized after emergency department admissions, cases receiving medical intervention, cases under observation, cases referred to another health service provider or referred from another health service provider are emergency service patients (Ministry of Health, 2012).

Crowding in emergency departments is an increasingly common situation throughout the world (Moskop et al., 2009). The causes of emergency departments crowding include a complex network of intertwined processes ranging from hospital workflow to viral outbreaks (Hoot & Aronsky, 2008). In the last 20 years, emergency departments have evolved towards the provision of primary health care services as well as acute emergency care (OECD, 2020).

As in the rest of the world, the pandemic in Turkey has led to the cessation of elective surgeries and outpatient clinic services in some hospitals and this has brought about an increase in emergency admissions. 2019 OECD Waiting Times Policy Survey 13 of the 24 countries that sent full responses stated that waiting time in the emergency department was a problem. An increasing number of OECD countries are also measuring wait times in other areas, including hospital emergency services visits, mental health services or primary care for cancer care (OECD, 2020). The appropriateness and full-time availability of emergency health departments also affect the quality of health care and patient satisfaction. It is also one of the seven dimensions included in the Hospital Set of Accreditation Standards in Emergency Health Services (Kayral et al., 2016).

As a result of the patients who cannot get an examination appointment in the polyclinic, there is a density in the emergency department and emergency patients cannot receive timely and necessary health services as a result of applying to the emergency department to be examined (Turkish Emergency Medicine Association, 2020). Crowding in emergencies prevents patients from receiving adequate and timely emergency health services. Of the 600 million outpatient clinic admissions in hospitals in Turkey, 150 million are made to emergency departments. While unnecessary applications are the most important reason for crowding in the emergency department, staff shortages are another reason (Turkish Society of Emergency Medicine, 2020). 13 of the 24 countries that submitted full responses to the OECD Waiting Times Policy Survey for 2019 stated that waiting time in the emergency department was a problem (OECD, 2020).

In the first part of the study, information about the causes and consequences of overcrowding in emergency departments was given. In the second part, the results of the analysis of the emergency admissions of the hospital examined in the study are included. In the last section, suggestions were made about what can be done to prevent emergency crowding.

2. Crowding In Emergency Services

Increasing patients' satisfaction with health care is the main health policy goal. Fast access to healthcare is one of the factors that increase patient satisfaction (OECD, 2020). The department where patients expect to receive the fastest health service is the emergency services. As in, the access period to health services in many OECD countries has been prolonged with the Covid-19 pandemic (OECD, 2020). Prolonged waiting times lead to worsening of health outcomes. It suggests that prolonged waiting may lead to worsening of the disease's symptoms, worsening of the patient's condition, and a less positive clinical outcome, and may also increase the likelihood of unplanned emergency admission (Bernstein et al., 1997; Rexius et al., 2004; Sobolev & Fradet, 2008).

In the healthcare industry, waiting times have always been a problem. Waiting times are a dynamic phenomenon (Siciliani & Hurst, 2005). Regardless of the type of health care needed, waiting times are a result of the demand for health services being greater than the supply. If demand exceeds supply, it increases over time, and if supply exceeds demand,

it decreases. Both demand and supply are likely to increase over time. Changes in the conditions of examination and treatment lead to a change in demand. This dynamic element indicates that if demand grows faster, periods of increased supply can be associated with increased waiting times. Policies to reduce waiting times, on the other hand, can increase supply, reduce or better manage demand, or both. It can be caused by capacity constraints or inefficiencies in referral processes and healthcare delivery, which can lead to a queue and patients having to wait.

The right mix of policies to address long waiting times is likely to depend on the health care system in each country. Successful approaches, however, typically combine specifying an appropriate maximum waiting time with interventions on the supply and demand side and regular monitoring of progress. In OECD countries, the most common policy used to reduce waiting times due to specialist consultations and elective treatments is to set a maximum waiting time. Maximum waiting times can then be used as a target for the provider and/or as a guarantee for the patient (as in the UK and Finland), and penalties may be imposed for providers who do not meet these targets. Waiting time guarantees can also be linked to patient selection policies (as in Denmark and Portugal), whereby patients are offered a choice of more providers (including private hospitals) when they approach or reach their maximum waiting time at no additional cost (OECD, 2020).

When waiting times are set as a goal, regulators and reimbursement agencies can use this as an accountability measure for healthcare delivery, with possible consequences when the goal is not met. The supply of treatment is determined by the overall capacity, which depends on the health workforce and its composition and infrastructure and equipment. But it is not only the availability of labor and capital that determines the supply, but also the productivity in which capacity is used. Efficiency will depend on communiqué-based arrangements made at the level of health workers and payment systems and organization. When health care workers are paid with a service charge rather than a salary or per capita payment, and when provider payments are based on activities, incentives to increase supply are stronger (Siciliani & Hurst, 2005).

Supply-side policies that increase resources and/or efficiency can be implemented to reduce wait times. Other policies act on the demand side and mostly aim to prioritize patients based on the need to avoid adding patients to the waiting list when the expected benefits are little or no at all, to reduce inappropriate referrals, tests and procedures, or to redistribute waiting times among patients with varying degrees of severity (so that patients with more severe conditions wait less) (OECD, 2020).

However, supply-side policies on their own are unlikely to deliver the expected reductions in wait times. The main risk is that the additional supply is offset by an increase in demand through an increase in referrals, tests and procedures, some of which are not suitable. Countries should ensure that supply-side policies are linked to the implementation of maximum waiting times to avoid frustration. Maximum wait times can serve as an indirect policy lever to ensure that providers do not offset them by increasing demand (albeit supply-driven demand or improper referrals) when supply increases (OECD, 2020).

Policymakers can also offer a variety of complementary and more direct approaches on the demand side to reduce waiting times for discretionary treatment, but any deficit reduction in demand can be politically difficult to accept. Clinical prioritization tools that distinguish between patients with different health benefits and severity can improve the referral process and the composition of patients on the list. Prioritization policies can also help reallocate wait times by allowing patients with more severe conditions to wait less than those with less severe conditions. However, more and more countries are taking advantage of the potential of new technologies (e.g. teleconsultations) to improve timely access to health services. Covid-19 crisis accelerates implementation of teleconsultation and other digital health tools (OECD, 2020).

In the literature, those who apply to the emergency service 4 or more times per year are expressed as "frequent emergency service users". In two studies examining frequent emergency department admissions, it was stated that the rate of frequent emergency admissions among total emergency department admissions was 14%. Cardiovascular and gastrointestinal diseases are important factors in emergency department admissions (Dufour et al., 2019; Huang et al., 2003). A similar report found that the most frequent 500 users of an emergency services accounted for 8% of total visits, and that 29% of these visits may be eligible for primary care (Dent et al., 2003).

Another reason for overcrowding in the emergency department or services? is insufficient staffing (Derlet & Richards, 2002; Kyriacou et al., 1999; Richards et al., 2000). A study by the American Association of Emergency Specialists found that the average nurse cared for 4 patients at the same time and the average doctor cared for 10 patients at the same

time (Schneider et al., 2003). The lack of adequate service beds also affects the crowd in the emergency (Cooke et al., 2004; Derlet et al., 2001; Compiler & Richards, 2002; Hwang, 2006; Richards et al., 2000). Patients who are hospitalized from the emergency department in Turkey should be transferred to the relevant clinic within a maximum of 2 hours (Ministry of Health, 2022). Another reason for the crowding in emergencies is the delays in laboratory tests (Derlet et al., 2001; Richards et al., 2000).

Emergency services crowding also affects the quality of health care. The most negative consequence of crowding in emergency servicess is death, and a significant, positive relationship has been observed between mortality rates and the number of weekly visits (Miró et al., 1999). When emergency servicess become overcrowded, rates of leaving without examination increase (Kyriacou et al., 1999). At least half of those who leave without examination need medical attention or are even hospitalized (Baker et al., 1991; Bindman et al., 1991; Rowe et al., 2006).

Another dimension of emergency department crowding is patient costs. Patients who are hospitalized in the emergency services for more than a day also stay in the hospital longer and the costs of treatment increase (Krochmal & Riley, 1994).

To eliminate crowding in the emergency services, it is necessary to increase the number of observation units and beds with an increase in resources and staff (Hoot & Aronsky, 2008). The employment of extra staff in the emergency department has been shown to shorten the waiting time by up to 35 minutes and reduce emergency departures without examination by 37% (Bucheli & Martina, 2004; Donald et al., 2005; Shaw & Lavelle, 1998).

3. Analysis and Findings

The admissions made to Yenimahalle Training and Research Hospital Adult Emergency Department between 01/10/2021-31/09/2022 were included in the study. The study was analyzed in quarterly periods in order to see the seasonal effect. Permission was obtained from the Yenimahalle Training and Research Hospital Ethics Committee for the study. The analyses performed in the study were performed by using Ms Excel Program.

Emergency department admissions were crowded in the summer rather than in the autumn and winter period, when there were epidemics of cold, flu, etc. The number of applications in the summer semester is more than 1.5 times higher than the number of applications in the summer and autumn semesters. It is evaluated that the reason for the increase in applications in the summer months is the leave period, the physicians do not take care of more patients than the number of patients defined in the Central Patient Appointment System in the summer months and especially in the summer period, the physicians take work stoppage action.

Some of the data obtained from the hospital were duplicate records, and when the duplicate 128,814 data were removed, the number of hospital admissions decreased to 194,320 within a year. Of the patients who applied, only 19 patients were treated with daily hospitalization. The average age of the applicants is 40.22 and 52.43% of them are women. There is a statistically significant difference between the mean age according to gender among the applicants. While 97.57% of the emergency department applicants were under the roof of the Social Security Institution, 2.43% of the health services were financed by other institutions and organizations. While 1.61% of emergency applications were provisioned as work accidents, 1.16% as traffic accidents, emergency applications were provisioned from 96.67%. While 93.82% of the applicants were discharged, 1.57% were hospitalized, 1.13% were referred to another hospital and 0.9% died.

345 of the patients admitted to the emergency department (0.018%) were processed within the scope of the tourist's health. Patients of 68 different nationalities were admitted to the emergency department. The highest number of foreign national applications were from Syria (339 times), Iraq (291 times) and Uzbekistan (110 times).

55.41% of those admitted to the emergency department are patients between the ages of 18-45. 11.5% of the patients admitted to the emergency department are patients aged 65 and over. 47.42% of emergency department admissions were made between 08-16 hours when polyclinics were open, 41.77% between 17-24 hours and 10.82% between 24 and 8 a.m.

When the number of applications is examined by days; the number of applications in the first two days of each month is higher than on other days. When evaluated on a monthly basis, the highest number of emergency applications was in July. Patients who apply to the emergency department in the Autumn and Winter period wait for about 12 minutes to be examined, while the waiting time for the examination in the Spring and Summer period can be up to 34 minutes. The monthly distribution of hospital admissions is given in Table 1.

Table 1: Monthly Evaluation of Adult Emergency Department Admissions

MONTHS	NUMBER OF APPLICATIONS	REFERENCE %	AVERAGE WAITING TIME (MINUTES)
JANUARY	12.921	6,89%	11:31
FEBRUARY	10.714	5,72%	10:51
MARCH	12.992	6,93%	11:31
APRIL	13.161	7,02%	27:47
MAY	16.670	8,90%	34:03
JUNE	18.214	9,72%	28:31
JULY	25.738	13,73%	34:00
AUGUST	19.471	10,39%	29:24
SEPTEMBER	18.831	10,05%	27:10
OCTOBER	13.118	7,00%	13:02
NOVEMBER	12.793	6,83%	13:01
DECEMBER	12.783	6,82%	12:02
TOTAL			
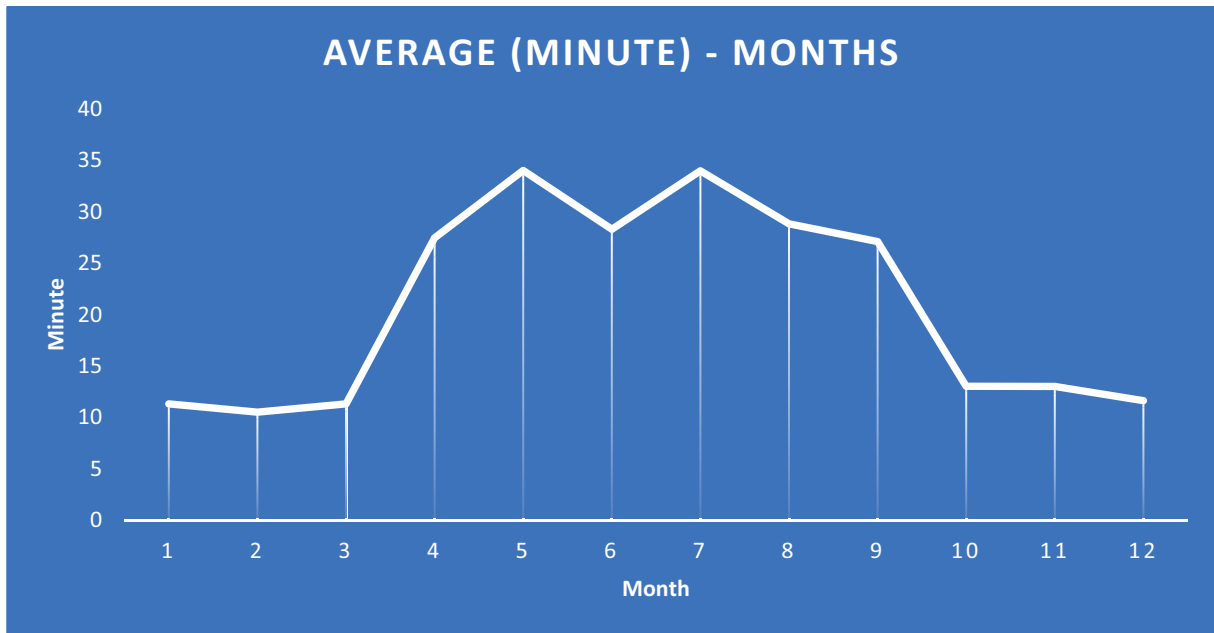
Figure 1: Plot of Wait Times

There is a discrepancy between the first triage procedure performed in the emergency services and the area examined. The triage of 61.96% of the patients who were triaged as green field patients was converted to yellow area. Comparison of inspection areas and triage is given in Table 2.

Table 2: Emergency Department Applications Triage/Inspection Unit Compliance

Triage/Inspection Unit	N	%
Red	**1204**	**0,62%**
Emergency Service Yellow 2	1181	0,61%
Emergency Service Green 1	10	0,01%
Yellow	**191034**	**98,31%**
Emergency Service Yellow 2	70154	36,10%
Emergency Service Green 1	120410	61,96%
Emergency Service Green 2	163	0,08%
Green	**2081**	**1,07%**
Emergency Service Yellow 2	108	0,06%
Emergency Service Green 1	1865	0,96%
Emergency Service Green 2	107	0,06%

When the applications to the emergency department are evaluated on a day-by-day basis, it is seen that the number of applications made on Mondays (15.22%) is less on weekends than on weekdays. Approximately half of the patients were admitted to the emergency department between 08-16 on both weekdays and weekends, while only 10% were admitted to the emergency department after midnight. While 47.67% of the red field patients were admitted to the emergency department between 08-16 hours, 40.95% were admitted to the emergency department between 17-13 hours and 11.38% after midnight.

Table 3: Emergency Department Referrals by Day and Time Zone

DAY	APPLICATION RATE	TIME ZONES		
		08-16	17-23	00-07
Monday	15,22%	48,64%	40,96%	10,41%
Tuesday	14,32%	46,99%	42,74%	10,26%
Wednesday	14,54%	47,82%	41,83%	10,36%
Thursday	14,17%	47,85%	41,83%	10,32%
Friday	14,36%	47,65%	41,90%	10,46%
Saturday	13,57%	46,93%	41,27%	11,80%
Sunday	13,81%	45,88%	42,17%	11,95%

Of the patients admitted to the emergency department once, 75.44% admitted once, 15.59% twice, 4.97% three times, and 4% (5,438 admissions) four times a year or more, who were considered frequent emergency services users. The average number of referrals for frequent emergency services users is 41 (min:4-max:59), while the median number of referrals is 4. The average age of frequently admitted users was found to be 41.32 years. Of those admitted to the emergency department frequently, 38.85% admitted to the hospital four times, 20.08% five times, 12.18% six times, and 6.93% seven times. 57% of frequent admissions are female patients. The most common admission to the emergency department was a male patient from the age of 34 who was admitted 59 times with the diagnosis of hemorrhoids.

Table 1: Diagnoses Received by Frequent Emergency Applicants

ICD code	n	%
M79- SOFT TISSUE DISORDERS	1356	60,22%
Z00-GENERAL INSPECTION AND INSPECTION	473	11,38%
R10-ABDOMIAL AND PELVIC PAIN	338	5,80%
J06-ACUTE UPPER RESPIRATORY TRACT INFECTION	306	4,75%
M54-DORSALJI	267	3,62%
R07-PAIN IN THE THROAT AND CHEST	230	2,69%
J39-UPPER RESPIRATORY TRACT DISEASES	203	2,09%
Z03-SUSPECTED DISEASES	181	1,66%
R11-NAUSEA VOMITING	175	1,55%
N30-CYSTITIS	136	0,94%
L50-URTICARIA	130	0,86%
OTHER	124	4,43%

The average age of frequent admissions to the emergency department is 41.1 years and all patients who frequently apply to the emergency department are covered by social security. These findings are consistent with the literature. When the residence addresses of the frequent admissions to the hospital are examined, it is seen that there are applications from 36 different cities.

Figure 2: Distribution of Frequent Emergency Service Applicants by Their Residential Address

When the diagnoses of patients who frequently apply to the emergency department are examined; 60.22% of soft tissue disorders, 11.38% of general examination without complaints and known diagnosis, 5.80% of abdominal and pelvic pain and acute upper respiratory tract diseases.

4. Discussion

Improper use of emergency services causes applicants to have late access to health care. Knowledge of socio-demographic characteristics in emergency department admissions will help to solve the problem. Approximately 10% of the admissions to hospital outpatient clinics are admitted to the emergency department. Considering that the hospital where the analysis is performed is a tertiary education and research hospital, it is necessary not to apply to a tertiary care hospital for the treatment of problems such as flu and flu that can be solved in other health institutions.

The fact that approximately half of the applications were made during working hours and that more than half of the applicants were between the ages of 18-45 may have been due to the desire for quick access to the outpatient clinic service (Gindi et al., 2016; Köksal et al., 2009; Niska et al., 2010). It was observed that approximately 62% of the applicants applied to the emergency department due to non-urgent problems. This rate is higher than the rates stated in the literature (Çevik & Tekir, 2014; Kilicaslan et al., 2005).

It was observed that an average of 400 patients were examined daily in the emergency department and this number increased to 800 in the summer months. This situation causes delays in the service intake of patients who need real emergency services. There was a strong statistically significant positive correlation (r=0.806, p<0.001) between the number of patient admissions and waiting times.

Similar to the literature, the most common reason for application is musculoskeletal system diseases starting with the "M" code (63.84%). The rate of admission from the emergency department is 1.57% and this rate is compatible (Ataman et al., 2011; Niska et al., 2010).

There are extensive studies in the literature on frequent emergency services admissions. However, frequent applicants do not show homogeneous group characteristics. Studies have shown that frequent admissions are associated with the number of emergency services visits per year with mental illness, substance and alcohol dependence (Billings & Raven, 2013; Ledoux & Minner, 2006). In our study, information on this subject could not be given due to the lack of such information in the anamnesis of frequently using patients.

Employment status and state insurance are often associated with high ED use (Gill & Riley, 1996; Yusuf et al., 2011). For example, younger age groups have also been associated with overuse of the emergency services, either because of the characteristics of the neighborhood surrounding the hospital or the type of hospital from which the data were obtained (Akseli, 2013; Gill & Riley, 1996).

5. Conclusion

In this study, an analysis of the emergency department visits at a training and research hospital was conducted, examining the reasons behind overcrowding in emergency departments. The findings identified the causes of overcrowding and suggested measures to mitigate it:

1. **Unnecessary Visits**: Patients often visit the emergency department for non-emergency conditions due to difficulties in accessing outpatient services and inadequacies in the appointment system. This contributes to overcrowding and delays in care for truly urgent cases.

2. **Staff and Resource Shortages**: Insufficient healthcare personnel and inadequate medical equipment in emergency departments lead to service disruptions and prolonged waiting times.

3. **Pandemic Impact**: The Covid-19 pandemic caused significant disruptions in healthcare services and access, resulting in a notable increase in emergency department visits.

4. **Lack of Education and Awareness**: Patients' lack of information about when to seek emergency care results in an increase in unnecessary visits.

5. **Access to Healthcare Services**: Problems in accessing primary healthcare services drive patients to seek care directly from emergency departments, increasing their burden and reducing service quality.

Based on these findings, the following recommendations are proposed to reduce overcrowding in emergency departments:

- Enhance the efficiency of outpatient services and improve the appointment systems.

- Ensure sufficient healthcare personnel and medical equipment in emergency departments.

- Increase the capacity of emergency departments and prepare adequately for extraordinary situations like pandemics.

- Educate and inform the public about appropriate emergency department usage.

- Facilitate access to primary healthcare services and expand these services.

These measures will contribute to reducing overcrowding in emergency departments and ensure that patients receive faster and more effective healthcare services.

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Evaluation of Health Risk Factors in OECD Countries using Cluster Analysis*

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ARTICLE INFO	ABSTRACT
Article Type: Research Article **Keywords:** Cluster Analysis, OECD Countries, Health Risk Factors **Corresponding Author(s)** [1] Şeyma Yenioğlu [2] Gülbiye Yenimahalleli Yaşar **E-mail:** [1] seymayenioglu1@trakya.edu.tr [2] gulbiyey@gmail.com **Article Application Date:** 25.02.2024 **Article Acceptance Date:** 29.03.2024	*Throughout their lives, individuals face numerous risks that can negatively impact their health. Human health is influenced not only by biological factors but also by a wide range of behavioral, environmental, social, and socioeconomic determinants. These factors, which increase the likelihood of diseases and injuries, are among the leading causes of the most significant global health issues and mortality. Understanding and addressing these underlying determinants is essential for preventing diseases and injuries. This study aims to classify 35 member countries of the Organisation for Economic Co-operation and Development (OECD) into similar clusters based on health risk factors and to identify the countries most similar to Turkey. The variables used to evaluate countries according to health risk factors include tobacco use, alcohol consumption, obesity, daily fruit consumption, daily vegetable consumption, exposure to air pollution, out-of-pocket health expenditures, unemployment, low educational attainment, and private health expenditures. The study employs cluster analysis to evaluate ten distinct health risk factors for 35 OECD countries using 2020 data. Initially, a separate cluster analysis was conducted for each risk factor, grouping countries into three clusters. Subsequently, a comprehensive cluster analysis was performed using all risk factors, resulting in the classification of countries into four clusters based on their similarities. Turkey was found to share the greatest similarity in health risk factors with Italy, Portugal, Spain, and Mexico. However, the findings revealed that Turkey belongs to the cluster with the highest health risk levels among the OECD countries.* * This study is derived from Şeyma Yenioğlu's Master's thesis with the same title conducted at Ankara University, Institute of Health Sciences, Department of Health Management under the supervision of Prof. Dr. Gülbiye Yenimahalleli Yaşar.

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Heidi

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YÖKDİL İNGİLİZCE FEN BİLİMLERİ 5 DENEME SINAVI

YÜKSEKÖĞRETİM KURUMLARI YABANCI DİL SINAVI

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Impact of Real World Data and Real World Evidence on Value in Health

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ARTICLE INFO	ABSTRACT
Article Type: Review Article **Keywords:** Value based payment, Real world evidence, Real world data, Value in health, Health technology **Corresponding Author(s)** [1,2] Aliye Aslı SONSUZ **E-mail:** [1,2] aasonsuz@ medipol.edu.tr **Article Application Date:** 03.04.2024 **Article Acceptance Date:** 17.08.2024	*Value in health is a concept that refers to the consideration of the output of health services according to their outcomes. This concept is on the agenda of health systems as a new approach that goes beyond the classical understanding based on cost and volume and takes into account the perceived relationship between the benefit provided and the money paid. This value-based approach aims to improve the quality of healthcare services, reduce costs and ensure satisfaction with a patient-centered approach. In order to achieve these goals, the benefit must be measured accurately. These measurements have been made through a variety of evidence to date, but real-world data and evidence are needed for data on environmental factors, healthcare providers/payers, or patient-reported outcomes that cannot be obtained from this evidence. Real-world data is obtained from people's lifestyles, drug and device use, and treatment results. Processing the data obtained, converting it into information and making it usable is also referred to as real-world evidence. In the health sector, these data can be obtained more easily and quickly with the development of technology. In the health sector, this data can be obtained more easily and quickly with the development of technology. Therefore, to expand the use of technological devices that will generate this data, regulations such as providing subsidies, supporting national and domestic production, and increasing technological literacy in society are thought to be needed. It is also necessary to establish legal regulations and platforms that will both protect the rights of the parties using this data and facilitate information sharing.*

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Illustrated by Eni Centi

Heidi

Original story by Johanna Spyri
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The Little Black Fish

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YÜKSEKÖĞRETİM KURUMLARI YABANCI DİL SINAVI
YÖKDİL İNGİLİZCE FEN BİLİMLERİ 5 DENEME SINAVI

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JTPH

Imaging Services Risk Assessment: 5x5 Matrix Method

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ARTICLE INFO	ABSTRACT
Article Type: Research Article **Keywords:** 5x5 Matrix Method, radiology, risk assessment, imaging services, proactive approach **Corresponding Author(s)** [1] Ayşe Avc [2] Yasemin Aslan **E-mail:** [1] aysevci@outlook.com [2] yaseminaslan@bandirma.edu.tr **Article Application Date:** 15.09.2024 **Article Acceptance Date:** 06.11.2024	*Radiology units have become some of the riskiest areas for patients, their relatives, and staff, as they have evolved from spaces where only X-ray machines were used into multi-room facilities housing a variety of imaging equipment, including magnetic resonance imaging, computed tomography, interventional radiology, ultrasonography, and other modalities. This study aims to evaluate the risk analysis of imaging services in a district state hospital using the 5x5 Matrix method. The study's universe consists of a risk assessment team of 15 staff members identified within the scope of the risk assessment processes for imaging services at a district state hospital in Bursa. In the study, the entire universe was evaluated without sampling. The "Imaging Services Risk Assessment Processes Data Collection Form" prepared by the researchers was used as the data collection tool. The data were obtained using procedures, instructions, workflow diagrams, past incident reports, and expert opinions, and were evaluated using the 5x5 Matrix method. The data was evaluated using the 5x5 Matrix Method. It was determined that the items in the high-risk category included psychosocial risks such as anger, stress, fatigue, burnout, and violence under the scope of psychological hazards, as well as the risk of infectious diseases and infections, electric shock, fire, injuries due to the lack of magnetic resonance-compatible equipment, radiation exposure resulting from the absence or damage of personal protective equipment, the risk of misdiagnosis and mistreatment due to the lack of maintenance and calibration of devices, and the risk of allergic reactions to contrast agents. The results of the study indicate that there are high-risk situations in imaging services that require preventive measures for patients, their relatives, and staff.*

SAĞLIKTA METİN MADENCİLİĞİ:
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pelikan

DR. SEMA DÖKME YAĞAR
DOÇ. DR. ÇAĞDAŞ ERKAN AKYÜREK

Investigation of Nursing Students' Perceptions of Leadership and Individual Innovativeness

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ARTICLE INFO	ABSTRACT
Article Type: Research Article **Keywords:** Leadership Self-Perception, Individual Innovativeness, Nursing Management. **Corresponding Author(s)** [1] Fadime Ulupınar [2] Şeyda Karasu **E-mail:** [1] fadime.ulupinar@ erzurum.edu.tr [2] seyda.kelle@ erzurum.edu.tr **Article Application Date:** 26.10.2024 **Article Acceptance Date:** 07.11.2024	*This study aimed to explore the relationship between leadership self-perception and individual innovativeness among nursing students while examining the impact of demographic factors on these competencies. A sample of 250 nursing students was selected from a university's Faculty of Health Sciences, and data were collected using the Leadership Self-Perception Scale (LSPS) and the Individual Innovativeness Scale (IIS). The findings revealed a significant positive correlation between leadership self-perception and individual innovativeness, suggesting that students who perceive themselves as stronger leaders are also more inclined towards innovative behaviors. The study also identified differences in leadership perception and innovativeness based on specific demographic factors such as grade level and income status. Senior students exhibited higher levels of leadership and innovativeness, indicating that experience and exposure to diverse challenges may contribute to the development of these competencies. Additionally, students from higher income backgrounds demonstrated a greater openness to change and innovation, highlighting the influence of socioeconomic factors on these attributes. These findings underscore the importance of leadership development and innovativeness in the field of nursing management. Nursing leaders must adopt effective leadership strategies and encourage innovative thinking to enhance the quality of nursing services and drive improvements within healthcare systems. Therefore, future research should focus on identifying the most effective strategies for fostering leadership and innovation in nursing management practices. Addressing these areas will contribute to cultivating stronger leaders and innovative solutions within an evolving healthcare environment.*

1. INTRODUCTION

The healthcare sector is experiencing significant changes, propelled by technological advancements, evolving disease patterns, and shifting demographics (Hernon et al., 2023; Ulupınar & Erden, 2024). These developments require nurses to adapt their competencies to effectively meet their professional responsibilities (Alshammari & Alenezi, 2023; Labrague et al., 2023). As frontline responders, nurses face a range of challenges that go beyond traditional patient care, encompassing policy-making, ensuring patient safety, and promoting interdisciplinary collaboration (Calder et al., 2022; Ibraheem et al., 2020). In this complex environment, leadership emerges as a critical skill for nurses at all levels (Cowden et al., 2011). Effective leadership is not merely about managing care; it also involves advocating for policy changes and innovating within their practices to enhance health outcomes (Duygulu & Kublay, 2011; Won & Cho, 2013). Consequently, there is a broad agreement on the need to integrate leadership skills into nursing education, equipping practitioners to adeptly handle the challenges of modern healthcare settings.

Self-leadership marks a significant evolution in leadership concepts within healthcare, emphasizing an individual's ability to self-regulate and direct their actions effectively (Al-Dossary, 2022; Wei et al., 2020). This skill is especially crucial in nursing, where practitioners often work in dynamic environments that demand rapid decision-making and adaptability (Raso et al., 2020; Sabbah et al., 2020). Self-leadership enhances nurses' performance through strategies that promote self-awareness, self-motivation, and self-direction (Farid et al., 2021; McKenna & Jeske, 2021). Such intrinsic motivation not only increases job satisfaction but also boosts productivity and reduces turnover rates (Alshammari & Alenezi, 2023; Wei et al., 2020). Additionally, in a profession where innovation is key to advancing patient care and operational efficiencies, individual innovativeness is invaluable (Huai et al., 2024; Ulupınar & Toygar, 2020). It empowers nurses to develop and implement new practices that significantly improve healthcare delivery (Goellner et al., 2022). By fostering a mindset open to change and challenges, nurses can make substantial contributions to both personal and organizational success (McKenna & Jeske, 2021; Won & Cho, 2013). Therefore, incorporating self-leadership and innovativeness in nursing education equips practitioners to not only adapt but also excel and lead in the ever-changing healthcare landscape.

Integrating leadership and individual innovativeness into nursing education is crucial for preparing nurses to navigate the complexities of today's healthcare environment (Marchiori et al., 2022; Ulupınar et al., 2024). These programs need to expand beyond basic clinical skills to include training that develops critical thinking, decision-making, and innovative problem-solving abilities (Abubakre et al., 2022; Atasoy et al., 2023). By incorporating leadership competencies into the curriculum, educational institutions enable nursing students to take initiative, effectively manage complex healthcare situations, and lead within their teams (Aslan & Ulupınar, 2020; Han et al., 2020). Promoting a culture of innovativeness equips future nurses to challenge traditional practices and introduce novel solutions that improve patient care and operational efficiency (Sarıköse & Türkmen, 2020). Despite the necessity, many current educational models remain narrowly focused on immediate clinical competencies and do not fully address these broader skills (Joseph et al., 2024). Closing this gap requires a deliberate effort to revise existing curricula to incorporate comprehensive modules on leadership theories, self-management techniques, and innovative processes. This enriched educational approach is essential for developing nursing professionals who are not only clinically adept but also skilled in leadership and innovation, ready to meet the demands of modern healthcare (Aryuwat et al., 2023; Chen et al., 2020).

This study aims to investigate nursing students' perceptions of leadership and individual innovativeness, specifically exploring the relationship between these critical competencies. The importance of this study lies in its potential to uncover educational deficiencies and opportunities for curriculum enhancement to more effectively prepare nursing students for the challenges of contemporary healthcare settings. The primary goal is to evaluate how these perceptions influence their preparedness for professional roles that require not only clinical proficiency but also adaptive leadership and innovative problem-solving skills. Through this inquiry, the study seeks not only to address an essential academic question but also to significantly impact the education of future healthcare leaders, ensuring they are equipped to thrive in the dynamic healthcare environment.

2. METHOD

2.1. Research Design

This study employed a quantitative, cross-sectional survey design to investigate the perceptions of leadership and individual innovativeness among nursing students. Conducted within the Nursing Department of the Faculty of Health Sciences at a university, the study utilized a structured questionnaire to systematically collect data from a representative sample of 250 nursing students. Data collection instruments included the validated Leadership Self-Perception Scale and the Individual Innovativeness Scale, which are designed to accurately assess the constructs of interest. The quantitative nature of this study allowed for the application of statistical methods to analyze the data, including descriptive statistics to provide an overview of the sample characteristics and inferential statistics, such as correlation analyses, to explore relationships between variables and assess the impact of demographic factors on the study outcomes.

2.2. Participants

The study encompassed a sample of 250 nursing students, who participated voluntarily out of an approximate total of 300 students. Based on the power analysis conducted using G*Power software, the sample size of 250 nursing students was determined to be adequate for achieving a statistical power of approximately 99%. This ensures robustness in detecting the true effect of the relationship between perceptions of leadership and individual innovativeness among the participants. The chosen effect size was 0.3, with an alpha error probability set at 0.01, confirming that the study is well-equipped to reveal significant findings within the predefined parameters of the research design.

2.3. Data Collection Process

The data collection process for this study was conducted with nursing students who provided written or verbal consent. Participants completed a series of assessments, including the "Personal Information Form," "Leadership Self-Perception Scale," and "Individual Innovativeness Scale," in face-to-face sessions that each lasted approximately 10 minutes.

Personal Information Form: This form consisted of 8 questions designed to gather basic demographic and personal background information from the participants.

Leadership Self-Perception Scale: Developed by Özbek and Kızılyallı in 2017, this scale comprises 20 items distributed across four dimensions: Participative Leader (6 items), Confident Leader (4 items), Principled Leader (6 items), and Resolute Leader (4 items). The scale has demonstrated high reliability, with a Cronbach's Alpha of 0.91 for the overall scale and values ranging from 0.70 to 0.82 for the individual dimensions (Özbek & Kızılyallı, 2017).

Individual Innovativeness Scale: Developed by Hurt et al. (1977) and validated in Turkish by Kılıçer and Odabaşı (2010), this scale includes 20 items across four sub-dimensions: Resistance to Change, Opinion Leadership, Openness to Experience, and Risk Taking (Kılıçer & Odabaşı, 2010; Thomas Hurt & Ward Teigen, 1977). Each item is scored on a 5-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree." The scale evaluates innovativeness by summing the scores from positive items, subtracting those from negative items, and adjusting with a fixed coefficient found through empirical research. Innovativeness levels are categorized based on the total score, ranging from "Innovative" for scores above 80, to "Traditionalist" for scores below 46. The scale has shown good internal consistency, with a Cronbach's Alpha of 0.84 for the overall scale in this study.

The scales were administered in their standardized format, and permissions were obtained from the original authors for their use. The reliability and validity of the scales ensure that the data collected will provide robust insights into the leadership and innovativeness perceptions among nursing students.

2.4. Data Analysis

The data collected from this study were comprehensively analyzed using IBM SPSS Statistics software (version 26.0) to ensure accurate interpretation of the findings. The analysis employed descriptive statistics, including means, frequencies, and percentage distributions, to provide a clear overview of the demographic data and the primary variables of interest—leadership perception and individual innovativeness. Initially, the analysis involved calculating means and standard deviations for all continuous variables. This step helped summarize the central tendency and dispersion of

the data, providing foundational insights into the sample characteristics. To explore the relationship between nursing students' perceptions of leadership and their levels of individual innovativeness, Pearson's correlation coefficient was used, providing a measure of the strength and direction of association between these two variables. For comparing scores across different sociodemographic groups, independent samples t-tests were utilized for two groups, and one-way ANOVA was applied for more than two groups. These tests determined significant differences between groups, aiding in the identification of demographic factors that might influence the main variables of interest. The significance level for all statistical tests was set at $p \leq 0.05$, establishing the threshold for determining statistically significant outcomes.

3. RESULTS

LSPS scores showed a significant difference across grade levels (F=3.963, p=0.009). The mean LSPS scores were 73.71±8.30 for 1st-grade students, 70.38±8.89 for 2nd-grade students, 75.80±10.80 for 3rd-grade students, and 75.43±11.72 for 4th-grade students. Similarly, IIS scores also showed a significant difference across grades (F=3.156, p=0.025). LSPS scores showed a significant difference based on income status (F=5.006, p=0.007). The mean LSPS scores were 76.95±7.79 for students with income lower than expenses, 72.63±10.26 for those with income equal to expenses, and 78.05±12.20 for those with income higher than expenses. However, there were no significant differences in IIS scores based on income status (p=0.632). High School Type, Gender, Status of Receiving Leadership and Innovation Training: There were no significant differences in LSPS and IIS scores based on high school type, gender, or the status of receiving leadership and innovation training.

There was a significant difference in total LSPS scores among the different levels of individual innovativeness (F=37.51, p<0.0001). The post-hoc tests revealed significant differences between the following groups: Innovative and Questioner (1-3), Innovative and Skeptic (1-4), Innovative and Traditionalist (1-5), Pioneer and Skeptic (2-4), and Pioneer and Traditionalist (2-5). A significant difference was found among the innovativeness categories in the Participative sub-dimension of LSPS (F=26.13, p<0.0001). Post-hoc comparisons indicated significant differences between the following groups: Innovative and Questioner (1-3), Innovative and Skeptic (1-4), Innovative and Traditionalist (1-5), Pioneer and Skeptic (2-4), and Pioneer and Traditionalist (2-5). There was a significant difference in the Confident sub-dimension scores of LSPS across innovativeness categories (F=17.22, p<0.0001). Post-hoc tests showed significant differences between the following groups: Innovative and Questioner (1-3), Innovative and Skeptic (1-4), Innovative and Traditionalist (1-5), Pioneer and Skeptic (2-4), and Pioneer and Traditionalist (2-5). The scores for the Principled sub-dimension of LSPS varied significantly across innovativeness categories (F=28.12, p<0.0001). Post-hoc tests revealed significant differences between the following groups: Innovative and Skeptic (1-4), and Pioneer and Skeptic (2-4). A significant difference was found in the Resolute sub-dimension of LSPS among the different levels of individual innovativeness (F=19.88, p<0.0001). Post-hoc comparisons indicated significant differences between the following groups: Innovative and Questioner (1-3), Innovative and Skeptic (1-4), Innovative and Traditionalist (1-5), Pioneer and Skeptic (2-4), and Pioneer and Traditionalist (2-5).

Table 1. Comparison of Participants' Sociodemographic Characteristics and Scores from the Scales (n= 250)

Descriptive Characteristics	n	%	LSPS Mean±SD	Statistic	p	IIS Mean±SD	Statistic	p
Gender								
Female	180	72	74.58±9.67	t=2.039	p=0.43	62.13±6.94	t=0.336	p=0.737
Male	70	28	71.67±11.24			61.81±6.81		
Class/Grade								
1st Grade	59	23.6	73.71±8.30	F=3.963	**p=0.009**	63.33±6.64	F=3.156	p=0.025
2nd Grade	67	26.8	70.38±8.89			59.97±5.89		
3rd Grade	62	24.8	75.80±10.80			62.95±9.97		
4th Grade	62	24.8	75.43±11.72			62.16±7.66		

High School								
Anatolian High School	189	75.6	73.76±10.29			62.01±6.82		
Vocational High School	10	4	69.50±11.90	F=1.204	p=0.310	60.80±9.29	F=0.721	p=0.579
Health Vocational High School	10	4	79.10±8.33			62.00±5.88		
Science High School	22	8.8	72.72±9.63			61.00±5.40		
Religious Vocational High School	19	7.6	74.47±9.52			64.31±8.30		
Income Status								
Income Lower than Expenses	43	17.2	76.95±7.79			62.27±7.47		
Income Equal to Expenses	189	75.6	72.63±10.26	F=5.006	**p=0.007**	61.86±6.74	F=0.459	p=0.632
Income Higher than Expenses	18	7.2	78.05±12.20			63.44±7.30		
Status of Receiving Training Related to Leadership								
Yes	15	6	73.13±12.59	t=-0.203	p=0.841	63.20±8.04	t=0.577	p=0.572
No	235	94	73.80±10.06			61.97±6.83		
Status of Receiving Training Related to Innovation								
Yes	32	12.8	72.28±10.97	t=-0.829	p=0.412	60.75±5.47	t=-1.379	p=0.174
No	218	87.2	73.98±10.09			62.23±7.07		

LSPS: Leadership Self-Perception Scale, IIS: Individual Innovativeness Scale, n: number, %: percentages, *= p value, SD: Standard Deviation,

Table 2. Analysis of Leadership Self-Perception Scores by Innovativeness Categories Among Participants (n= 250)

		N	Mean	SD	F	p	Post Hoc Tests
LSPS Total	Innovative (1)	4	90.75	1.26	37.51	<0.0001	1-3 1-4 1-5 2-4 2-5 3-4
	Pioneer (2)	33	83.55	6.92			
	Questioner (3)	161	74.62	8.27			
	Skeptic (4)	50	63.40	8.56			
	Traditionalist (5)	2	69.00	1.41			
LSPS Sub-Dimension 1 (Participative)	Innovative (1)	4	26.75	0.96	26.13	<0.0001	1-3 1-4 1-5 2-4 2-5
	Pioneer (2)	33	25.06	2.93			
	Questioner (3)	161	22.41	2.78			
	Skeptic (4)	50	19.08	3.09			
	Traditionalist (5)	2	21.50	0.71			
LSPS Sub-Dimension 2 (Confident)	Innovative (1)	4	17.25	1.50	17.22	<0.0001	1-3 1-4 1-5 2-4 2-5
	Pioneer (2)	33	15.85	2.00			
	Questioner (3)	161	13.82	2.36			
	Skeptic (4)	50	12.14	1.82			
	Traditionalist (5)	2	11.50	0.71			

LSPS Sub-Dimension	Category	n	Mean	SD	F	p	Post-hoc
LSPS Sub-Dimension 3 (Principled)	Innovative (1)	4	28.25	2.36	28.12	<0.0001	1-4 2-4
	Pioneer (2)	33	26.30	2.57			
	Questioner (3)	161	24.11	3.12			
	Skeptic (4)	50	19.84	3.38			
	Traditionalist (5)	2	24.00	1.41			
LSPS Sub-Dimension 4 (Resolute)	Innovative (1)	4	18.50	1.73	19.88	<0.0001	1-3 1-4 1-5 2-4 2-5
	Pioneer (2)	33	16.33	1.83			
	Questioner (3)	161	14.29	2.43			
	Skeptic (4)	50	12.34	1.99			
	Traditionalist (5)	2	12.00	1.41			

LSPS: Leadership Self-Perception Scale. The table presents the mean scores, standard deviations, and statistical results for the Leadership Self-Perception Scale (LSPS) across different levels of individual innovativeness. Significant differences between categories were identified using one-way ANOVA and post-hoc comparisons (p < 0.05).

The total LSPS score was significantly correlated with all sub-dimensions of LSPS: Sub-Dimension 1 (r=0.840, p=0.000), Sub-Dimension 2 (r=0.814, p=0.000), Sub-Dimension 3 (r=0.869, p=0.000), and Sub-Dimension 4 (r=0.826, p=0.000). All LSPS sub-dimensions were also significantly correlated with each other, with correlation coefficients ranging from 0.561 to 0.675, all significant at p=0.000. The total LSPS score was significantly correlated with the total IIS score (r=0.625, p=0.000) and all IIS sub-dimensions: Sub-Dimension 1 (r=0.146, p=0.021), Sub-Dimension 2 (r=0.729, p=0.000), Sub-Dimension 3 (r=0.735, p=0.000), and Sub-Dimension 4 (r=0.756, p=0.000). LSPS Sub-Dimension 1 was significantly correlated with the IIS Total score (r=0.544, p=0.000) and with IIS Sub-Dimensions 2, 3, and 4 (r=0.549, r=0.628, and r=0.516, respectively; all significant at p=0.000). LSPS Sub-Dimension 2 was significantly correlated with the IIS Total score (r=0.463, p=0.000) and with IIS Sub-Dimensions 2, 3, and 4 (r=0.688, r=0.587, and r=0.534, respectively; all significant at p=0.000). LSPS Sub-Dimension 3 was significantly correlated with the IIS Total score (r=0.549, p=0.000) and with IIS Sub-Dimensions 2, 3, and 4 (r=0.573, r=0.668, and r=0.752, respectively; all significant at p=0.000). LSPS Sub-Dimension 4 was significantly correlated with the IIS Total score (r=0.528, p=0.000) and with IIS Sub-Dimensions 2, 3, and 4 (r=0.681, r=0.563, and r=0.721, respectively; all significant at p=0.000). The total IIS score was significantly correlated with all IIS sub-dimensions: Sub-Dimension 1 (r=-0.467, p=0.000), Sub-Dimension 2 (r=0.675, p=0.000), Sub-Dimension 3 (r=0.761, p=0.000), and Sub-Dimension 4 (r=0.445, p=0.000). Significant correlations were also found between all IIS sub-dimensions, with coefficients ranging from 0.116 to 0.761 (all significant at p<0.066).

Table 3. Correlation Matrix Between Leadership Self-Perception Scale (LSPS) and Individual Innovativeness Scale (IIS) Total and Sub-Dimension Scores

LSPS Total		LSPS Sub-Dimensions					IIS Sub-Dimensions				
		1	2	3	4	IIS Total	1	2	3	4	
LSPS Total	r	1	,840**	,814	,869	,826	,625	,146	,729	,735	,756
	p		,000	,000	,000	,000	,000	,021	,000	,000	,000
1	r	,840	1	,561	,630	,570	,544	,062	,549	,628	,516
	p	,000		,000	,000	,000	,000	,329	,000	,000	,000
2	r	,814	,561	1	,593	,675	,463	,244	,688	,587	,534
	p	,000	,000		,000	,000	,000	,000	,000	,000	,000
3	r	,869	,630	,593		,606	,549	,098	,573	,668	,752
	p	,000	,000	,000		,000	,000	,121	,000	,000	,000

4	r	,826	,570	,675	,606	1	,528	,121	,681	,563	,721
	p	,000	,000	,000	,000		,000	,055	,000	,000	,000
IIS Total	r	,625	,544	,463	,549	,528	1	-,467	,675	,761	,445
	p	,000	,000	,000	,000	,000		,000	,000	,000	,000
1	r	,146	,062	,244	,098	,121	-,467	1	,223	,117	,116
	p	,021	,329	,000	,121	,055	,000		,000	,064	,066
2	r	,729	,549	,688	,573	,681	,675	,223	1	,715	,516
	p	,000	,000	,000	,000	,000	,000	,000		,000	,000
3	r	,735	,628	,587	,668	,563	,761	,117	,715	1	,526
	p	,000	,000	,000	,000	,000	,000	,064	,000		,000
4	r	,756	,516	,534	,752	,721	,445	,116	,516	,526	1
	p	,000	,000	,000	,000	,000	,000	,066	,000	,000	

LSPS (Leadership Self-Perception Scale): Comprises four sub-dimensions: Participative Leader, Confident Leader, Principled Leader, and Resolute Leader. IIS (Individual Innovativeness Scale): Consists of four sub-dimensions: Resistance to Change, Opinion Leadership, Openness to Experience, and Risk Taking. r: Pearson correlation coefficient. p: Significance value.

4. DISCUSSION

The findings of this study underscore the crucial role of leadership and individual innovativeness in nursing, aligning with existing literature that considers these competencies fundamental to effective nursing practice. Previous research, such as the systematic review by Labrague and Toquero (2023), highlights the positive influence of transformational and authentic leadership styles on nurses' innovative behaviors (Labrague & Toquero, 2023). This observation is consistent with the current study, which identified significant correlations between leadership self-perception and individual innovativeness among nursing students. Furthermore, Bagheri and Akbari (2018) emphasize the value of an entrepreneurial and self-leadership mindset, which is mirrored in our findings, suggesting that leadership perception enhances students' readiness to engage in innovative practices (Bagheri & Akbari, 2018). These competencies are not only pivotal for managing patient care effectively but also for addressing evolving challenges in healthcare, such as integrating new technologies and ensuring patient safety (Seo & Ko, 2024). Therefore, prioritizing these attributes in nursing education can better equip students for the complexities of contemporary healthcare environments.

Our results demonstrate a significant positive correlation between nursing students' self-perception of leadership and their individual innovativeness. Students who perceive themselves as stronger leaders also exhibit higher levels of innovativeness. This finding aligns with the study by Stilgenbauer and Fitzpatrick (2019), which reported that nurse leaders with stronger self-perceived leadership skills were more inclined toward innovative approaches in acute care settings (Stilgenbauer & Fitzpatrick, 2019). Similarly, Seo and Ko (2024) emphasize the role of self-leadership in fostering professionalism and innovative thinking among nursing students. This connection suggests that the development of self-leadership skills may inherently encourage a greater propensity for innovation, which is essential for adapting to the dynamic and often unpredictable healthcare landscape. Moreover, Sarıköse and Türkmen (2020) found that transformational leadership perceptions positively influenced individual innovativeness, reinforcing the idea that cultivating leadership qualities can lead to enhanced innovative behaviors (Sarıköse & Türkmen, 2020). Together, these findings highlight the intertwined nature of leadership and innovativeness, indicating the need for educational programs that concurrently develop both competencies to prepare nursing students for complex professional roles.

The results of our study also revealed significant differences in leadership self-perception and innovativeness based on specific demographic factors such as grade level and income status. These findings are in line with previous research, such as Sarıköse and Türkmen's (2020) study, which indicated that students' perceptions of transformational leadership varied across different occupational and demographic contexts. Similarly, Gündoğdu and Gündüz (2022) found that

demographic variables, including socioeconomic status, influenced individual innovativeness among nurses, with those from higher-income backgrounds demonstrating greater openness to change and innovation (Gündoğdu et al., 2022). In our study, senior students exhibited higher levels of leadership perception and innovativeness compared to their junior counterparts. This is consistent with the findings of Stilgenbauer and Fitzpatrick (2019), who reported that experience and exposure to leadership opportunities enhance leadership perceptions and innovative capabilities. These results suggest that exposure to diverse experiences and challenges throughout nursing education plays a pivotal role in shaping students' leadership and innovative thinking skills. Therefore, these findings underscore the importance of considering demographic factors when designing educational interventions to enhance leadership and innovativeness in nursing programs.

The findings from this study suggest critical implications for nursing education programs, particularly concerning the integration of leadership and innovativeness training into the curriculum. As the healthcare landscape becomes increasingly complex, traditional educational approaches that primarily focus on clinical competencies may no longer be adequate. Studies by Stilgenbauer and Fitzpatrick (2019) and Seo and Ko (2024) highlight the necessity of developing leadership and self-leadership skills alongside innovative thinking to better prepare nursing students for future challenges. Similarly, Sarıköse and Türkmen (2020) emphasize that perceptions of leadership and innovativeness can be shaped through targeted educational interventions, such as experiential learning, mentorship programs, and leadership workshops. Incorporating structured modules on leadership theories, self-regulation techniques, and innovation processes could effectively address existing gaps in nursing education. This approach aligns with the recommendations by Gündoğdu and Gündüz (2022), who suggest that fostering a culture of leadership and innovation empowers students to take proactive roles in patient care and healthcare improvement initiatives. By enriching the curriculum with these competencies, nursing programs can produce graduates who are not only clinically proficient but also equipped with essential leadership and innovative capabilities, allowing them to excel in dynamic healthcare environments.

Despite the acknowledged significance of leadership and innovativeness in nursing, several barriers hinder the development of these competencies among nursing students. One major challenge is the traditional structure of nursing education, which often prioritizes rote learning and clinical skills over leadership and innovation training (Sarıköse & Türkmen, 2020). This conventional model limits opportunities for experiential learning, mentorship, and exposure to real-world leadership scenarios, which are crucial for the development of these skills (Stilgenbauer & Fitzpatrick, 2019). Additionally, Bagheri and Akbari (2018) note that the lack of structured entrepreneurial and self-leadership programs within nursing curricula impedes the cultivation of innovative thinking. The hierarchical nature of clinical environments also presents a barrier, potentially discouraging students from taking initiative or proposing new ideas, thereby fostering a culture resistant to change (Seo & Ko, 2024). Another key barrier identified by Gündoğdu and Gündüz (2022) is the insufficient emphasis on fostering self-awareness and self-regulation strategies, which are essential for both leadership and innovativeness. Overcoming these challenges requires a concerted effort to reform nursing education by adopting a more holistic approach that integrates leadership training and innovation-focused learning experiences.

The practical implications of this study underscore the need for targeted interventions within nursing education to foster leadership and innovativeness among students. Recognizing the positive relationship between leadership perception and individual innovativeness, educators can design programs that focus not only on clinical skills but also on the development of self-leadership and creative problem-solving techniques (Bagheri & Akbari, 2018). For instance, integrating modules that emphasize experiential learning, mentorship opportunities, and leadership simulations could bridge the gap between theoretical knowledge and practical application (Stilgenbauer & Fitzpatrick, 2019). Additionally, the findings highlight the importance of cultivating a supportive learning environment that encourages innovative thinking and reduces resistance to change within clinical settings (Sarıköse & Türkmen, 2020).

In terms of future research, there is a need for longitudinal studies to explore the development of these competencies over time and across different educational stages. Further investigations could also assess the effectiveness of specific interventions, such as leadership workshops or innovation labs, in enhancing students' readiness for leadership roles (Seo & Ko, 2024). Moreover, comparative studies examining different educational models or cultural contexts could provide deeper insights into the most effective approaches for cultivating these skills among nursing students. By addressing these areas, future research can contribute to the ongoing refinement of nursing education programs, ultimately leading to a workforce better prepared to meet the evolving challenges of healthcare.

5. CONCLUSION AND RECOMMENDATIONS

This study highlights the importance of leadership perception and individual innovativeness among nursing students, emphasizing the interconnected nature of these competencies in preparing future healthcare professionals. The findings demonstrate a significant positive correlation between students' self-perceived leadership and their inclination toward innovative behaviors, indicating that fostering leadership skills may concurrently enhance innovative thinking. Additionally, differences in leadership perception and innovativeness based on demographic factors such as grade level and income status suggest that targeted educational interventions may be necessary to address these variations.

Given these findings, it is crucial for nursing education programs to incorporate structured modules focused on leadership development and innovation processes. Experiential learning opportunities such as mentorship, and leadership workshops can play a pivotal role in nurturing these skills. Moreover, understanding the impact of demographic factors on these competencies can help educators tailor interventions that foster inclusive and supportive learning environments for all students.

Recommendations for future research include longitudinal studies exploring how leadership perceptions and innovativeness evolve throughout students' academic and professional careers. Comparative studies across different educational models or cultural contexts would provide deeper insights into effective approaches for nurturing these essential competencies. By addressing these areas, both nursing education and research can contribute to developing a more adaptive and innovative nursing workforce, capable of meeting the evolving demands of modern healthcare.

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