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Investigation of the patients admitted to 3rd level emergency department

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Abstract

Emergency departments are centers where there is an intensive inflow and outflow of patients who need to make quick and correct decisions and these decisions must be implemented just as quickly. In our country, emergency departments offer a wide range of medical intervention opportunities to a large number of our citizens due to their easy accessibility. It will not be easy to manage such a dynamic service with unstable and fluctuating admissions. In this study, we aimed to demographically evaluate the emergency department patient applications and with these data, we aimed to support the targeted structuring studies of the emergency department service and to ensure that the system is made better quality. All patients who met the inclusion criteria and were admitted to our hospital between 01.02.2020 and 31.12.2023 were included in our retrospective study "Investigation of the patients admitted to 3rd level emergency department". 171.937 patients were admitted to the emergency department of our hospital between February 1, 2020, and December 31, 2023. Of these patients, 49.3% were male and 50.7% were female. The most common age group for emergency admissions was 19-45 years (43.8%). The highest number of admissions occurred in December, with Monday being the busiest day of the week and the 08:00-16:00 time period being the most frequent for admissions. The cardiology department was the most frequently consulted specialty. By analyzing the data we obtained, it was ensured to contribute to the planning and planning for the effective use of services in emergency services and the solution of problems.

Keywords: Emergency department, 3rd level, malpractice

Introduction

Emergency departments are units where many independent branches work simultaneously with each other due to the size of the hospitals or the population density in the location. In our country, applications to emergency services are increasing day by day [1]. Due to the patient density in our country, it is difficult for patients to get appointments from doctors and problems in patient triage systems increase the density in emergency departments and slow down the service flow. The workload of emergency service workers increases even more with the wide variety of complaints and the limited time that can be allocated to the patient [2]. Each patient who applies is first classified according to their clinics in triage and the treatment order and sequence is planned with the appropriate colour code. The applications of patients with chronic diseases to emergency services for treatment is another reason that increases the burden of emergency services [3].

The aim of this study is to demographically evaluate the patient applications after the transition of Balıkesir University emergency department to the tertiary status and to contribute to the targeted structuring of the emergency department service with the data obtained and to make the system better quality.

Material and Methods

All patients who met the inclusion criteria and admitted to our hospital between 01.02.2020 and 31.08.2023 were included in our retrospective study "Investigation of the patients admitted to 3rd level emergency department", which will be conducted at Balıkesir University Faculty of Medicine, Department of Emergency Medicine.

The study was initiated after the approval of the clinical research ethics committee of Balıkesir University (01/11/2023-2023/159).

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All patients who were admitted to the emergency department of Balıkesir University Faculty of Medicine Emergency Department after the level 3 registration were included in this study.

Demographic characteristics of the patients, complaints at admission, triage classes and their distribution, days and hours of admission, consultation rates, treatment application conditions, hospitalisation and discharge rates, and diagnoses according to the International Classification of Diseases-10 (ICD-10) diagnostic system were evaluated.

Statistical Analysis

IBM SSPS 25.0 programme was used for statistical analyses (SSPS for Windows, Version 25.0, SSPS, Chicago, Illinois, USA). Descriptive statistics were expressed as frequency (n), percentage (%), mean±standard deviation (SD) and median. The chi-square test was used for comparison between groups. The suitability of the data for normal distribution was evaluated by Kolmogorov-Smirnov test. P<0.05 was considered statistically significant.

Results

171937 patients were included in the study. 49.3% of the patients were male and 50.7% were female. The most common age range of presentation was 19-45 years (43.8%). The most common age range for both males and females was 19-45 years (Table 1).

Table 1. Demographic characteristics of the patients

Age group	Woman (n)	Male (n)	Total (n)
Between 0-18 years	7.131	8.926	16057
Between 19-45 years	40.418	35.737	76.155
Between 46-59 years	14.354	14.238	28.592
Between 60-74 years	14.640	16.073	30.713
Between 75-89 years	9.700	9.041	18.741
>90 years	924	755	1.679
Total	87.167	84.770	171.937
Total %	50.7	49.3	100
Chi-square	562.595		
p	0.00		

When we look at the mode of arrival of the patients, it was seen that 13154 patients were admitted to the hospital with 112 ambulances. This number is approximately 7.65% of the total number of patient applications .

When we evaluate the applications by months, the highest number of applications was 19170 (11.1%) in December, followed by 18.458 applications (10.7%) in November and 15.752 applications (9.2%) in October (Figure 1).

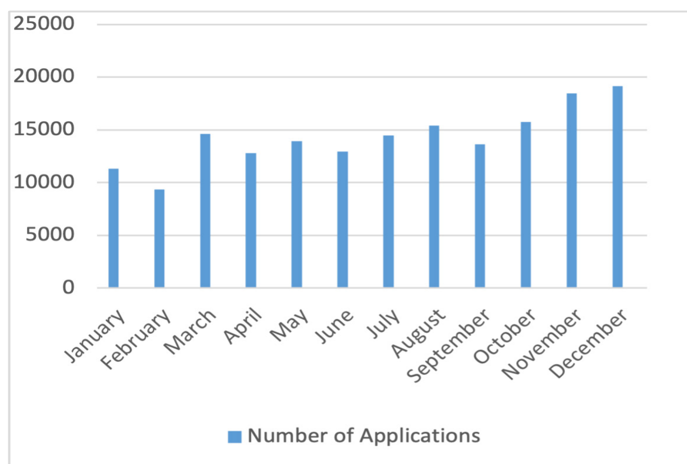

Figure 1. Monthly patient admission rates

When we evaluated the admissions according to days, the highest number of admissions were on Monday (27784 patients) and Friday (25786 patients), respectively. The lowest number of admissions was on Saturday (21217 patients) and Sunday (21803 patients), which are the days after the week. (Figure 2) When we evaluated the admissions according to time periods, the highest number of admissions was between 12.00-16.00 hours with 44526 patients (25.9%). 2. The time period with the highest number of admissions was between 08.00-12.00 hours with 40093 patients (23.3%). The time period with the least number of admissions was between 04.00-08.00 with 5824 patients (3.4%) (Figure 3).

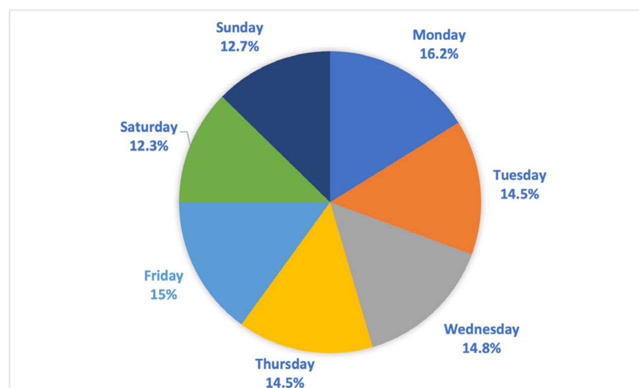

Figure 2. Patient admission rates according to days

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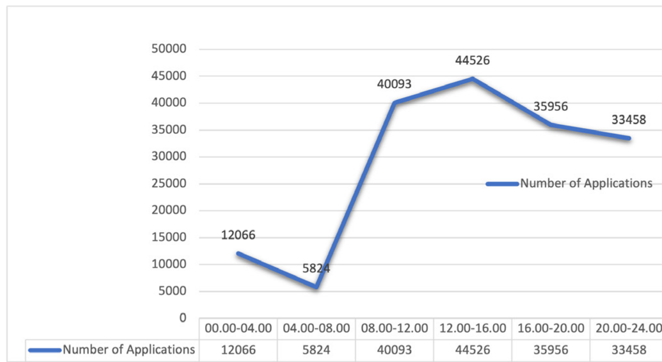

Figure 3. Patient admission rates according to time zones

When the post-examination results of the patients admitted to the hospital were examined, hospitalisation was observed with 23632 patients (13.7%). 86.1% (147953 patients) were discharged (Table 2).

Table 2. Finalisation rates of admitted patients

Conclusion	Number of applications (n)	Percent (%)
Discharged	147953	86.1
Hospitalisation	23632	13.7
Dispatch	352	0.2
Total	171937	100

When the number of consultations made for the patients admitted was analysed, it was determined that no consultation was made for 34791 patients (20.2%). The most consulted branch was cardiology with 6240 consultations (3.6%). In 2nd place was gastroenterology with 3582 consultations (2.1%) and in 3rd place was general surgery consultation with 3485 consultations (2%) (Table 3).

Table 3. Number of consultations performed

Unit	Number (n)	Percent (%)
No consultation	34791	20.2
Brain and nerve surgery clinic	1138	0.7
General surgery clinic	3485	2.0
Gastroenterology clinic	3582	2.1
Cardiology clinic	6240	3.6
Anaesthesia and reanimation clinic	2284	1.3
Neurology clinic	1711	1.0
Internal medicine clinic	2175	1.3
Chest diseases clinic	2491	1.4
Urology clinic	1095	0.6
Eye diseases clinic	1677	1.0
Orthopaedics and traumatology clinic	3217	1.9
Cardiovascular surgery clinic	575	0.3
Gynaecology and obstetrics clinic	3690	2.1
Nephrology diseases clinic	1050	0.6
Ear-nose-throat diseases clinic	1024	0.6
Infectious diseases clinic	1792	1.0
Mental health and diseases clinic	464	0.3
Plastic, reconstructive and aesthetic surgery clinic	495	0.3
Child health and diseases clinic	47	0.0
Endocrinology and metabolism clinic	134	0.1
Interventional radiology clinic	50	0.0
Physiotherapy and rehabilitation clinic	5	0.0
Paediatric surgery clinic	62	0.0
Dermatology clinic	88	0.1
Haematology clinic	12	0.0

When the number of examinations performed was analysed, it was seen that blood examination was the most common examination with 98031 examinations (57%). It was observed that radiography was performed in 23.2% of the patients and computed tomography was performed in 60786 patients (35.4%). Magnetic resonance imaging (MRI) was performed in 25% of the patients and ultrasound was performed in 26.7% of the total applications (Table 4).

Table 4. Rates of the investigations performed

Type of examinations	Number (n)	Percent (%)
Blood test	98031	57.0
X-ray examination	39962	23.2
Computerised tomography	60786	35.4
Magnetic resonance	42955	25.0
Ultrasound	45856	26.7

Discussion

Emergency departments are the busiest departments of hospitals with the fastest patient circulation. Firstly, diagnosis and treatment of patients whose condition is unstable or whose stable condition will deteriorate if not intervened quickly are carried out. However, in our country, patients from every triage code can apply to emergency departments at any time of the day and services are provided in this process. With the triage system application, the treatment of the applicants in the emergency department can be taken in a certain order. However, when the waiting time is prolonged, physicians, health workers and patients come face to face. This leads to various incidents of violence. Even if the violence is verbal, it is known that it negatively affects the motivation of healthcare workers. Especially in time periods with intensive patient applications, the excessive workload faced by health workers causes an increase in violent incidents [4]. Relatives of patients should be admitted to the emergency department patient examination and intervention areas only when deemed appropriate by physicians. Otherwise, the density in the emergency department cannot be managed. In addition, inappropriate arrangement of entrances and exits to the emergency department leads to a dense crowd even if the number of patients admitted is small. This may prevent the emergency services from working effectively [1].

Patients who apply to the emergency department of our hospital are evaluated with the triage system and after this evaluation, they are prioritised and examined according to the triage code given to them. With the training and experience of the health personnel performing triage, it will be a system in which the evaluation is accurate and the necessary patient reaches the physician immediately. Intermittent triage training of healthcare personnel will reduce problems.

When we looked at the mode of arrival of the patients, the ratio of 112 ambulances and hospital admissions to total admissions was 7.65%. This rate was 10.2% in the study conducted in Uludağ University Hospital and 6.2% in Akdeniz University Hospital [5,6]. When we examine the application percentages, patients applied to Balıkesir University with 112 ambulances due to the difficulty of transportation to Balıkesir University other than their own vehicle and its distance to other health centres. The emergency service at Balıkesir University became operational in 2019 and started to serve as a 3rd step emergency service in February 2020. Previously, cases coming from surrounding centres and districts were taken to other health centres by 112 ambulance. This caused the case durations of 112 ambulances to be prolonged. In addition, 112 ambulance teams from another more distant centre were passing instead of the ambulance that was active for the continuation of service to other cases during transport. This caused the teams to spend more time for a case in terms of time. After the university emergency service started to serve as a 3rd step emergency service, trips to other centres decreased. This provided comfort to 112 ambulances and it became easier for them to be ready for other cases. When the teams were absent, the time to reach the case was prolonged and the treatments were delayed due to the fact that the teams coming to their places could not fully master that region. With the increase in the specialised services provided in our hospital, patients coming from other hospitals are admitted from the emergency department and their treatment is organised. With this situation, patients who have to go out of the province for further examination can apply to the University emergency department and receive treatment. Considering all these cases, the fact that our university has started to serve as a 3rd step emergency has reduced the time and financial needs of the ambulances by making less kilometres and less expense, and the time and financial needs of the citizens have decreased by applying to our emergency service instead of going out of the province.

When the patients admitted in our study were evaluated according to their sex, 49.3% were male and 50.7% were female and there was no statistically significant difference between the two sexes. In the study conducted in the USA, no significant difference was found between genders [7,8]. When analysed according to age groups, it was determined that the middle age group was more common. In the 0-18 age group, only trauma patients were included in our study and the rate of admission was 9.3% of all admissions. It is thought that examination and treatment of paediatric trauma patients in the same service with adult trauma patients may further agitate paediatric patients who are already agitated by trauma. For this reason, paediatric trauma patients can be completely isolated from the adult emergency department and their diagnosis, examination and treatment can be performed in the paediatric emergency department. Or, adult trauma and paediatric trauma patients can be separated with a paediatric trauma room in the adult emergency department. In our study, 44.3% (76155) of 171937 patients were between 19-45 years of age. The fact that most of the applicants are in the middle age group is similar to the data from the USA [9]. The number of patients over 60 years of age is approximately one third of all applications. This is an expected rate in Balıkesir province where

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the elderly population is high. In addition, the number of geriatric patients admitted to emergency departments is increasing due to the prolonged life expectancy with the diagnostic and treatment methods developed in recent years. In addition, it is seen that there are frequent applications to the emergency department due to the need for palliative care and these patients prolong the waiting and observation times of the emergency department. For this reason, planning the rapid referral of these patients to palliative centres with a coordinated system with palliative centres will relieve the intensity of the emergency department. Patients who come to emergency departments with complaints such as general condition disorder, dehydration or fracture as a result of a fall from the same distance should be examined in detail. Since it is thought that more geriatric patients will be treated with the increase in chronic diseases in the following years, it would be appropriate and appropriate to establish geriatric emergency services separately from adult emergency services such as paediatric emergency services.

In February 2019, when the emergency department of Balıkesir University Faculty of Medicine first started to serve, the average number of patients per month was low and the majority of patients were admitted by 112. In the following years, as the equipment of the hospital increased and more medical branches started to serve, the number of applications to the hospital increased and accordingly, the number of patients admitted to the emergency department also increased.

In addition, not wanting to wait in queues in polyclinics, being cheaper than private institutions and not being able to reach their physicians increase the number of applications to the emergency department [10,11].

According to the data, the highest applications were 19.170 applications (11.1%) in December, 18.458 applications (10.7%) in November and 15.752 applications (9.2%) in October. Possible reasons for the increase in applications in this period coinciding with the seasonal transition and winter months. The high number in summer months increases the number of patients admitted to our university hospital, which provides specialised healthcare services in Balıkesir and is a level 3 emergency department, with the increase in the population of the region due to migration to summer regions. In addition, emergency cases such as dehydration and heat stroke seen in summer months may also increase the number of applications. Due to the location of our university hospital, patients in need of medical assistance mostly apply to our emergency department. Due to its location far from the central settlement, code green cases are relatively less common in our emergency department. Patients who are examined in other centres and cannot be diagnosed afterwards or who require additional examinations apply to our emergency departments even if their condition is stable.

When the days of the applications are analysed, it is seen that the highest rate of application is on Monday. After the lack of access to outpatient clinics on this weekend, it was thought that the patients came to the emergency departments after the examination time could not be found in the applications to the outpatient clinic on Monday, and even if they were not urgent, they requested to be examined and treated or to be consulted to the relevant speciality unit after admission from the emergency department. Although the number of applications decreased slightly after Monday until Friday, applications still continue. On Friday, patients who think that they will not be able to find the relevant specialist doctor at the weekend increase their applications to the emergency department on the last day of the week. The number of referrals increases during religious holidays or national holidays. The reason for this is that the specialist physicians in the vicinity do not want to admit patients to the service during the holiday period and refer the patient from the emergency department with the preliminary diagnosis of the need for further examination or sub-specialisation. On weekends, there is a relative decrease in the number of referrals compared to other days (12.3% on Saturday, 12.7% on Sunday). The location of the emergency department outside the province reduces the number of non-urgent cases at the weekend and relatively fewer patients are admitted on other days.

Looking at the intensity of the applications in terms of hours, it is seen that the most intense applications are between 08.00 and 16.00. Approximately half of the applications are realised in these hours. As the outpatient clinics are open during these hours, there are patients who need hospitalisation but are waiting for hospitalisation in the emergency department due to lack of space, and patients coming from the outpatient clinic for treatment increase the intensity of the emergency department. In working societies, patients who cannot go to the hospital during working hours apply to the emergency department after working hours. Our citizens who have the problem of making an appointment apply to the polyclinic but are directed to the emergency department because they do not have an appointment. If we make after-hours outpatient clinic services more widespread, the density will decrease.

When the number of consultations in the admitted patients was analysed, it was seen that 20% of the applicants were treated in the emergency department without any consultation and discharged. Edirne, T et al. found that 19.5% of the patients admitted to the emergency department were discharged after outpatient treatment [12]. This rate is compatible with our study. This shows that the majority of patients who come to our emergency department are treated with at least one consultation. It has shown that our emergency department has more patients requiring a multidisciplinary approach in which other branch physicians also make recommendations to the patient, such as code yellow and code red patients rather than code green patients. The most consulted branches were cardiology diseases, gastroenterology diseases and general surgery diseases. With the 24-hour availability of a branch doctor and the presence of the gastroenterology department in our university, the number of patients requiring consultation with related branches increased.

Due to the fact that emergency services receive support from other units in the treatment process of patients, not only the patient density, but also the length of stay and conclusion of the patients in the emergency department during the examination phase and consultation phase are prolonged and the density of emergency services increases even more.

When the tests performed are analysed, the number of patients who underwent any blood test is 57%. It shows that the applications to the emergency department are made by patients with yellow and red codes who need to be examined. The number of radiography, tomography, magnetic resonance and ultrasound examinations is generally high. The lack of tomography and magnetic resonance examinations in nearby hospitals has increased the rate of examinations performed as a result of patients who need them applying to the university. In addition, the fact that ultrasound service is available only at our university after hours in our province has increased the number of outpatient or 112 applications to our emergency department from external centres in case additional examinations such as ultrasound may be needed.

The lack of intensive care or ward beds after the decision to hospitalise the patients after the examination is taken is another factor that increases the intensity of the emergency department and the patient's waiting in the emergency department until the patient is hospitalised even though there is no additional diagnostic step. By increasing the number of beds and intensive care units in our province and hospital, the duration of stay in the emergency department will be shortened, patient circulation in the emergency department will be fast and patient satisfaction will increase.

Our hospitalisation rate is 13.7% after the finalisation of our patients admitted to the emergency department. In anoother study, the hospitalisation rate was 3.57% [13]. The fact that our rate is higher compared to other studies is again due to the fact that our patients require hospitalisation as previously mentioned.

When the result is considered with all the data, we can say that our emergency department is an appropriate and well-working 3rd step emergency department. It is a preferred emergency service with its multidisciplinary work with other branches, rapid performance of examinations and easy access to physicians and patients. With the increase in the capacity of the ward and intensive care beds, the intensity of the emergency department will decrease and there will be no unwanted problems.

Another reason that increases the intensity is that the relatives of substance addicts and suicidal patients slow down the functioning by making outbursts in the follow-up of the patients, at this point, the emergency service will be able to work in accordance with its purpose when measures are taken in accordance with the security.

Conclusion

It will be possible to reduce the intensity of emergency services by raising awareness of patients. Awareness can be created in patients through visual and written media. Well-functioning triage systems that can consistently and continuously distinguish between emergency and non-emergency cases should be implemented. This system should be explained to both other physicians and patients at every opportunity. Thus, it will be possible to manage non-urgent cases by family physicians. Extending practices similar to palliative care centres for individuals with chronic diseases and preventing the admission of patients who cannot or do not find a queue in the outpatient clinic to the emergency department will also contribute positively to patient density. It should be kept in mind that emergency department density is not a local problem and can be solved with practices covering the whole country. Additional studies are needed to reduce the intensity of the emergency department.

Limitations of the Study

Our study has several limitations. Firstly, our study was conducted in a single hospital. No information was given about whether the patients who applied to the emergency department applied as outpatients or using ambulance service. The number of patients is quite small compared to similar emergency department applications. If the study had been conducted with a larger number of patients, the results might have been different.

Conflict of Interests
The authors declare that there is no conflict of interest in the study.

Financial Disclosure
The authors declare that they have received no financial support for the study.

Ethical Approval
Ethical permission was obtained from the Kahramanmaraş Sütcü İmam University, Medical Faculty Clinical Research Ethics Committee for this study with date 10/08/2021 and number 2021/25.

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