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User - Space Relationship in Emergency Departments

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Abstract

When examining the planning process of healthcare buildings, which comprises phases such as programming, design, implementation, usage and evaluation, it can be observed that changes are sometimes made to projects immediately after their commissioning and occasionally even before they are put into service. This situation can be attributed to the neglect of users such as healthcare personnel, patients and their families during the planning process, leading to unmet requirements or evolving requirements over time. Designers who approach the planning process based on their assumptions or predictions can inevitably lead to the design of spaces that could negatively impact users. Therefore, expecting designers with limited observations and experiences of the process to comprehend what users discern through their experiences within healthcare facilities wouldn't be appropriate. The aim of this study is to identify spatial problems emerging in healthcare buildings through fieldwork, access the sources of these issues within the planning process and thus create a database for designers. Within the scope of the study, the focus has been on emergency departments, which are the busiest and most heavily utilized units within healthcare buildings. Functional, technical and psycho-social requirements were examined in two emergency departments located in Ankara. The study material consists of nationally and internationally conducted prior research on the subject, along with data obtained from field studies conducted in the emergency department of Gazi University Hospital and Lokman Hekim Hospital in Ankara. The method employed for the study included observations and examinations in these emergency departments, along with photographic documentation of the existing conditions. The study's outcomes reveal that the sampled environments encompass adverse conditions pertaining to numerous spatial parameters. Accordingly, suggestions have been made to enhance the spatial qualities of existing environments and to provide insights for future designs.

1. INTRODUCTION

Hospitals are living organisms composed of numerous components with distinct functions. Due to their intricate structure consisting of departments, sub-departments and spaces, hospitals fall under the category of "complex functional buildings" [1]. During the constantly changing daily workflow, healthcare personnel in hospitals can find themselves dealing with the repercussions of an outbreak of a disease while simultaneously addressing the aftermath of an explosion or fire incident [2].

When examining the planning process of hospitals, which encompasses programming, design, implementation, usage and evaluation phases [3], it becomes evident that modifications are sometimes made to projects shortly after their commissioning and occasionally even before they are operational. The emergence of this situation can be attributed to extended construction periods, inadequately equipped designers, planning without sufficient research and importantly, the neglect of users such as healthcare personnel, patients and their families, resulting in unmet requirements. It is important to note that the failure to meet user requirements results in the emergence of spaces that lose their functionality, inevitably leading to the need for continuous alteration and transformation of buildings due to user-driven reactions following the implementation phase.

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Emergency departments, being the most active and intense units within hospitals, hold a crucial position due to the urgent nature of the cases they handle, often involving patients in critical conditions. Therefore, these units must be presented for use through a flawless planning process. Operating continuously every day of the year, emergency departments in our country often receive patients whose conditions do not require urgent attention. These departments serve as the initial point of contact for patients and their relatives, forming the first impressions of the hospital as a whole.

Emergency departments are not spaces where patients and their relatives spend extended periods. The primary purpose of these units is to stabilize the patient's condition, make a diagnosis and subsequently either discharge the patient or transfer them to an appropriate department for further treatment. The essential aspect of emergency departments is the ability to provide effective and rapid services to all patients.

In our country, user dissatisfaction is observed in emergency departments, which are likely to be used by every individual at some point in their lives and are currently utilized by numerous individuals. The unmet user requirements resulting from the lack of evaluation during the usage phase of existing emergency departments, coupled with functional inadequacies, are believed to significantly contribute to user dissatisfaction. This assumption is substantiated by the fact that previous studies focused on identifying functional inadequacies in emergency departments across the country have established their functional insufficiencies [4-6].

Architectural planning deficiencies and errors in emergency departments that impact user dissatisfaction can be understood through a thorough evaluation of utilization. The presence of spaces not considered during the programming phase, design criteria disregarded during the design phase and overlooked aspects of users – such as their diversity, social and cultural backgrounds, economic status, utilization patterns and densities – can be discerned through assessments conducted during the evaluation phase. Designers who approach the entirety of planning process solely based on their speculative judgments or predictions can inevitably result in the design of spaces that could lead to negative effects on users. In this context, this study aims to enable a comprehensive inquiry, evaluation and determination of requirements within the currently operational emergency departments. Consequently, the focus is on providing a resourceful guide that could benefit designers. In the experimental section of the study, the emergency departments of Gazi University Hospital and Lokman Hekim Hospital were examined. The selection of hospitals was based on the criteria of "hospital bed capacity." Accordingly, Gazi University Hospital is the second-largest hospital in the city center of Ankara. On the other hand, Lokman Hekim Hospital possesses the highest capacity among hospitals located in district centers. Permission for experimental research could not be obtained at the hospital with the largest bed capacity in the city center of Ankara. On the other hand, patients have free access to examination and treatment services in the emergency departments of all hospitals, regardless of their property status, thus eliminating the public-private distinction for emergency patients. Therefore, within the scope of the case study, the differences in the ownership status of hospitals have not been taken into account. In the case study, the following methodology was employed:

i) Observations and examinations were conducted in the emergency departments. Since they were structured based on different architectural design inputs, components related to the pediatric emergency department have not been included in the scope of the study. The scope of the study is limited to the adult section of the emergency departments.
ii) Following the acquisition of necessary permissions from hospital administrations, on-site assessments were conducted through photographic documentation to capture the existing conditions.

2. PLANNING OF EMERGENCY DEPARTMENTS

In the field of medical science, the concept of "emergency" refers to the immediate need for medical care by a patient. In cases of any trauma or accident, the aim is to prevent and eliminate sudden and life-threatening situations [7]. Given that routine operations within hospitals need to be conducted according

to specific plans and programs and a significant portion of outpatient services operates through appointment systems, establishing an emergency outpatient clinic that operates seamlessly every day of the year has become inevitable. Emergency departments are designed to provide care to patients facing critical or life-threatening conditions [8]. They encompass a specialized team providing continuous service throughout the year, equipped to promptly address the complaints of patients brought to the hospital as emergency cases. These units possess the infrastructure to identify and address underlying issues, possess the necessary equipment for short-term treatment and observation and can facilitate the admission of cases requiring brief stays in the hospital [9]. Aydın (2009) puts it as follows [1]:

"Emergency departments should:
- Possess personnel and medical equipment,
- Provide uninterrupted service with necessary medications, fluids and consumables,
- Ensure seamless provision of service without causing any disruptions in ambulance services."

In our country, the concept of emergency departments can be characterized as relatively new and not fully understood. The establishment of emergency medicine discipline in 1993 and the lack of specialized physicians capable of meeting the demand up until the present day, along with the absence of well-trained designers in this field, can be identified as concrete reasons behind the dissatisfaction with the services provided by emergency departments in our country. The scarcity of an adequate number of specialists has led to the engagement of physicians from various disciplines or general practitioners in emergency departments across the country.

2.1. The Relationship Between Emergency Department and Near Surroundings

There should be directional signs guiding patients to reach the emergency department swiftly from the main transportation approach, aiding them in accessing the unit without delay [10]. To facilitate accessibility and minimize any potential time loss due to vertical circulation elements, it is preferred to locate the emergency department on the ground floor.

Within the premises where the emergency department is situated, separate traffic flows should be arranged for ambulance traffic and general vehicular traffic. The traffic flow within the premises should not hinder the movement of vehicles dedicated to emergency services [11]. A designated parking area should be established in front of the emergency department to enable each vehicle to approach for patient transfer [10]. A U-shaped approach road can be designed in front of the emergency department to facilitate the ambulance's departure after patient transfer, enhancing operational efficiency [12]. Covered emergency parking areas should be strategically placed in close proximity to enable easy access for the staff during emergencies.

In the 26th article of the Private Hospital Regulation (2002), it is defined that an emergency department must have a separate entrance from the hospital's main entrance, which is easily accessible, accommodates ambulance access and permits vehicle entry and exit. Additionally, the entrance should feature a suitable inclined stretcher ramp.

Outpatient entrance and ambulance (stretcher) entrance should be separated in emergency department [11]. This separation of entrances proves beneficial by preventing patients who are physically or mentally compromised from being observed by other walk-in patients, preserving their privacy and dignity.

2.2. Components of an Emergency Department

The spaces within an emergency department can be listed as follows, based on the emergency service operational plan suggestion included in the Minimum Design Standards for Healthcare Facilities 2010 Guide issued by Ministry of Health of Türkiye and the patient flow diagram from a study conducted at the University of Alberta (Figure 1-2):

1. Entrance hall of the emergency department
   1. 1. Entrances for walk-in and ambulance arrival patients
   1. 2. Waiting area
2. Triage Area
3. Resuscitation Room
4. Decontamination Room
5. Examination Rooms
6. Observation Area
7. Pharmacy
8. Laboratory
9. Imaging Units
10. Support Units

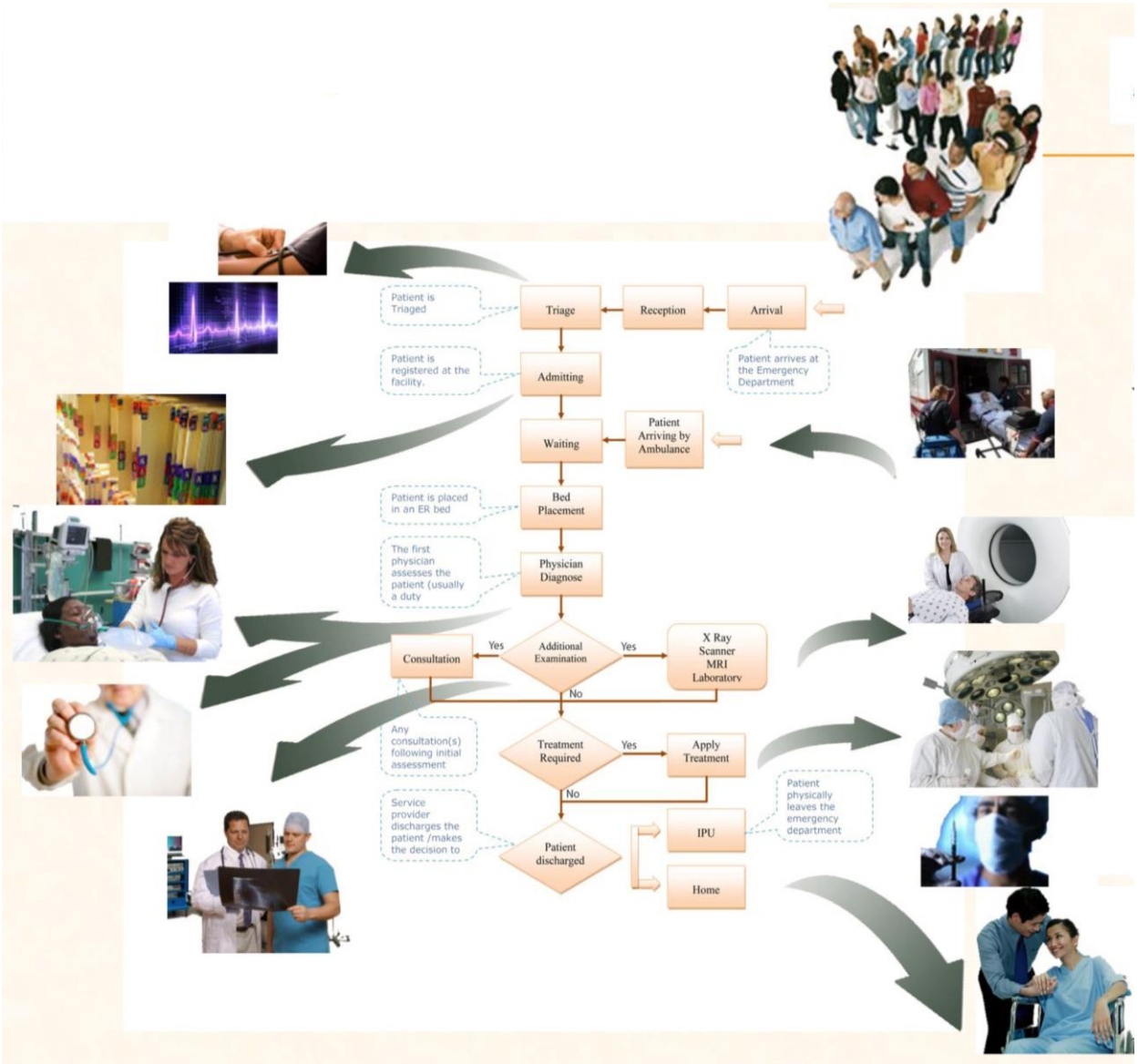


Figure 1. *Patient flow of an emergency department [13]*

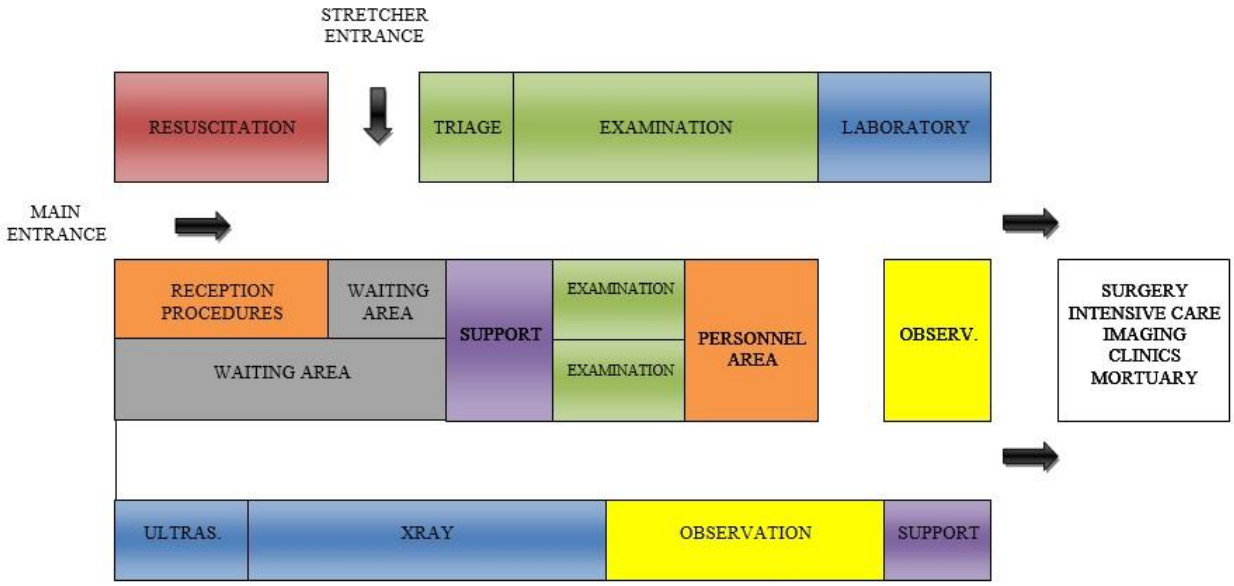


Figure 2. *Proposal of an emergency service operational plan*
(edited by the author through Minimum Design Standards for Healthcare Facilities 2010 Guide-Türkiye)

Entrance hall of emergency department

The unit entrance hall, preferably designed with separate entrances for walk-in patients and those arriving by ambulance, should be directly linked to the resuscitation room, decontamination room, waiting area, stretcher park, reception - document registration unit and security unit.

The reception - document registration unit serves as the place where patients entering the emergency department through the existing system are registered. The reception - document registration unit should have a direct connection to the triage area. As the necessity for examinations, observations or tests for the patient is determined in the triage area, after the patient-physician pre-assessment in the triage area, the patient is directed to the reception - document registration unit for entry. The design of the reception - document registration unit should be spacious enough to accommodate patients and their companions rather than small recording booths, ensuring both auditory and visual privacy [10].

The design of waiting rooms is crucial as they serve as the spaces where patients and their companions form their initial impressions about emergency departments. The waiting room should be easily observable from the reception unit. In order for patients and their companions to feel comfortable and at ease, easy access to essential personal needs and service units such as toilets, cafeteria, television, tea & coffee vending machines should be provided.

Triage area

The function of triage area is to assess patients arriving at emergency department, determine appropriate area (examination room, observation room, imaging unit, etc.) to direct the patient after entry through the documentation and registration unit, if necessary. In triage area, experienced nurses gather information about the patients' complaints, medications and vital signs, making decisions for the process. The importance of triage area is significant in preventing unnecessary examinations and enabling prompt emergency interventions in emergency department.

To prevent time loss, it's beneficial for triage area to be located close to entrances, establishing a direct relationship with the resuscitation room and decontamination room, which are primarily used for patients requiring basic life support. To expedite patient evaluation and prevent congestion within the service, easily accessible sinks can be provided. The triage area can consist of private rooms or a single space with multiple stretchers side by side. In triage areas composed of private rooms, glass surfaces can be utilized

to establish a visual connection with the unit entrance and waiting area, while privacy can be ensured using curtains behind the glass surfaces. Adequate provision of equipment such as pneumatic tube stations and medical gases is expected in the triage area [10].

Resuscitation room

Resuscitation room is utilized for the care of severely injured and critical patients. Direct access from the ambulance entrance is preferred for resuscitation room. Additionally, easy access from resuscitation room to intensive care unit, imaging unit and operating room is expected. Due to the care of patients in critical condition and severe trauma cases, the room should be located away from patient circulation areas and congestion. It is recommended to provide an area where medical personnel can move around patient stretcher in a 360-degree manner to allow intervention on all sides of patient when necessary. Equipping resuscitation room with a mobile X-ray device can facilitate rapid imaging of patients. The room should have sufficient space for equipment, monitors, storage, washing and waste disposal activities. Ensuring both auditory and visual privacy is of paramount importance [11].

Decontamination room

These are areas where patients contaminated with chemical and nuclear substances are treated. The patient is cleaned using the decontamination shower present in the room. In emergency department, access should be provided from the area where ambulance enters and from outside without need to enter another space. In decontamination rooms, there are concepts of the "hot zone" and the "cold zone." The area where patient cleaning is performed is referred to as "hot zone," while the area where the patient is after cleaning and where the staff dress is defined as "cold zone" [10].

Examination room

These are the spaces where emergency cases related to various specialties such as orthopedics (casting room), ophthalmology, otolaryngology, gynecology and pediatrics are evaluated. The purpose of the examination rooms is to conduct a detailed evaluation of the patient, whose anamnesis is taken during triage, in order to diagnose their condition. As part of the diagnosis, the patient may be referred to observation rooms, imaging areas, outpatient clinics, etc. The components and furnishings that should be present in examination rooms can be listed as follows:
- Doctor's desk,
- Dressing area,
- Doctor's consultation area,
- Sink [1].

It is important to design the numerical and size of examination rooms in proportion to capacity of emergency departments and to provide natural ventilation/lighting options for these spaces.

Observation area

In the design of emergency department, the current approach is towards having single-patient observation rooms [10]. This approach enhances patient comfort, the need for privacy, reduces the risk of infection and increases user satisfaction [14]. Single-patient observation rooms should be designed in a way that is similar to the triage area, allowing them to be observed by the central nurse-doctor workspace [12]. The rooms should be arranged around the nurse's workspace in a "U" shape whenever possible. This layout enables the staff to monitor all patients effectively [15].

Pharmacy and laboratory

It can be noted that the specificity of pharmacy services within the emergency department varies depending on the size of the unit and the annual patient care volume. In cases where there is no dedicated pharmacy for the unit, medication storage areas are usually planned near the patient care zones.

The necessity of having a dedicated laboratory for the unit is a topic discussed in the field of emergency department architecture. Considering that laboratory results might slow down emergency services, efforts should be made to find solutions in collaboration with laboratory personnel. The idea of increasing efficiency through a unit-specific laboratory should not burden emergency department further. However, it cannot be claimed that the emergency laboratory is unsuccessful in speeding up services [10].

Imaging units

In departments with an annual patient care count exceeding 20,000, having dedicated imaging facilities for the departments is recommended. The presence of imaging services in departments with a high number of patients can facilitate prompt service delivery [10]. Transferring a patient from emergency department to the hospital's radiology unit is not a preferred method. The positioning of imaging units in easily accessible areas, reachable from both outpatient and ambulance entrances, as well as from resuscitation rooms, observation areas and examination rooms, is necessary for the rapid assessment of emergency cases.

3. CASE STUDY

3.1. Emergency Department of Gazi University Hospital

The campus of Gazi University Hospital is situated in a narrow area with heavy vehicle traffic. Although there are multiple pedestrian entrances to the campus, vehicle access can only be made from a single point (via the Ankara-Konya Highway). The fact that vehicle access to the campus is limited to a single point leads to increased congestion of vehicle traffic during the day, making access to the emergency department more challenging (Figure 3).

Figure 3. *Entrance point of emergency department of Gazi University Hospital*

The emergency department is located within the campus between Radiation Oncology Block and Polyclinic Block. It can be noted that there is no horizontal expansion possibility for the emergency department in the future due to advancements in medical technology and capacity increase. One of the blocks constituting the entirety of the hospital functions as the emergency department (Figure 4). The emergency department can be accessed from both outside and within the hospital. Controlled passage from the emergency department’s 1st floor to other units within the hospital is facilitated (Figure 5).

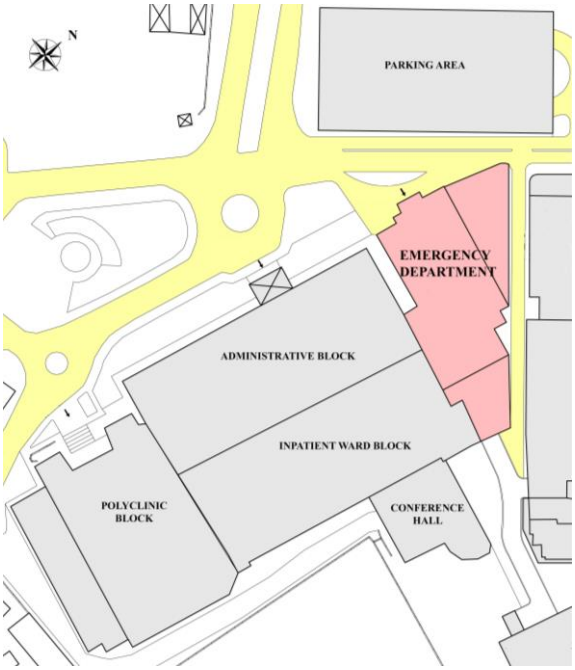


Figure 4. *Site plan of emergency department of Gazi University Hospital*

Figure 5. *The connection between the main building and the emergency department of Gazi University Hospital*

During the period of the study, there were three parking areas available within the campus of Gazi University Hospital that were accessible to users of the emergency department. The first one was a parking area serving university personnel, the second one was a three-story covered parking area catering to the medical faculty members and the third one was a paid public parking area serving the general public. During the period of the study, in the adult section of the emergency department, the following facilities were present:

- A waiting area of 90 m² that also serves the pediatric section.
- A triage area of 10 m².
- Two resuscitation rooms with dimensions of 16 m² and 50 m², totaling 8 beds.
- Four examination rooms with a combined area of 70 m² and a total of 9 beds.
- A casting room with an area of 18 m².
- Three observation rooms with dimensions totaling 95 m² and 14 beds.
- A unit-specific laboratory with an area of 38 m².
- A unit-specific radiology department with an area of 75 m².
- A meeting room with an area of 35 m².
- A pharmacy with an area of 15 m².
- Seven staff rooms with a combined area of 76 m².
- Two toilets.

In the pediatric emergency section, the following facilities were available:

- Three examination rooms with dimensions totaling 30 m² and 3 beds.
- Two observation rooms with dimensions totaling 100 m² and 10 beds.
- One toilet (Figure 6).

Figure 6. *Emergency department plan.of Gazi University Hospital*

3.2. Emergency Department of Lokman Hekim Hospital

Located along Polatlı 2 Boulevard, the Lokman Hekim Hospital campus provides accessibility for both vehicular and pedestrian traffic from all directions. However, the roads leading to the emergency

department also serve nearby residential users, which can lead to increased traffic congestion and potential slowdown of emergency services (Figure 7).

Figure 7. *Entrance point of emergency department of Lokman Hekim Hospital*

Lokman Hekim Hospital is a healthcare facility encompassing emergency department, polyclinics, administrative units and inpatient services within a single block. The design of the emergency department is such that it is either fully integrated or partially integrated into the hospital mass, which eliminates the possibility of vertical and horizontal expansion for the unit in the future, considering advancements in medical technology and capacity increase. A portion of the ground floor of the hospital serves as the emergency department (Figure 8). Access to the emergency department is available both from outside and within the hospital. Controlled passage from the emergency department to other units within the hospital is facilitated (Figure 9).

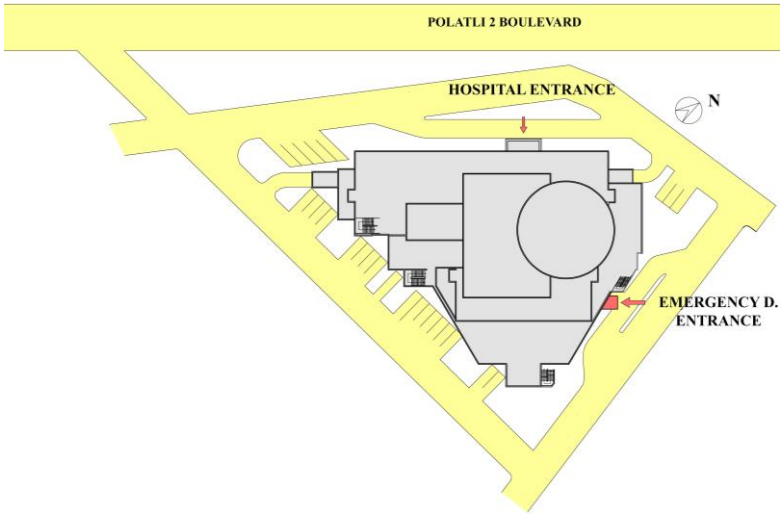


Figure 8. *Site plan of emergency department of Lokman Hekim Hospital*

Figure 9. *The connection between the main building and the emergency department of Lokman Hekim Hospital*

Within the campus of Lokman Hekim Hospital, parking areas available for the users of the emergency department are limited. Apart from the hospital's main entrance parking area, users have the option to use parking areas located on the streets surrounding the hospital vicinity. During the period of the study, the emergency department comprises:

- Three adult examination rooms with a total of 46 m^2 area and 3 beds,
- A pediatric examination room with an area of 15 m^2 and 1 bed,
- A resuscitation room with an area of 20 m^2 and 2 beds,
- A pediatric observation room with an area of 35 m^2 and 5 beds,
- An adult observation room with an area of 75 m^2 and 8 beds,
- A medication storage room with an area of 8 m^2,
- A casting room with an area of 13 m^2 and 1 bed,
- An injection room with an area of 7 m^2 and 1 bed,
- Three toilets, one of which is accessible for disabled individuals (Figure 10).

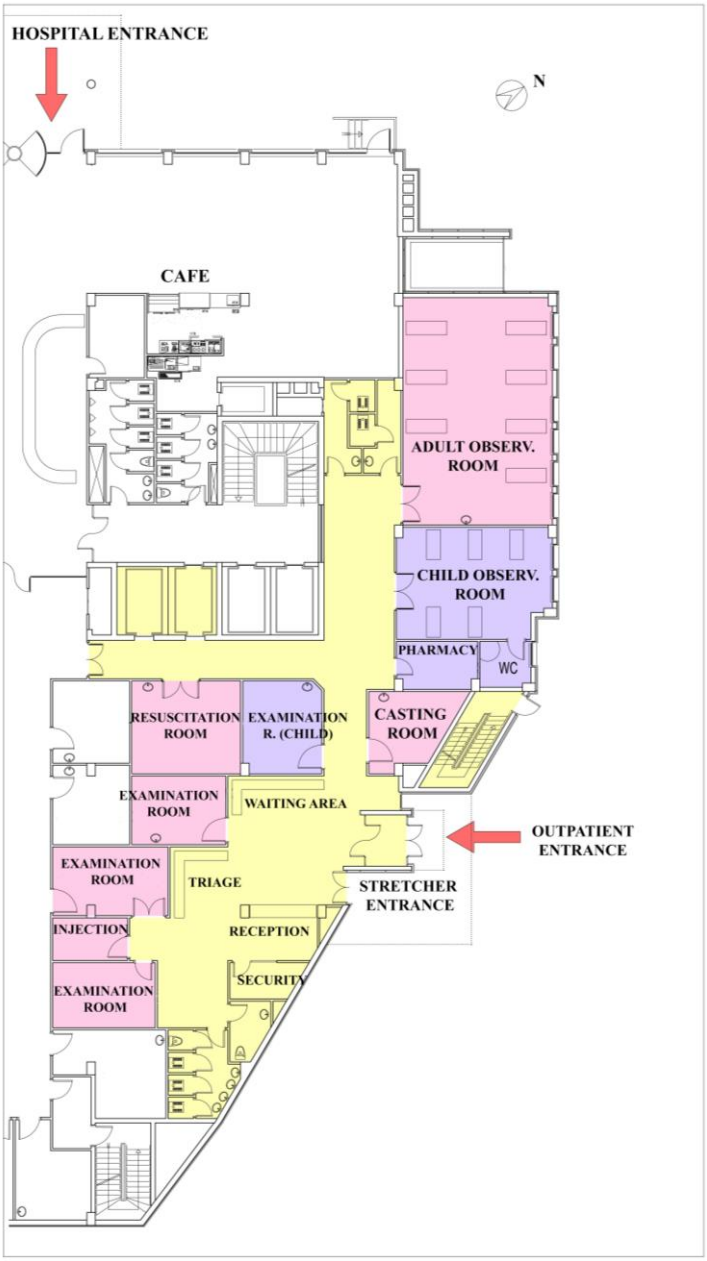


Figure 10. *Emergency department plan.of Lokman Hekim Hospital*

3.3. Findings related to emergency departments of Gazi University Hospital and Lokman Hekim Hospital

The findings obtained through observations, examinations and architectural project analyses related to the components of the sample set are listed in Table 1.

Table 1. *Findings regarding spatial characteristics of the emergency departments*

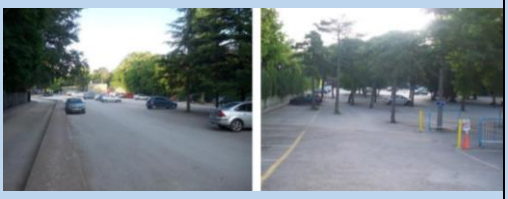
Component of emergency department	Emergency Department of Gazi University Hospital	Emergency Department of Lokman Hekim Hospital
Surrounding environment		
	The emergency departments of Gazi University Hospital and Lokman Hekim Hospital were not prominently visible from the main road. The reason for the units not being easily visible from the main road could be attributed to the lack of adequate frontage of the units facing the main road. This situation could pose difficulties for patients and their families trying to reach the unit.	
Parking areas		
	The relationship between the parking areas and the entrance points in both emergency departments has been perceived negatively. This situation is believed to be attributed to the distant proximity of the parking areas from the emergency department at Gazi University Hospital, the limited availability of parking areas for the emergency department at Lokman Hekim Hospital and the utilization of parking areas associated with residential zones.	
Entrance points		
	The entrance point of emergency department of Lokman Hekim Hospital.has been deemed less suitable for patient evacuation compared to the emergency department of Gazi University Hospital. It has also been found to be inadequate in terms of lighting levels and uninterrupted availability of ambulance access.	
Entrance hall & Waiting area		
	The size and adaptability of the entrance halls and waiting rooms in both emergency departments have been found insufficient. The distance of the entrance halls and waiting areas from overcrowding has not been positively evaluated in either of the emergency departments.	

Table 1. (Continued) *Findings regarding spatial characteristics of the emergency departments*

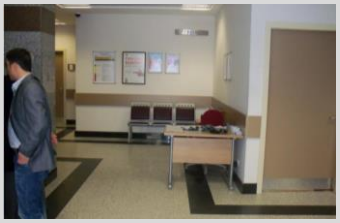
Component of emergency department	Emergency Department of Gazi University Hospital	Emergency Department of Lokman Hekim Hospital
Triage area		
	It can be stated that the size, visual and auditory privacy and many other user requirements of the triage areas in both emergency departments are not adequately met. As a reason for this, the improper planning of the triage areas in the departments in alignment with their intended use can be indicated.	
Resuscitation room	 	
	It can be noted that the resuscitation rooms in both emergency departments are suitable in terms of purpose, size and arrangement of patient beds. However, the inadequacy of the relationship with ambulance entry, radiology unit, operating room and intensive care unit, as well as the rooms not being located in a separate area to avoid overcrowding, can be negatively evaluated due to its impact on the efficiency of staff work. In the emergency department of Gazi University Hospital, the observability of resuscitation rooms by medical personnel compared to the resuscitation room of Lokman Hekim Hospital's emergency department is important for patient satisfaction. Additionally, the lack of privacy in the resuscitation rooms in both departments can cause concern, especially for patients.	
Examination rooms & observation rooms	 	 
	The lack of organization of examination and observation rooms within the controlled area application in the emergency department of Lokman Hekim Hospital, unlike in Gazi University Hospital's emergency department, can lead to user dissatisfaction. Due to the absence of a controlled area application, unnecessary overcrowding has been observed in the treatment areas of Lokman Hekim Hospital's emergency department. In the emergency department of Gazi University Hospital, it has been determined that both patients and technical-medical personnel do not have access to daylight, which has been considered negatively in terms of achieving user satisfaction.	

Table 1. (Continued) *Findings regarding spatial characteristics of the emergency departments*

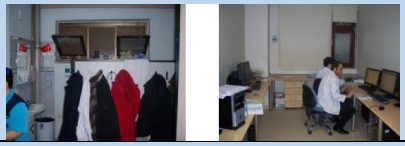
Component of emergency department	Emergency Department of Gazi University Hospital	Emergency Department of Lokman Hekim Hospital
Casting room		
	The general appearance of the casting room in Gazi University Hospital's emergency department, compared to the casting room in Lokman Hekim Hospital's emergency department, may create a more negative impression on the users due to the quality of materials used, insufficient lighting levels and its location, which may result in using the space as a circulation area within the unit.	
Pharmacy		
	The pharmacies in both emergency departments have been notably inadequate in terms of location, size, adaptability to changes, lighting levels and level of comfort. While pharmacies are not spaces where technical-medical personnel spend extended periods of time, meeting these requirements is still expected within the pharmacy environment.	
Laboratory & Imaging Units	 	-
	In the emergency department of Lokman Hekim Hospital, there is no dedicated unit-specific laboratory. On the other hand, the laboratory present in Gazi University Hospital's emergency department gives the impression of being appropriately sized for the department's capacity. Lokman Hekim Hospital's emergency department does not have a dedicated unit-specific radiology unit. In contrast, the radiology unit present in Gazi University Hospital's emergency department is located in a distant area from the main entrance, which has been observed to make it difficult for patients arriving.	
Personnel rooms		-
	In the emergency department of Gazi University Hospital, the personnel rooms have been observed to be insufficient in terms of size and quantity. Due to reasons such as inadequate lighting, lack of access to daylight and insufficient level of comfort, the quality of the space is reduced. It has been determined that there is no personnel room in the emergency department of Lokman Hekim Hospital.	

Table 1. (Continued) *Findings regarding spatial characteristics of the emergency departments*

Component of emergency department	Emergency Department of Gazi University Hospital	Emergency Department of Lokman Hekim Hospital
Stairs & corridors & toilets		
	In both emergency departments, the corridors have been found to be insufficient in size. This situation could be attributed to the lack of storage areas, which leads to the positioning of stretchers, wheelchairs and some medical equipment in the corridors. The shortage of toilets is notably observed in the emergency department of Gazi University Hospital. The absence of toilets available for patients and their companions, particularly in the waiting area, has been identified as a significant issue. Adequate arrangements for disabled individuals have not been made in the toilets. It is observed that some toilets are converted into storage or changing rooms during the usage process. The number of toilets in Lokman Hekim Hospital's emergency department is more suitable for capacity compared to Gazi University Hospital's emergency department. There is one disabled toilet in the department. However, it has also been observed that some toilets have been converted into storage areas in this department as well.	

The conditions related to functional, technical and psycho-social requirements, which have been elaborated in detail based on observations and examinations in Emergency Department of Gazi University Hospital and Lokman Hekim Hospital, can be collectively read as presented in Table 2.

Table 2. *Assessment table for adequacy of user requirements*

		Surrounding environment		Parking areas		Entrance points		Entrance hall & Waiting area		Triage area		Resuscitation room		Examination rooms & observation rooms		Casting room		Pharmacy		Laboratory & Imaging Units		Personnel rooms		Stairs & corridors & toilets	
Functional requirements	Availability for purpose			-	-			-	-	-	-	+	+	+	+	-	+	-	-	+	**X**	-	**X**	+	+
	Adaptability to changes							-	-	-	-	-	-	-	-	-	-	-	-	-	**X**	-	**X**	-	-
	Location			-	-			+	-	-	-	-	-	+	-	-	+	-	-	-	**X**	-	**X**	-	-
	Size/Numerical sufficiency	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	-	-	+	**X**	-	**X**	-	+

Table 2. (Continued) *Evaluation table created based on user requirements*

		Surrounding environment		Parking areas		Entrance points		Entrance hall & Waiting area		Triage area		Resuscitation room		Examination rooms & observation rooms		Casting room		Pharmacy		Laboratory & Imaging Units		Personnel rooms		Stairs & corridors & toilets	
Technical requirements	Level of lighting			-	+	+	-	+	+	+	+	+	+	+	+	-	+	-	-	+	X	-	X	-	-
	Suitability for climate conditions					+	-														X		X		
	Daylight utilization							-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	X	-	-
Psycho-social requirements	Overall appearance of the space	-	-	-	-	+	-	-	-	-	-	+	+	-	-	-	+	-	-	+	X	-	X	-	-
	Level of privacy							-	-	-	-	-	-	-	-	-	+				X	-	X		
	Level of spaciousness							-	-	-	-	-	+	-	-	-	+	-	-	-	X	-	X	-	-

Emergency Department of Gazi University Hospital	
Emergency Department of Lokman Hekim Hospital	

4. CONCLUSION

Spaces created in accordance with individuals' needs can eventually become inadequate in meeting user requirements. In the context of emergency departments, factors like increased capacity, innovations in medical technologies and changes in individual preferences and expectations can contribute to this situation. Evaluating the usage process of emergency departments will facilitate making decisions for improving the existing ones over time, in alignment with evolving technologies and establishing criteria for designing new emergency departments in the future.

The results of the case study indicate that, overall, user requirements are not adequately met in both emergency departments. In emergency departments, it can be deduced that proper spatial organization, the presence of an adequate number of components in line with capacity and their organization to accommodate potential changes in requirements over time, as well as facilitating diverse uses when needed, play a crucial role in achieving user satisfaction and providing effective service. Capacity expansion, innovations in medical technologies and potential functional obsolescence due to changes in individual preferences and expectations can be mitigated through flexible solutions that adapt to developments, offer various possibilities and prevent functional obsolescence.

The proper design of the relationship between emergency departments and their surrounding environment is crucial and it can be highlighted that parking requirements are among the most significant challenges. Analyzing the connection between the department and parking areas is advisable. In case of an increase in department capacity, it should be taken into consideration that this change should also be reflected in the parking area capacity.

In order to enhance the quality of emergency departments, it can be stated that planning decisions that can adapt to change, innovations and adequately meet user requirements are of great importance for emergency departments, especially considering that the standards set by the Ministry of Health of Türkiye may expand in the future. Thus in Türkiye, conducting post occupancy evaluation during the usage stage in emergency departments and the legal regulations structured based on the outcomes of these studies to contribute to emergency department planning processes, are considered important for ensuring the provision of minimum user requirements.

It is recommended that this study be used as a guide by future researchers for the purpose of enabling various units within hospitals affiliated with the Ministry of Health of Türkiye and universities to be utilized in a capacity-appropriate, functional, long-lasting and cost-effective manner.

NOTES

This study was derived from the master's thesis titled "Emergency Department Design with User Participation", completed under the supervision of Prof. Dr. Sare SAHİL in 2012. The publication of this study as a single-authored work was done with the knowledge and consent of Prof. Dr. Sare SAHİL.

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* The plans of the emergency department of Gazi University Hospital were obtained from Gazi University Directorate of Construction and Works, while the plans of the emergency department of Lokman Hekim Hospital were acquired from Altu Architecture – Engineering Co. within the scope of this study.

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