

# SATURATION AND OVERCROWDING OF THE EMERGENCY SERVICE OF AN URBAN HOSPITAL

SATURACIÓN Y HACINAMIENTO DEL SERVICIO DE EMERGENCIA DE UN HOSPITAL URBANO

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ORIGINAL PAPER

## ABSTRACT

**Introduction:** The saturation and overcrowding of patients are a problem in the emergency service.

**Objective:** To describe the characteristics of the demand for medical attention to the emergency service of an urban hospital and to assess its overcrowding. **Methods:** Observational study carried out at the Rebagliati hospital, first quarter 2019. Sociodemographic variables, time and emergency indicators of the institutional statistical system were evaluated. Descriptive statistics were performed with IBM SPSS 24.

**Results:** Of 5,1244 attentions in patients between 14 and 102 years (median 60), 56.7% were female. 18% recorded more than one service in the quarter. The day of greatest demand was Monday and the hours between 08 and 13 hours. Priority care III and IV were 83.5% of the total. In the topics of medicine and relief, 63% of care was performed. In the trauma-shock unit, 3% of the care was performed. 13% of emergency care were admitted to observation rooms. The most frequent diagnoses were respiratory failure, infections and strokes. 88% of admissions were made in common rooms with a stay between 4.4 and 7.0 days. 0.8% of those seen died, surgery was performed in 0.7%, and 0.1% was transferred to another facility, respectively.

**Conclusion:** The demand to the emergency service is mainly due to medical problems (priority 3 and 4), predominantly elderly and female patients. 13% of those attended were admitted with a long stay, low mortality, very few transfers and a high rate of return.

**Key words:** Demand for health services; Saturation of services; Overcrowding; Emergency service (source: MeSH NLM).

## RESUMEN

**Introducción:** La saturación y hacinamiento de pacientes son un problema en el servicio de emergencia.

**Objetivo:** Describir las características de la demanda de atención médica al servicio de emergencia de un hospital terciario de la seguridad social y evaluar su hacinamiento. **Métodos:** Estudio observacional realizado en el hospital Rebagliati, primer trimestre 2019. Se evaluaron variables sociodemográficas, de tiempo e indicadores de emergencia del sistema estadístico institucional. Se realizó estadística descriptiva con IBM SPSS 24.00.

**Resultados:** 51294 atenciones en pacientes entre 14 y 102 años (mediana 60), 56,7% de sexo femenino. 18% registró más de una atención en el trimestre. El día de mayor demanda fue el lunes y el horario entre 08 y 13 horas. Las atenciones de prioridad III y IV fueron el 83,5% del total. En los tópicos de medicina y de alivio se realizaron el 63% de atenciones. En unidad de trauma-shock se realizaron el 3% de las atenciones. Se admitieron en las salas de observación el 13% de las atenciones de emergencia. Los diagnósticos más frecuentes fueron insuficiencia respiratoria, infecciones y accidentes cerebrovasculares. El 88% de las admisiones se realizaron en salas comunes con una estancia entre 4,4 y 7,0 días. Falleció el 0,8% de los atendidos, se realizó intervención quirúrgica en el 0,7% y se transfirió a otro establecimiento al 0,1% respectivamente. **Conclusión:** La demanda al servicio de emergencia es principalmente por problemas médicos (de prioridad 3 y 4), predominando pacientes adultos mayores y de sexo femenino. Se admitió al 13% de los atendidos con estancia prolongada, baja mortalidad, muy pocas transferencias y alta tasa de retorno.

**Palabras clave:** Demanda de servicios de salud; Saturación de servicios; Servicio de emergencia (fuente: DeCS BIREME).

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**Cite as:** Waldo Taype-Huamani, Delcio Miranda-Soler, Lino Castro-Coronado, José Amado-Tineo. Saturation and overcrowding of the emergency service of an urban hospital. Rev. Fac. Med. Hum. April 2020; 20(2):216-221. DOI 10.25176/RFMH.v20i2.2709

Journal home page: <http://revistas.urp.edu.pe/index.php/RFMH>

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## INTRODUCTION

The emergency service is a fundamental area in hospital operations, whose main objective is to save the patient's life or prevent disabling sequelae. It operates 24 hours a day, 7 days a week and in second or third level hospitals has specialized units and high resolution<sup>(1)</sup>.

For more than two decades in the emergency service of the main hospitals in the country, the demand for medical care has increased, with stretchers persisting in passageways and long waiting times<sup>(2-4)</sup>. This is not exclusive to a hospital or the social security system (EsSalud), but is also present in other health subsystems (ministry of health, armed forces and even in the private sector), especially in the urban area of our country<sup>(5)</sup>.

The overcrowding of patients is one of the main problems of the emergency service, reported worldwide, influenced by many factors<sup>(6-9)</sup>. Causes can be grouped into pre, intra and post-emergency service stages. Among the pre-emergency factors, inadequate consultation stands out, with reports of up to 70%, with the most frequent causes being the patient's own initiative (or decision), no appointments in primary care, and lack of medication, related to minor diseases<sup>(5,10)</sup>.

The main intra-emergency factors that influence overcrowding are: delay in initial care (operation of hospital triage), delay in diagnostic assistance, administration of treatment or availability of observation beds. Post-emergency factors include the availability of beds in hospital floors, other hospitals, and transportation for patient transfer<sup>(10)</sup>.

Despite the improvements implemented in the infrastructure of several hospitals, the problem remains, so this work seeks to describe the characteristics of the demand for medical care in the adult emergency service of a tertiary social security hospital and assess its overcrowding during the first quarter of 2019.

## METHODS

### Design

Observational study carried out in the emergency service of adults at the Edgardo Rebagliati Martins Essalud National Hospital (Lima-Peru), during the first quarter of 2019, without including gynecological or psychiatric emergencies.

## Population and Sample

This service provides more than 160 thousand cares per year for people over 14 years of age<sup>(2)</sup>.

Since 2016, the emergency service operates in a 5-level facility, using a structured triage system of 5 priorities (Manchester type), the patient arriving is directed to the initial assessment area, according to their care priority: trauma-shock unit, medical topics (priority 2 or 3), surgery, trauma and relief (priority 4 or 5).

For patients who are admitted there are critical care observation rooms: intensive (12 beds), intermediate (20 beds), chest pain (10 beds) and neurovascular (10 beds). There are also three general observation rooms with 42 beds each and a re-evaluation room with 24 stretchers, the number of which is increased according to demand.

The service has exclusive staff, 110 emergency, internal medicine and intensive care physicians, 300 nurses and 400 nursing technicians, as well as other health professionals such as psychologist, social worker, nutritionist and administrative staff. It also has other specialists on duty for 12 hours (cardiologist, neurologist, nephrologist, gastroenterologist, surgeon, anesthesiologist and traumatologist) and other specialties that come for consults.

## Procedures

The admission and triage of the patient was carried out in computerized systems, as well as the entry and exit to the different areas of the emergency service. Diagnostic aid tests were conducted in separate computer systems. However, the register of medical care, nursing, procedures, consultations and pharmacy responses were carried out manually (handwritten on paper).

## Statistical Analysis

The institutional statistical system was revised by selecting all hospitality between 1 January and 31 March 2019. Sociodemographic variables, arrival time, area of care, destination and main emergency indicators were evaluated. The data was encoded and processed in Microsoft Excel 2010. Descriptive statistical analysis and comparative graphs were performed in IBM SPSS 24.0.

## Ethical Considerations

Principles of good investigative practice were followed with the authorization of the head of the service.

## RESULTS

During the first quarter of 2019, 51294 patients aged between 14 and 102 years (median 60) were treated, 56.7% were female. 18% of patients registered two or more visits during the trimester evaluated. The number of daily attentions is shown in Figure 1, by topic of attention in Figure 2 and the number of attentions per hour and priority are shown in Figure 3. The services classified as priority III (31161) and IV (10684) totaled 42845, corresponding to 83.5% of the total of services in this period.

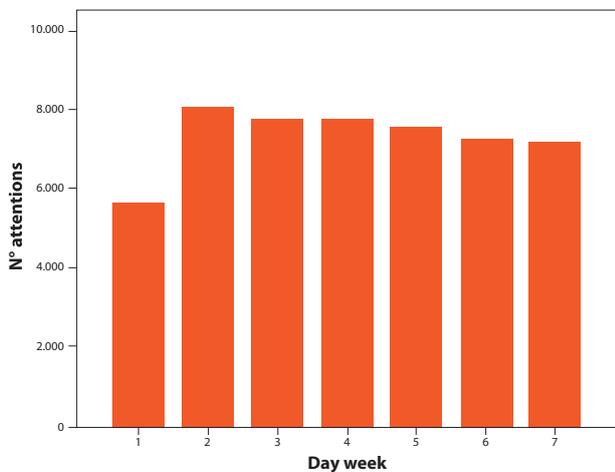
The most frequent diagnoses after initial care (CIE-10 code registered in the institutional system) were: abdominal pain 7.2%, urinary tract infection 5.1%, acute diarrhea 4.4%, low back pain 4.1%, acute pharyngitis 2.7% and headache 2.3%; The rest corresponded to more than 20 less frequent pathologies. There were 422 deaths (0.8% of total care), 391 surgeries (0.7%) and 69 transfers (0.1%).

There were 6683 admissions to observation rooms of the service (13% of total attendance). Female 50.2%

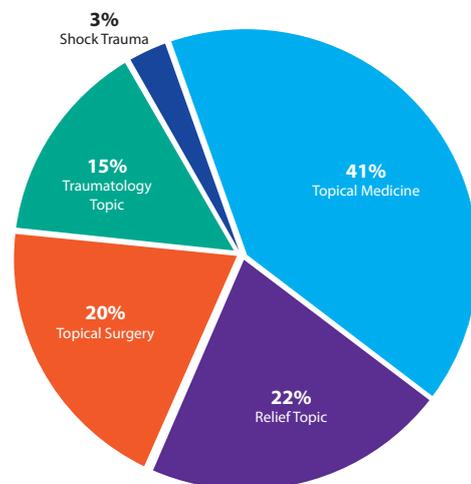
and median age 65 years. 13% of patients admitted had two or more emergency admissions during the trimester evaluated. The most frequent diagnoses of patients admitted to emergency observation rooms were respiratory failure 7.6%, sepsis 6.1%, urinary tract infection 4.1%, stroke 4.0%, abdominal pain 3.1%, and pneumonia 2.4%.

From the total admissions, it corresponded to the re-evaluation room 43%, observation 45.7%, intermediate care 3.4%, neurovascular chest pain 7.6% and intensive care 0.3% respectively. 80% of patients in the intensive and intermediate care rooms were on invasive mechanical ventilation and inotropic support.

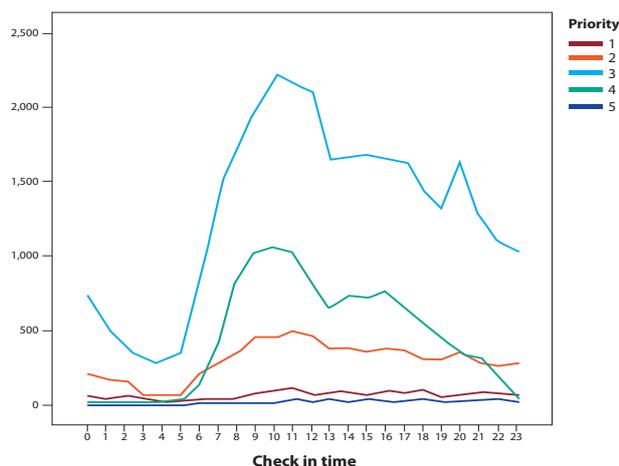
The daily flow of patients is presented in Table 1, of which the reevaluation room (of 24 emergency beds) extends to the passageways of the second floor, increasing its capacity up to 3 or 4 times. The destination of patients to the emergency patient care center is shown in Figure 4. The average stay and mortality per ward are shown in Table 2. The average overall stay in observation rooms of the emergency service was 5.7 days and its overall mortality was 9%.



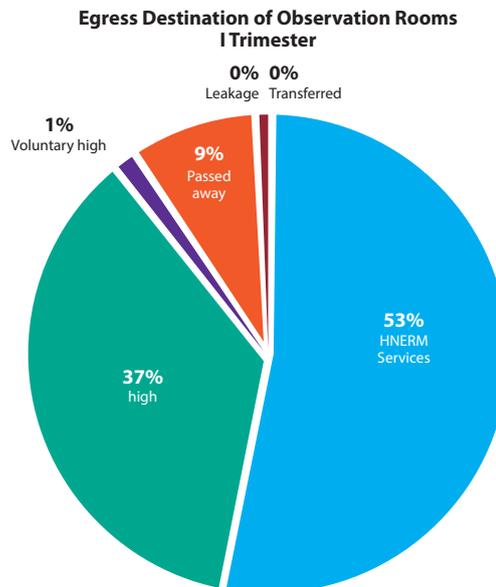
**Figure 1.** Number of daily visits by day of the week in the emergency service of an urban hospital, January-March 2019.



**Figure 2.** Percentage of attentions according to topic of admission to the emergency service of an urban hospital, January-March 2019.



**Figure 3.** Number of attentions according to priority of care and time of arrival at the emergency service of urban hospital, January-March 2019.



**Figure 4.** Destination of patients admitted to observation rooms of the emergency department of an urban hospital, January-March 2019.

**Table 1.** Daily flow of patients admitted to observation rooms of the emergency department of an urban hospital, January-March 2019.

Emergency unit	N° Beds	Daily-income		Egress-daily	
		Of topics	Other room	Discharges	Hospital
Reevaluation room	24-80	21	1	10	5
Observation medicine	84	14	2	6	8
Observation surgery	40	5	1	3	4
Intensive care	14	< 1	< 1	-	< 1
Intermediate care	20	2	1	-	< 1
Neurovascular chest pain	20	4	1	2	1

**Table 2.** Stay and mortality by observation rooms of the emergency service of an urban hospital, January-March 2019.

Emergency unit	N° Beds	Stay (days) *	Mortality (%) **
Reevaluation room	24-80	4.4	1
Observation medicine	84	5.9	16
Observation surgery	40	7.0	6
Intensive care	14	12.6	37
Intermediate care	20	9.5	66
Neurovascular chest pain	20	5.3	2

\* Average stay in days, \*\* % of total patients per room.

## DISCUSSION

The over demand for care and overcrowding of patients is maintained in the emergency service of Rebagliati hospital, with high frequency in the morning hours, higher on Mondays and with a significant decrease on Sundays, similar to previous reports in local and other places in Latin America<sup>(2,11-13)</sup>. despite having a new infrastructure in our specific case.

The focus is on priorities III and IV, topics of medicine and alleviation similar to 2015<sup>(2)</sup>. The percentage of attentions that corresponded to "non-emergencies" was similar to what was reported by the ombudsman's office in 2016<sup>(14)</sup>. It is noteworthy that almost a fifth of patients come more than once in this trimester, a fact not previously reported in our country, but which was a reality.

Returning patients correspond to patients who complete outpatient parenteral treatment; Patients referred for invasive procedures that for lack of outpatient supply is satisfied that demand for patient safety, patients with indication to return to their respective appointments for diagnostic help. Inappropriate uses of emergency services, also reported elsewhere<sup>(13,15)</sup>.

The demand for care in the emergency service is predominantly in elderly patients (50% are over 60 years old) with a slight predominance of females, for very diverse care reasons, reflecting the effects of the epidemiological transition and problems in the primary level of care in the national social security<sup>(2,11,12)</sup>. Also reported in other countries, where the decompensation of chronic diseases is a cause of frequent use<sup>(13)</sup>.

Regarding mortality at emergency admission, 0.8% of the total number of visits was reported, similar to what was reported in 2015, less than 2%, which is indicated by the technical standard of the local ministry of health<sup>(1,2)</sup>. A low proportion of surgical interventions was reported 0.7% of the attentions, influenced by the high frequency of non-emergency attentions.

The very low transfer rate (0.1%) is noteworthy, assuming that the majority of procedures performed in highly complex facilities should be performed in less complex facilities. This is due to the lack of resolution capacity in other health facilities, where there is no 24-hour emergency consultation, lack of staff and inpatient facilities. But it is also influenced by the direct demand of users who do not go to the first level of care as well as the references made to our emergency without coordinating or considering the complexity of the patient.

Were admitted to observation rooms 13% of attentions, lower than 2015, however 13% had more than one admission in a single quarter (more than half of 21% per year reported in 2015 and also higher than 2012 in the same service)<sup>(2,3)</sup>.

This indicates that a lower proportion of attentions are being hospitalized, but with greater recurrence, making use of various mechanisms such as outpatient intravenous treatments, invasive diagnostic procedures (radiology, pneumology or gastroenterology) in order to reduce stay and overcrowding in the emergency, but also represent inadequate hospitalizations<sup>(16)</sup>.

The average stay in reevaluation rooms was 4 days and sometimes there were up to 84 stretchers in the passageways. This is in line with what the ombudsman's office said in its report on the state of emergency of Lima 2016, where it mentions institutionalization of the corridor, overcrowding and permanence of more than 12 hours. It corresponds to a problem of the entire health system and not just of a hospital service<sup>(14)</sup>.

The medical and surgical observation rooms shelter patients mainly for problems that are no longer emergency with a stay of 6 to 7 days, with a high percentage of discharge at home. This means that emergency observation rooms have been converted into inpatient rooms for other medical and surgical services, where treatments and diagnostic studies are completed due to lack of beds in other hospital services. It could also express the need for more hospital beds for complex and chronic patients (long-stay units).

The overall mortality of patients admitted to the emergency department is low (9% of patients admitted), but when comparing the different wards, there are large differences. A special case is the intermediate room with high mortality rates, but behind which are important factors such as previous situation of patients (often with terminal chronic illness in a situation of last days or agony) or stay critically ill patients due to lack of beds in intensive care units.

This study does not evaluate waiting times for patient care or delay in hospitalization due to lack of beds, as reported by a study of overcrowding of emergency services in Colombia and others in our country<sup>(4, 11,17)</sup>; However, the number of patients (especially in the re-evaluation room) and the prolonged stay in emergency confirm the overcrowding that has been occurring for more than a decade and has to do with the entire health system<sup>(2,3)</sup>.

Among the main limitations of the study are that it was conducted in a single hospital during three months of the year, the data were recorded by non-medical personnel

asynchronously, the diagnoses are not uniform and part of the care was not recorded electronically. Another limitation was not to use scales to quantify crowding, but as previously reported they always result in the highest score<sup>(4)</sup>. However, what has been reported is an important contribution and could represent the reality of other hospitals with similar characteristics nationwide.

## CONCLUSION

It is concluded that the demand to the emergency service of the hospital evaluated is mainly due to medical problems (priority 3 and 4), predominantly elderly and female patients. 13% were admitted with

prolonged stay, low mortality, very few transfers, high rate of return and insufficient supply of hospital beds. The over demand for care and overcrowding of patients persist.

**Authorship contributions:** The authors participated in the genesis of the idea, project design, data collection and interpretation, analysis of results and preparation of the manuscript of the present research work.

**Financiamiento:** Autofinanciado.

**Conflicto de interés:** Los autores declaran no tener conflicto de interés en la publicación de este artículo.

**Recibido:** 04 de febrero 2020

**Aprobado:** 20 de marzo 2020

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