

Análise Regional das Autorizações de Internação Hospitalar para Tratamento de Fraturas Faciais no Estado da Paraíba

Regional Analysis of Hospital Admission Authorizations for the Treatment of Facial Fractures in the State of Paraíba
Análisis regional de las autorizaciones de ingreso hospitalario para el tratamiento de fracturas faciales en el estado de Paraíba

RESUMO

Objetivo: Este estudo tem como objetivo analisar essa demanda entre 2014 e 2024, fornecendo subsídios para o planejamento e a distribuição de recursos em saúde. **Materiais e Métodos:** Utilizando dados de AIHs do sistema DATASUS, foram analisados os tipos de fraturas industriais em hospitais estaduais, incluindo o número de autorizações, o tempo médio de internação e os óbitos associados. A metodologia envolveu uma análise descritiva da evolução das AIHs e da distribuição entre as diferentes portas hospitalares. **Resultados e Discussão:** Os dados mostram um aumento significativo das AIHs ao longo do período, com maior concentração em hospitais de referência, como o Hospital Dom Luiz Gonzaga Fernandes e o Hospital Senador Humberto Lucena, que atendem a maior parte dos casos complexos. Os resultados indicam a necessidade de descentralização do atendimento e fortalecimento dos hospitais regionais, a fim de melhorar o acesso e reduzir a sobrecarga dos grandes centros. **Conclusões:** O aumento das internações por fraturas faciais e a concentração dos atendimentos em hospitais de referência indicam a necessidade de descentralizar a assistência e fortalecer os hospitais regionais. Tais medidas são essenciais para melhorar o acesso, reduzir a sobrecarga dos grandes centros e orientar o planejamento estratégico em saúde. **Palavras-chave:** face; fixação interna de fraturas; serviço de internação hospitalar; fraturas ósseas; centros de trauma.

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ABSTRACT

Objective: This study aims to analyze this demand between 2014 and 2024, providing support for the planning and distribution of health resources. **Materials and Methods:** Using AIH data from the DATASUS system, the types of industrial fractures in state hospitals were analyzed, including the number of authorizations, the average length of hospital stay, and the associated deaths. The methodology involved a descriptive analysis of the evolution of AIHs and the distribution among the different hospital doors. **Results and Discussion:** The data show a significant increase in AIHs over the period, with a greater concentration in reference hospitals, such as Hospital Dom Luiz Gonzaga Fernandes and Hospital Senador Humberto Lucena, which treat most of the complex cases. The results indicate the need for decentralization of care and strengthening of regional hospitals in order to improve access and reduce the overload of large centers. **Conclusions:** The increase in hospitalizations due to facial fractures and the concentration of care in referral hospitals indicate the need to decentralize care and strengthen regional hospitals. Such measures are essential to improve access, re-

duce the burden on large centers and guide strategic health planning. **Keywords:** face; internal fixation of fractures; hospital inpatient service; bone fractures; trauma centers.

RESUMEN

Objetivo: Este estudio pretende analizar esta demanda entre 2014 y 2024, aportando soporte a la planificación y distribución de recursos en salud.

Materiales y métodos: Utilizando datos de AIH del sistema DATASUS, se analizaron los tipos de fracturas industriales en los hospitales estatales, incluyendo el número de autorizaciones, la duración media de la estancia hospitalaria y las muertes asociadas. La metodología consistió en un análisis descriptivo de la evolución de las IAHS y su distribución entre las diferentes puertas de entrada del hospital.

Resultados y Discusión: Los datos muestran un aumento significativo de los AIH a lo largo del período, con mayor concentración en hospitales de referencia, como el Hospital Dom Luiz Gonzaga Fernandes y el Hospital Senador Humberto Lucena, que tratan la mayoría de los casos complejos. Los resultados indican la necesidad de descentralizar la atención y fortalecer los hospitales regionales para mejorar el acceso y reducir la sobrecarga de los grandes centros. **Conclusiones:** El aumento de las hospitalizaciones por fracturas faciales y la concentración de la atención en hospitales de referencia indican la necesidad de descentralizar la atención y fortalecer los hospitales regionales. Estas medidas son esenciales para mejorar el acceso, reducir la sobrecarga de los grandes centros y orientar la planificación estratégica de la salud. **Palabras clave:** cara; fijación interna de fracturas; servicio de admisión hospitalaria; fracturas óseas; centros de trauma.

INTRODUÇÃO

Bone fractures represent a significant challenge for health systems worldwide, given the anatomical complexity of the craniofacial region and the serious functional and aesthetic consequences associated with these injuries. Globally, human fractures are estimated to account for a substantial proportion of trauma center visits, with rates varying according to regional, cultural, and socioeconomic factors^{1,2}. Among the main causes, traffic accidents, interpersonal violence, falls, and sports activities stand out, which together account for the majority of registered cases^{3,4}. In Brazil, physical fractures constitute a relevant public health problem, especially in the context of the Unified Health System (SUS), which is the main provider of care for the low-in-

come population. Hospital Admission Authorizations (AIHs) represent an important mechanism for financing and monitoring hospital procedures, providing robust data for epidemiological analyses [5,6]. The analysis of AIHs allows the identification of temporal and regional patterns of care, in addition to supporting public policies aimed at prevention and improvement in hospital care [7].

In the state of Paraíba, these fractures represent an additional challenge due to regional inequalities in access to specialized services. While referral hospitals equipped to treat complex traumas are concentrated in large urban centers, such as João Pessoa and Campina Grande, in more peripheral regions, there are structural difficulties and deficiencies in specialized professionals [8,9]. In addition, social, economic, and cultural factors contribute to variations in the incidence and clinical results of these injuries [10].

Previous studies have shown that the centralization of care in referral hospitals can overload these units, hindering the decentralization of services and compromising access to treatment in more remote areas [11,12]. Thus, a detailed analysis of the temporal and regional patterns of AIHs associated with the treatment of bone fractures can provide crucial information to optimize the distribution of resources and strengthen the hospital infrastructure in the state.

Given this scenario, the present study aims to carry out an epidemiological analysis of AIHs approved for the treatment of bone fractures in hospitals in the state of Paraíba between 2014 and 2024. Through a comparative approach between the main hospitals in the state and a temporal analysis throughout the decade, we seek to identify regional and temporal patterns that can support public policies for prevention and health planning.

MATERIALS AND METHODS

STUDY DESIGN AND PARTICIPANTS

This study was conducted as an observational, analytical, and retrospective study, using secondary data obtained from DATASUS, specifically from the SUS Hospital Information System (SIH/SUS). Hospital Admission Authorizations (AIHs) related to the treatment of metal fractures in the state of Paraíba were analyzed. The study covered a 10-year period (2014–2024), seeking to identify temporal and regional patterns of care, as well as inequalities between referral and regional hospitals. Indirect participants included all patients hospitalized with a diagnosis related to metal fractures, according to the records available in SIH/SUS.

STUDY VARIABLES

The variables analyzed included the following:

- Demographic variables: age, sex, and region of care.
- Clinical variables: mortality rate, length of hospital stay, rate of postoperative complications, and readmission rate.
- Structural variables: hospital infrastructure, service capacity, equipment availability, and professional specialization.
- Temporal variables: temporal trends during the study period, seasonal variations, and impacts of implemented public policies.
- Variables related to the type of hospital: comparison between reference hospitals and regional hospitals.

MEASUREMENT TOOLS

The data were obtained directly from the DATASUS database (SIH/SUS), through structured queries on official platforms. The variables were extracted and organized in electronic spreadsheets in the Excel program. Specific indicators, such as postoperative complication rates, readmission rates, and the average lengths of hospital stay, were calculated from the available raw data. Data consistency was verified through standardized internal audit procedures.

STATISTICAL ANALYSIS

Descriptive, comparative, and multivariate analyses were performed to investigate associations between the variables studied. Analytical statistical models, such as logistic regression, were applied to evaluate factors associated with prolonged hospital stay, mortality, and other relevant outcomes. In addition, longitudinal temporal analyses were conducted to identify significant trends throughout the study period. TabWin software, provided by the

Ministry of Health, was used for the statistical analysis of the data, while illustrative graphs and comparative tables were generated in the Excel program, facilitating the visualization of the results. Statistical analyses followed a significance level of $p < 0.05$.

RESULTS

The analysis of Hospital Admission Authorizations (AIHs) approved for the treatment of bone fractures in Paraíba between 2014 and 2024 allowed us to identify important patterns in terms of demand, the complexity of procedures, hospital distribution, and associated factors such as length of stay and deaths. These data are important for understanding the health system's capacity to deal with physical trauma, as well as for targeting improvements in hospital care and resource planning.

DISTRIBUTION BY TYPE OF PROCEDURE

Over a specific period, a total of 3595 IHAs were approved for different bone fracture treatment procedures (Figure 1A). The most frequent procedures included "Osteosynthesis of complex fracture of the mandible" (864 approvals) and "Osteosynthesis of fracture of the orbito-zygomatic-maxillary complex" (745 approvals), together accounting for more than 44% of all IHAs (Figura 1A). These figures suggest that the majority of industrial fractures treated were highly complex, reflecting serious injuries that required extensive surgical interventions to stabilize multiple bony structures in the face. The predominance of these procedures points to a demand for technical expertise and developed infrastructure in hospitals that carry out such treatments, since these surgical procedures involve considerable risks and require a multidisciplinary team, including oral and maxillofacial surgeons, anesthesiologists, and intensive care specialists.

Establishment	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
TOTAL	230	348	283	258	253	367	296	340	338	477	406	3,596
2336812 SANTA FILOMENA REGIONAL HOSPITAL	1	1	-	-	-	-	-	-	2	3	9	16
2362848 ANTONIO TARGINO HOSPITAL	4	9	6	2	2	2	-	-	-	-	-	25
2362856 DOM LUIZ GONZAGA FERNANDES EMERGENCY AND TRAUMA HOSPITAL	99	122	117	74	83	127	85	103	109	213	175	1,307
2399628 MANGABEIRA HOSPITAL COMPLEX GOV TARCISIO BURITY	27	11	2	3	5	1	-	-	-	1	-	50
2400243 LAURO WANDERLEY UNIVERSITY HOSPITAL	-	7	1	1	2	1	-	1	-	-	-	13
2400324 EDSON RAMALHO HOSPITAL	-	-	-	-	-	-	-	-	1	2	-	3
2504537 DISTRICT HOSPITAL DEP MANOEL GONCALVES DE ABRANTES	-	-	-	-	-	-	-	5	14	22	20	61
2593262 SENATOR HUMBERTO LUCENA EMERGENCY AND TRAUMA HOSPITAL	56	127	110	131	127	119	129	152	147	166	107	1,371
2605473 HOSPITAL COMPLEX DEP JANDUHY CARNEIRO	33	55	41	30	34	112	79	75	62	67	53	641
2613476 CAJAZEIRAS REGIONAL HOSPITAL	-	-	-	-	-	-	-	-	1	3	41	45
2757710 PICUI REGIONAL HOSPITAL	10	16	6	17	-	5	3	4	2	-	1	64

Figure 1A - AIH approved per year according to establish different procedures to treat facial bone fractures/Sep 2014–Sep 2024. Source: Ministry of Health—SUS Hospital Information System (SIH/SUS) (2024).

Procedures: 0404020496 osteosynthesis of unilateral fracture of mandibular condyle, 0404020500 osteosynthesis of complex fracture of mandible, 0404020518 osteosynthesis of complex fracture of

maxilla, 0404020526 osteosynthesis of fracture of orbito-zygomatic-maxillary complex, 0404020534 osteosynthesis of naso-orbito-ethmoidal complex fracture, 0404020550 osteosynthesis of simple mandibular fracture, 0404020577 reduction of alveolo-dental fracture without osteosynthesis, 0404020585 reduction of maxillary fracture - le fort i without osteosynthesis. , 0404020593 reduction of maxillary fracture - le fort ii, without osteosynthesis, 0404020607 reduction of mandibular fracture without osteosynthesis, 0404020666 surgical treatment of zygomatic bone fracture without osteosynthesis, 0404020704 osteosynthesis of zygomatic bone fracture, 0404020720 osteosynthesis of bilateral mandibular condyle fracture. **period:** sep/2014-sep/2024

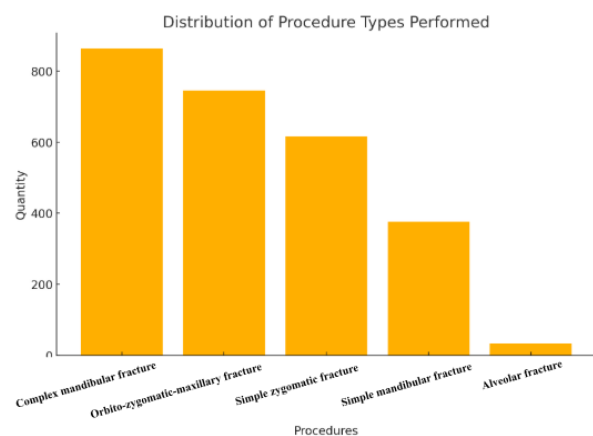


Figure 1B - Graph detailing the Distribution of Types of Procedures Performed. Source: Ministry of Health—SUS Hospital Information System (SIH/SUS) (2024).

Other procedures also had significant numbers, such as “Surgical treatment of zygomatic bone fracture without osteosynthesis” (616 approvals)

Procedure	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
TOTAL	232	351	286	266	256	373	298	341	340	481	410	3,634
0404020496 OSTEOSYNTHESIS OF UNILATERAL FRACTURE OF THE MANDIBULAR CONDYLE	16	3	2	3	4	2	-	7	13	16	10	76
0404020500 OSTEOSYNTHESIS OF COMPLEX FRACTURE OF THE MANDIBLE	52	79	33	48	57	64	74	93	108	162	94	864
0404020518 OSTEOSYNTHESIS OF COMPLEX FRACTURE OF THE MAXILLA	14	27	16	19	9	17	11	19	17	21	21	191
0404020526 OSTEOSYNTHESIS OF FRACTURE OF THE ORBITO-ZYGOMATIC-MAXILLARY COMPLEX	31	31	14	25	35	47	53	71	88	194	156	745
0404020534 OSTEOSYNTHESIS OF FRACTURE OF THE NASO-ORBITO-ETHMOIDAL COMPLEX	1	1	-	1	1	2	2	-	5	1	8	22
0404020550 OSTEOSYNTHESIS OF SIMPLE MANDIBLE FRACTURE	15	34	27	32	18	65	44	26	21	41	53	376
0404020577 REDUCTION OF ALVEOLAR-DENTAL FRACTURE WITHOUT OSTEOSYNTHESIS	7	4	4	-	6	3	1	1	2	2	3	33
0404020585 MAXILLARY FRACTURE REDUCTION - LE FORT I WITHOUT OSTEOSYNTHESIS.	-	2	4	3	-	11	1	3	-	4	-	28
0404020593 MAXILLARY FRACTURE REDUCTION - LE FORT II, WITHOUT OSTEOSYNTHESIS	1	1	4	-	3	3	1	2	-	3	2	20
0404020607 MANDIBLE FRACTURE REDUCTION WITHOUT OSTEOSYNTHESIS.	3	17	29	8	16	30	22	38	9	2	2	176
0404020666 SURGICAL TREATMENT OF ZYGOMATIC BONE FRACTURE WITHOUT OSTEOSYNTHESIS	19	72	100	100	83	59	40	51	59	12	21	616
0404020704 OSTEOSYNTHESIS OF ZYGOMATIC BONE FRACTURE	69	75	48	26	23	66	48	27	14	14	32	442
0404020720 OSTEOSYNTHESIS OF BILATERAL FRACTURE OF THE MANDIBULAR CONDYLE	4	5	5	1	1	4	1	3	4	9	8	45

Figure 2A - Annual evolution of AIH approvals—2014–2024. Source: Ministry of Health—SUS Hospital Information System (SIH/SUS) (2024).

and “Osteosynthesis of simple mandible fracture” (376 approvals). Less frequent procedures, such as “Reduction of alveolodental fracture without osteosynthesis” and “Osteosynthesis of bilateral mandibular condyle fracture”, accounted for 33 and 45 approvals, respectively, showing a lower prevalence in alveolodental and mandibular condyle injuries among the patients seen. The variation in the types of procedures approved reflects the diversity of protected surgical fractures, ranging from simple, localized injuries to complex traumas involving several regions of the face.

TEMPORAL ANALYSIS

The annual evolution of IHA approvals showed an upward trend, culminating in 2023 with the highest number of approved hospitalizations (481). Compared to 2014, which saw 232 AIHs, this was an increase of more than 100% over the course of a decade (Figure 2A and Figure 2B). This growth may be associated with several factors, including the increase in the urban population and the growth in risk factors such as traffic accidents and violence, which are common causes of apparent fractures. The increase may also indicate improvements in the process of diagnosing and reporting these traumas, as well as an expansion in the care capacity of referral hospitals. The slight reduction observed in 2024, with 410 AIHs approved, suggests a possible stabilization in demand or a seasonal variation that may be related to changes in the rates of accidents and violent incidents. This temporal pattern highlights the importance of continuously monitoring risk factors for mechanical fractures, allowing health authorities to respond proactively to changes in demand for trauma services.

O gráfico (Figura 2) ilustra a evolução anual das Autorizações de Internação Hospitalar (AIHs) para o tratamento de fraturas faciais no estado da Paraíba entre 2014 e 2024.

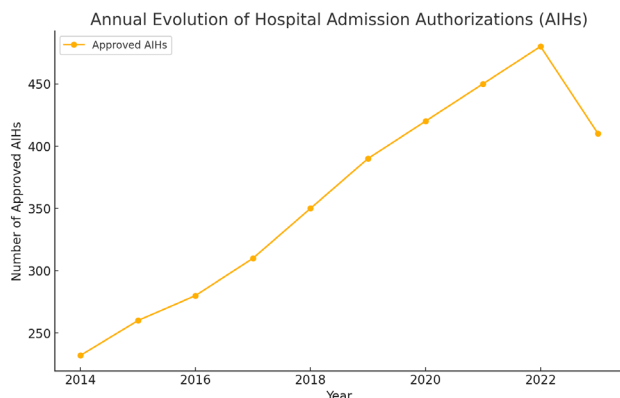


Figure 2B - Graph detailing the Annual Evolution of Hospital Admission Authorizations (AIHs). Source: Ministry of Health—SUS Hospital Information System (SIH/SUS) (2024).

DISTRIBUTION BY HOSPITAL

The concentration of approvals in certain hospitals revealed the centralization of specific trauma care in Paraíba's main referral centers. The Dom Luiz Gonzaga Fernandes Emergency and Trauma Hospital and the Senador Humberto Lucena Emergency and Trauma Hospital were responsible for 1371 and 1307 approvals, respectively. These hospitals, located in urban regions with high population densities, have the infrastructure and specialized teams to deal with complex cases, which justifies the high volume of admissions. The Complexo Hospitalar Deputado Janduih Carneiro also had a significant number of

approvals, with 641 AIHs, indicating its importance in the specific trauma care network.

Smaller hospitals, such as the Cajazeiras Regional Hospital and the Lauro Wanderley University Hospital, recorded a lower annual average of AIH approvals, between 1.7 and 1.8, respectively, but play an important role for the population living in areas further away from the major centers. This unequal distribution between large and smaller hospitals suggests that the demand for more complex procedures is technically higher in hospitals with greater technical capacity and infrastructure. This reflects a strategy of the regionalization of care, but it also raises questions about equitable access to facial trauma treatment for patients living far from major centers.

DEATHS RELATED TO TREATMENT

Mortality associated with the treatment of bone fractures was low (Figure 3A and Figura 3B), with four deaths recorded over the period. Two of these deaths occurred at the Dom Luiz Gonzaga Fernandes Emergency and Trauma Hospital, while the Senador Humberto Lucena Emergency and Trauma Hospital and the Deputado Janduih Carneiro Hospital Complex registered one death each. Although the number of deaths was low, it indicates that some cases of bone fractures are serious enough to result in fatal complications, possibly due to the complexity of the trauma, the presence of comorbidities, or post-operative complications. These data suggest that, despite the low mortality rate, there is a need for specific care protocols to minimize risks and ensure safe and effective treatment, especially for critically ill patients.

Establishment	2020	2021	2022	Total
TOTAL	1	1	2	4
2362856 DOM LUIZ GONZAGA FERNANDES EMERGENCY AND TRAUMA HOSPITAL	1	-	1	2
2593262 SENADOR HUMBERTO LUCENA EMERGENCY AND TRAUMA HOSPITAL	-	-	1	1
2605473 HOSPITAL COMPLEX DEP JANDUIH CARNEIRO	-	1	-	1

Figure 3A - Mortality rate associated with the treatment of facial bone fractures/Sep 2014–Sep 2024. Source: Ministry of Health—SUS Hospital Information System (SIH/SUS) (2024).

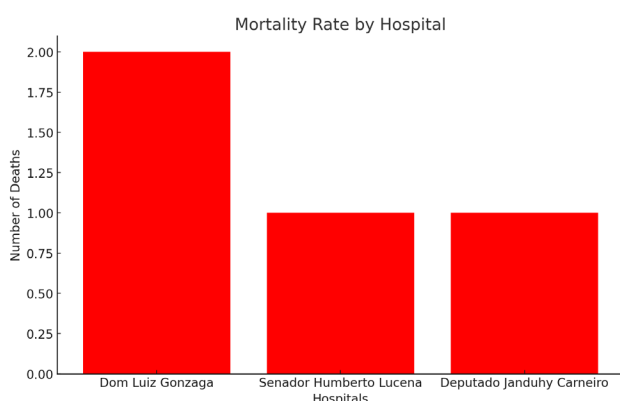


Figure 3B - Graph detailing Mortality Rate by Hospital. Source: Ministry of Health—SUS Hospital Information System (SIH/SUS) (2024).

3.5. AVERAGE HOSPITAL STAY

The average hospital stay varied specifically between hospitals, with an overall average of 6.5 days (Figure 4A and Figure 4B). The Dom Luiz Gonzaga Fernandes Emergency and Trauma Hospital had the longest average stay, at 8.5 days, while the Senador Humberto Lucena Emergency and Trauma Hospital recorded an average of 4.7 days. This difference can be explained by the complexity of the cases treated at each hospital. The longer average stay at the Dom Luiz Gonzaga Fernandes Hospital may have been associated with the care of more serious cases, which require a prolonged recovery period and intensive monitoring. On the other hand, the short-

er length of stay at the Senador Humberto Lucena Hospital may indicate a higher turnover of beds and an approach to medium-complexity cases, with a shorter recovery time. The average hospital stay is an important indicator of the severity of the cases treated and the hospital's ability to manage the demand for beds, especially in highly complex trauma units.

The data show a growing demand for bone fracture care in Paraíba, with a significant concentration of AIH approvals in large, specialized hospitals. The annual growth in AIH approvals and the concentration of complex procedures in reference hospitals highlight the need for continuous support in these centers, as well as investments in training and infrastructure. The distribution of procedures

and the average lengths of hospital stay highlight the need for an integrated care network that can manage both highly complex cases and less serious injuries in regional hospitals.

Although the number of deaths was low, the analysis reinforces the importance of safety and prevention policies to reduce the incidence of severe trauma, as well as safe clinical practices to minimize complications and promote better outcomes. These findings provide a solid basis for public health planning, targeting investments in strategic hospitals and considering the need to decentralize care to ensure access to human trauma treatment in all regions of the state.

Establishment	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
TOTAL	230	348	283	258	253	367	296	340	338	477	406	3,596
2336812 SANTA FILOMENA REGIONAL HOSPITAL	1	1	-	-	-	-	-	-	2	3	9	16
2362848 ANTONIO TARGINO HOSPITAL	4	9	6	2	2	2	-	-	-	-	-	25
2362856 DOM LUIZ GONZAGA FERNANDES EMERGENCY AND TRAUMA HOSPITAL	99	122	117	74	83	127	85	103	109	213	175	1,307
2399628 MANGABEIRA HOSPITAL COMPLEX GOV TARCISIO BURITY	27	11	2	3	5	1	-	-	-	1	-	50
2400243 LAURO WANDERLEY UNIVERSITY HOSPITAL	-	7	1	1	2	1	-	1	-	-	-	13
2400324 EDSON RAMALHO HOSPITAL	-	-	-	-	-	-	-	-	1	2	-	3
2504537 DISTRICT HOSPITAL DEP MANOEL GONCALVES DE ABRANTES	-	-	-	-	-	-	-	5	14	22	20	61
2593262 SENADOR HUMBERTO LUCENA EMERGENCY AND TRAUMA HOSPITAL	56	127	110	131	127	119	129	152	147	166	107	1,371
2605473 HOSPITAL COMPLEX DEP JANDUHY CARNEIRO	33	55	41	30	34	112	79	75	62	67	53	641
2613476 CAJAZEIRAS REGIONAL HOSPITAL	-	-	-	-	-	-	-	-	1	3	41	45
2757710 PICUI REGIONAL HOSPITAL	10	16	6	17	-	5	3	4	2	-	1	64

Figure 4A - Average hospitalization days for different bone fracture treatment procedures from Sep 2014 to Sep 2024. Source: Ministry of Health—SUS Hospital Information System (SIH/SUS) (2024).

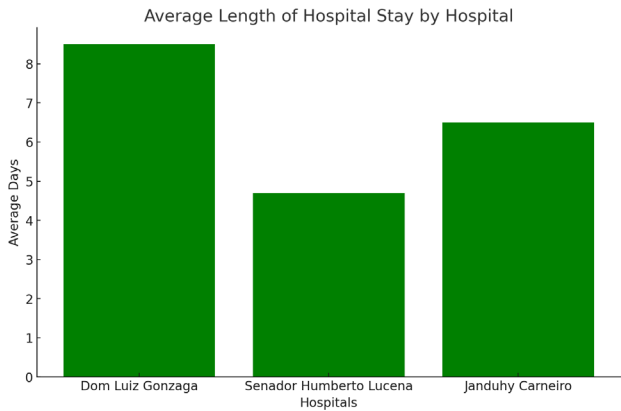


Figure 4B - Graph detailing the Average Number of Days of Hospitalization per Hospital. Source: Ministry of Health—SUS Hospital Information System (SIH/SUS) (2024).

DISCUSSION

The results of this study reveal a growing demand for facial fracture care in Paraíba, as well as a significant concentration of this care in large, specialized hospitals. These findings reflect both the complexity of facial trauma and the distribution of hospital resources and capacities in the state. The high frequency of complex procedures, such as osteosyn-

thesis of mandibular fractures and fractures of the orbito-zygomatic-maxillary complex, indicates that the majority of cases treated involve serious injuries, which raises important questions about the allocation of resources and the infrastructure needed to manage these cases.

The temporal analysis shows a significant increase in hospital admission authorizations (AIHs) over the years, with a peak in 2023. This growth can be attributed to various factors, such as population and urban growth, which are generally associated with a higher incidence in traffic accidents and interpersonal violence, two common causes of facial fractures^{11,12}.

The increase may have also been related to a possible improvement in the notification and diagnosis of these cases, indicating that health systems are better prepared to identify and record facial trauma. These data suggest that in order to sustainably meet the growing demand, Paraíba's health system may need to expand its specialized care capacity, mainly in large centers, but also in regional hospitals to ensure access in peripheral areas^{13,14}.

The concentration of AIH approvals in reference hospitals, such as the Dom Luiz Gonzaga Fernandes Emergency and Trauma Hospital and the

Senador Humberto Lucena Emergency and Trauma Hospital, highlights the importance of these centers as pillars of facial trauma care in the state. This centralization of care is common in health systems that rely on high-capacity hospitals for complex treatments, but it also points to a possible weakness in the decentralization of care. The dependence on a few hospitals to carry out most complex procedures can overload these units and limit access for patients in distant regions. This scenario raises the need to consider expanding infrastructure and training in regional hospitals to distribute the care load and ensure that patients across the state have timely access to specialized care^{15,16}.

Another important point is the mortality rate associated with the treatment of facial fractures, which, although low, is notable for the seriousness that some of these cases can have. Although the number of deaths was small, it highlighted the complexity of certain facial traumas and the need for strict safety protocols and well-trained teams to minimize risks during care and the post-operative period. Complications can occur due to the nature of the trauma, the presence of comorbidities, or even the lack of adequate resources to manage critical cases. This suggests that, even with a limited number of deaths, care policies should include continuous training and investment in advanced support equipment to improve patient safety^{17,18,19}.

The average length of stay varied between the hospitals, reflecting differences in the profile of the patients and the complexity of the cases treated. The Dom Luiz Gonzaga Fernandes Hospital, with an average stay of 8.5 days, indicated a greater focus on highly complex cases that required a longer recovery and intensive follow-up. In contrast, the Senador Humberto Lucena Hospital, with an average of 4.7 days, may have been dealing with medium-complexity cases or have a structure that allows for a more agile recovery. The length of stay is an important indicator of a hospital's efficiency and ability to cope with the demand for beds, especially in an environment where the volume of facial trauma is high. These data also suggest that hospitals with longer lengths of stay need more resources to manage complex cases, while hospitals with shorter lengths of stay can benefit from strategies to increase turnover and free up beds for new patients^{20,21}.

This study raises important points for public health planning, especially with regard to the distribution of resources and hospital training. The high concentration of care in a few hospitals indicates that strategies to decentralize and strengthen regional hospitals can relieve the pressure on large centers and facilitate access to treatment for patients

in more remote areas. In addition, the data highlight the importance of facial trauma prevention policies, such as traffic safety and violence prevention awareness campaigns, which could help reduce the occurrence of facial fractures and, consequently, the demand for these treatments²².

Finally, information on the types of procedures, the average lengths of hospital stay, and mortality rates provide information for improving clinical and safety protocols. Implementing evidence-based protocols and the continuous training of health teams can improve the management of severe cases and reduce hospital stays, promoting more efficient and safe care. In summary, the data analyzed point to a growing demand for facial fracture care and the importance of strategic planning that takes into account both the strengthening of large centers and the expansion of regional capacity, ensuring a more equitable and effective health system in the treatment of facial trauma.

CONCLUSIONS

This study reveals a growing demand for treatment of facial fractures in Paraíba, with a high concentration of care in referral hospitals such as the Dom Luiz Gonzaga Fernandes Hospital and the Senador Humberto Lucena Hospital. This increase, coupled with factors such as traffic accidents and violence, indicates the need to strengthen the infrastructure of these centers and decentralize care to regional hospitals, improving access and reducing the overload on large centers. The low mortality rate is a positive point, but the differences in average hospital stays reflect the complexity of the cases and suggest improvements in efficiency. For an effective response, strategic planning that includes decentralization, the strengthening of resources, and preventive policies is essential. In this way, the health system will be able to meet the growing demand in an equitable and efficient manner, promoting the health and well-being of the population.

FUTURE DIRECTIONS

From a clinical perspective, future studies could focus on more elaborate analyses of individual patient characteristics, including data on comorbidities, fracture severity, postoperative complications, and quality of life after treatment. In addition, it would be relevant to evaluate the effectiveness of different surgical and therapeutic protocols applied in regional and referral hospitals, as well as the impacts of possible structural interventions in health services.

From a scientific perspective, additional research could explore more advanced multivariate analyses to determine predictive factors associated with better or worse clinical advances. Longitudinal prospective studies, which follow patients over time, are also important to understand the evolution of treatments and long-term results. In addition, comparisons with other regions of Brazil or even with other countries would allow identifying epidemiological and relevant structural differences that could guide more effective public policies.

Finally, it is essential that future public research also evaluate the impact of specific policies, such as accident and violence prevention programs, on the number of hospitalizations due to facial fractures. These combined approaches, combined with continued investment in infrastructure and staff training, can not only improve clinical care but also reduce the incidence of these injuries, resulting in a more equitable and efficient health system.

METHODOLOGICAL LIMITATIONS

This study had some limitations that should be considered. Since it was a retrospective analysis with secondary data from DATASUS, there was a risk of registration errors, underreporting, and inconsistencies in the data found. The absence of individual clinical variations, such as comorbidities and severity of fractures, limited the analysis of specific factors that influenced the results. In addition, differences in care protocols and infrastructure between hospitals may have generated information. Contextual factors, such as seasonal changes or specific public policies, may not have been fully captured. Finally, the results reflect the reality of the state of Paraíba and may not be generalizable to other regions. Despite these limitations, the study offers valuable insights for strategic planning in public health and the optimization of hospital resources.

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