International Journal of Health and Surgical Research
ISSN 3086-2574

INCIDENCE OF FEMUR FRACTURES AND ITS SUBTYPES IN THE STATE OF MATO GROSSO BETWEEN 2018 AND 2024

Incidência de fratura de fêmur e seus subtipos no estado de Mato Grosso entre os anos de 2018 a 2024

Incidencia de fracturas de fémur y sus subtipos en el estado de Mato Grosso entre los años 2018 y 2024

https://doi.org/10.5281/zenodo.18510334

Elias Mendes Leal Neto
Graduando em Medicina
Universidade Centro Universitário de Várzea Grande
Várzea Grande, Mato Grosso, Brasil
e-mail: xaprendendopelanetx@gmail.com

Daniel Virgilio Soares da Silva
Graduando em Medicina
Universidade Centro Universitário de Várzea Grande,
Várzea Grande, Mato Grosso, Brasil.
e-mail: danielvirgiliosoares@gmail.com

Gabriela Carvalho Lima
Graduanda em Medicina
Universidade Centro Universitário de Várzea Grande,
Várzea Grande, Mato Grosso, Brasil.
e-mail: gabrielacarvalho1202@gmail.com

Manwa Mohamad Mahfouz
Graduanda em Medicina
Universidade Centro Universitário de Várzea Grande,
Várzea Grande, Mato Grosso, Brasil.
e-mail: manwaa.mm@gmail.com

Letícia Moreira Serigiolli
Graduanda em Medicina
Universidade Centro Universitário de Várzea Grande,
Várzea Grande, Mato Grosso, Brasil.
e-mail: leticiaserigiolli@gmail.com

International Journal of Health and Surgical Research
ISSN 3086-2574

Mateus Andrade Machado
Graduando em Medicina
Universidade Centro Universitário de Várzea Grande,
Várzea Grande, Mato Grosso, Brasil.
e-mail: mateus.andrade@aluno.imepac.edu.br

Renan Urt Mansur Bumlai
Graduado em Medicina
Universidade Centro Universitário de Várzea Grande,
Várzea Grande, Mato Grosso, Brasil.
e-mail: rbumlai@gmail.com

- **Tipo de Estudo:** Artigo de incidência
- **Recebido**: 30/01/2026
- **Aceito**: 06/02/2026
- **Publicado**: 07/02/2026

CC BY-NC 4.0 LOCKSS Program
This work is licensed under a Creative Commons Attribution 4.0 International License, and a LOCKSS sistem.

ABSTRACT

Femoral fracture is a consequence of several adverse conditions that may affect an individual, such as trauma or osteoporosis, and it can occur in people of all ages. Due to the lack of literature on this topic in the state of Mato Grosso, this study aimed to investigate the incidence of different types of femoral fractures in Mato Grosso, Brazil. This is a retrospective, population-based, and observational study, using data from the SIH/DataSUS system. The main variables analyzed were types of femoral fracture, sex, and length of hospital stay. Data were recorded in an Excel spreadsheet and analyzed using R software version 4.5. A total of 14,842 patients were included, of whom 59.32% were male and 40.68% were female. The year with the highest incidence was 2024, with 73.55 cases per 100,000 inhabitants. The most frequent type of fracture was proximal femoral fracture, which also showed the highest mean length of hospital stay (6.65 days). Furthermore, older adults presented the highest incidence and hospitalization rates for proximal fractures, whereas younger individuals had more diaphyseal fractures. The mortality rate was 1.73%. The year 2024 presented the highest incidence of femoral fractures. Males were the most affected, especially older men, who also accounted for the highest number of hospitalizations related to these fractures. This study has limitations, as other relevant variables are not available in the information system. Therefore, further original studies may complement these findings.

Keywords*: Femoral fracture; Incidence; Epidemiology; DataSUS; Mato Grosso.*

International Journal of Health and Surgical Research
ISSN 3086-2574

RESUMO

A fratura de fêmur é consequência de diversas adversidades que podem acometer uma pessoa, como um trauma ou osteoporose, alcançando pessoas de todas as idades. Devido à falta de literatura sobre o tema em MT, esse estudo se propõe a investigar a incidência dos diferentes tipos de fraturas do fêmur no estado de Mato Grosso. Esse é um estudo retrospectivo, populacional e observacional, baseado em dados do SIH/DataSUS. As principais variáveis foram os tipos de fratura de fêmur, sexo, dias de internação. Os dados foram registrados em uma planilha do Excel, que foi analisada pelo software R versão 4.5. Essa pesquisa possui 14.842 pacientes, dos quais 59,32% eram homens e 40,68 eram mulheres, o ano com maior incidência foi o de 2024 com 73,55 casos por 100.000 habitantes. O tipo de fratura mais frequente foram as proximais, a qual também possui a maior média de dias de internação com 6,65 dias. Além disso, os idosos foram os com maior incidência e maior interação em fraturas proximais, enquanto os jovens tinham mais fraturas diafisárias, a taxa de óbito foi de 1,73%. O ano de 2024 teve a maior incidência quanto às fraturas de fêmur. O sexo masculino foi o mais acometido, em especial homens idosos, faixa etária que possui mais internações derivadas dessas fraturas. Esse estudo possui limitações, visto que não há outras variáveis de interesse no sistema de informação. Consequentemente, este estudo poderá ser complementado por novos estudos originais sobre o tema.

Palavras-chave: Fratura do fêmur; Incidência; Epidemiologia; DataSUS; Mato Grosso.

RESUMEN

La fractura de fémur es consecuencia de diversas condiciones adversas que pueden afectar a una persona, como el trauma o la osteoporosis, y puede ocurrir en individuos de todas las edades. Debido a la escasez de literatura sobre el tema en el estado de Mato Grosso, este estudio tuvo como objetivo investigar la incidencia de los diferentes tipos de fracturas de fémur en Mato Grosso, Brasil. Se trata de un estudio retrospectivo, poblacional y observacional, basado en datos del sistema SIH/DataSUS. Las principales variables analizadas fueron los tipos de fractura de fémur, el sexo y los días de hospitalización. Los datos se registraron en una hoja de cálculo de Excel y se analizaron mediante el software R versión 4.5. Se incluyeron 14.842 pacientes, de los cuales el 59,32% eran hombres y el 40,68% mujeres. El año con mayor incidencia fue 2024, con 73,55 casos por cada 100.000 habitantes. El tipo de fractura más frecuente fue la fractura proximal, la cual también presentó el mayor promedio de días de hospitalización (6,65 días). Además, las personas mayores presentaron la mayor incidencia y tasa de hospitalización por fracturas proximales, mientras que los jóvenes tuvieron más fracturas diafisarias. La tasa de mortalidad fue del 1,73%. El año 2024 presentó la mayor incidencia de fracturas de fémur. El sexo masculino fue el más afectado, especialmente los hombres mayores, grupo etario que presentó el mayor número de hospitalizaciones derivadas de estas fracturas. Este estudio presenta limitaciones, ya que el sistema de información no incluye otras variables de interés. En consecuencia, estos resultados podrán ser complementados por nuevos estudios originales sobre el tema.

Palabras clave: *Fractura de fémur; Incidencia; Epidemiología; DataSUS; Mato Grosso.*

1. INTRODUCTION

Femur fracture is a loss of bone continuity associated with trauma of varying intensity, depending on bone quality. It presents symptoms such as pain and impaired mobility. Inadequate treatment of this condition may lead to a worse prognosis for the affected patient[1].

The International Classification of Diseases and Related Health Problems (ICD-10) is a tool created by the World Health Organization that provides codes for disease classification. It allows the monitoring of the incidence and prevalence of diseases and health conditions in a practical and universal manner. Femur fracture is identified by ICD-10 code S72 and its extensions for the respective injured regions of the long bone.

Thus, the research conducted in this article collected data related to ICD-10 S72 and its extensions, cataloged through platforms such as DWweb and DATASUS, in order to identify the social impact of these fractures on society[25,26,27].

The incidence of femur fracture is higher in the age groups of 15 to 44 years, accounting for 34%, 5 to 14 years, with 29%, and individuals older than 60 years, with 21%, being much more common in low-income countries[1]. In addition, there are notable risk factors among affected individuals, such as: female sex, White race, advanced age, alcohol and tobacco use, previous fracture, low estrogen levels, bone cancer, osteoporosis, and a history of falls[2].

Explain the classification of femur fractures: proximal (head, neck, intertrochanteric), subtrochanteric and diaphyseal, distal (articular or extra-articular).

Currently, the gold standard for the treatment of femoral shaft fractures is surgical treatment with intramedullary fixation, which allows early mobilization and better short- and long-term functional recovery. Early fixation is associated with fewer complications and lower mortality. However, in resource-limited settings or when surgery is contraindicated, non-surgical methods such as immobilization may be performed instead of surgery[7].

In the acute phase of the condition, treatment is based on realignment and stabilization of the fracture. Proximal fractures are generally treated surgically, with cannulated screws, plates, cephalomedullary nails, or arthroplasty, depending on the patient's needs. Diaphyseal fractures are treated with intramedullary nails, and distal fractures with plates and screws. It is important to emphasize that treatment methods vary substantially depending on the case.

Correct diagnosis and the choice of procedure are crucial factors for effective patient recovery. This, combined with an appropriate rehabilitation process with a physical therapist, ensures proper recovery for patients[8].

However, it should be emphasized that inadequate treatment often precedes a negative prognosis[3]. Other conditions may occur, such as nonunion, malunion, or delayed bone healing after fracture, which occurs in approximately 7% of long bone fractures[4]. Osteonecrosis is a frequent complication associated with femoral neck fractures[3].

The prognosis of some of these conditions depends on several factors, but may be associated with debilitating consequences such as joint pain, reduced mobility, and post-traumatic osteoarthritis[3].

A Brazilian study that recorded the incidence of femur fractures between 2008 and 2018 presents concerning data on the topic. It reports that during this period there was a 76.9% increase in hospitalization records, corresponding to an average increase of 5.87% per year. It also reports an average incidence of 19.46 fractures per 10,000 older adults. This study reflects a worrying reality regarding the successive increase in femur fractures, especially among elderly patients in Brazil[9].

There is a clear lack of medical literature on this topic in the state of Mato Grosso, demonstrating insufficient attention to an issue that is highly relevant for evaluating mobility loss among older adults and fracture incidence among young people due to accidents. Therefore, it is necessary to produce and expand research on the local reality of the state in this regard.

The objective of this article is to evaluate the incidence of different types of femur fractures in the state of Mato Grosso, enabling a comparison of the incidence of this trauma with neighboring states, as well as with national and international incidence rates.

Furthermore, the demographic profile of hospitalized patients with this fracture will be described in order to create an information base that may support the development of future public health policies.

2. METHODOLOGY

This is a retrospective, population-based study using secondary data. Therefore, information collection was based on secondary databases, with the main sources being DwWeb / SES-MT26 and DataSUS27. These platforms contain categorized data related to hospital admissions recorded in the Brazilian Unified Health System (SUS), and the SIH (Hospital Information System) was used for this academic study.

The platform allows data searches to be performed by specific ICD-10 codes, enabling the separation of data for different types of femur fractures, as well as the analysis of the regions of the state where the fractures occurred.

Thus, all hospital admission records for femur fractures classified under ICD-10 codes S72.0, S72.1, S72.2, S72.3, S72.4, S72.7, S72.8, and S72.9 were included, involving patients of all ages hospitalized in Mato Grosso. The data collection period ranged from 2018 to October 2024, and the following collected variables were analyzed: number of hospitalizations, number of fractures per month, age groups, sex, location by health region, length of hospital stay, and number of ICU admissions.

After extracting the raw data from the databases, they were organized and analyzed using Microsoft Excel spreadsheets. Subsequently, the incidence results were presented using graphs produced with R software version 4.4.3 (Foundation for Statistical Computing, Vienna, Austria).

In addition, incidence rates per 100,000 inhabitants were calculated based on the 2022 IBGE census for population estimates.

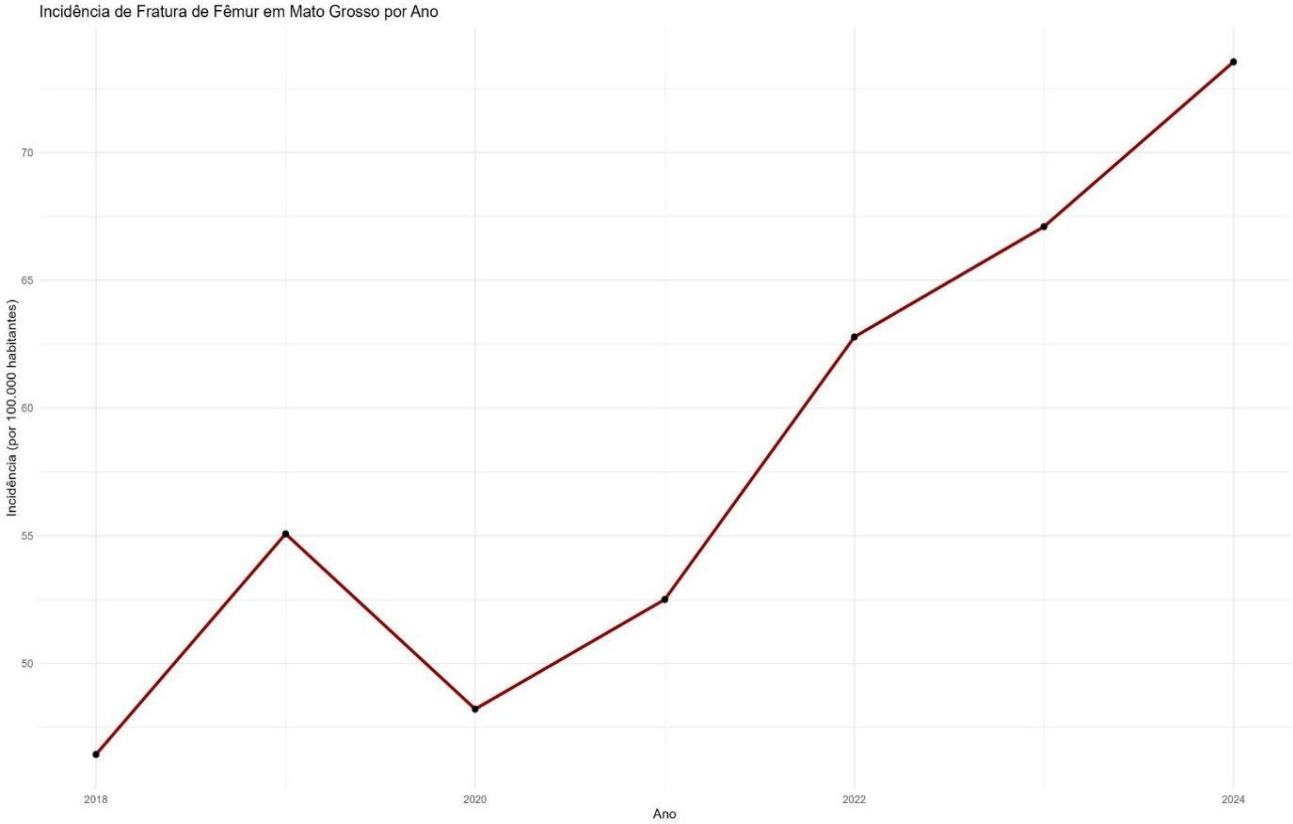
Regarding ethical aspects, since this study used publicly available secondary data, submission to a research ethics committee was not required, according to Resolution No. 510 of 2016 from the Brazilian National Health Council.

3. RESULTS AND DISCUSSION

This study aims to evaluate the incidence of femur fractures in the state of Mato Grosso. In this context, 14,842 patients were identified, of whom 59.32% (8,804) were male and 40.68% (6,038) were female. Among these, most cases occurred in 2024, with 73.55 cases per 100,000 inhabitants, followed by 2023 with 67.10 cases per 100,000 inhabitants, and 2022 with 62.78 cases per 100,000 inhabitants.

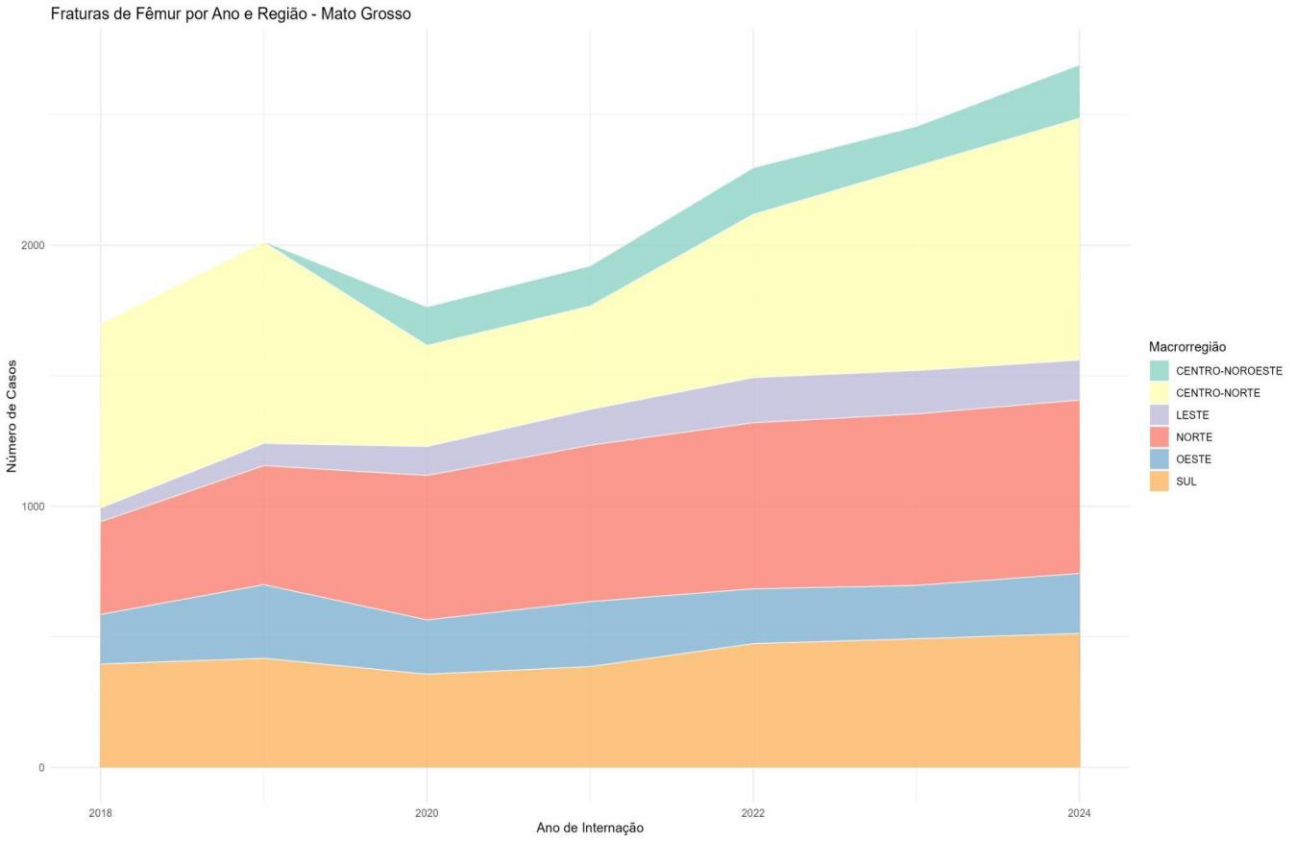
It is noteworthy that the incidence in 2021, 2020, 2019, and 2018 was 52.50, 48.21, 55.07, and 46.43, respectively. This is shown in Figure 1, which presents the incidence over recent years, revealing a growth trend that was interrupted during the pandemic but remained very strong afterward.

Figure 1. Incidence of femur fractures in the state of Mato Grosso between 2018 and 2024.



A spatial distribution analysis of femur fracture cases in the state of Mato Grosso was also performed. This analysis is shown in Figure 2, in which it is possible to observe that the most affected regions were Centro-Norte, Norte, and Sul. In addition, it can be noted that fractures in the Sul and Norte regions remained relatively constant even during the pandemic, whereas in the Centro-Norte region there was a fluctuation during the pandemic followed by a rapid increase in the number of cases.

Figure 2. Distribution of femur fractures in the state of Mato Grosso by health macroregion from 2018 to 2024.



In addition, a comparison was conducted between the mean length of hospital stay according to femur fracture type.

In Figure 3, it can be observed that the highest mean length of hospital stay was associated with proximal femur fractures, with an average of 6.65 days, followed by distal femur fractures with 6.62 days. Next, multiple or unspecified femur fractures presented a mean of 6.00 days. Femoral shaft (diaphyseal) fractures followed with 5.68 days. Finally, the category "other or unknown," which reflects cases without adequate reporting, presented a mean of 4.19 days of hospitalization. Welch's t-test was applied, and this result showed statistical significance, with a p-value of 4.55e-23.

International Journal of Health and Surgical Research
ISSN 3086-2574

Figure 3. Comparison of mean length of hospital stay by fracture type between 2018 and 2024.

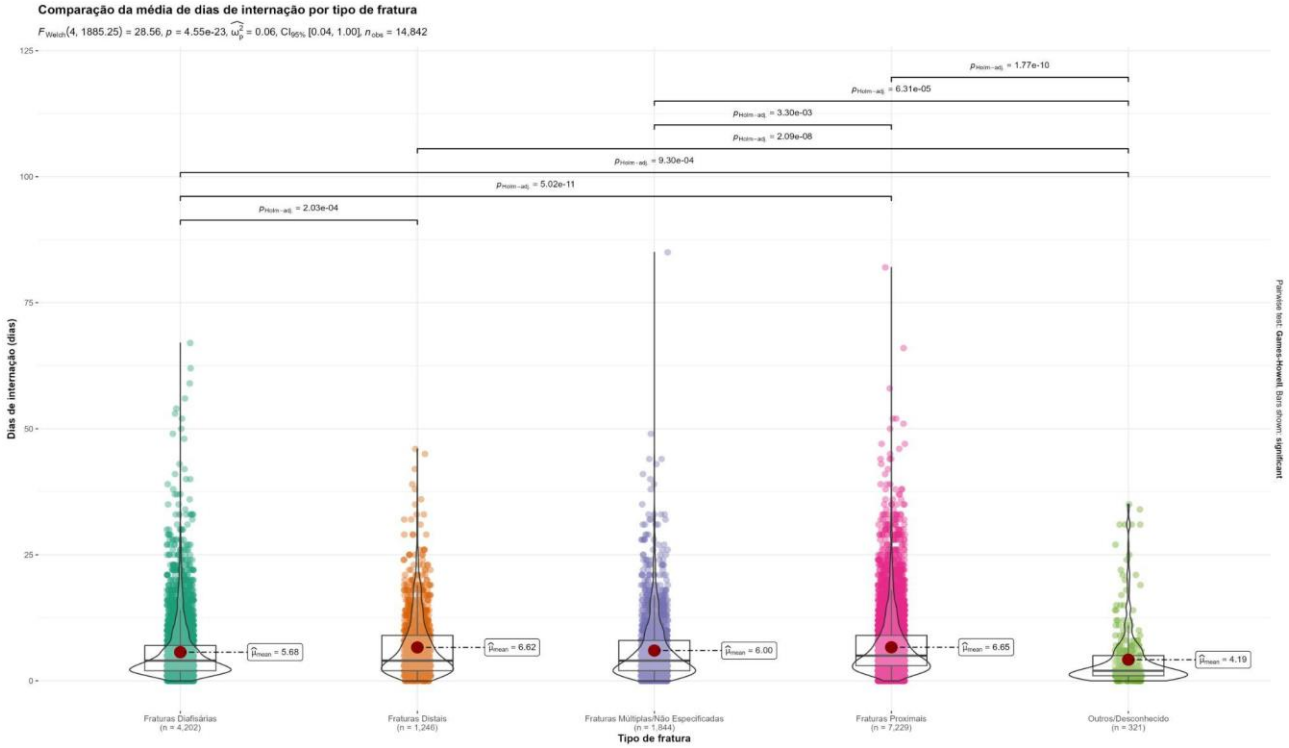


Figure 4 shows the trend in cases according to femur fracture type. Thus, it is evident that proximal fractures presented a much higher number of cases throughout the entire period, with a decrease during the pandemic, similarly to diaphyseal and proximal fractures.

However, multiple or unspecified fractures showed a gradual and constant increase over all years, whereas fractures classified as unknown due to inadequate reporting or other causes presented a small peak in 2020 followed by a continuous decline.

Figure 4. Femur fracture subtypes from 2018 to 2024.

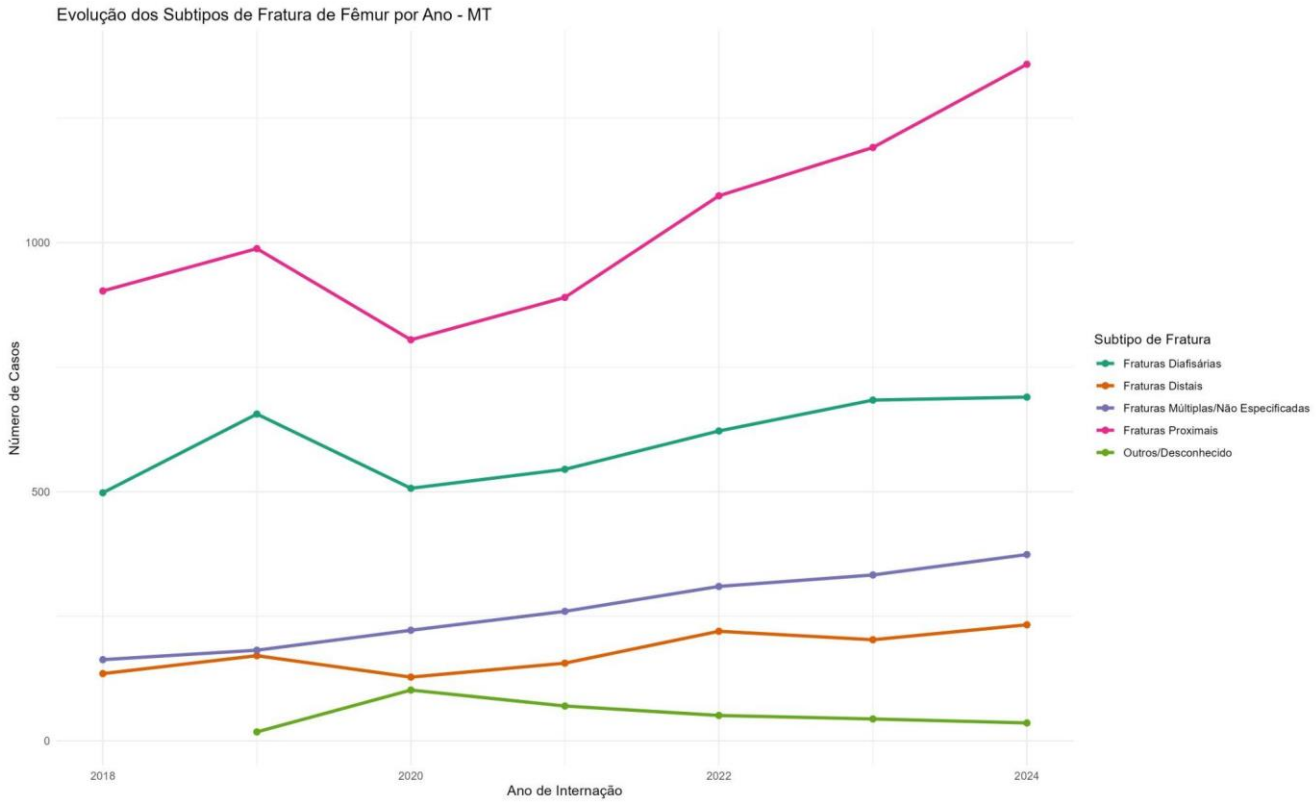
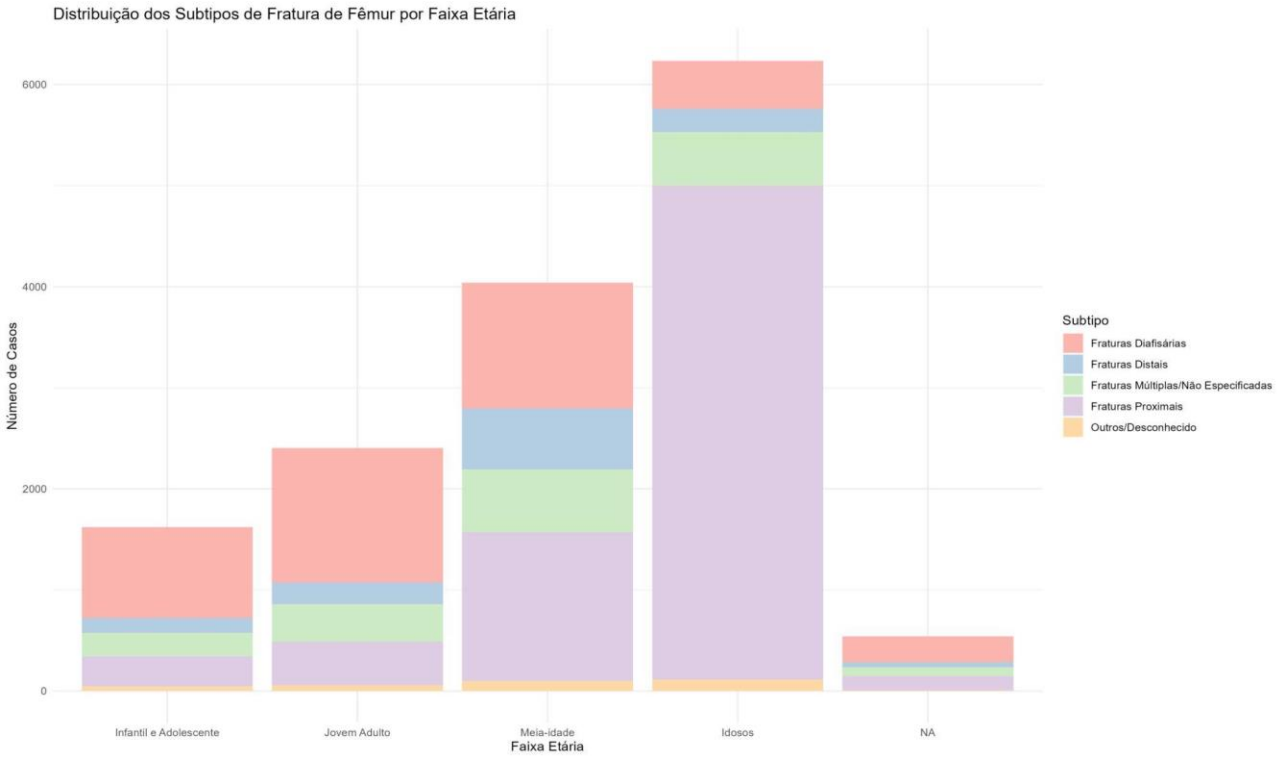


Figure 5 shows the distribution of femur fracture subtypes across patient age groups. For the analysis, age groups were categorized as follows: patients aged 18 years or younger were included in the child and adolescent group; patients aged 19 to 29 years were classified as young adults; patients aged 30 to 59 years were included in the middle-aged group; patients aged 60 years or older were classified as older adults; and finally, the "not reported" group included all data inconsistent with the previous classification.

In this context, it was observed that diaphyseal fractures were more common among children, adolescents, and young adults, whereas the most common fracture type among adults and older adults was proximal fracture. An interesting finding is that, in middle-aged and older adult groups, multiple or unspecified fractures increased substantially in number. In addition, diaphyseal fractures were also more frequent among middle-aged patients.

International Journal of Health and Surgical Research
ISSN 3086-2574

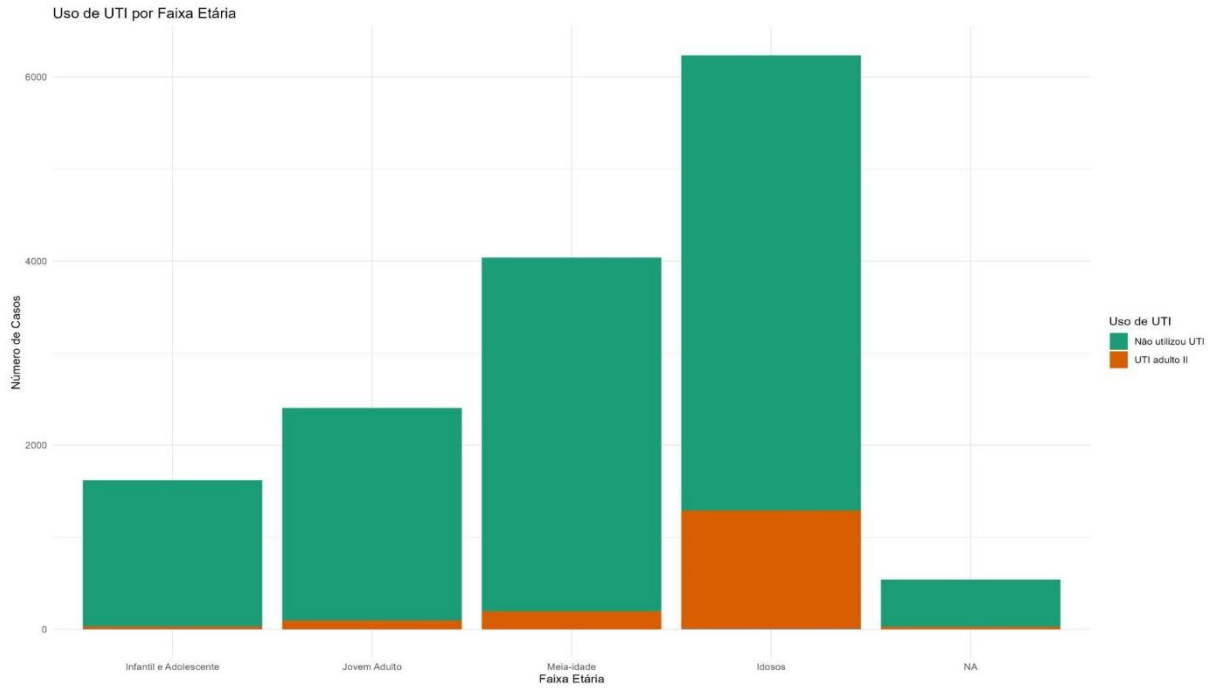
Figure 5. Femur fracture subtype by age group between 2018 and 2024.



Subsequently, Figure 6 shows ICU admission among patients with femur fractures according to the corresponding age group. A progressive increase in ICU use can be observed with advancing age. Among the child and adolescent group, the young adult group, and the middle-aged group, ICU use increased more gradually. This contrasts with the sharp rise in ICU admissions among older adults compared with the other groups.

International Journal of Health and Surgical Research
ISSN 3086-2574

Figure 6. ICU admission by age group from 2018 to 2024 among patients with femur fractures.



Furthermore, this study identified other relevant findings. Nearly all cases were classified as medium complexity, accounting for 97.70% of cases, whereas high complexity represented 2.30%. It is also noteworthy that 98.27% of patients survived, while 1.73% died. Care was predominantly provided under the public healthcare system, accounting for 89.77% of cases, whereas private care represented 10.23%. The months with the highest number of cases were August, July, October, and June, accounting for 9.51%, 9.27%, 8.79%, and 8.77% of cases, respectively.

Based on the analysis of the data collected during the study period (2018–2024), an average of 2,120.28 cases per year was observed across all regions of the state. Moreover, the subtle increase in the total number of fractures at the end of the time interval is consistent with the noticeable rise in the number of cases both in Brazil as a whole[11] and in other parts of the world, such as Portugal[12].

Regarding fracture type, proximal fractures were among the most prevalent subtypes observed in the analysis, being common due to osteoporosis affecting older adults. On the other hand, femoral shaft fractures are highly recurrent due to motor vehicle accidents and are more common among young adults and middle-aged adults[11].

Concerning fracture seasonality, a subtle discrepancy was found compared with analyses conducted at the national level, since the most common months for femur fractures in Brazil, especially proximal third fractures, are January, June, and August[13]. However, when analyzing fractures in the international context, a certain similarity is notable with countries such as Sweden, which presents similar data for children and younger individuals[14].

When analyzing fracture trends by sex, a discrepancy was again observed compared with national-level data. Notably, the predominance of femur fracture cases in Brazil is female[13], and the trend observed internationally points to the same result[12], except among younger individuals[14]. This differs from our study, in which most cases occurred in males.

Finally, it should be emphasized that the hospitalization profile based on age group is consistent with other data collected at the national level, which reinforce the higher occurrence of hospitalizations at older ages due to the presence of risk factors such as osteoporosis16. From this perspective, it is also worth noting that a similar profile has been observed internationally in countries such as Somalia[29].

Because this study used data from the DwWeb system, it is subject to underreporting due to failure to report conditions by healthcare professionals. In addition, the findings are limited to the state of Mato Grosso, and similar studies in other locations are needed to establish a broader parameter for these traumas in Brazil.

4. CONCLUSION

Therefore, the incidence of these fractures has shown a significant increase in recent years, reaching its peak in 2024. This increase was mitigated during the pandemic but resumed afterward. The most affected regions of Mato Grosso were Centro-Norte, Norte, and Sul. The most affected age group was older adults, and this population required significantly greater ICU access compared with younger groups.

The most frequent fractures were proximal and diaphyseal fractures, with proximal fractures being more common among older adults and diaphyseal fractures among younger individuals. This study plays an important descriptive role by characterizing risk factors and the profile of individuals affected by this trauma, contributing evidence that may support further studies and public health policies. Thus, it is vital to understand these data in order to develop proposals and measures that may mitigate this problem in the state of Mato Grosso.

REFERENCES

1. Agarwal-Harding K, Meara J, Greenberg S, Hagander L, Dyer G. Estimating the global incidence of femur fracture. 2013.

2. Egol KA, Koval KJ, Zuckerman JD. *Handbook of Fractures*. 5th ed. Philadelphia, PA: Wolters Kluwer Health; 2015

3. Barney J, Piuzzi NS, Akhondi H. Femoral Head Avascular Necrosis. In: *StatPearls [Internet]*. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Updated July 3, 2023. Available from: https://www.ncbi.nlm.nih.gov/books/NBK546658/. Accessed February 13, 2025.

4. Lara Júnior AF, Ferreira LGS, Darmstadter HE, Garrido FHF, Heleno RG, Marçal MGS. Tratamento de pseudoartrose de fratura de fêmur diafisária após falha da dinamização de haste intramedular – relato de caso com técnica simples. *Brazilian Journal of Development*. 2022;8(10):68952-68955. doi:10.34117/bjdv8n10-261.

5. Fu BS, Zheng ZH. Surgical treatments for femoral shaft fractures: a narrative review. *Malays Orthop J*. 2023;17(3):5-8. doi: 10.5704/MOJ.2311.002.

6. Gadegone W, Gadegone P. Antegrade and retrograde femoral nailing. In: Banerjee A, Biberthaler P, Shanmugasundaram S, editors. *Handbook of Orthopaedic Trauma Implantology*. Singapore: Springer; 2023. Available from: https://doi.org/10.1007/978-981-15-6278-5_11-1.

7. Hellwinkel JE. Innovations in treatment of femoral fractures throughout history. *J Orthopaedic Experience Innov*. 2024;5(2). https://doi.org/10.60118/001c.94220.

8. Romeo NM, Deitch JR. Femur injuries and fractures treatment & management. Medscape. Updated May 5, 2023. Available from: https://emedicine.medscape.com/article/90779-treatment?form=fpf. Accessed February 11, 2025.

9. Pavan BA, Zucoloto ML, Nunes AA, Souza MM de, Martinez EZ. Seasonal variations in incidence of femoral fractures in the state of Rio Grande do Sul, southern Brazil. *Fisioter Mov*. 2022;35:e35144. Available from: https://doi.org/10.1590/fm.2022.35144.

10. Guedes A. Fraturas do fêmur em idosos no Brasil - incidência, letalidade e custos (2008-2018). *Rev Cient HSI*. 2022;6(3):165-171. https://doi.org/10.35753/rchsi.v6i3.333.

11. Araújo LB, Garces TS, Sousa GJB, Moreira TMM, Pereira MLD, Damasceno LLV, Gomes IM, Gomes LA. Tendência de hospitalizações por fratura de fêmur no Brasil: uma série temporal. *Braz J Develop*. 2020;6(5):28499-28510. Available from: https://ojs.brazilianjournals.com.br/ojs/index.php/BRJD/article/view/10213. Accessed February 13, 2025.

12. Silva J, Linhares D, Ferreira M, Amorim N, Neves N, Pinto R. Tendências epidemiológicas das fraturas do fêmur proximal na população idosa em Portugal. *Acta Med Port*. 2018;31(10):562-567. Portuguese. doi: 10.20344/amp.10464.

13. Hungria Neto JS, Dias CR, Almeida JDB de. Características epidemiológicas e causas da fratura do terço proximal do fêmur em idosos. *Rev Bras Ortop*. 2011;46(6):660–667. Available from: https://doi.org/10.1590/S0102-36162011000600007.

14. Engström Z, Wolf O, Hailer YD. Epidemiology of pediatric femur fractures in children: the Swedish Fracture Register. *BMC Musculoskelet Disord*. 2020;21:796. doi: 10.1186/s12891-020-03796-z.

15. Lo JC, Zheng P, Grimsrud CD, Chandra M, Ettinger B, Budayr A, Lau G, Baur MM, Hui RL, Neugebauer R. Racial/ethnic differences in hip and diaphyseal femur fractures. *Osteoporos Int*. 2014;25(9):2313-2318. doi: 10.1007/s00198-014-2750-1.

16. Soares DS, Mello LM de, Silva AS da, Nunes AA. Análise dos fatores associados a quedas com fratura de fêmur em idosos: um estudo caso-controle. *Rev Bras Geriatr Gerontol*. 2015;18(2):239–248. Available from: https://doi.org/10.1590/1809-9823.2015.14022.

17. Leonora Dias da Silva E, Abrahão G, Silva G, Paiva Luciano A. Perfil epidemiológico das internações por fratura de fêmur em idosos no Brasil entre 2013 e 2022. *RESP*. 2023;1(2). Available from: https://respcientifica.com.br/index.php/resp/article/view/14. Accessed February 13, 2025

18. Peterle VCU, Geber Junior JC, Darwin Junior W, Lima AV, Bezerra Junior PE, Novaes MRCG. Indicators of morbidity and mortality by femur fractures in older people: a decade-long study in Brazilian hospitals. *Acta Ortop Bras*. 2020;28(3):142–148. Available from: https://doi.org/10.1590/1413-785220202803228393.

19. Rocha MA, Carvalho WS, Zanqueta C, Lemos SC. Estudo epidemiológico retrospectivo das fraturas do fêmur proximal tratados no Hospital Escola da Faculdade de Medicina do Triângulo Mineiro. *Rev Bras Ortop*. 2001;36(8):311-316.

20. Rojas LG, Padilla MD, Cervantes RE, et al. Fragility fracture systems, Latin America perspective. *OTA Int*. 2022;5(3S):e178. doi: 10.1097/OI9.0000000000000178.

21. Souza e Silva M, Regiani Barbosa VdC, Hernandes Júnior PR, Agra da Silva C, Bastos Neto RM, Nicácio Costa VE. Analysis of the epidemiological panorama of hospitalizations for femur fracture in Brazil from 2018 to 2020. *Int J Health Sci*. 2022;2(22). doi: 10.22533/at.ed.1592222230049.

22. Santos Júnior JE, Silva RBB da. Femur fractures in the elderly in Northeast Brazil: epidemiological data and expenses for the SUS. *RSD*. 2021;10(14):e180101421984. Available from: https://rsdjournal.org/index.php/rsd/article/view/21984. Accessed February 13, 2025.

23. Gutzeit EM, Lopez TV, Cortijo de Campos S, et al. Assessment of the profile of victims of femur fractures treated at an urgent and emergency hospital in the Brazilian western Amazon. 2022. Available from: https://doi.org/10.56238/colleinternhealthscienv1-024. Accessed February 13, 2025.

24. Paiva M de M, Leal DP, Kuroki PK, et al. Distal femoral fractures from high-energy trauma: a retrospective review of complication rate and risk factors. *Acta Ortop Bras*. 2022;30(spe2):e256896. Available from: https://doi.org/10.1590/1413-785220223002e256896.

25. Classificação Internacional de Doenças. CID 10 - Classificação Internacional de Doenças. CID10. Available from: https://cid10.com.br. Accessed February 13, 2025.

26. Brasil. Secretaria de Estado de Saúde de Mato Grosso. Dados abertos - Pesquisa temática. Available from: http://appweb3.saude.mt.gov.br/dw/pesquisa/tema. Accessed February 28, 2025.

27. Brasil. Ministério da Saúde. Datasus - Informações de saúde Tabnet. Available from: https://datasus.saude.gov.br/informacoes-de-saude-tabnet/. Accessed February 28, 2025.

28. Mello N. Censo 2022: maioria dos municípios de MT se declaram pardos; veja lista. G1. December 26, 2023. Available from: https://g1.globo.com/mt/mato-grosso/noticia/2023/12/26/censo-2022-maioria-dos-municipios-de-mt-se-declaram-pardos-veja-lista.ghtml. Accessed February 28, 2025.

29. Ibrahim YB, Mohamed AY, Ibrahim HS, et al. Risk factors, classification, and operative choices of femur fractures at a tertiary hospital: first report from Somalia. *Sci Rep*. 2023;13(1):12847. doi: 10.1038/s41598-023-39671-9. Erratum in: *Sci Rep*. 2023;13(1):13295.