


ANALYSIS OF DEATHS OF ELDERLY PATIENTS TREATED AT A BRAZILIAN REFERENCE HOSPITAL IN TRAUMATOLOGY

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ABSTRACT

INTRODUCTION: In Brazil, from the age of 60, individuals are already considered elderly, and this is the age group that grows the most proportionally in the country, exhibiting one of the fastest growth rates in the world. Estimates show that from the years 1970 to 2000, the population aging rate in developed countries was 54%, while in developing countries this rate reached 123% (Daniel, Antunes & Amaral, 2015).

Keywords: Deaths in elderly patients. Hospital traumatology. Mortality analysis.

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INTRODUCTION

In Brazil, from the age of 60, individuals are already considered elderly, and this is the age group that grows the most proportionally in the country, exhibiting one of the fastest growth in the world. Estimates show that from the years 1970 to 2000, the population aging rate in developed countries was 54%, while in developing countries this rate reached 123% (Daniel, Antunes & Amaral, 2015).

According to data from the World Health Organization (WHO, 2017), the projection is that by 2050 the elderly population will reach the 2 billion mark, contrasting with the 900 million registered in 2015. The expansion of longevity brings with it not only significant opportunities for seniors, their families, and society at large, but also highlights the crucial influence of technology and the promotion of healthy habits, factors that contribute to the continued growth in the number of seniors.

However, as life expectancy has increased, recent studies have begun to establish links between the declines associated with old age and the life patterns, habits, and behaviors adopted throughout life (Faller, Teston, & Marcon, 2015). Aging emerges as a topic of great relevance for research, aiming to contribute to the formulation and implementation of public policies, given its global nature. Throughout life, there is a constant adaptation, marked by the balance between gains and losses, and decreases in physical and cognitive abilities tend to increase with advancing age (Jung et al., 2019).

Despite the opportunity for a longer life, the aging process brings with it very important reflections: Death by accidents is a serious global health problem and the elderly are more susceptible to suffering from them. (Yadav et al., 2023) In addition, the chronic diseases of the elderly and their greater fragility can reduce their ability to resist, including small traumas. With technological advances and improved quality of life, the elderly become more exposed to the risk of accidents. With the current aging of the world's population, the number of people over 60 years of age has been increasing significantly. (Kwon et al., 2020) In this scenario, there is a need to expand scientific studies, considering that trauma in the elderly causes intense suffering to the victims and their families, in addition to entailing high costs for the world economy. (Eckhardt et al., 2020).

OBJECTIVE

The main objective of this study was to conduct a data survey on the epidemiological incidence of trauma in the elderly in a Brazilian public hospital and to

review the scientific literature regarding the interventions that could be adopted to minimize morbidity and mortality in these cases. (Jang et al., 2021)

METHODOLOGY

A statistical survey was carried out on the total number of deaths of elderly people admitted in 2022 to the João XXIII Hospital, victims of trauma or clinical causes, on an urgent or emergency basis. We evaluated how many arrived in CPA (Cardiorespiratory Arrest) at admission and were successfully resuscitated, what were the incidences by gender and age of the patients, what were the trauma mechanisms or causes of care, whether the patients were taken to the hospital by rescue teams or their means, which trauma diseases or main traumas occurred, which medical specialties participated in the care of the patients, whether they underwent surgical treatment, which surgeries were performed, how many died in an intensive care unit, what was the patient's classification according to the Manchester protocol in hospital triage, in addition to the collection of data on the average hospital stay until the date of death and on how many patients died as a result of infectious complications acquired after hospital admission.

The statistical analysis was performed through Microsoft Excel, which ensured the consolidation of the data in an organized manner. The Microsoft Excel 2017 program aggregated the researched articles in spreadsheet form, to allow the extraction of research information, and the creation of graphs for the display of the results.

DEVELOPMENT

The medical records of 264 elderly patients over 60 years of age, victims of trauma or with severe clinical conditions, who died in 2022, were evaluated. All the medical records of hospitalized patients and all the records of external care of patients admitted to the João XXIII Hospital, who died this year, were reviewed. Hospitalized patients are those patients who had a hospitalization record performed by the attending physician. Outpatients are those patients for whom no hospital record has been made; The documentation of the clinical case is restricted to the external care form, as the patients died as soon as they were admitted to the hospital. The data were entered and analyzed by the WHO EPIINFO program.

INCIDENCE BY SEX AND AGE

There were 264 consultations during the period from January 1, 2022 to December 2022, of which 62.12% were male (n= 164) and 37.88% were female (n=100) (Graph 1).

The mean age was 66.51 years, as shown in Table 1.

Graph 1 – Gender of the Research Participants

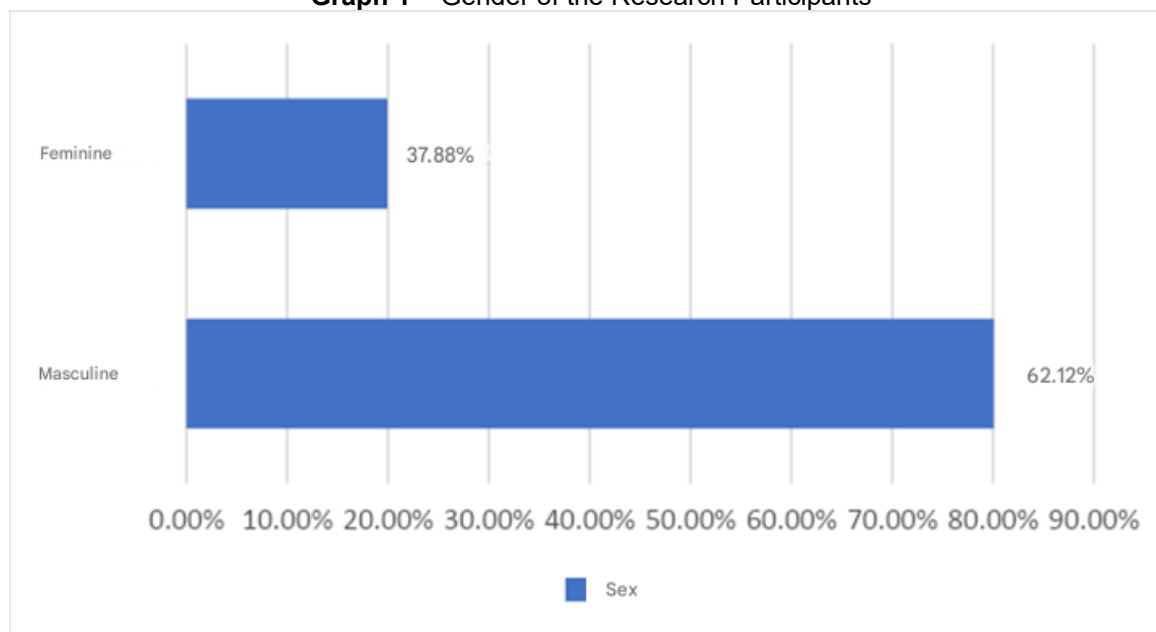


Table 1 - Age of the Research Participants

Age	Female	Male
Average - 66.51 Median - 67 Minimum value - 60 Maximum value - 89 25% - 62th Percentile 75% - 74th Percentile	Average - 69.49 Median-69 Minimum value - 60 Maximum value-89 25%- 65th Percentile 75%- 72nd Percentile	Average - 65.62 Median-66 Minimum value-60 Maximum value-88 25%-63rd Percentile 75%-73rd Percentile

4.2 MAIN MECHANISMS OF TRAUMA

The main causes of care were falls, responsible for 120 visits (n=120), followed by being run over (n=21); burns (n=11); car accident (n=8), assault (n=4), attempts at self-extermination (n=4), motorcycle accidents (n=3), bicycle accident (n=1) and exogenous poisoning (n=1) as shown in Table 2.

It is worth noting that 85 patients were treated for clinical conditions, such as decompensated heart disease (n=13), acute respiratory failure (n=9), non-traumatic acute abdomen (n=10), stroke (n=10), infectious conditions: urinary tract infection and pneumonia (n=7), post-cardiorespiratory arrest (n=2) and hospitalized for workup, without diagnosis at admission (n=34). A total of 6 patients with complications after trauma were treated: surgical wound infection (n=2) and sepsis (n=4).

Of the 264 patients, 100 (37.87%) were taken to the hospital by SAMU/rescue and 5 (1.76%) by air transport.

Table 2 - Cause of care

Falling from Your Height	86
Falling from the ladder	8
Drop from height	15
Nonspecific hair loss	2
Falling from the bed	9
Falls – Total	120
Clinical causes	85
Hit	21
Burn	11
Car accident	8
Trauma complications	6
Self-extermination	4
Assault/knife	3/1
Motorcycle accident	3
Cycling accident	1
Exogenous intoxication	1
Total	264

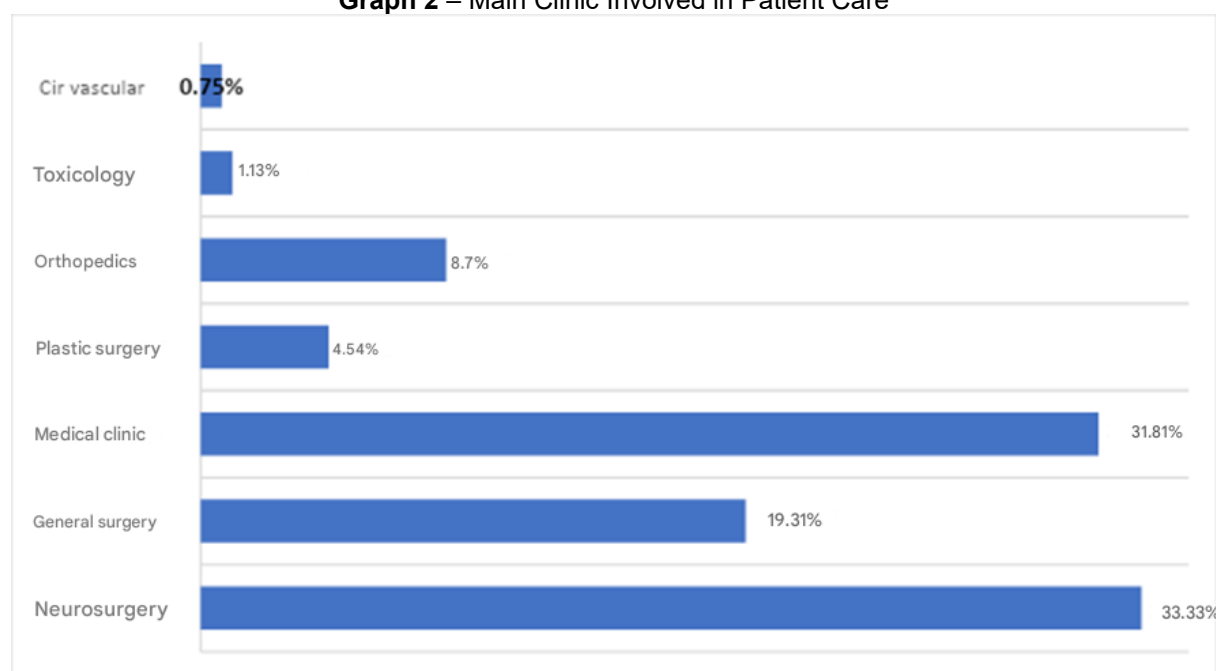
The most recurrent trauma disease associated with care was traumatic brain injury (n=89), as shown in Table 3, followed by upper and lower limb trauma (n=23), burns (n=13), spinal cord trauma (n=8), pelvic trauma (n=6), thoracoabdominal trauma (n=5), isolated chest trauma (n=3), isolated abdominal trauma (n=3), exogenous intoxication (n=3), and facial trauma (n=1).

Corroborating this data, it is possible to perceive that neurosurgery was the main clinic involved in the care of these patients (n=89), followed by internal medicine (n=84); general surgery (n=51); orthopedics (n=23), plastic surgery (n=12), toxicology (n=3) and vascular surgery (n=2) (Graph 2).

Table 3 - Traumatological Illness

Major trauma	Number of patients
TBI/ facial trauma	89/1
Burn	13
TRAIN	8
Exogenous Intoxication	3
Thoracic Trauma	3
Trauma MMII/MMSS	23
Trauma Abdominal	3
Thoraco-abdominal trauma	5
Pelvic trauma	6

Graph 2 – Main Clinic Involved in Patient Care



In this context, 195 surgical procedures were performed. The main ones were: Craniotomy and Decompressive Craniectomy, with intracranial pressure monitoring, tracheostomy, laparotomies, debridement of extensive wounds, treatment of closed and open limb fractures, spine arthrodesis, thoracic drainage, limb amputation and others (vascular surgeries, gastrostomy, ventriculoperitoneal shunt, pelvic fracture fixation, hemodialysis catheter installation, upper digestive endoscopy) as shown in Table 4.

Table 4 - Surgeries performed

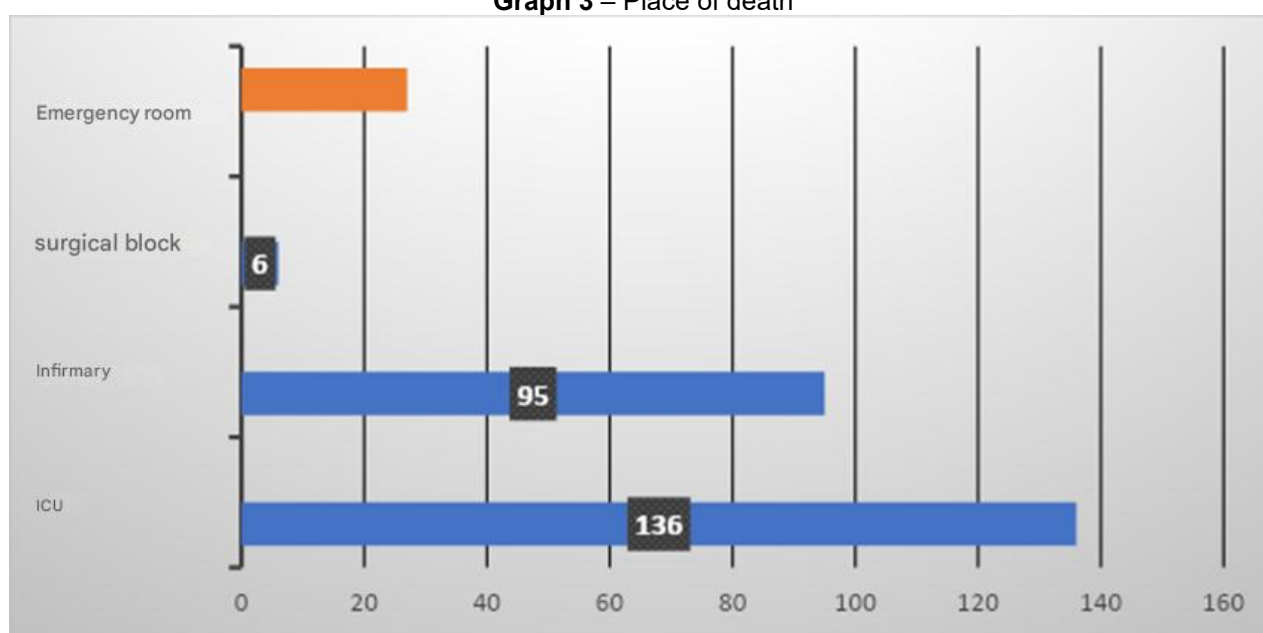
Surgery	Number of patients
TQT	29
Laparotomy	25
Decompressive Craniectomy	13
Craniotomy	40
Debridement of extensive wounds	24
Spine arthrodesis	12
Chest drainage/thoracotomy	9/1
Limb amputation	4
Closed and open limb fractures	16/3
Vascular surgeries	3
Other	16
Total	195

FACTORS RELATED TO DEATH AND PROGNOSIS

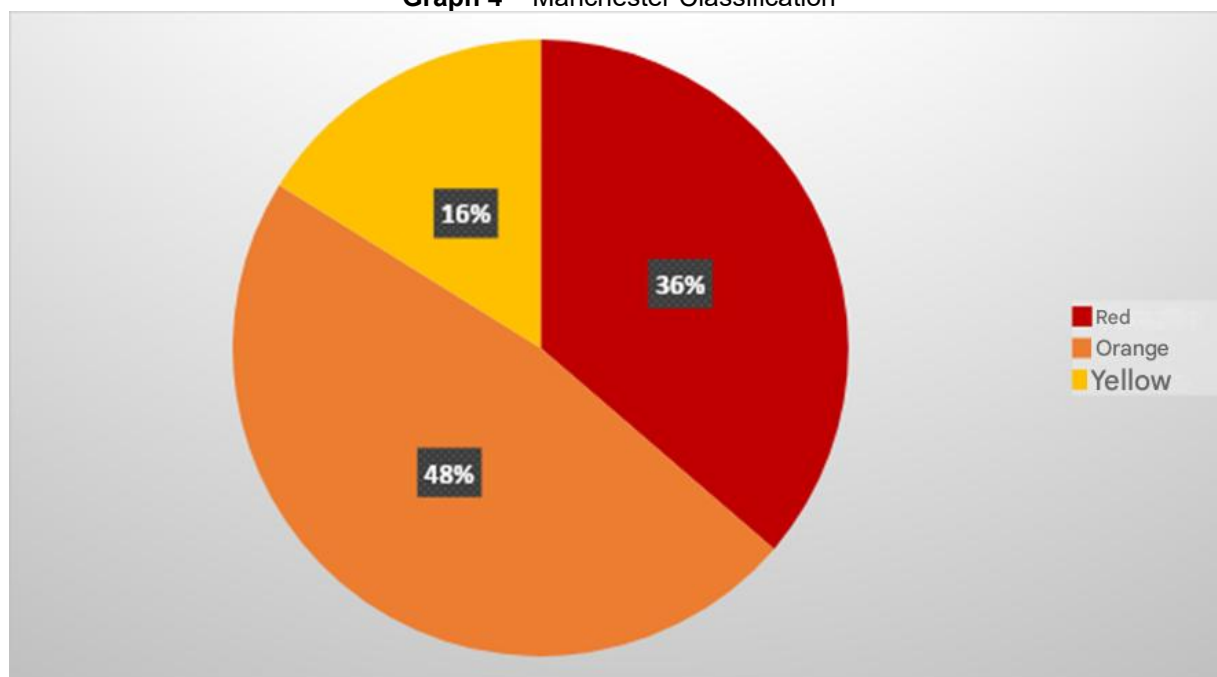
Regarding deaths, it was found that most occurred in the hospital's intensive care unit -ICU (n=136), followed by the ward (n=77), emergency rooms (n=45) and surgical block, respectively (n=6) (Graph 3).

The Manchester Protocol was used as a screening method to classify the risks and define which patients needed priority care at hospital admission, using wristbands with colors: Red, 90 patients at risk of death or in conditions of extreme severity who needed immediate care; oranges, 118 patients in urgent cases, with a waiting time of a maximum of 10 minutes; 40 patients who could be at risk, but not immediately, with an average waiting time of up to 1 hour (Graph 4). 16 patients were not classified at hospital admission.

Graph 3 – Place of death



Graph 4 – Manchester Classification



Regarding the hospital stay until death, the average was 11.07 days. Only 6.38% of the cases died after 30 days of hospitalization.

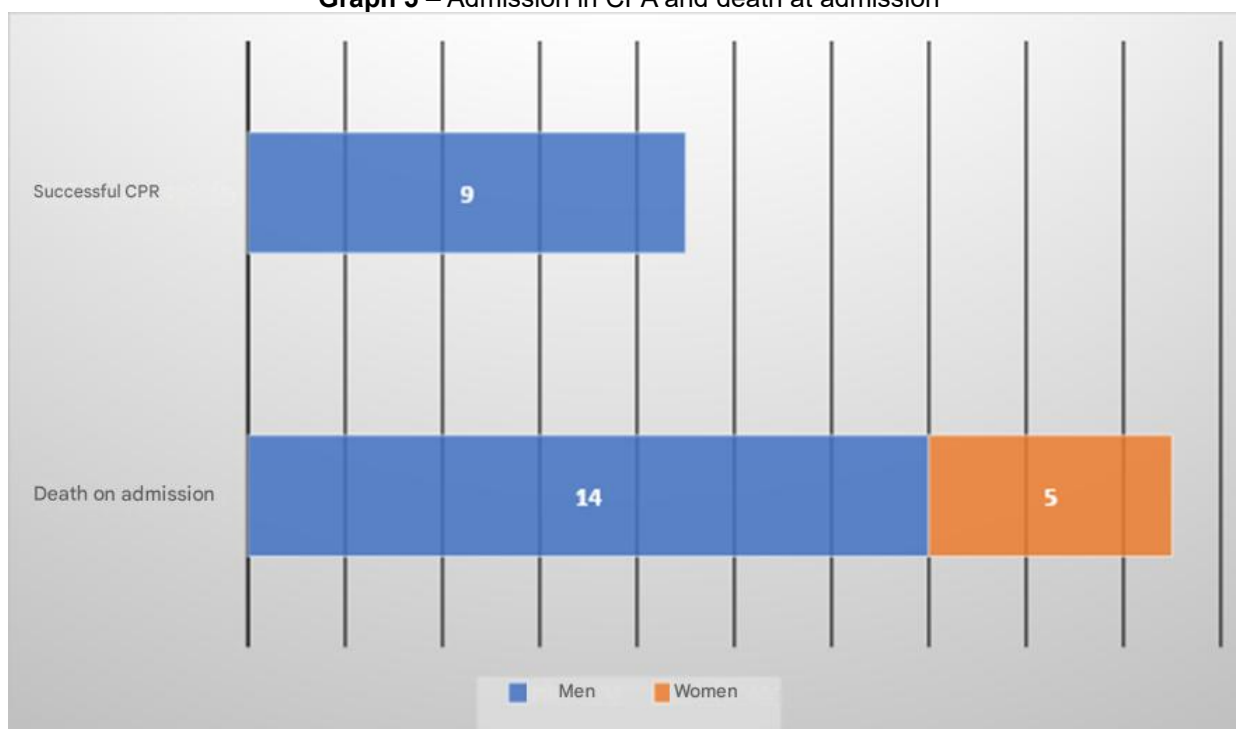
The resuscitation room of the João XXIII Hospital has communication with an alarm system called "red wave". This system refers to an institutional protocol for the care of patients at imminent risk of death, involving the performance of a multidisciplinary team and the synchronization between different sectors of the urgent and emergency unit, such as the resuscitation room, helipad, surgical block and other units of the hospital.

The "red wave" is triggered when a patient arrives extremely serious, requiring urgent referral to the operating room. This activation is done through a signal, similar to a police car radar. The signal is transmitted to the blood bank, which prepares to send O- (O negative) blood to the operating room. The surgical block, in turn, has a specific room for the "red wave", ensuring effective harmony between the sectors.

Conceptually, the "red wave" represents a set of medical and administrative tactical actions aimed at the surgical approach of patients at imminent risk of death. This approach occurs in a properly prepared and trained surgical center, instead of the polytrauma care room. The protocol enables immediate care with blood products and the provision of a room in the operating room equipped with the necessary materials for urgent surgical procedures.

The "red wave" is considered a successful experience at the institution, standing out for the adherence of professionals to the protocol, for the recognition of its importance and, mainly, for the improvement in the quality of care for patients at imminent risk of death. There was only 1 case of "red wave" in this series, and the patient underwent thoracotomy, but died in the operating room.

Graph 5 – Admission in CPA and death at admission



A total of 23 patients were admitted in cardiorespiratory arrest and of these, 14 died on hospital admission (Graph 5).

Another important fact is that 100 (37.87%) of the patients with severe or non-severe diseases died as a result of infectious complications acquired after hospital admission. Sepsis and severe TBI are also noteworthy as the cause of death, as shown in Table 5.

The most frequent brain injuries were acute subdural hematoma (n=31), traumatic subarachnoid hemorrhage (n=21), cerebral contusion (n=15), cerebral intraparenchymal hematoma (n=7), followed by chronic subdural hematoma (n=6), skull fractures (n=4), intraventricular hemorrhage (n=3) and acute extradural hematoma (n=2).

Table 5 - Causes of death

Cause of death	Number of patients
Sepsis	84
Pneumonia/bronchoaspiration	12
Cardiogenic shock	13
Severe TBI	55
Hypovolemic shock	24
TRAIN	4
Thoracoabdominal trauma	9/1
Acute respiratory failure	4
Acute abdomen	16
BIRD	3
Other	40
Total	264

This study found that falls were a relevant trauma mechanism, being the main cause of accidents among the elderly admitted to the hospital. Falls in the elderly are an important public health problem, because the prevalence of falls is high among the elderly and the consequences are serious. Approximately 95% of all hip fractures each year are attributed to falls, and 20% to 30% of those who fall and suffer a hip fracture die within 1 year. The rapid growth in the number of older adults, associated with the high costs of falls, even if not fatal, requires that effective fall prevention strategies be identified and tested. In this sense, the study by Ruge *et al.* (2020) corroborates this research, as it demonstrated that mortality is high among elderly patients with traumatic brain injury (TBI).

In the study by Amorim *et al.* (2017) the authors found that the main causes of trauma in emergency are due to: fall, traffic accident, aggression and wound by knife or firearm, such data are similar to ours, which showed that of the 264 patients taken to the hospital by SAMU/rescue and air transport, 120 suffered falls.

In this sense, head trauma was pointed out as the main trauma associated with the patients studied. Head trauma is classified by the nature of the force causing the injury and the severity of the injury. The forces that cause head trauma are called impact or inertia forces. Impact forces result from the impact of the head on a surface or a moving object hitting the head; These forces often cause skull fractures, focal brain injuries, and subdural or epidural hematomas. Inertial forces are typically the result of the rapid acceleration and deceleration of the brain within the skull, resulting in a shear or disruption of brain tissue and nerve fibers (Miranda, 2017).

Most traumatic brain injuries are the result of both types of forces. The severity of the head injury can range from a concussion (mild diffuse axonal injury) to a more serious

injury. Damage to nervous system tissue occurs both at the moment of impact or by penetration, and by secondary damage (Miranda, 2017).

Corroborating this information, neurosurgery was the clinical specialty most involved in the care of most patients. Regarding deaths, it was found that most occurred in the intensive care unit (ICU), a hospital sector dedicated to intensive care, where specialized treatment and continuous monitoring of patients are offered. Patients admitted to the ICU are more susceptible to contracting more severe and frequent infections. These factors associated with preexisting physical and systemic impairment can predispose to death in many cases (Galhardo et al., 2020). In agreement with the literature, 37.87% of the patients with severe or non-severe diseases died as a result of infectious complications acquired after hospital admission.

Healthcare-associated infections are increasingly in the spotlight of patients, insurers, governments, and regulators. This is due not only to the severity of the problem in terms of morbidity, mortality, and associated treatment costs, but also to the growing recognition that most of these infections are preventable. The medical community is witnessing simultaneous and unprecedented advances in understanding the pathophysiology of infectious diseases and the global spread of multidrug-resistant infections in healthcare facilities (Graveto et al., 2018).

These challenges, compounded by the scarcity of new antimicrobials, have necessitated a review of the role of basic infection prevention practices in modern healthcare. There is now unquestionable evidence that strict adherence to hand hygiene effectively reduces the risk of cross-transmission of infections. Hand hygiene is described by many healthcare professionals as the single most important tool in preventing the spread of healthcare-associated infections among patients (Tarso *et al.*, 2017).

In addition to this factor, 14 of the 23 patients admitted in cardiorespiratory arrest died at hospital admission, but 9 survived, demonstrating the importance of this first qualified care at the institution.

It should also be noted that for patients admitted to traumatology, a screening should be carried out based on symptoms and recommended waiting time, patients receive a color according to the severity of the situation. The most serious pathologies are designated with the color red, indicating the need for immediate care; very urgent cases are orange, with a recommended waiting time of ten minutes; Urgent cases are identified with the color yellow, and the recommended waiting time is 60 minutes. Patients classified as green and

blue have less severity, being considered little or not urgent, and should be seen within four hours. The triage system also considers the possibility of worsening the patient's health situation while waiting for medical care, allowing a change through a second assessment. The classification is carried out by a professional with a higher education, usually a nurse, who must have communication skills, agility, ethics and good clinical knowledge (Franco, Bueno & Merhy, 2019).

In this study, the Manchester classification for patients was: 90 red; 118 orange; 40 yellow, demonstrating the severity of the cases while hospital admission is considered a factor of worse prognosis, associated with higher mortality. According to Franco, Bueno and Merhy (2019), the purpose of the Manchester classification is to humanize care through qualified listening to clients who seek urgent/emergency services. This approach involves classifying, through a protocol, the complaints of users who seek urgent/emergency services, to identify those who need immediate or immediate medical care. In addition, it seeks to take advantage of this meeting with citizens as an opportunity to educate them about urgent/emergency care and develop care flows in this context, taking into account the health care service network.

FINAL CONSIDERATIONS

Old age can lead to significant and negative physical, cognitive, affective, and social changes that cause dependence and lack of autonomy in the elderly, causing them to lose their freedom, damaging their memory, distancing themselves from family, friends, affections and social relationships. Human beings fear the losses that cause suffering. The experience of losses can generate situations of abandonment, with progressive damage.

In this context, falls are a relevant public health problem and cause high rates of morbidity and mortality in the elderly. In this sense, public health and management actions should include actions aimed at improving the functional and psychosocial capacity of the elderly, consequently increasing the well-being and general health of the elderly, preventing diseases and accidents. Measures to improve accessibility to all places to be frequented by the elderly population are highlighted.

Infections related to hospital care should be avoided by the simple act of washing hands when dealing with patients. In addition, care should be taken with strict antisepsis and asepsis when dealing with venous accesses, bladder probes, orotracheal tubes, and tracheostomy cannulas.

It is essential to invest in improving patient care, in a welcoming and individualized way, with an understanding of their family context, assessing the global scope of their diseases and comorbidities, respecting their physical and mental needs. In this context, the use of the Manchester risk classification during urgent and emergency care is highlighted, ensuring efficient and effective care, understanding and prioritizing the complaint and current physical situation of patients.

It is up to the team, with the support of the institutions, to be trained and qualified to perform highly technical service and deal with chaotic situations. This preparation will enable the efficiency and effectiveness of the maneuvers necessary for the care of accident victims and in serious, urgent or emergent situations. The success of patient care is possible through the association of efforts of trained and qualified teams, with the involvement and interest of each professional, with the unrestricted logistical, financial and administrative support of managers and health institutions.

REFERENCES

1. Adler, Robert A. et al. (2016) Managing osteoporosis in patients on long-term bisphosphonate treatment: report of a task force of the American Society for Bone and Mineral Research. *Journal of Bone and Mineral Research*, vol. 31, no. 1, p. 16-35. <https://asbmr.onlinelibrary.wiley.com/doi/full/10.1002/jbmr.2708>
2. Alves-Silva, J.D., Scorsolini-Comin F., Santos M.A. (2013) Elderly in Long-Term Care Institutions: Development, Living Conditions and Health. *Psychology: Reflection and Criticism*, 26(4), 820-830. Retrieved October 23, 2023, from <https://www.scielo.br/j/prc/a/qqS5Cdp9JcWBgW4Q84MDwsD/?format=pdf&lang=pt>
3. Amorim, E.S. et al. (2017) Epidemiological profile of victims of traumatic brain injury. *Rev Enferm Ufpe On Line*, Recife, v. 10, n. 11, p. 50-56. Retrieved October 23, 2023, from <https://periodicos.ufpe.br/revistas/revistaenfermagem/article/viewFile/231177/25151>
4. Andrade, F.M.D. et al. (2020) Profile of care for violence against the elderly in urgent and emergency services: analysis of the 2017 viva survey. *Revista Brasileira de Epidemiologia*, [S.L.], v. 23, n. 1, p. 1. FapUNIFESP (SciELO). <http://dx.doi.org/10.1590/1980-549720200008.supl.1>.
5. Barbieri, N.A. (2014) *Disease, Active Aging and Frailty: Discourses and Practices around Old Age*. 2014. 199 f. Thesis (Doctorate) - Health Sciences Course, Federal University of São Paulo. Paulista School of Medicine, São Paulo. Retrieved October 23, 2023, from <http://www.repositorio.unifesp.br/bitstream/handle/11600/41274/Tese-14578.pdf?sequence=1&isAllowed=y>
6. Beauvoir, S. (1990) *Old Age: Uncomfortable Reality*. Rio de Janeiro: Nova Fronteira.
7. Brazil. (1988) *Constitution of the Federative Republic of Brazil*. Brasília – DF, Planalto.
8. Brazil. (1990) *Law No. 8,080, of September 19, 1990*. Provides for the conditions for the promotion, protection and recovery of health, the organization and operation of the corresponding services and provides for other provisions. Brasília – DF, Planalto. Retrieved October 23, 2023, from https://www.planalto.gov.br/ccivil_03/leis/l8080.htm
9. Brazil. (1991) *Law No. 8,212, of July 24, 1991*. Provides for the organization of Social Security, institutes a Costing Plan, and makes other provisions. Brasília – DF, Planalto. Retrieved October 23, 2023, from https://www.planalto.gov.br/ccivil_03/leis/l8212cons.htm
10. Brazil. (2003) *Control of the SUS*. Brasília – DF, Planalto, 2003. Retrieved October 23, 2023, from <https://www.scielo.br/j/prc/a/qqS5Cdp9JcWBgW4Q84MDwsD/?format=pdf&lang=pt>
11. Brazil. (2006) Ministry of Health; Secretariat of Health Care, Department of Primary Care. *Aging and health of the elderly*. Brasília. (Cadernos de Atenção Básica, 19).

12. Brazil. (2018) Paraná State Department of Health. *Multidimensional assessment of the elderly*. Retrieved October 23, 2023, from http://www.saude.pr.gov.br/arquivos/File/AvaliacaoMultidoldoso_2018_atualiz.pdf
13. Brito, A.M.M, Camargo, B.V, Castro, A. (2017) Social Representations of Old Age and Good Old Age among the Elderly and Their Social Network. *Journal of Psychology of Imed*, [s.l.], v. 9, n. 1, p.5-21, 14 nov. Complexo de Ensino Superior Meridional S.A. Retrieved on October 23, 2023, from <http://dx.doi.org/10.18256/2175-5027.2017.v9i1.1416>.
14. Bulgo, D. C. et al. (2023) *Health-promoting view for the elderly in the city of Franca/SP: municipal actions in favor of active aging*. Thesis (Doctorate in Health) – Graduate Program in Health, University of Franca – UNIFRAN. 2023. <https://downloads.editoracientifica.com.br/articles/230111782.pdf>
15. Cadore, E. (2014) Strength and Endurance Training Prescription in Healthy and Frail Elderly. *Aging And Disease*, [s.l.], v. 5, n. 3, p.183-190, 1 jun. Aging and Disease. <http://dx.doi.org/10.14336/ad.2014.0500183>.
16. Carneiro, M.B., Alves, D.P.L. & Mercadante, M.T. (2013) Physiotherapy in the postoperative period of Proximal Femoral Fracture in the Elderly. *Acta Ortop Bras*. 21(3):175-8. Retrieved October 23, 2023, from <http://www.scielo.br/pdf/aob/v21n3/10.pdf>
17. Coimbra, V. S. A. et al. (2018) Gerontological contributions to the care of the elderly in long-term care institutions. *Rev. Bras. Sickness* 71 (suppl 2). <https://doi.org/10.1590/0034-7167-2017-0357>
18. Costa, F.A. (2018) Woman, work and family: the impacts of work on women's subjectivity and family relationships. *Pretextos - Revista da Graduação em Psicologia da PUC Minas*, v. 3, n. 6, jul./dez.
19. COT. *Resources for Optimal Care of the Injured Patient*. Chicago (IL): American College of Surgeons; 2022.
20. Daniel, F., Antunes, A. & Amaral, I. (2015) Social Representations of Old Age. *Análise Psicológica*, [s.l.], v. 33, n. 3, p.291-301, 23 set. ISPA - University Institute. Retrieved October 23, 2023, from csx.
21. Dettmer, Jacqueline Alves Borba de Oliveira et al. (2023) The importance of risk classification in services. *Temas de Ciências da Saúde*, p. 137.
22. Eckhardt, T, Horst, K, Störmann, PA-O, Bläsius, FA-O, Hofman, MA-O, Herren, CA-O et al. (2020) Impact of Chest Trauma and Overweight on Mortality and Outcome in Severely Injured Patients. *J Clin Med*; 9(9):2752.
23. El Miedany, Y. (2022). Bone Health in Men. *New Horizons in Osteoporosis Management*, 171-198. https://link.springer.com/chapter/10.1007/978-3-030-87950-1_5

24. Faller, J.W., Teston, E.F. & Marcon, S.S. (2015) Old age from the perspective of elderly individuals of different nationalities. *Text & Context - Nursing*, [s.l.], v. 24, n. 1, p.128-137, mar. FapUNIFESP (SciELO). Retrieved October 23, 2023, from <http://dx.doi.org/10.1590/0104-07072015002170013>.
25. Fátima Filha, Maria de. (2014) *The importance of reception with risk classification in the urgent/emergency service*. Final Paper (Specialization in Health Sciences) – Graduate Program in Nursing, Health Sciences Center – Lines of Care in Urgency and Emergency, Federal University of Santa Catarina, Florianópolis. <https://repositorio.ufsc.br/xmlui/handle/123456789/173621>
26. Felipe, T. W. S. S., Sousa, S. M. N. (jul.-dez. 2014) The construction of the old age category and its meanings. *PRACS*. Macapá, v.7, n. 2, p. 19-33. <https://periodicos.unifap.br/index.php/pracs/article/view/1384/thayzav7n2.pdf>
27. Fleg, J.L. (2012) Aerobic exercise in the elderly: a key to successful aging. *Discoverymedicine*, Internet, v. 1, n. 1, p.1-10, 2012. Retrieved October 23, 2023, from <http://www.discoverymedicine.com/Jerome-L-Fleg/2012/03/26/aerobic-exercise-in-the-elderly-a-key-to-successful-aging/>
28. Fluetti, M.T et al. (2018) Frailty syndrome in institutionalized older adults. *Rev. Bras. Geriatr. Gerontol*, Rio de Janeiro, v. 21, n. 1, p. 62-71. Retrieved October 23, 2023, from http://www.scielo.br/pdf/rbagg/v21n1/pt_1809-9823-rbagg-21-01-00060.pdf
29. Franco, T.B., Bueno, W.S., Merhy, E.E. (2019) Embracement and health work processes: the case of Betim, Minas Gerais, Brazil. *Cad. Saúde Pública*, Rio de Janeiro, v. 15, n. 2, abr. Available at <<http://www.scielo.br/pdf/csp/v15n2/0319.pdf>
30. Galhardo, L. et al. (2020) Mouth Injuries in Hospitalized Patients of an Intensive Care Unit. *Research, Society and Development* [Internet]; 9(8): 1-10 <http://10.33448/rsd-v9i8.5945>.
31. Garcia, G.B.M, Serquiz, A.C. (2019) Analysis of the risk factors triggering frailty syndrome in the elderly. *Annals of the UNI-RN Scientific Initiation Congress: Education 4.0*, Natal (RN), October 24 to 26, 2019, Natal: UNI-RN.
32. Graveto, J.M. et al. (2018) Hand hygiene management among nurses: collective health challenges. *Revista Brasileira de Enfermagem*, [S.L.], v. 71, n. 1, p. 562-567. FapUNIFESP (SciELO). <http://dx.doi.org/10.1590/0034-7167-2017-0538>.
33. Guedes, R.C. et al. (2019) Decline in gait speed and health outcomes in the elderly: data from Rede Fibr. *Fisioterapia e Pesquisa*, [s.l.], v. 26, n. 3, p.304-310, set. FapUNIFESP (SciELO). <http://dx.doi.org/10.1590/1809-2950/18036026032019>.
34. IBGE. (2018) BRAZILIAN INSTITUTE OF GEOGRAPHY AND STATISTICS. Elderly people indicate paths to a better age. *Retratos Magazine*. Retrieved October 23, 2023, from <https://agenciadenoticias.ibge.gov.br/agencia-noticias/2012-agencia-de-noticias/noticias/24036-idosos-indicam-caminhos-para-uma-melhor-idade>

35. Inacio, B.S. (2011) *Strength training for the elderly*. 35 f. TCC (Undergraduate) – Physical Education Course, Federal University of Santa Catarina, Florianópolis. Retrieved October 23, 2023, from <https://repositorio.ufsc.br/bitstream/handle/123456789/190388/Bruno%20S.%20In%C3%A1cio.pdf?sequence=1&isAllowed=y>
36. Jandrey, J. S., Trindade, L. F. (2023) Health education strategy for active aging: experience report 1. *Hall of Knowledge*, v. 9, n. 9. <https://www.publicacoeseventos.unijui.edu.br/index.php/salaconhecimento/article/view/24325>
37. Jang JY, Lee HS, Lee JH, Lee S, Kang M, Lee YS [Internet]. Changes of clinical result after launching of Regional Trauma Center Project: NHIS data analysis. *National Health Insurance Service Ilsan Hospital*; 2021. Contract No.: 004. Available from: <https://www.nhimc.or.kr/research/board/commBoardRscTestBigDList.do?page=3&searchyyyy=2021>. [in Korean].
38. Jang JY, Shim H, Kwon HY, Chung H, Jung PY, Kim S, et al. (2019) Improvement of outcomes in patients with pelvic fractures and hemodynamic instability after the establishment of a Korean regional trauma center. *Eur J Trauma Emerg Surg* 2019; 45(1):107-13.
39. Jung K, Kim I, Park SK, Cho H, Park CY, Yun JH, et al. (2019) Preventable Trauma Death Rate after Establishing a National Trauma System in Korea. *J Korean Med Sci* 2019; 34(8):1-10.
40. Kim K, Shim H, Jung PY, Kim S, Bang H-J, Kwon HY, et al. (2020) Early experience of a regional trauma center in Gangwon province: First step toward organizing a regional trauma system. *Hong Kong J Emerg Med*.
41. Kwon J, Lee JH, Hwang K, Heo Y, Cho HJ, Lee JCJ, et al. (2020) Systematic Preventable Trauma Death Rate Survey to Establish the Region-based Inclusive Trauma System in a Representative Province of Korea. *J Korean Med Sci*; 35(50):e417.
42. Latif, J. M. A. *The era of rights*. (2023) [Review] Democratic Rights & Modern State Magazine. Vol. 1 No. 7. <https://revistas.pucsp.br/index.php/DDEM/article/view/61098>
43. Locatelli, P.A.U.P.C. (2017) Social representations of old age from the perspective of users of a long-term care institution. *Revista Brasileira de Ciências do Aging Humano*, [s.l.], v. 14, n. 1, p.65-82, 11 out. UPF Editora. Retrieved October 23, 2023, from <http://dx.doi.org/10.5335/rbceh.v14i1.6107>.
44. Lorenzini, E., Monteiro, N.D. & Bazzo, K. (2013) Long-term care institution for the elderly: nurse performance. *Revista de Enfermagem da Ufsm*, [s.l.], v. 3, n. 2, p.259-272, 7 out. Federal University of Santa Maria. <http://dx.doi.org/10.5902/217976927169>.
45. Melo. M.A., Driusso. P. (2006) Proposal Physiotherapy for the care of Alzheimer's Disease Patients. *Aging and Health* 12(4). p. 11-18.

https://www.researchgate.net/profile/Patricia-Driusso/publication/240617862_Proposta_Fisioterapeutica_para_os_cuidados_de_Portadores_da_Doenca_de_Alzheimer/links/53f54bdf0cf2888a7491bccd/Proposta-Fisioterapeutica-para-os-cuidados-de-Portadores-da-Doenca-de-Alzheimer.pdf

46. Merquiades, J.H. et. al. (2009) The Importance of Physical Exercise for the Quality of Life of the Elderly. *Brazilian Journal of Prescription and Exercise Physiology*. v.3, n.18, nov/dez. São Paulo, p. 597-614. <http://www.rbpfex.com.br/index.php/rbpfex/article/view/213>
47. Miranda, G.M.D., Mendes, A.C.G., Silva, A.L.A. (2016) Population aging in Brazil: current and future social challenges and consequences. *Revista Brasileira de Geriatria e Gerontologia*, [s.l.], v. 19, n. 3, p.507-519, jun. FapUNIFESP (SciELO). <http://dx.doi.org/10.1590/1809-98232016019.150140>.
48. Mithal, A. et al. (2013) Erratum to: Impact of nutrition on muscle mass, strength, and performance in older adults. *Osteoporosis International*, [s.l.], v. 24, n. 4, p.1527-1528, 29 jan. Springer Science and Business Media LLC. <http://dx.doi.org/10.1007/s00198-013-2278-9>.
49. Moraes, E.N. (2011) *Prevention strategies and clinic management*. Belo Horizonte, MG: Folium.
50. Morat, Tobias et al. (2023) Evaluation of a novel technology-supported fall prevention intervention—study protocol of a multi-centre randomised controlled trial in older adults at increased risk of falls. *BMC geriatrics*, v. 23, n. 1, p. 1-13. <https://bmgeriatr.biomedcentral.com/articles/10.1186/s12877-023-03810-8>
51. Oliveira, S. M. C. (Sep/Oct 2018) Longevity and trauma due to falls. *Journal debates in psychiatry*. <https://revistardp.org.br/revista/article/download/296/270/905>
52. Park Y, Lee GJ, Lee MA, Choi KK, Gwak J, Hyun SY, et al. (2021) Major Causes of Preventable Death in Trauma Patients. *J Trauma Inj*; 34(4):225-32.
53. Pereira, J.K., Giacomini, K.C., Firmo, J.O.A. (2015) Functionality and disability in old age: to stay or not to be still. *Cadernos de Saúde Pública*, [s.l.], v. 31, n. 7, p.1451-1459, jul. FapUNIFESP (SciELO). <http://dx.doi.org/10.1590/0102-311x00046014>.
54. UNDP. (2020) *Human Development and HDI*. <https://www.br.undp.org/content/brazil/pt/home/idh0.html>
55. Reade, M. C. (2022) Perspective: the top 11 priorities to improve trauma outcomes, from system to patient level. *Crit Care*;26:395. <https://ccforum.biomedcentral.com/articles/10.1186/s13054-022-04243-2>
56. Rodrigues, O. F. F. (2023) *Empowering for active and healthy aging*. Dissertation (Master's Degree in Community Nursing) – School of Health, Polytechnic Institute of Viana do Castelo, Viana do Castelo (Portugal). <http://repositorio.ipvc.pt/handle/20.500.11960/3310>

57. Ruge, T. *et al.* (2020) Is medical urgency of elderly patients with traumatic brain injury underestimated by emergency department triage? *Uppsala Journal Of Medical Sciences*, [S.L.], v. 125, n. 1, p. 58-63, 2 jan. Uppsala Medical Society. <http://dx.doi.org/10.1080/03009734.2019.1706674>.
58. Santos, C. L. (2016) *Social construction of old age and aging: interpretations and meanings in the present*. Final Paper (Bachelor's Degree in Social Work) – Socioeconomic Center, Department of Social Work, Federal University of Santa Catarina – UFSC, Florianópolis – SC. <https://repositorio.ufsc.br/bitstream/handle/123456789/169849/TCC%20Carla%20Li%20ane%20dos%20Santos.pdf?sequence=1&isAllowed=y>
59. Santos, D. K., Lago, M. C. S. (Jan-Apr 2016) The age device, the production of old age and subjectivation regimes: genealogical traces. *Psicol. USP* 27(1). <https://doi.org/10.1590/0103-656420140060>
60. Silva, A. M. S., Sousa, A. C., Sousa, L. S. (2023) Educational strategies for active aging: a case study in the Floravida project in the city of Parnaíba-Piauí. *IX National Congress of Education – CONEDU*. https://www.editorarealize.com.br/editora/anais/conedu/2023/TRABALHO_COMPLETO_EV185_MD1_ID7656_TB3019_10122023233940.pdf
61. Silva, M.S et al. (2014) Risk of chronic non-communicable diseases in the population assisted by a Nutritional Education Program in Goiânia (GO), Brazil. *Ciência & Saúde Coletiva*, 19(5):1409-1418. Retrieved October 23, 2023, from <https://www.scielo.br/j/csc/a/MBbwmGctpZnjVbBHtpVkXrJ/?format=pdf&lang=pt>
62. Silva, Rosane Seeger da et al. (2019) Health conditions of institutionalized older adults: contributions to interdisciplinary and health-promoting action. *Cadernos Brasileiros de Terapia Ocupacional*, v. 27, p. 345-356. <https://www.scielo.br/j/cadbto/a/9ZZBqkWW999PJbhzQcWzTvB/?format=html>
63. Soares, R. (2019). Conduta Fisioterapêutica na Doença de Alzheimer, Humanismo e Ética / Physical Therapeutic Conduct in Alzheimer's Disease, Humanism and Ethics. *Brazilian Journal of Health Review*, 2(5), 4116–4123. <https://doi.org/10.34119/bjhrv2n5-019>
64. Souza, Íris Loren de. (2023) *Occupational therapy and sarcopenia: a basic guide for the elderly*. Lizard. Monograph (Bachelor's Degree in Occupational Therapy) – Department of Occupational Therapy, Federal University of Sergipe, Lagarto. <https://ri.ufs.br/handle/riufs/18140>
65. Tarso, A.B. et al. (2017) Hand hygiene in hospital infection control in the intensive care unit. *Rev. Eletron. Atualizava Saúde*, Salvador, p. 96-104, dez. <http://atualizarevista.com.br/wp-content/uploads/2017/08/a-higieniza%C3%A7%C3%A3o-das-m%C3%A3os-no-controle-da-infec%C3%A7%C3%A3o-hospitalar-na-unidade-de-terapia-intensiva-v-6-n-6.pdf>

66. Tavares, J. C., Santinha, G., Rocha, N. (2023) Health policy in a context of demographic aging.: Age-friendly principles: a programmatic priority?. *Finisterre*, v. 58, n. 123 (AOP). <https://revistas.rcaap.pt/finisterre/article/view/29037>
67. Teles, Mateus Romualdo. (2023) *Affective experiences and the sense of place: interactions between young and old in the urban space*. Pelotas. 199 f. Dissertation (Master's Degree in Architecture and Urbanism) – Graduate Program in Architecture and Urbanism, Faculty of Architecture and Urbanism, Federal University of Pelotas. https://guaiaca.ufpel.edu.br/bitstream/handle/prefix/10909/Mateus_Romualdo_Teles_Disserta%c3%a7%c3%a3o.pdf?sequence=1&isAllowed=y
68. Thé, R. F. S. (2022) Teaching through lives: biographical-narrative constructions thought of as an active and meaningful methodology. *Education and Research*, v. 48, p. e246118. <https://doi.org/10.1590/S1678-4634202248246118por>
69. Veras, R. P, Oliveira, M. (2018) Aging in Brazil: the construction of a care model. *Ciência & Saúde Coletiva*, [s.l.], v. 23, n. 6, p.1929-1936, jun. FapUNIFESP (SciELO). <http://dx.doi.org/10.1590/1413-81232018236.04722018>.
70. Witkowski, A, Jakubaszko J, Mańka R, Witkowski T. (2020) Preventable trauma deaths rate (PTDR) – Analysis of variables that shape its value with patterns of errors contributing to trauma mortality. Fifteen Years of Experience Based on the Example of a Polish Specialist Regional Hospital. *Front Sustain Cities*;2:24.
71. Yadav, K. et al. (2023) Predictors of mortality among older major trauma patients. *Canadian journal of emergency medicine*, v. 25, n. 11, p. 865-872. <https://link.springer.com/article/10.1007/s43678-023-00597-w>
72. Zanello, V., Silva, L.C., Henderson, G. (2015) Mental Health, Gender and Old Age in the Geriatric Institution. *Psychology: Theory and Research*, [s.l.], v. 31, n. 4, p.543-550, dez. FapUNIFESP (SciELO). <http://dx.doi.org/10.1590/0102-37722015042444543550>.