ORIGINAL ARTICLE

ARAÚJO, Angela Amorim De [1], VIEIRA, Arthur Tibério De Lacerda [2], PEDROSA, Ivanilda Lacerda [3], FLORÊNCIO, Márcia Virgínia Di Lorenzo [4], SILVA, Pablo Raphael Oliveira Honorato Da [5], ARAÚJO, Suely Amorim De [6]

Contents

SUMMARY

Drowning is a global problem, and is among the main causes of death in the world, and the elderly are part of this new reality as a special group who also suffer submersion accidents. The aim of this study was to analyze deaths due to drowning in the elderly in the state of Paraíba from 2005 to 2015. This is a retrospective, descriptive study associated with spatial analysis of regions with a higher incidence of drowning in people aged 60 years or older in the state of Paraíba. Data were collected from the IML (Gemol and Numol) records from 2005 to 2015, totaling 80 cases of drowning. Sociodemographic characteristics such as age group, gender, spatiality and local description of the occurrence (rivers, dams, sea, waterfall, cacimbas, dams and domestic environments), care provider, file of the Legal Medical Institute of the Scientific Police, international code of diseases – ICD 10 (code W74), shift of occurrence. As results we located the region of Mari sector of the wild region of Paraíba – Açude Olho D'agua (Latitude 7.11º S and Longitude 35.2º), was the place with the highest number of drownings, where dams/lakes (55%), male (91%), married (46%), aged between 60 and 69 years (60%), the local population made the first care (41%), 14h was of higher occurrence (11%), and on Sundays (29%). We can conclude that drowning occurs in several aquatic scenarios, and in this study occurred in fresh water, several factors were associated with drowning in the elderly, such as cognition deficits, polypharmaceuticals and physical limitations, such outcomes can help encourage protection policies for this group as well as family members guide in freshwater regions and accentuate care.

Keywords: Drowning, elderly, fresh water, nursing.

1. INTRODUCTION

Research conducted by the Global Burden of Disease Study (GBD 2016) estimate that around 370,000 people died from drowning, and of these more than 90% were from low- and middle-income countries. In Brazil, according to data from the Brazilian Society of Aquatic Rescue – Sobrasa, subtracted from Datasus, we had 5,692 cases of drowning death in 2017, among children and adults, and events occur in various locations, such as sea, river, dams, lakes and various aquatic sites (MURRAY, 2016; SPILZMAN, 2018; DATASUS, 2017).

Factors such as the extensive Brazilian coastal coast and the evolution in the number of cases of accidents associated with drowning, have presented alarming data in the scenario of drownings in the regions of Brazil, especially in freshwater regions. The descriptions of these occurrences in rivers and lakes, have provided results that represent a new reality about risk areas. Factors such as age corroborate the increase in these statistics, ranging from very young individuals to the other extreme, the elderly who are the age group selected for this article (VITTOINE, 2006).

In Brazil, according to the National Continuous Household Sample Survey- Characteristics of Residents and Households, published by the Brazilian Institute of Geography and Statistics (IBGE), the trend towards aging was more than 18% reaching 30.2 million in 2017, according to the National Survey by Continuous Household Sample – Characteristics of Residents and Households, published by IBGE. The expectation is that the number of people over 60 years of age, by 2050, will exceed the number of Brazilians under the age of 29, thus focusing on a phenomenon classified as a population aging process (IBGE, 2018).

Demographic projections indicate that the number of elderly people will surpass those of children under 14. Gains from access to education, a medicine of better quality and accessibility to health services, support this development, including social and recreation activities so stimulated that they can measure the elderly physical and emotional benefits (MIRANDA, 2016; CAMARO, 2009).

In the presence of comorbidities and vulnerability specific to aging, and some risks are enhanced if they are associated with cardiovascular diseases, cognition deficit, manifestations of global impairment, changes in attention and the sleep-wake cycle and make this age group need a differentiated look at external activities. Accidents occur inside or outside your home, with simple daily practices including household chores, personal cleaning, outdoor activities, and can become real challenges for the elderly, including drownings that are fatal events. (ANDRADE, 2017; NORDON, 2009; LEME and SILVA, 1996). The most common accidents in the elderly are falls, however recent studies related to drowning, reveal that the number has become more frequent. Whether due to situations associated with nature such as flooding, risk situations in an open place or not (sea, rivers and lakes), the causes are not well understood, but spatial disorientation or attempt at autocide were cited in studies in Asia and England (FREITAS, 2016; ROCKETT, 1993; SALIB,

2003).

The occurrences of drowning in the elderly has been portrayed in the world pictures in a still discreet way, the work of the Brazilian Society of Aquatic Rescue (SOBRASA) has been continuous to try to describe situations of a special group, however the notifications are still reduced due to the low notification of occurrences in fresh water, due to the non-obligation of the presence of life guard in these places where it would be possible to intervene quickly. The concern with policies to protect the long-lived, of which safety is part, made us try to understand in our state the accidents by submersion in the various environments among them the activities related to leisure, such as aquatic environments. (MAHONT, 2017; SPILZMAN, 2018).

In Paraíba, a survey conducted by Sobrasa from 1998 to 2012 showed a correlation with years before 98 that there was an increase of 24.9% of drowning cases, 3.3% of all cases of deaths from unintentional drownings. Most likely the elderly population that continues to grow in an upward curve performs its work and leisure activities in various environments according to its reality, and aquatic ones also follow this line because there are still little studies directed to the leisure of the elderly even in the aquatic environment (FASTAME, 2018).

Data from SOBRASA indicate in its 2015 report that in Paraíba the number of drownings in all age groups increased from 1.44% (1979), to 4.6% (2013) per 100,000 inhabitants, with consistent attention focused on proposals that can be offered to the aging population and has real risks for accidents associated with submersion (SOBRASA, 2015).

In this context, the rate of drownings has awakened through studies in other countries as an important marker of care and preservation for the elderly in aquatic environments, facilitating by mapping risk areas the sites with higher event data. It may be recommended in the population, an observation of people at risk for such activities, through a study conducted by Doo (2019), that cardiac events were among the occurrences associated with drowning. This rate of occurrence is not yet well clarified in the clinical records of the death verification service, given the physiological alteration of the cardiovascular condition of the elderly (LEE, 2019; QUEIROGA, 2013).

It is necessary to point out that a drowning situation requires some skills to get away from it. The human being, in order to remain on the surface, struggles desperately, holding his breath in an attempt not to vacuum liquid. This whole scenario worsens when the drowning victim is an elderly person, the difficulty of effective reaction in this situation is clear. Muscle strength is diminished over the years, as well as its ability to stay on the surface. Their decreased respiratory capacity and body fragility are aggravating factors for the effective risk of drowning, so these points are addressed, we need to adequately investigate the profile of these elderly who drowned (JOOST, 2016).

The main objective of this study was to analyze the incidence of drowning death in the state of Paraíba between 2005 and 2015, trying to evaluate and answer society questions associated with drowning in this special group.

2. MATERIALS AND METHODS

2.1 TYPE OF STUDY

This is a retrospective and documentary ecological study of convenience. According to Gallacher (2001) an ecological study is one in which the unit of analysis is a population or a group of people who usually belong to a defined geographical area and seek to assess how social and environmental contexts can affect the health of the population. It is also intended to use spatial statistics in the present study, since it aims to identify phenomena whose distribution is affected by its geographical location and its relationship with its neighbors. Through this method it is possible to model the occurrence of phenomena, incorporating, for example, the determining factors, the spatial distribution structure or the identification of patterns.

2.2 PLACE OF REALIZATION

The geographic space studied was the state of Paraíba, with a total population of 3,766,528 inhabitants, with a population density of 66.70 inhabitants, composed of 223 municipalities (IBGE, 2018). Data were collected at the Institute of Scientific Police of the State of Paraíba,

through its Executive Management of Medicine and Legal Dentistry – GEMOL. The Executive Management of Medicine and Legal Dentistry – GEMOL is the body responsible for the realization of medical and dental-legal services in the metropolitan region of João Pessoa, while the other municipalities of the state are served by the three Centers of Medicine and Legal Dentistry – NUMOL located in the municipalities of Campina Grande, Guarabira and Patos, in which data were collected from the other municipalities of this state.

2.3 POPULATION AND SAMPLE

The population was composed of elderly people aged 60 years or older, who had deaths reported from January 1, 2005 to December 31, 2015, and whose cadavers were admitted to the death verification services from the various regions of the state of Paraíba, with cadaveric determination of death by drowning, according to a report issued by a coroner of the Institute of Legal Medicine of the state , and documented in the service's own form.

2.4 INCLUSION AND EXCLUSION CRITERIA

We included all reported cases of drowning deaths, which occurred within 72 hours after the incident, of older people aged 60 years or older who whose GEMOL and NUMOL identification records contained the following items: gender, age, place of occurrence (Rio, dam, waterfall or domicile), municipality of occurrence. For exclusion criteria: cases that were involved with ma's or firearm injury, or incomplete GEMOL and NUMOL notification forms.

2.5 RESEARCH AND DATA COLLECTION INSTRUMENT

Data were collected with a semi-structured instrument, constructed from a standard form of the Scientific Police Institute, covering sociodemographic information, death profile, location and who performed the care, in addition to the cadaveric conditions observed and contained in the coroner's assessment.

Prior to data collection, a workshop was held with the collectors and researchers involved, clarifying the purposes and procedures of sample collection.

The data collection team participated, through institutional cooperation, officers from the Paraíba Fire Department stationed in the regions near the Centers of Medicine and Legal Dentistry, distributed as follows in the collection sites:

- Military Firefighters of the Search and Rescue Battalion: GEMOL – João Pessoa;
- Military Firefighters 2nd Battalion: NUMOL – Campina Grande;
- Military Firefighters of the 3rd Battalion: NUMOL – Guarabira;
- Military Firefighters of the 4th Battalion: NUMOL – Patos;

2.6 DATA PROCESSING

The data were organized in spreadsheet using the Microsoft Office Excel 2013 software. Such spreadsheets were imported into the Software Statistical Package for the Social Sciences (SPSS), version 19.0. The data were worked in the form of descriptive statistics, in absolute numbers and percentages. Drowning mortality rates were also built in the state of Paraíba. To standardize the data, proportions and drowning rates were calculated.

In relation to the geoprocessing treatment, Quantum GIS (QGIS) 1.7.4 was used, according to the regions of the state of Paraíba (TORQUATO, 2014).

2.7 STUDY VARIABLES

The dependent variable of the study is the outcome of the accident in death by drowning (ICD 10 W74).

The independent variables needed to describe the groups contain sociodemographic data (name, age, sex, marital status, address, occupation, ethnic data, estimated weight, place of occurrence), quantitative variables (drowning data, such as: airway sand, sea product residues, presence of water, glot spasms, foam mushroom, anserine skin, skin macerated, watery emphysema, blood dilution , Paltauf stains) and if it occurred in salty or sweet water.

Data processing and analysis were performed to construct drowning mortality rates in the state of Paraíba. To standardize the data, proportions and drowning rates were calculated.

2.8 ETHICAL ASPECTS

The study was conducted in compliance with the principles and guidelines indicated in Resolution N°. 466 of 2012 of the National Health Council, being registered in plataforma Brasil and submitted to the Ethics Committee of the Center for Health Sciences of the Federal University of Paraíba, under the approval of the ethics committee, through opinion N°. 1,704,949, filed with CAAE:56341816.1.0000.5188.
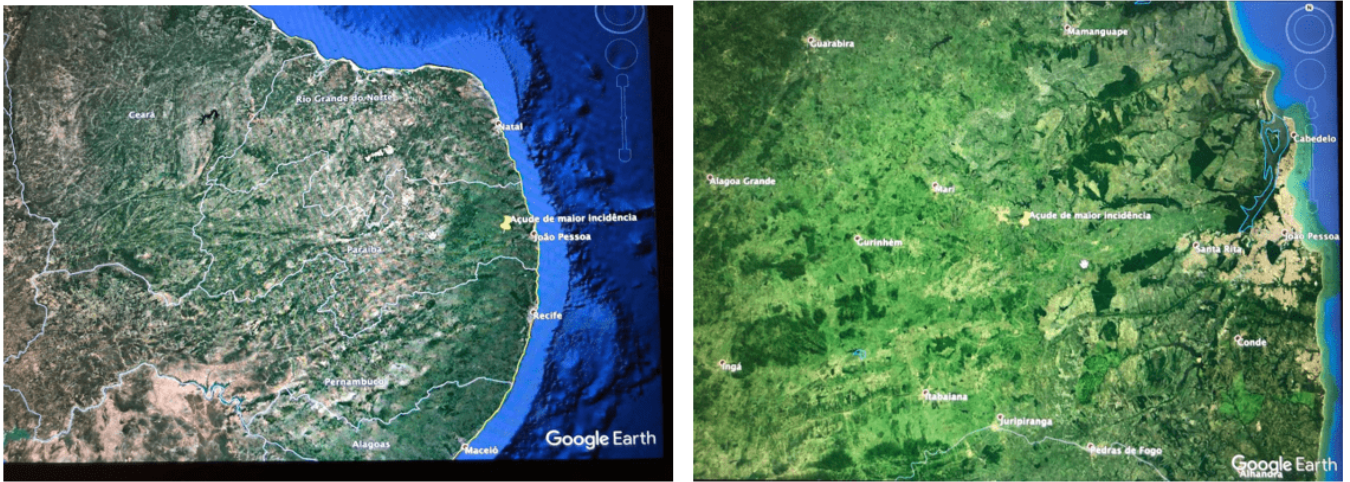
3. RESULTS

80 cases of drowning were identified in the period studied. The results describe in the region of the wild region of Paraíba, located in the city of Mari, near Guarabira, the açude Olho D'agua (Latitude 7.11º S and Longitude 35.2º W) as having the highest number of deaths from drowning in dams (43.21%), and the elderly males (91%) as the most affected, being married in 44.44% of the cases, with a mean age ± 68.93 years. The day time period was identified as being the one with the highest incidence of drowning (93.74%), especially between the 12:00 to 16:00 times. The year 2007 had the highest number of occurrences. November and Sunday were the most incidents of drownings in the elderly.

In the attendance forms were also described the cardiac conditions as the presence of calcification on examination and reduction of cardiac mass, the cadaveric data observed in the study showed the presence of cadaveric stiffness (65%), cold skin (100%), water in the respiratory tract (100%), anserine skin (90%), foam mushroom (67%), contents inside the larynx/trachea was foamy with thrubbery residues (54%), presence of liquid content inside the stomach (100%), putrefaction was observed in 12% of cases.

It was the local population who made the first care to the victim in 43.21% of the cases, followed by family members and acquaintances (14%), third to the military police (13%), firefighters (9%) and SAMU (3%).
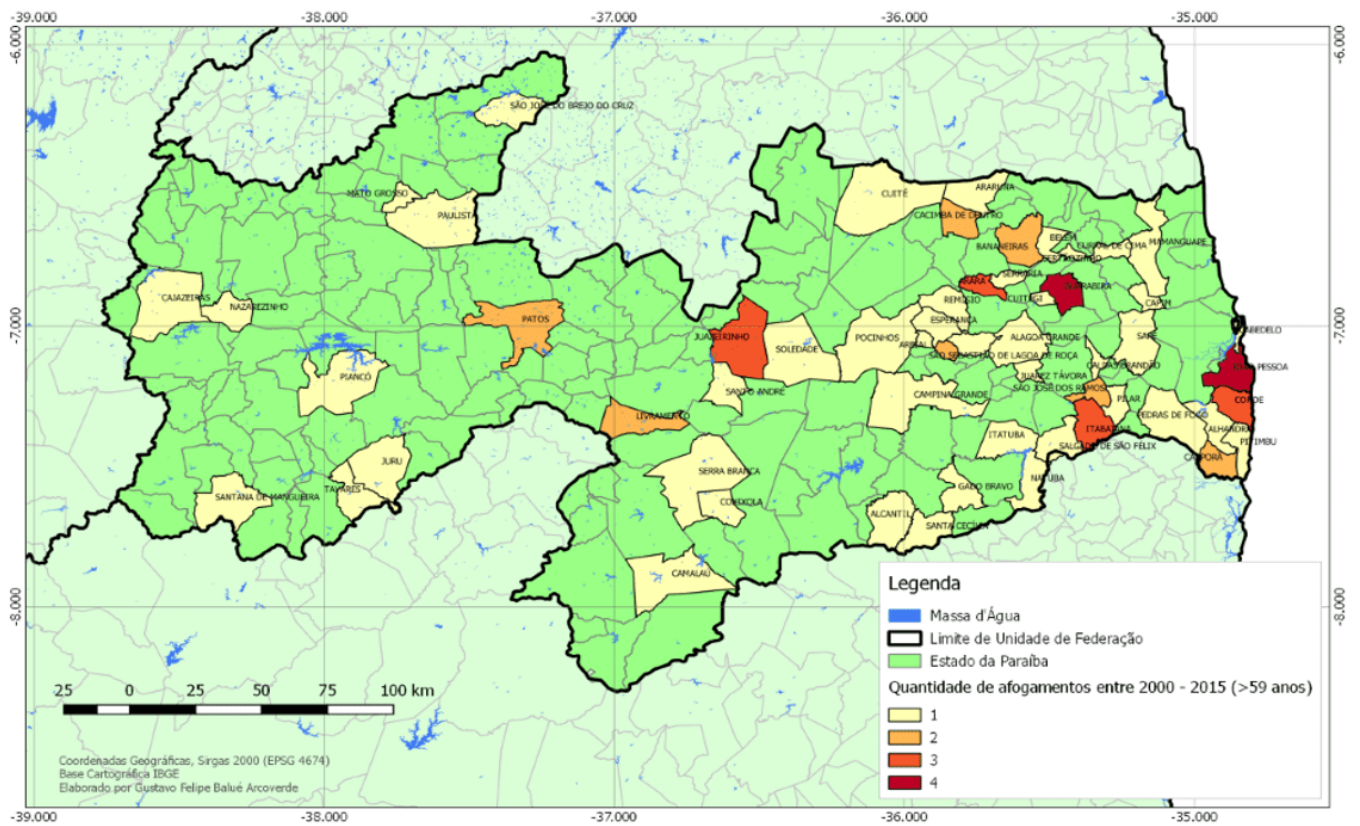
Figure 1: Place of occurrence of number of drownings in Paraíba.

Source: Google Earth, 2020.

Figure 2: State of Paraíba and location of drownings in the State

Source: Authors, 2018.

4. DISCUSSION

Drowning is defined as a result of asphyxia by immersion or submersion in any liquid medium, caused by the entry of water into the airways, partially or completely hindering ventilation or oxygen exchange with atmospheric air. The data found in the literature show important points, such as the age group most affected by death due to drowning, which are children from 1 to 9 years of age and 52% in swimming pools and residences, a number that has become increasingly close to the reality of all the country, children and adults drown more in natural waters (SPILZMAN, 2018).

Occurrences involving the elderly are little discussed when associated with suicide, a study by Alves (2014) that portrays suicide in the elderly points out some cases of submersion in which these groups are involved, the article mentions psychiatric disorders, physical diseases and use of psychoactive substances that were possibly the causes for suicide. Observations about why the elderly drown, but most of the studies from Asia and North America describe situations of cardiovascular impairment where these groups perform recreation or sports activities without due medical evaluation (ALVES, 2014).

The age group of the study shows that the elderly between 60-69 years, occupied the percentage of 60% of the cases. According to Segundo and Sampaio (2015) in a descriptive study, during 2012, the predominant age groups were adolescents (40.8%), followed by young adults (27.1%) and adults (19.8%). Men over 65 years of age, according to a study done in Greece, have a very strong factor of association with drownings, showing cardiovascular disease as a strong predictor for events that can trigger loss of consciousness or severe arrhythmias that can lead to death. Submersion causes thermal, hemodynamic and increased circulating volume in some patients, causing a reduction in colloidoshomeic pressure, leading to an increase in pressure in the elderly who have slower compensatory mechanisms and may develop thrombus due to changes. However, the risk of the patient being unconscious due to fatal arrhythmias due to efforts may be among the causes of death by drowning (STRAVOULOS, 2007).

The day of the week with the highest occurrence of drownings in this study was Sunday, a day associated with the rest of most workers in the country. Most people often use this day for leisure and recreation activities, alone or in groups. Lopes (2014) notes that january, in

summer, is a very inviting month for aquatic activities throughout the country, in addition to mentioning the stimulus that physical educators and doctors have made for leisure activities and their strong connection with the days mentioned in the study (LOPES, 2014).

In Datasus evaluating the month of occurrence of drownings, January presented 20.9% of the cases in most of the publications as a reflection of the population's access to vacation and school recess period, but in the present article data collection shows that the months of occurrence differed showing the months of November and December as the months of greatest occurrence, followed by April , February and September. This may indicate that accidents due to submersion may not only have been associated with leisure time, but also to occurrences of cardiac events or suicides. (CRESTANI, 2019)

The year 2007 showed a higher incidence of drowning with the elderly in the state of Paraíba, within the period studied. As a global data, we can observe that among the areas of greatest relative risk the Northeast presents 4.4%, due to its large coastal area and its hydrographic basins. All work has been developed by civil societies (Sobrasa, ONGs-Non-governmental organization) and public services (Fire Department) with the objective of collecting data, carrying out actions to reduce the number of drownings and guide the population, but not yet enough because every year new realities arise and there is no continuous program to reduce these rates related to drowning and new adaptation measures , such as saving lives in rivers and dams, mandatory filter for pool drains (SOBRASA, 2015).

Data from Gemol and Numol show through the collected plugs that fresh water was the most evident means of drowning for this research. It describes the place with the highest case report as being rough in the state, region of the city of Mari, in the açude Olho D'agua. Of the 80 cases of deaths identified in the period studied, 44 of them occurred in the area of dam or lagoon, that is, 55% of the cases occur in pre-established regions.

The cadaveric data observed in the study showed the presence of cadaveric stiffness (65%), cold skin (100%), water in the respiratory tract (100%), anserine skin (90%), Foam mushroom (67%), contents inside the larynx/trachea was foamy or contained untouched residues (54%), presence of liquid content inside the stomach (100%), putrefaction in 12% of cases, stiffened coronary arteries were observed, but the heart was not weighed to associate the increase of cardiac chambers with ischemic injury or increase by compensatory mechanism. It is also

possible that death occurs in liquid medium without substantial aspiration of this, a situation classically described as "death by inhibition", quite common in children and the elderly (BORDONI et al, 2019; RODRIGUES, 2007).

Therefore, among the population that uses these bathers in fresh water, whether for leisure or various social activities, the elderly are those who have conditions of physical and emotional frailties, which can increase the risk of drowning, due to factors inherent to their aging condition such as syncope, disorientation by neurological diseases (Sunset syndrome), cardiovascular diseases , diabetes and the difficulty of walking, thus making a serious event occur (LEE, 2018).

Among the occurrences in salt water (sea), the presence of fluid in the lung and anatomical changes compatible with drowning are common, but aging has been little mentioned in the articles. The most cited relationship in the literature for drowning in all adult age groups has been alcohol intake, a risk factor for this event (PEARN, 2019).

A study conducted by the Royal Life Saving National (Australian) Fatal Drowning Database showed that people aged 45 to 54 had an increase in the number of drowning deaths, and between the ages of 25 and 64 had 118 cases of drowning between 2017 and 2018. In the cases of elderly who drowned and died, comorbidities associated with the event were identified as heart disease neurological degenerative diseases, convulsion, alcohol intake, polypharmaceuticals, difficulty moving and risk of sudden illness (RLSN, 2019; QUEIROGA, 2013).

5. CONCLUSION

Elderly with various comorbidities perform recreation activities or social visits to aquatic environments (rivers, pools, dams, lakes and others) throughout the state of Paraíba and the lack of evaluation of the physical conditions of the sites and the health of users can contribute to fatal occurrences. A consequence due to physical exertion or even an unclarified circumstance such as autocide may even occur.

The various autopsy records studied lack details in the expert reports to clarify the main cause of death in the case of elderly individuals, such as weighing certain structures (heart,

spleen, lung), which would assist in the reports and in the definition of the cause of death. However, they only mention the basic diagnostic findings, information extracted from documents with statistical data. We recommend a differentiated evaluation regarding situations involving the elderly, data collection with family members, as well as mapping by region of the sites with potential occurrence of fatal accidents.

The main limitations of the study were lack of necropsy data such as organ weighing to better clarify the cause of the drowning event, notification of the family in relation to comorbidities, lack of filling out the necropsy form, Numol sites without proper notification in the service, closed sectors for weeks, and the study will be forwarded to the organs that conduct such service in the state for possible adjustments (CAMPOS , 2010).

RFERENCES

ALVES, Verônica de Medeiros; MAIA, Ana Claudia C. de Ornelas; NARDI, Antonio Egidio. Suicide among elderly: a systematic review. Medical Express (São Paulo, online), São Paulo, v. 1, n. 1, p. 9-13, Feb. 2014.

ANDRADE, F. L. J. P. et al. Incapacidade cognitiva e fatores associados. Rev. Bras. Geriatr. Gerontol., Rio de Janeiro, 2017; 20(2): 186-197

ARAUJO RT. Aspectos médicos legais e preventivos dos casos de afogamento na Região de Ribeirão Preto [dissertação]. Ribeirão Preto (SP): Universidade de São Paulo; 2007.

_____. BRASIL. Estatuto do Idoso. Lei nº 10.741/03. 1º de outubro de 2003. Brasília: Senado Federal, 2003.

_____. BRASIL. Política Nacional do Idoso. Lei nº 8.842/94. 4 de janeiro de 1994. Brasília: Senado Federal, 1994.

_____. BRASIL. Portaria do Gabinete do Ministro de Estado da Saúde de nº 2528, de 19 de outubro de 2006, que aprova a Política Nacional de Saúde da Pessoa Idosa. Brasília: Ministério da Saúde, 2006.

BORDONI L. S. et al. Análise médico-legal de 553 casos suspeitos de afogamento. Rev Med Minas Gerais 2019;29 (Supl. 8): S10-S18.

CAINE ED, Grossman H, Lyness JM. Delirium, dementia, and amnestic and other cognitive disorders and mental disorders due to a general medical condition. In: KaplanHI, Sadock BJ, editors. Comprehensive textbook of psychiatry. 6th ed. Baltimore: William & Wilkins, 1995:705-44

CAMARANO AA, Kanso S. Perspectivas de crescimento para a população brasileira: velhos e novos resultados. Rio de Janeiro: Ipea; 2009.

CAMPOS, Deise et al. Uso da autópsia verbal na investigação de óbitos com causa mal definida em Minas Gerais, Brasil. Cad. Saúde Pública, Rio de Janeiro, v. 26, n. 6, p. 1221-1233, June 2010.

CRESTANI C., MASOTTI V., CORRADI N. et al. Suicide in the elderly. Acta Biomed 2019; Vol. 90, N. 1: 68-76.

DAVID SZPILMAN & DIRETORIA SOBRASA 2018-22. Afogamento – Boletim epidemiológico no Brasil 2018. Sociedade Brasileira de Salvamento Aquático SOBRASA – Publicado on-line em http://www.sobrasa.org , agosto 2018.

FASTAME, M.C., Hitchcott, P.K. & Penna, M.P. The impact of leisure on mental health of Sardinian elderly from the 'blue zone': evidence for ageing well. Aging Clin Exp Res 30, 169–180 (2018). https://doi.org/10.1007/s40520-017-0768-x

FREITAS, C.V., Falcão Sarges E.S.N; Moreira KECS; Carneiro S.R. Avaliação de fragilidade, capacidade funcional e qualidade de vida dos idosos atendidos no ambulatório de geriatria de um hospital universitário. Rev. Bras. Geriatr. Gerontol. Rio de Janeiro, 2016; 19(1):119-128.

IMHOF, A E. Mortality problem in Brazil and in Germany: past present future. Learning from each other? Rev. Saúde Pública, São Paulo, v. 19, n. 3, p. 233-250, jun. 1985.

IBGE – Instituto Brasileiro de Geografia e Estatística. Envelhecimento Populacional/Projeções

da população (2018). http//: www.ibge.gov.br

JOOST J. L. M. BIERENS, PHILIPPE LUNETTA, MIKE TIPTON, DAVID S. WARNER. Physiology of Drowning: A Review. Physiology Published 17 February 2016 Vol. 31 no. 2, 147-166.

JUSTO, J S.; ROZENDO A.S. A velhice no estatuto do idoso. Estudos e Pesquisa em Psicologia-UERJ. 2010(2).471-89.

LEE, Doo Hyo et al. Clinical characteristics of elderly drowning patients. The American Journal of Emergency Medicine. Volume 37, issue 6, p1091-1095, june 01, 2019.

LOCALI, R F; ALMEIDA, M; OLIVEIRA-JUNIOR, I S. Use of the histopathology in the differential diagnosis of drowning in fresh and salty water: an experimental model establishment in rats. Acta Cir. Bras., São Paulo, v. 21, n. 4, p. 203-206, Aug. 2006.

LOPES, Anderson Lemos et al. Motivos de ingresso e permanencia de idosos em um programa de atividades aquáticas: um estudo longitudinal. Rev. educ. fis. UEM, Maringá, v. 25, n. 1, p. 23-32, Mar. 2014.

MAHONY et al. Fatal, unintentional drowning in older people: na assessment of the role of preexisting medical conditions. Healthy Aging Research (2017) 6:e7.

MIRANDA, Gabriella Morais Duarte; MENDES, Antônio da Cruz Gouveia; SILVA, Ana Lucia Andrade da. O envelhecimento populacional brasileiro: desafios e consequências sociais atuais e futuras. Rev. bras. geriatr. gerontol., Rio de Janeiro, v. 19, n. 3, p. 507-519, June 2016.

MATTHEW D. T et al. "The epidemiology of drowning in low- and middle-income countries: a systematic review." BMC public health vol. 17,1 413. 8 May. 2017. doi:10.1186/s12889-017-4239-2

MODELL, J.H.; GAUB, M.; MOYA, F.; VESTAL, B.; SWARS, H. Physiologic effects of near drowning with chlorinated fresh water, distilled water and isotonic saline. Anesthesiology 1966; p. 27, 33-41.

MURRAY, C. J. L. Global, regional, and national comparative risk assessment of 79 behavioral, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015.www.thelancet.com Vol 388 October 8, 2016.

ORGANIZAÇÃO MUNDIAL DE SAÚDE – OMS. Global report on drowning. Informação mundial sobre afogamento-2018.

PEREIRA, R H M et al . Envelhecimento populacional, gratuidades no transporte público e seus efeitos sobre as tarifas na Região Metropolitana de São Paulo. Rev. bras. estud. popul., São Paulo , v. 32, n. 1, p. 101-120, Apr. 2015.

PEARN, J.H.; PEDEN, A.E.; FRANKLIN, R.C. The Influence of Alcohol and Drugs on Drowning among Victims of Senior Years. Safety 2019, 5, 8.

QUEIROGA, AC & Peden, A Drowning Deaths in Older People – A 10-year analysis of drowning deaths in people aged 50 years and over in Australia. Royal Life Saving Society – Australia, Sydney. 2013.

ROCKETT IR, Smith GS. Covert suicide among elderly Japanese females: questioning unintentional drownings. Soc. Sci. Med. 1993 Jun; 36 (11):1467-72.

SEGUNDO Arnildo De Santana Só; SAMPAIO, Márcio Cardoso. Perfil epidemiológico dos afogamentos em praias de Salvador, Bahia, 2012. Epidemiol. Serv. Saúde, Brasília, 24(1):31-38, jan-mar 2015.

SALIB E. Trends in suicide by drowning in the elderly in England and Wales 1979-2001. Int J Geriatr Psychiatry. 2005 Feb;20 (2):175-81.

SPILZMAN, D. Afogamento. Rev Bras Med Esporte _ Vol. 6, Nº 4 – Jul/Ago, 2000

STAVROULA A. et al. Cardiovascular Disease and Drowning: Autopsy and Laboratory Findings. Hellenic J Cardiol 48: 198-205, 2007.

TORCHETTO, NL. QUEIROZ R. PEYROT, C. PATATT, E.R. LANGNE, C H. OCHO, L. KOPPE, E. O

uso do Quantum Gis (QGIS) para caracterização e delimitação de área degrada por atividade de mineração de basalto no município de Tenente Portela (RS). REGET – V. 18 n. 2 Mai-ago. 2014, p.710-717.

UNFPA. Relatório sobre a situação da população mundial 2011- Pessoas e possibilidades em um mundo de 7 bilhões. Divisão de População do Departamento de Economia e Assuntos Sociais das Nações Unidas. Relatório foi produzido pela Divisão de Informações e Relações Externas do UNFPA, o Fundo de População das Nações Unidas. 2011.

VIANA KP ET AL. Acesso medicamentos no Brasil. Rev Saúde Pública. 2015;49:14.

VITTOINE, M; PIA, F. It doesn't look like they're drowning: how to recognize the instinctive drowning response. On Scene, [S.l.], p. 14, 2006.

[1] PhD in Gerontology from the Pontifical University of Rio Grande do Sul; Master's degree in Nursing from the Federal University of Paraíba – PPGENF; Specialist in Cardiovascular Nursing through SOBENC; Graduated in Nursing.

[2] Master's degree in Development and Environment from the Federal University of Paraíba. Graduated in Tactical Management in Public Security Policies from the State University of Ceará (2010); Specialist in Management and Educational Technology from the State University of Paraíba (2009), Bachelor of Law from the University Center of João Pessoa (2009) and Graduated in the Training Course of Military Firefighter Officers by the Military Police of the State of Paraíba (2002).

[3] PhD in Biomedical Gerontology from PUCRS; Master's degree in Nursing from UFPB; Specialization in Public Health by ENSP /Oswaldo Cruz Foundation; Professor at the Federal University of Paraíba-Technical School of Health.

[4] PhD in Biomedical Gerontology from PUCRS; Master's degree in Nursing from UFPB; Specialist in Medical-Surgical Nursing by the Nursing Residency Program of the Hospital das Clínicas of the Federal University of Pernambuco. Professor at the Federal University of Paraíba-Technical School of Health; Disciplines Icu Nursing and Emergency Nursing.

[5] Master's degree in Development and Environment from the Federal University of Paraíba;

Specialist in Management of Military Organizations by the Academy of Military Firefighter Aristarcho Pessoa; Specialist in Rehabilitation of Musculoskeletal Injuries; Graduated in Fire and Panic Safety Engineering from the State University of Paraíba; Graduated in Physiotherapy from the Federal University of Paraíba.

[6] PhD in Health Sciences, Federal University of Uberlândia; Master in Higher Education Education-UNITRI; Specialization in Medical-Surgical Nursing UFPB; Professor of the Undergraduate Nursing at the Federal University of Uberlândia of the adult health course.