Deaths in nursing homes

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Summary

Objective: To define the causes of death in a nursing home population. **Methods:** The study selected a 508-bed nursing home with standard medical records, regular meetings concerning death certificates and 12 medical doctors in charge of supervising or issuing death certificates. The procedure standard (2006 death certificates) was considered consistent enough to undergo the analysis. The collected data were gender, age, cause(s) of death and underlying disease(s). The statistical analysis compared data between the two genders and two age ranges (< 75 years and ≥ 75 years). **Results:** There were 118 deaths in 2006 (mean age: 74.5 ± 15.2 years) - 64 women (mean age: 78.4 ± 14.4 years old) and 54 men (mean age: 69.8 ± 15.0 years old). Causes of death were sepsis (41 deaths), septic shock (25), bronchopneumonia (16), sudden death (11), multiple-organ failure (9) and other causes (16 deaths). The main underlying diseases were infections (63 deaths) – bronchopneumonia (34), sepsis (12), urinary tract infection (7) infected pressure ulcers (7), osteomyelitis (2) and bile duct infection (1); immobility syndrome (42 deaths). The proportion of women older than 75 years showed statistical significance concerning the number of deaths. The sample did not show statistical significance regarding seasonality, causes of death or underlying disease(s) when comparing infectious and noninfectious causes of death *vs.* men and women, aged older or younger than 75 years. **Conclusion:** Deaths in nursing homes were basically caused by a combination of immobility and infections that developed into sepsis.

Keywords: Aged; nursing homes for the aged; mortality.

Study conducted at Hospital Geriátrico e de Convalescentes Dom Pedro II, São Paulo, SP, Brazil

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Introduction

The fast population aging process currently observed in Brazil is resulting in an increase in the number of elderly individuals with varied degrees of significant physical, mental and/or social dependence[1]. An eminently urban phenomenon, this demographic picture implies in an assistential overload for increasingly smaller families, with an increasingly larger number of members working outside the home. Thus, the role of institutions such as residential care facility for the elderly (RCFE) becomes increasingly more relevant as an alternative for assistance to highly dependent elderly individuals[2]. That also implies in the fact that institutionalized elderly have specific characteristics, with different dynamics when compared to the elderly who live within a community[3]. These two groups – the institutionalized and the community-dwelling ones – have in common the presence and the association of several chronic-degenerative diseases, albeit with different degrees of organic involvement and functional independence.

What would be the main causes of death in a RCFE? Would there be differences in comparison with community-dwelling elderly individuals?

A search carried out on 01/28/2009 and 01/29/2009 at http://www.scielo.br/ using the terms "elderly" and "mortality" showed 56 references, of which few mentioned data on mortality in RCFE[4,5].

The first of these publications reported the comparative epidemiological analysis between the pattern of death in reference hospitals and Clínica Santa Genoveva in Rio de Janeiro, Brazil[4]. This clinic became tragically famous in 1996 for its high rate of mortality, linked to poor patient care. Guerra *et al.*[4] defined that the simple use of data from the Hospital Information System of the Brazilian Public Health System (SIH-SUS) would allow the observation of the high mortality rate that had been occurring in this clinic since 1993 and which might have been reduced before it came to public attention in 1996.

The other reference, by Villas Bôas and Ferreira[5], shows data on the occurrence of infections in institutionalized elderly. They considered its incidence to be high and reported a mortality rate due to infection of 5.0%.

It is noteworthy the fact that, in addition to finding, only two national references, both publications aimed at specific aspects of elderly individuals living in RCFE and not the context of mortality in RCFE, which was the objective of the present study.

Objective

To define the causes of death in an institutionalized population living in RCFE during a one-year period through a retrospective observational study.

Methods

The present study was carried out at *Hospital Geriátrico e de Convalescentes Dom Pedro II* (HGCDPII), which belongs to *Irmandade da Santa Casa de Misericórdia de São Paulo*. The hospital is a 508-bed nursing home with standard medical records, regular meetings concerning death certificates and 12 medical doctors in charge of supervising or issuing death certificates. The procedure standard was considered consistent enough to allow the analysis of medical records and death certificates issued during the year 2006, aiming at defining general data (gender and age), cause of death and underlying cause(s) of death.

The collected data were gender, age, cause(s) of death and underlying disease(s).

Fisher's exact test was used to test the statistical significance of differences regarding the proportions and Student's *t* test was used for means. The sample was divided between the two sexes and two age ranges (< 75 years and ≥ 75 years), considering a statistically significant alpha of 5%.

The present study is part of Project #019/08 approved by the Ethics in Research Committee of the institution where the study was conducted.

Results

There were 118 deaths during the year of 2006 (mean age: 74.5 ± 15.2 years); 64 women (mean age: 78.4 ± 14.4 years) and 54 men (mean age: 69.8 ± 15.0 years), with the following causes of death being identified (Table 1): sepsis (41 deaths), septic shock (25), bronchopneumonia (16), sudden death (11), multiple-organ failure (9), other causes (16 deaths). The main underlying causes of death were infectious (63 deaths); bronchopneumonia (34), sepsis (12), urinary infection (7), infected pressure ulcers (7), osteomyelitis (2) and cholangitis (1); followed by immobility syndrome (42 deaths). There was a significant statistical difference regarding the proportion of female elderly ≥ 75 years. The same was not observed regarding seasonality (Table 2), cause of death or underlying cause of death when considering infectious and noninfectious causes *vs.* men and women, aged older or younger than 75 years.

Discussion

The number of elderly individuals in the Brazilian population is rapidly increasing in predominantly urban regions, with increasingly smaller families and families that have a low degree of integration between generations. These facts generate pressure in areas linked to the care of the elderly[1,6]. By housing elderly individuals with a higher degree of physical, mental and/or social dependence, the RCFEs have become, within this assistance scenario, a very important factor that deserves more attention and definitions on technology of the care given to individuals in this age range.

Table 1 – Causes of death and basic causes in 118 deaths occurred in nursing homes

	Women < 75 yrs	Women ≥ 75 yrs	Men < 75 yrs	Men ≥ 75 yrs	Total
Number	18	46	28	26	
Causes of death			-		
Sepsis	6	13	15	7	41
Septic shock	6	13	1	5	25
Bronchopneumonia	1	1	4	10	16
Sudden death	1	6	4	-	11
Multiple-organ failure	1	4	2	2	9
Other causes	3	9	2	2	16
Basic causes*			-		
Bronchopneumonia	5	15	3	11	34
Sepsis	2	6	2	2	12
Urinary infection	3	1	3	-	7
Infected pressure ulcers	-	3	4	-	7
Osteomyelitis	-	2	-	-	2
Cholangitis	-	1	-	-	1
Immobility syndrome	5	15	16	6	42
Femur fracture sequelae	1	6	1	-	8
CVA sequelae	2	1	4	-	7
CET	-	-	6	-	6
Other diseases	6	4	14	3	27

*There was more than one underlying cause in 24 deaths. CVA, cerebral vascular accident; CET, cranioencephalic trauma

Table 2 – Monthly distribution of deaths in 2006, per sex and total number of deaths, in *Hospital Geriátrico e de Convalescentes Dom Pedro II*

Deaths	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Male	5	5	3	4	7	3	7	3	1	9	6	1	54
Female	6	3	4	4	4	4	4	10	5	3	9	8	64
Total	11	8	7	8	11	7	11	13	6	12	15	9	118

The profile and volume of deaths in a RCFE define its degree of quality and offers a broad view on its type of population[3-5]. It allows preventive proposals and actions related to causes of death to be implemented[4,5,7].

Infections are common events in RCFE and specific care regarding the team in charge of providing assistance to these populations is needed[8]. It is estimated that approximately 70% of RCFE residents use antibiotics at least once a year[7]. That is the result of hospitalizations that preceded the institutionalization or that recurred after the later, allowing patient contact with the intra-hospital bacterial flora and subsequent dissemination of these strains in the confinement environment of the RCFE[8]. Due to its special characteristics, the RCFEs are regulated by specific laws (RDC N°. 283 of 09/26/2005 - http://e-legis.anvisa.gov.br), which determines the creation of a Hospital Infection Control Committee (CCIH), a fact that has been present in the institution analyzed in this study since 2002. The CCIH of HGCDPII has been developing preventive care for infections in the main sites observed in RCFE – urinary tract, respiratory airways, skin and subcutaneous tissue and digestive system – associated with the rational use of antibiotics. The patients' degree of frailty and the potential for bacterial resistance to antibiotics justifies the high frequency of mortality due to infections that is still observed, compatible with data from other studies[5,9-11]. Pictures of sepsis originating from the urinary tract, pressure ulcers and respiratory airways were determinants in a significant number of deaths, such as what was observed in other samples[9-12].

Sudden death also occurs at significant frequencies in samples from RCFE[10,12,13]. Its occurrence is equally justified by the dependence characteristic, usually found in institutionalized elderly, who can have asymptomatic coronary disease go undiagnosed and untreated due to the absence of the necessary physical effort to produce precordial pain and/or dyspnea on exertion[14]. The immobility syndrome and patient frailty itself are also factors that can predict mortality in the elderly and in many underlying causes such as trauma and neurological disease sequelae, which can be prevented with early rehabilitation[15,16]. Unfortunately, most institutionalized individuals already presented

with these diseases at admission in the RCFE, thus decreasing the multiprofessional team performance in the places.

Older age and loss of personal autonomy are considered risk factors for mortality in the elderly. Regarding the higher survival of women, the statistical significance for the proportion of elderly females aged 75 and older is justified, something that is expected in RCFE[17].

Therefore, the main causes of death in a RCFE – infections and sudden death – are liable to preventive actions, that is, RCFE adequately structured can decrease hospitalizations and/or therapies that can be costly for the public health system. There is, however, another open question that deserves to be discussed in the Brazilian literature: considering that elderly individuals in RCFE are highly dependent and at the final stages of clinical pictures such as dementia syndromes, would they be considered eligible for palliative care? That would imply in significant changes regarding admission protocols and the evolution of this population of elderly individuals in RCFE and in hospitals.

When comparing with the national literature, we also observed differences and similarities regarding the cause of death in relation to elderly individuals living in residential communities and/hospitals.

Maia *et al.*[17] considered as risk factors for mortality in community-dwelling elderly in the city of Sao Paulo: (1) difficulties regarding locomotion, (2) older age, (3) male gender, (4) self-reported poor health status and (5) difficulty to go to the bathroom on their own. Except for the male gender, the profile established by these risk factors defines elderly individuals at the pre-institutionalization phase. On the other hand, Francisco *et al.*[18] observed a significant decrease in mortality due to respiratory diseases among the elderly in the state of São Paulo after the start of annual vaccination campaigns against the influenza virus. It would be interesting to verify whether vaccination campaigns in both places, community and RCFE, would have a similar result regarding the decrease in mortality. Otero *et al.*[19] reported the finding of a significant number of deaths among the elderly in the Southeast region of Brazil due to malnutrition. Would consumptive diseases, such as neoplasias or difficulties in performing self-care activities, be the cause of this report? If they are, the pre-institutionalization death and the absence of report of this cause of death in the present study are justified. Regarding the SABE study (Health, Well-being and Aging)[20], coordinated by the Pan-American Health Organization, a higher incidence of circulatory diseases, neoplasias and respiratory diseases was observed as the causes of death among elderly individuals living in the city of São Paulo, with 55.3% of the deaths occurring among older males, that is, the opposite of what observed in the RCFE in the present study. It would be interesting to assess whether this can be attributed to male elderly individuals being cared for by their wives, who, when widowed and dependent, would be institutionalized, resulting in a higher number of deaths among elderly females in these RCFE.

As for mortality of hospitalized elderly individuals, it is linked to the number of associated diseases and age range, being high when related to bronchopneumonia and heart disease[21,22]. Once again, a common fact in clinical practice can be observed, that the highly dependent elderly individual, when hospitalized, will remain in the hospital longer and will have a higher risk of death; moreover, the incapacity after discharge and return to their homes is a likely outcome, resulting in institutionalization after the hospital discharge.

It is noteworthy, as a final discussion, the facts reported by Oliveira *et al.*[23] in a study of necropsies of elderly individuals that had died at *Hospital Escola da Faculdade de Medicina do Triângulo Mineiro* (Uberaba), where the necropsied individuals were predominantly males (67.5% of the total) that had died of cardiovascular or infectious causes. The authors of this study conclude that there is an overlapping of causes of death due to chronic-degenerative and infectious diseases, a fact that is common to the three places where the death of the elderly occurred (home, hospital and RCFE).

Conclusion

Deaths in nursing homes occur basically due to a combination of immobility and infections that develop into sepsis.

References

1. Chaimowicz F. A saúde dos idosos brasileiros às vésperas do século XXI: problemas, projeções e alternativas. Rev Saúde Pública 1997;31:184-200.
2. Chaimowicz F, Greco, DB. Dinâmica da institucionalização de idosos em Belo Horizonte, Brasil. Rev Saúde Pública 1999;33:454-60.
3. Mitchell SL, Teno JM, Miller SC, Mor V. A national study of the location of death for older persons with dementia. J Am Geriatr Soc. 2005;53:299-305.
4. Guerra HL, Barreto SM, Uchoa E, Firmo JOA, Lima-Costa MFF. A morte de idosos na Clínica Santa Genoveva, Rio de Janeiro: um excesso de mortalidade que o sistema público de saúde poderia ter evitado. Cad Saúde Pública 2000;16:545-51.
5. Villas Bôas PJF, Ferreira ALA. Infecção em idosos internados em instituição de longa permanência. Rev Assoc Med Bras. 2007;53:126-9.
6. Veras R. Envelhecimento populacional contemporâneo: demandas, desafios e inovações. Rev Saúde Pública 2009;43:548-54.
7. Wick JY. Infection control and the long-term care facility. Consult Pharm. 2006;21:467-80.
8. Gorzoni ML, Pires SL. Aspectos clínicos da demência senil em instituições asilares. Rev Psiquiatr Clín. 2006;33:18-23.
9. Alessi CA, Harker JO. A prospective study of acute illness in the nursing home. Aging (Milano). 1998;10:479-89.
10. Aronow WS. Clinical causes of death of 2372 older persons in a nursing home during 15-year follow-up. J Am Med Dir Assoc. 2000;1:95-6.
11. Oliveira FA, Reis MA, Castro ECC, Cunha SFC, Teixeira VPA. Doenças infecciosas como causas de morte em idosos autopsiados. Rev Soc Bras Med Trop. 2004;37:33-6.
12. Goldberg TH, Botero A. Causes of death in elderly nursing home residents. J Am Med Dir Assoc. 2008;9:565-67.
13. Katz BP, Zdeb MS, Therriault GD. Where people die. Public Health Rep. 1979;94:522-7.
14. Amella EJ. Presentation of illness in older adults. Am J Nurs. 2004;104:40-51.

15. Abate M, Di Iorio A, Di Renzo D, Paganelli R, Saggini R, Abate G. Frailty in the elderly: the physical dimension. Eura Medicophys. 2007;43:407-15.
16. Silva TJ, Jerussalmy CS, Farfel JM, Curiati JA, Jacob-Filho W. Predictors of in-hospital mortality among older patients. Clinics 2009;64:613-8.
17. Maia Fde O, Duarte YA, Lebrão ML, Santos JL. Risk factors for mortality among elderly people. Rev Saúde Pública 2006;40:1049-56.
18. Francisco PMSB, Donalisio MRC, Lattorre MRDO. Impacto da vacinação contra influenza na mortalidade por doenças respiratórias em idosos. Rev Saúde Pública 2005;39:75-81.
19. Otero UB, Rozenfeld S, Gadelha AMJ, Carvalho MS. Mortalidade por desnutrição em idosos, região Sudeste do Brasil, 1980-1997. Rev Saúde Pública 2002;36:141-8.
20. Maia FOM, Duarte YAO, Lebrão MA. Análise dos óbitos em idosos no Estudo SABE. Rev Esc Enferm USP 2006;40:540-7.
21. Lucif Júnior N, Rocha JSY. Estudo da desigualdade na mortalidade hospitalar pelo índice de comorbidade de Charlson. Rev Saúde Pública 2004;38:780-6.
22. Villas Bôas OJF, Ruiz T. Ocorrência de infecção hospitalar em idosos internados em hospital universitário. Rev Saúde Pública 2004;38:372-8.
23. Oliveira FA, Reis MA, Castro ECC, Cunha SFC, Teixeira VPA. Doenças infecciosas como causas de morte em idosos autopsiados. Rev Soc Bras Med Trop. 2004;37:33-6.