



Morbidity and interference in seniors' functional ability*

Morbidade e sua interferência na capacidade funcional de idosos

Morbilidad y su interferencia en la capacidad funcional de personas de la tercera edad

Rosalina Aparecida Partezani Rodrigues¹, Paula Gobi Scudeller², Elizandra Cristina Pedrazzi³, Fábio Veiga Schiavetto³, Celmira Lange⁴

ABSTRACT

Objective: Identifying the interference of morbidity of the functional ability of seniors receiving care in an outpatient clinic of a school hospital, in Ribeirão Preto – SP, from January 1, 2001 to December 30, 2002. **Methods:** The instrument of assessment used in this study was “*Older Americans Resources and Services*” and a questionnaire elaborated by the study authors. **Results:** Data from 195 seniors assessed were analyzed descriptively, with most of them being female (70.3%). Age varied from 61 to 97 years, with 76 years being the average. The most frequent diseases were hypertension (HYP) (72.3%), dyslipidemia and atherosclerosis (24.1% each), arthritis (23%) and diabetes (21.5%). Those interfering in seven or more daily life activities (DLA) were: Stroke (82.6%), cataract (45.5%), osteoporosis (35.0%) and HYP (31.8%); those interfering in three or more instrumental daily life activities (IDLA) were: stroke (83.4%), cataract (61.9%), heart disease (55.0%) and Chagas’ disease (47.4%). **Conclusion:** Morbidities interfere in the seniors’ functional ability to perform DLA and IDLA.

Keywords: Morbidity/epidemiology; Aged; Activities of daily living; Frail elderly

RESUMO

Objetivo: Identificar a interferência de morbidades na capacidade funcional de idosos atendidos em serviço ambulatorial de um hospital escola, em Ribeirão Preto-SP, no período de 02/01/2001 a 30/12/2002. **Métodos:** Utilizou-se como instrumento de avaliação, o “*Older Americans Resources and Services*” e um questionário elaborado pelos autores deste estudo. **Resultados:** Os dados dos 195 idosos avaliados foram analisados de forma descritiva, sendo a maioria mulheres (70,3%). A idade variou de 61 a 97 anos, com média de 76 anos. As doenças mais frequentes foram hipertensão arterial (HAS) (72,3%), dislipidemia e artrose (24,1% cada), artrite (23%), diabetes (21,5%). As que interferiram em sete ou mais atividades da vida diária (AVDs) foram: AVC (82,6%), catarata (45,4%), osteoporose (35,0%) e HAS (31,8%); as que interferiram em três ou mais atividades instrumentais da vida diária (AIVDs), foram: Acidente Vascular Cerebral (AVC)(83,4%), catarata (61,9%); cardiopatias (55,0%) e doença de Chagas (47,4%). **Conclusão:** As morbidades interferem na capacidade funcional dos idosos para as AVDs e AIVDs.

Descritores: Morbidades/epidemiologia; Idoso; Atividades cotidianas; Idoso fragilizado

RESUMEN

Objetivo: Identificar la interferencia de morbilidades en la capacidad funcional de personas de la tercera edad atendidos en consultorios externos de un hospital docente, en Ribeirão Preto-SP, en el período comprendido entre el 02/01/2001 al 30/12/2002. **Métodos:** Se utilizó como instrumento de evaluación el “*Older Americans Resources and Services*” y un cuestionario elaborado por los autores de este estudio. **Resultados:** Los datos de las 195 personas de la tercera edad evaluados fueron analizados de forma descriptiva, siendo la mayoría mujeres (70,3%). La edad varió de 61 a 97 años, con un promedio de 76 años. Las enfermedades más frecuentes fueron hipertensión arterial (HA) (72,3%), dislipidemia y artrosis (24,1% cada), artritis (23%), diabetes (21,5%). Las que interfirieron en siete o más actividades de la vida diaria (AVDs) fueron: ACV (82,6%), catarata (45,4%), osteoporosis (35,0%) e HA (31,8%); las que interfirieron en tres o más actividades instrumentales de la vida diaria (AIVDs), fueron: Accidente Cerebro Vascular (ACV)(83,4%), catarata (61,9%); cardiopatías (55,0%) y enfermedad de Chagas (47,4%). **Conclusión:** Las morbilidades interfieren en la capacidad funcional de las personas de la tercera edad para las AVDs y AIVDs.

Descriptores: Morbilidad/epidemiología; Anciano; Actividades cotidianas; Anciano frágil

* Research funded by CNPq

¹ RN, Professor at the General and Specialized Nursing Department at Escola de Enfermagem de Ribeirão Preto da Universidade de São Paulo – USP – Ribeirão Preto (SP), Brazil.

² Undergraduate nursing student at Escola de Enfermagem de Ribeirão Preto da Universidade de São Paulo - USP– Ribeirão Preto (SP), Brasil.

³ RN, student at the Fundamental Nursing Graduate Program at Escola de Enfermagem de Ribeirão Preto da Universidade de São Paulo – USP – Ribeirão Preto (SP), Brasil.

⁴ RN, Ph.D at Escola de Enfermagem da Universidade Federal de Pelotas – UFPel – Pelotas (RS), Brasil.

INTRODUCTION

The demographic transition due to the process of population aging has been accompanied by epidemiological changes that occur first and gradually in the developed countries. In Brazil, this transition did not occur similar to that in industrialized countries, neither in the Latin-American neighbor countries, like Chile, Cuba, and Costa Rica. The Brazilian population aged rapidly as of the 1960s, and the main characteristics was the reduced rates of fecundity and mortality, the increase in life expectancy at birth and, especially, the change in the nosological pattern. This transition moved from the predominance of transmissible diseases to a predominance of chronic non-transmissible diseases⁽¹⁾.

Estimates of the World Health Organization⁽²⁾ for 205 include Brazil among the ten countries in the world with the highest number of elderly (60 years of age or more) people. In the country, the percentage of elderly individuals went from 6.3% in 1980 to 7.6% in 1996, with an estimate for 14% in 2025. The aging process causes changes, both demographic and epidemiologic, that result in an expressive growth of the demand for health care services⁽³⁾.

The Brazilian population health profile in the context of the epidemiological transition was reviewed and the authors⁽⁴⁾ showed that non-transmissible chronic diseases were responsible for 66.3% of the disease burden in the country, whereas infectious diseases totaled 23.5%, and external causes, 10.2%.

The Brazilian literature shows that the increase in non-transmissible chronic diseases is intimately related to the increase in the elderly demand in Brazil. If it is true that this population is more vulnerable to becoming ill, it is the interaction between men and the environment and social organization itself that will determine "each one's state of aging"⁽⁵⁾. It is known that complications of the non-transmissible chronic diseases affecting the elder population imply a longer treatment and a slower and more complicated recovery, sometimes calling for high-risk interventions. This situation shows there is a need to reorganize health care to the elderly in the country, with the purpose to prevent sequelae that limit an optimal functional performance, and, therefore, generators of specific health care demands⁽⁵⁾.

Many people with 60 years of age or more have multiple coexisting diseases or co-morbidities, most of which are chronic, non-transmissible, associated or not to performance limitations due to these or those sequelae. Hence, it is important to understand the extent of hindrance that those diseases pose on performing everyday activities in the elderly, and, also, to learn with care needs they demands in order to outline a more adequate care plan⁽⁶⁾.

Most elders have at least one chronic disease⁽⁷⁾ and, in spite of that, many lead a normal life, keeping their infirmities under control. In healthy aging, autonomy is essential, i.e., the elder individual's capacity to determine and perform his or her own functions. But losing control over one's chronic diseases can result in associated sequelae and incapacities, which would decisively compromise the elder individual's autonomy and functional capacity⁽⁸⁾. Hence, the longer the period of loss of control over those diseases, the stronger the chances of compromising the functional capacities of people within that age range.

Functional capacity, therefore, is a new health paradigm with deep meaning for the elderly⁽⁹⁻¹⁰⁾. Healthy aging within this new view results from the multidimensional interaction between physical and mental health, economic independence and daily life autonomy, as well as social interaction, and family support. Wellbeing at an old age results from the balance between the many levels of elderly functional capacity, without meaning the absence of problems at these levels⁽⁸⁾.

Considering these morbidities among the elderly, the central question in this study focused on: the morbidities among the elderly affect their functional capacity, i.e., their daily life independence?

OBJECTIVE

To identify the effect that morbidities have on the functional capacities of elder individuals seen at a out-patient clinic of a tertiary level teaching hospital.

METHODS

This is a sectional study based on epidemiology. The population consisted of all the elder individuals, men and women, with 60 years of age or more, living in the urban region of Ribeirão Preto, São Paulo state, who were seen at the out-patient clinic of a public tertiary level hospital in the same city, from January 2, 2001 to December 30, 2002.

First, in the period from June to October 2003, 280 elder individuals were identified at the Medical File and Statistics Service of the referred hospital, by consulting the records of patient seen at the out-patient clinic from January 2001 to December 2002. Thirty of these patients died, and therefore were 'lost'. Hence, data collection was performed on 250 records, with the following information: medical diagnoses, personal information, date of the last appointment at the out-patient clinic, home address, and telephone. Next, the information was organized by neighborhood and streets to facilitate and speed up data collection with the elderly. More losses occurred due to deaths, changes of address or refusals to participate, which resulted in 55 individuals (28.2%).

Hence, 195 elderly individuals participated effectively in the study.

Before the home visit, the interviewer would make the appointment over the phone and clarify the elder individual and/or the family about the study objectives. As to the period of data collection, the home visits occurred from December 12, 2003 to March 23, 2004. The field work for data collection was performed by a team of interviews composed by the first author of this study, *scientific initiation* fellowship holders, master and doctoral study graduates, under the coordination of the study adviser. Two technical support grant holders were also in the team, and were responsible for typing the data.

As expected and with the goal to standardize the interviews, the team received proper training before starting the pilot test. The interviewers attended the interviews two-by-two. The pilot test consisted of interviewing 20 elder individuals with the purpose to estimate the time required for the interview, the quality and how it was conducted, as well as to check the difficulties found by the interviewers. In summary, it served to provide all the interviewers with the same information. After this stage, the interviewers were considered prepared to collect the data.

As mentioned before, data collection was performed using the Older Americans Resources and Services tool. Below is a description of the tool and its form of administration.

Older Americans Resources and Services (OARS)

This multidisciplinary tool, which evaluates the functional state of elderly individuals, was developed by the Duke University⁽¹¹⁾, and adapted and validated for the Brazilian reality⁽¹²⁾. This study used only part of the OARS already used in the country⁽⁵⁾, consisting of five items: Identification: gender, age, color, time and place of residence, number of children; Social profile of the elderly individual: education level, socioeconomic situation, current and previous professional activity, housing, family composition in the residence; Morbidities classified according to ICD-10⁽¹³⁾; basic everyday activities: eating, bathing, getting dressed, combing one's hair, lying on the bed/getting up, going to the bathroom in time, walking on a flat surface, going up and down the stairs, walking around the house, trimming toe nails. The elderly individuals were classified as dependent or independent according to the number of activities they were able to perform, as follows: 0 = Independent and 1 to 3; 4 to 6 and 7 and more activities = Dependents; Instrumental daily life activities: shopping, preparing meals, financial management; taking medication, using the telephone, difficulty to leave home, cleaning. The punctuation was considered as 0 = independent and 1 to 2, 3 or more activities, dependents.

As to the databank, its development started in November, 2003, using EPIINFO, version 6.04 of January, 2001. This software was chosen since it is of public domain and has easy resources to handle the data. Typing was done as double entry so as to analyze internal consistency. The data were then submitted to EPIINFO software VALIDATE, in order to check the mistakes while typing and make the necessary corrections until achieving 100% internal consistency.

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS, 1999)11.5, and the data was processed on EPIINFO. The analysis was descriptive, crossing the study variables.

The Free and Informed Consent Form, designed by the lead-researcher along with the study author, complied with each of the requirements of Resolution 196/96 of the National Health Council. All participants signed both copies of the document, kept one copy and the other was filed by the interviewers.

As expected, the research project was submitted to the Ethics Committee of the Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto-USP, and was approved as per process HCRP 2929/2003.

RESULTS

As to the sociodemographic characteristics, 137(70.3%) of the interviewees were women and 58 (29.7%) were men, with ages ranging between 61 and 97 years. The average age was 76 years, and most 51 (26.1%), were within the age group of 75 to 79 years. As to education, most of the study population, 100 (51.3%) reported having 1 to 4 years of education, and 36 (18.4%) were illiterate. With regards to their income, 123 (63.1%) received retirement pension, however 8 (13.8%) men still practiced remunerated activities. Concerning marital status, 33 (56.9%) of the men reported having a partner, while 87 (63.5%) of the women reported being a widow. As to their families, 114 (58.5%) of the elderly individuals lived with family members, most of them women; however, 29 (14.9%) of them lived alone.

As to the morbidities, the participants reported 14 items. Hypertension had the greatest presence (72.3%), followed by morbidities related to the osteoarticular system, like arthrosis (24.1%) and arthritis (23%). Special highlight should also be given to type 2 diabetes mellitus, reported by 21.5% of the elderly subjects, followed by other less frequent morbidities. It should be stated that Chagas disease, endemic in the Ribeirão Preto region, was reported by 9.7% of the subjects (Table 1); the average number of morbidities was 2.72 per elderly individual in this population.

Table 2 shows the morbidities and the effect that each has on the Daily Life Activities (DLAs) of the elderly. As observed, all (100%) of those who had suffered a stroke

were dependents, 82.6% of which presented an effect level on seven or more DLAs; others had 70% of dependence or more (1 to 7 DLAs) in the following morbidities: heart diseases (81.1%); Chagas disease (78.6%), cataract (72.7%), type 2 diabetes mellitus (71.5%), and dyslipidemia (70.2%). Some of the elderly presented morbidities with 30% or more independence, such as: depression (30.8%), systolic hypertension (31.2%), obesity (32.1%), arthrosis (32.6%), arthritis (34.1%), and osteoporosis (40.0%).

Table 3 shows the increasing order of independence regarding Instrumental Daily Life Activities (IDLAs). Of all elderly individuals who suffered a stroke, 83.4% were dependent and compromised for three or more IDLAs; 66.0% of those with cataract were dependent, 61.9% of which had three or more compromised IDLAs; 65.0% of those with heart disease were dependent, 55.0% of which had three or more compromised IDLAs. An observation is important: despite the fact of Chagas disease not being among the three morbidities with the greatest level of dependence, 57.9% of those with the

disease were dependent, and 47.4% suffered effects on three or more IDLAs.

Table 1 – Morbidities of the elderly individuals seen at a out-patient clinic, according to ICD-10

ICD-10	Morbidities	Total	%
I 10	Systolic hypertension	141	72.3
M 19.9	Arthrosis	47	24.1
E 78.8	Dyslipidemia	47	24.1
M 13.9	Arthritis	45	23.0
E 11.9	Type 2 Diabetes Mellitus	42	21.5
I 51.9	Heart disease	40	20.5
E 66.9	Obesity	32	16.4
F 32.9	Depression	29	14.8
H 26.9	Cataract	24	12.3
I 64	Stroke	24	12.3
M 81.9	Osteoporosis	20	10.2
B 57.2	Chagas disease	19	9.7
N 39.4	Urinary Incontinence	12	6.1
E 10.9	Type 1 Diabetes Mellitus	9	4.6

ICD-10 = International Statistical Classification of Diseases and Related Health Problems(13)

Table 2 – Levels of morbidity effects on the DLAs of the elderly seen at a university out-patient clinic

Morbidities	Independents	Dependents		
		1 to 3	4 to 6	7 and more
Stroke	0 (0%)	4 (17.4%)	0 (0%)	19 (82.6%)
Heart disease	7 (18.9%)	10 (27.1%)	7 (18.9%)	13 (35.1%)
Chagas disease	3 (21.4%)	4 (28.6%)	3 (21.4%)	4(28.6%)
Cataract	6 (27.3%)	2 (9.1%)	4 (18.2%)	10 (45.4%)
Type 2 Diabetes Mellitus	12 (28.5%)	10 (23.9%)	7 (16.7%)	13 (30.9%)
Dyslipidemia	14 (29.8%)	16 (34.0%)	3 (6.4%)	14 (29.8%)
Depression	4 (30.8%)	2 (15.4%)	3 (23.0%)	4 (30.8%)
Hypertension	43 (31.2%)	35 (25.3%)	16 (11.6%)	44 (31.9%)
Obesity	9 (32.1%)	11 (39.3%)	3 (10.7%)	5 (17.9%)
Arthrosis	15 (32.6%)	15 (32.6%)	5 (10.9%)	11 (23.9%)
Arthritis	15 (34.1%)	13 (29.6%)	5 (11.3%)	11 (25.0%)
Osteoporosis	8 (40.0%)	3 (15.0%)	2 (10.0%)	7 (35.0%)

DLAs = Daily Life Activities

Table 3- Levels of morbidity effects on the DLAs of the elderly seen at a university out-patient clinic

Morbidities	Independents	Dependents	
		1 to 2	3 and more
Stroke	4 (16.6%)	0 (0%)	20 (83.4%)
Cataract	7 (33.4%)	1 (4.7%)	13 (61.9%)
Heart disease	14 (35.0%)	4 (10.0%)	22 (55.0%)
Type 2 Diabetes Mellitus	18 (40.9%)	9 (20.5%)	17 (38.6%)
Chagas Disease	8 (42.1%)	2 (10.5%)	9 (47.4%)
Hypertension	65 (46.4%)	20 (14.3%)	55 (39.3%)
Depression	15 (46.9%)	4 (12.5%)	13 (40.6%)
Arthrosis	23 (48.9%)	9 (19.2%)	15 (31.9%)
Osteoporosis	10 (50.0%)	3 (15.0%)	7 (35.0%)
Dyslipidemia	24 (51.1%)	7 (14.9%)	16 (34.0%)
Arthritis	23 (51.1%)	8 (17.8%)	14 (31.1%)
Obesity	18 (58.0%)	6 (19.4%)	7 (22.6%)

DLAs = Daily Life Activities

DISCUSSION

As evidenced, the sociodemographic data agree with those obtained in previous studies⁽¹⁴⁻¹⁷⁾, in which most of the studied population also consisted of widows. It should be emphasized that aging associated to being a widow and to morbidities lead the elderly towards living with their single or multi-generation family members. Some authors⁽¹⁶⁾ state that living alone is a factor of protection for moderate/severe dependence. One of the hypotheses is that females prevail among the elderly and use health services more.

In terms of education, it was observed that, in both genders, most had 1 to 4 years of education; illiteracy also stood out, though at a lower percentage among the elderly subjects. A fact that could justify this finding is that in the early 20th century, children and young people, especially women, did not have access to basic education⁽¹⁸⁾.

It is observed that non-transmissible chronic diseases were the main health problem among the elderly, in several parts of the world, because, with aging, harmful life habits and failure to comply with the treatment of chronic diseases can cause irreversible lesions in one's organism, and cause several incapacities in the elderly. For example, non-compliance to hypertension treatment accelerates arterial complications⁽¹⁹⁾ and cardiovascular problems. In the list of non-transmissible chronic diseases, this one is the most frequently stated, and is often totally unknown by the elderly individuals. When associated with diabetes mellitus it can increase the possibility of having a stroke.

In the present study, the morbidities that achieved 2.72/elderly person, can be a great risk to their health and, consequently, would favor the development of incapacities, which in turn contribute to, independently, reduce longevity.

Morbidities can be a risk factor associated to the loss of functional capacity. Furthermore, due to the limitation that they imply on the individuals, they can worsen or speed up the appearance of new morbidities. The authors⁽²⁰⁾ evaluated the morbidities, and mentioned that the function and capacity of staying independent should be evaluated. The authors value the elderly health paradigm, i.e., the fact that including the elderly in their social context should also be seen as a reducer of further incapacity.

There is strong evidence that the incapacity process dimensions contribute to making the everyday life activities more difficult for the elderly. This population's difficulties in everyday life activities can be due to several factors, including: Physiological factors: example of comorbidities, low aerobic comorbidity, low muscle strength, balance deficit, functional limitations; Psychological factors: cognitive function, mood; Social factors: the lack of

education, social isolation; Behavior factors: lack of physical activity⁽²¹⁾.

The data in the present study show that morbidities reduce some DLAs and IDLAs in the elderly, like stroke, cataract, and osteoporosis, which have a stronger effect. In the case of stroke, the instrumental activities are the ones that most compromise the elderly individual's life, but there are survivors that recover completely; those who stay mildly compromised, with moderate to severe sequelae need help to perform activities, others have severe incapacities, and some others die. A strong association was found⁽²²⁾ between non-transmissible chronic diseases and functional reduction, in a three-year follow-up, which triggered a greater risk to reduce the elderly individual's capacity. The deficits due to chronic diseases, especially stroke, can be motor (vision, hemiplegia opposite the cerebral lesion, cognitive (states of depression, memory loss, difficulty to understand, and expression related to aphasia and mental disorder) and sensitive (changes in surface and proprioceptive sensitivity).

In a multidimensional home interview performed with older people in the city of São Paulo, the authors⁽⁷⁾ reported that 86% of them referred having at least one chronic disease, and more than half of the studied population (53%) reported they needed full or partial help to perform at least one daily life activity. In addition, 29% of the elderly individuals needed full or partial help to perform up to three activities, and 17% needed help in four or more activities.

In this view, evaluating the DLAs and IDLAs is essential in order to plan the home care to the elderly in the health/disease process, since these variables imply greater risk for their hospitalization.

The present study has some limitations in terms of the sample, since all the subjects were seen at a tertiary level out-patient clinic, which increases the risk due to the chronic health condition. Taking this into consideration, there is a need for the out-patient clinic team to create education programs with a view to this population complying with the treatment and to the prevention of the risks caused by comorbidities. That is the only way that it is possible to preserve the elderly individuals' functional capacity, understood as the ability to maintain their physical and mental capacities, which are indispensable for living an independent and autonomous life. This is a new health paradigm for the elderly, which transcends diagnosis and treatment, since it values autonomy and self-determination, and also preserves their physical and mental independence⁽²³⁾.

It is worth to emphasize there is a need for further studies on morbidities and functional capacity, since this elderly health paradigm should be evaluated in order to identify their health care needs. Hence, there is a need for changing this population's lifestyle, focused on health

promotion supported by the municipal, state, and federal spheres in order to create more problem-solving policies so as to offer a healthier life to the Brazilian elderly population.

CONCLUSIONS

As expected, the analysis of the effect that morbidities have on the functional capacities of elderly individuals seen at an out-patient clinic suggests there should be a significant increase in the number of morbidities throughout the aging process, and the effect that DLAs and IDLAs have on the lives of older people, which is directly associated to an

overload for the health system as well as for their family. The study showed that visual difficulty and stroke are the morbidities with the strongest effect on elderly dependence in cases of DLAs (affected 7 or more activities) and IDLAs (affected 3 or more difficulties). Thus it is relevant that health professionals need to develop intervention strategies directed to older people and their families, with a view to educating them towards self-care, in cases of non-transmissible diseases. Hence, it is expected that this would reduce the dependence due to DLAs and IDLAs so as to provide the elderly with the opportunity of living as independent as possible, always in search for each one's functional capacity.

REFERENCES

- Teixeira CF. Transição epidemiológica, modelo de atenção à saúde e previdência social no Brasil: problematizando tendências e opções políticas. *Cienc Saude Coletiva*. 2004; 9(4): 841-3.
- Diet, nutrition and the prevention of chronic diseases. *World Health Organ Tech Rep Ser*. 2003; 916:i-viii, 1-149, backcover.
- Garcia MAA, Rodrigues MG, Borega RS. O envelhecimento e a saúde. *Rev Ciencias Medicas*. 2002; 11(3): 221-31.
- Schramm JMA, Oliveira AF, Leite IC, Valente JG, Gadelha AMJ, Portela MC, Campos MR. Transição epidemiológica e o estudo de carga de doença no Brasil. *Cienc Saude Coletiva*. 2004; 9(4): 897-908.
- Rodrigues RAP. Mulheres em mudança no processo de vida e envelhecer [tese]. Ribeirão Preto: Escola de Enfermagem de Ribeirão Preto da Universidade de São Paulo; 1997.
- Duarte YAO. Desempenho funcional e demandas assistenciais. In: Lebrão ML, Duarte YAO, organizadoras. SABE-Saúde, Bem-estar e Envelhecimento - O Projeto SABE no Município de São Paulo: uma abordagem inicial. Brasília: Organização Pan-Americana de Saúde; 2003. p. 185-200.
- Ramos LR, Rosa TEC, Oliveira ZMA, Medina MCG, Santos FRG. Perfil do idoso em área metropolitana na região sudeste do Brasil: resultados de inquérito domiciliar. *Rev Saude Publica = J Public Health*. 1993; 27(2):87-94.
- Ramos LR. Fatores determinantes do envelhecimento saudável em idosos residentes em centro urbano: Projeto Epidoso, São Paulo. *Cad Saude Publica = Rep Public Health*. 2003; 19(3): 793-8.
- Fillenbaum GG, Pieper CF, Cohen HJ, Cornoni-Huntley JC, Guralnik JM. Comorbidity of five chronic health conditions in elderly community residents: determinants and impact on mortality. *J Gerontol A Biol Sci Med Sci*. 2000; 55(2): M84-9.
- Kane RA, Kane RL. Assessing the elderly: a practical guide to measurement. Lexington, Mass.: Lexington Books; c1981.
- Duke University Center for the Study of Aging and Human Development. Multidimensional Functional Assessment: The OARS methodology. Durham: Duke University Medical Center; 1978.
- Ramos LR. Growing old in São Paulo, Brazil: assessment of health status and family support of the elderly of different socio-economic strata living in the community [thesis]. London: London School of Hygiene and Tropical Medicine; 1987.
- Organização Mundial de Saúde. CID-10: classificação estatística internacional de doenças e problemas relacionados à saúde. 9a ed. rev. São Paulo: EDUSP; 2003.
- Veras RP. País jovem com cabelos brancos: a saúde do idoso no Brasil. 2a. ed. Rio de Janeiro: Relume Dumará; c1994.
- Ramos LR, Toniolo J, Cendoroglo MS, Garcia JT, Najas MS, Perracini M, et al. Two-year follow-up study of elderly residents in S. Paulo, Brasil: methodology and preliminary results. *Rev Saude Publica = J Public Health*. 1998; 32(5): 397-407.
- Rosa TEC, Benício MHDA, Latorre MRDO, Ramos LR. Fatores determinantes da capacidade funcional entre idosos. *Rev Saude Publica = J Public Health*. 2003; 37(1): 40-8.
- Camarano AM, Beltrão KI, Pascom, ARP, Medeiros M, Goldani MG. Como vive o idoso brasileiro? In: Camarano AM, organizadora. Muito além dos 60: os novos idosos brasileiros. Rio de Janeiro: IPEA; 1999.
- Lange C. Acidentes domésticos em idosos com diagnóstico de demência atendidos em um ambulatório de Ribeirão Preto, SP [tese]. Ribeirão Preto: Escola de Enfermagem de Ribeirão Preto da Universidade de São Paulo; 2005.
- Fries JF. Aging, natural death, and the compression of morbidity. *Bull World Health Organ*. 2002; 80(3): 245-50.
- Guralnik JM, Branch LG, Cummings SR, Curb JD. Physical performance measures in aging research. *J Gerontol*. 1989; 44(5): M141-6.
- Avlund K, Pedersen AN, Schroll M. Functional decline from age 80 to 85: influence of preceding changes in tiredness in daily activities. *Psychosom Med*. 2003; 65(5): 771-7.
- Kriegsman DM, Deeg DJ, Stalman WA. Comorbidity of somatic chronic diseases and decline in physical functioning: the Longitudinal Aging Study Amsterdam. *J Clin Epidemiol*. 2004; 57(1):55-65.
- Gordilho A, Sérgio J, Silvestre J, Ramos LR, Freire MPA, Espindola N, et al. Desafios a serem enfrentados no terceiro milênio pelo setor saúde na atenção integral ao idoso. Rio de Janeiro: Universidade Aberta da Terceira Idade. Universidade do Estado do Rio de Janeiro; 2000.