

Effectiveness of a preventive physical therapy program for the elderly

Eficácia de um programa de fisioterapia preventiva para idosos

Ronaldo Wagner Gontijo¹, Míriam Rêgo de Castro Leão²

DOI: 10.5935/2238-3182.20130028

ABSTRACT

¹ Physical Therapist. Barreiro Health Center. Belo Horizonte, MG – Brazil.
² Nurse. Coordinating Professor of the Nursing Course at the PUC-MG Barreiro. Belo Horizonte, MG – Brazil.

Objective: To assess the effectiveness of a program of preventive physical therapy for the elderly using parameters linked to quality of life, functional capacity, and balance. **Method:** We studied 17 elders enrolled in the Family Health Strategy (ESF, in Portuguese) at the Centro de Saúde Barreiro, in Belo Horizonte. The assessments were carried out using the Brazilian version of the 36-item Short Form Health Survey (SF-36) of the Medical Outcomes Study, the Berg Balance Scale, and the Katz Index, before and after the treatment plan of 16 twice-weekly sessions of 50 minutes each. **Results:** Statistical analysis showed significant improvement in balance ($p=0.000$) and quality of life in the following aspects: functional capacity ($p=0.001$), physical limitations ($p=0.002$), pain ($p=0.000$), overall health ($p=0.000$), vitality ($p=0.001$), social ($p=0.007$) and emotional aspects ($p=0.003$) and mental health ($p=0.000$). Significant improvement was found for functional capacity ($p=0.002$) measured by Katz. A significance level of 5% was used for all statistical tests. Analyses were carried out using the Statistical Package for Social Sciences (SPSS) software, version 16.0. **Conclusion:** The preventive physical therapy program significantly improves the quality of life, balance, and functional capacity of older adults and may even contribute to lowering the rates of falls and hospitalizations, possibly reducing health expenditure.

Key words: *Elderly Health; Public Health; Physical therapy; Primary Prevention; Health Promotion.*

RESUMO

Objetivo: avaliar a efetividade de um programa de fisioterapia preventiva para idosos, usando parâmetros relacionados à qualidade de vida, capacidade funcional e equilíbrio. **Método:** foram estudados 17 idosos inscritos na Estratégia Saúde da Família (ESF) do Centro de Saúde Barreiro, Belo Horizonte. Foram aplicadas para avaliação a versão brasileira do Medical Outcomes Study Short Form – 36 Healthy Survey (SF-36), a Escala de Equilíbrio de Berg e o Índice de Katz, antes e após o plano de tratamento de 16 sessões com duração de 50 minutos cada, duas vezes por semana. **Resultados:** a análise estatística constatou melhora significativa em relação ao equilíbrio (valor $p=0,000$) e à qualidade de vida, quanto aos domínios: capacidade funcional (valor $p=0,001$); limitações por aspectos físicos (valor $p=0,002$); dor (valor $p=0,000$); estado geral de saúde (valor $p=0,000$); vitalidade (valor $p=0,001$); aspectos sociais ($p=0,007$) e emocionais ($p=0,003$); e saúde mental (valor $p=0,000$). Constatou-se, em relação à capacidade funcional medida por Katz, melhora significativa (valor $p=0,002$). Em todos os testes estatísticos, foi utilizado o nível de significância de 5%. As análises foram realizadas no software estatístico Statistical Package for Social Sciences (SPSS), versão 16.0. **Conclusão:** o programa preventivo de fisioterapia melhora significativamente a qualidade de vida, o equilíbrio dos idosos e a capacidade funcional, podendo contri-

Submitted: 04/30/2010
Approved: 10/04/2012

Institution:
Belo Horizonte City Hall. Secretaria Municipal de Saúde.
Centro de Saúde Barreiro.
Belo Horizonte, MG – Brazil.

Corresponding Author:
Ronaldo Wagner Gontijo
E-mail: ronaldogontijo@uai.com.br

buir com baixos índices de quedas e hospitalizações e com possível redução de gastos com saúde.

Palavras-chave: Saúde do Idoso; Saúde Pública; Fisioterapia; Prevenção Primária; Promoção da Saúde.

INTRODUCTION

The transformation of the health care system in Brazil has been guided by principles such as universalization, decentralization, integrality, and popular participation. Such principles integrated the initial agenda of the sanitary reform movement and were incorporated in the Brazilian Constitution of 1988. 21 years after the Unified Health System (Sistema Único de Saúde – SUS) was implemented, there is practical evidence of the efforts of thousands of managers, professionals and users of the service attempting to materialize these principles in the day-to-day activities in the health services. The principle of integrality is prominent in the field of health practices due to the creative capacity of these agents in making the SUS a promoter of health policy and services.

Although integrality has many meanings, it is necessary to understand the practices developed for the construction of this principle as a right and as a service from a critical perspective. It is about examining the different contexts, from their recurrent use in institutional documents for the formulation and implementation of health policies to the practices of the agents in everyday health services.¹ With all this in mind, the problem of the absence of a physical therapist in the teams that identify risks and work in prevention programs for collective health must be addressed.²

We are currently undergoing the implementation of a unique model to promote basic health care, oriented by multidisciplinary action towards an intervention focused on promoting the health of the population and consolidated in the Family Health Strategy (FHS) Program. Public health practices for the elderly are among the interventions focused on health. The identification of risks that lead to impediments to health among the elderly population substantially facilitates in the elaboration of prevention programs to promote better quality of life and avoid hospitalization.³

Falls and their ensuing complications are the most frequent types of accident among the elderly. Among the main causes of death of people over 65 years of age, falling ranks in third position as a cause of mortality among the elderly. Around 29% of the elderly in Brazil fall at least once a year and 13% of them fall recurrently.⁴

The economic impact of this type of incident is substantial. Around one third of the North Americans aged over 65 years fall every year, adding to an estimated annual cost of 20.2 billion dollars.⁵ In Brazil falls take the lead in terms of number of hospitalizations, representing 56.1% of that total.⁶

In an attempt to reduce medical care costs and improve the quality of life of the elderly, it is important to know the risk factors associated to hospital admissions among the elderly in order to prevent the occurrence of these factors and also to organize the services in hospitals, clinics, and in the community.⁷

In terms of hospitals, reducing the average time of permanence in the hospital environment also increases the number of beds available for the community, leading to cost reductions in hospital expenses without prejudice to the patients. This also allows the SUS to revert expenses to other ends.¹

Physical therapy may actively contribute in minimizing hospital expenses, acting in the prevention and promotion of health by the Family Health Strategy (FHS) teams. In order to strengthen the FHS and operationalize the inclusion of professionals as physical educators, social workers, psychologists, physical therapists, occupational therapists, speech therapists, nutritionists, and specialist physicians in FHS, ordinance 154 of 24 January 2008 was put into effect by the Ministry of Health to create the Family Health Support Centers (Núcleos de Apoio à Saúde da Família – NASF). The strategy advocates for the coordination of healthcare based on Primary Care.⁸

The NASFs allow for the implementation of actions focused on health promotion, health protection, and recovery, and assures the principles of universality, integrality, and equality.⁸ They expand the coverage and the scope of primary care actions, as well as their ability to resolve issues by supporting the insertion of FHS in the network of services and through the process of territorialization and regionalization of Primary Care.⁸

The responsibility shared between the Family Health teams and the NASF team in the community includes a review of the practices of patient referral based on a referral and counter-referral process, expanding it to a longitudinal monitoring process under the responsibility of the Primary Care/Family Health team and working to strengthen its attributions in the role of healthcare coordinator at the SUS.⁸

This study aims to assess the effectiveness of the preventive physical therapy program for the elderly, using parameters related to quality of life, functional capacity, and balance.

METHOD

This is a quasi-experimental study since there is no control group and the sample was chosen by convenience.

The work was approved by the Ethics in Research Committee of the Belo Horizonte Municipal Health Authority (CEP-SMSA/PBH) under CAAE number 0079.0.410.000-09.

This study was conducted at the Barreiro Health Center, which is part of the Primary Care network of the Barreiro region sanitary district, the users of which have been enrolled by the Family Health teams.

Participants were evaluated by means of specific tests regarding balance, functional capacity, and quality of life, both before and after an intervention program.

Participants

Users over 60 years of age who accepted to participate in the study were selected regardless of gender or profession. Those with cognitive, hearing, or visual deficits that prevented them from answering the questionnaires were excluded; so were those who had already been taking part in any physical therapy prevention program and who showed neurological or orthopedic deficits that limited their participation in the activities developed in the program. Seventeen patients were selected to be interviewed about their quality of life, functional capacity, and balance.

Evaluation

Participants functional capacity was evaluated using the Katz Index and the Berg Balance Scale, and for quality of life by the SF-36.

The Katz Index is a descriptive scale that analyzes functional capacity, i.e., the degree of preservation of their ability to perform, independently and autonomously, basic/routine activities of daily living and everyday instrumental activities. The scale is composed of six items that include: showering, dressing, toileting, transferring, continence and feeding. Patients are classified as independent, dependent and requiring help.⁹

The Berg Scale analyses static and dynamic balance, focusing on reaching out, rotating, transferring, remaining standing and getting up. It is made up of 14 items with common activities of daily living and progressive levels of difficulty.¹⁰

SF-36 is an inventory that evaluates eight different aspects: functional capacity, physical and emotional aspects, pain, general health status, vitality, social aspects, and mental health (Figure 1).

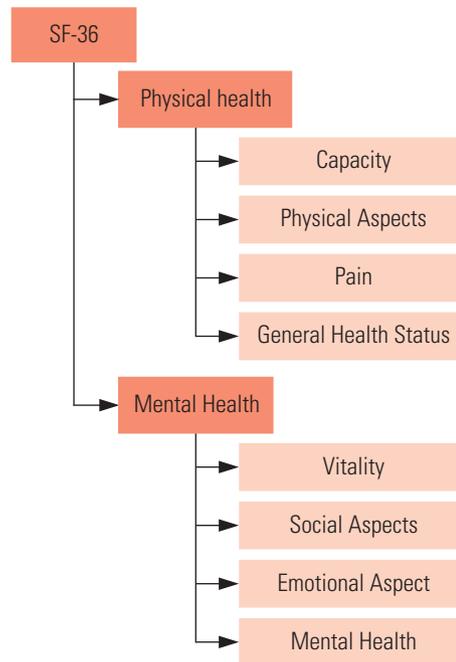


Figure 1 - Flowchart - SF-36 domains list. Source: Ciconelli *et al.* (1999)¹¹.

Intervention

Participants underwent the initial evaluation and were selected for the intervention proposed in this study. Sixteen 50-minute sessions were held twice a week.

The intervention was based on exercises for motor coordination, balance, stretching, overall muscular strengthening and transference training, aiming at improving the function and quality of life and reducing the patient's risk of hospitalization.



Figure 2 - Patients participating in stretching exercises at the Barreiro Health Center – Belo Horizonte, 2010.

STATISTICAL ANALYSIS

Initially, a descriptive statistical analysis of the variables was performed. In this analysis the variables were investigated for frequency, measurements of central tendency, dispersion, and normality. Independent variables, functional capacity, balance, and the domains functional capacity, physical aspects, vitality, social, and emotional aspects in the scale of quality of life did not show a normal distribution. The comparison between the scores presented by the patients in these independent variables before and after the physical therapy intervention was performed based on the nonparametric Wilcoxon test. For the domains pain, overall health status, and mental health in the scale of quality of life that comparison was performed using the paired student t-test. In all statistic tests a significance level of 5% was used. The analyses were performed using the *Statistical Package for Social Sciences (SPSS) statistical software* version 16.0.

RESULTS

The sample was made up of 17 patients. Before this intervention, 11 (64.7%) were independent and 06 (35.3%) showed moderate dependence according to the Katz Index. No patient was classified as very dependent. After the physical therapy intervention, all patients (100%) were independent regarding their functional capacity according to the Katz Index. The results show the distribution of the functional capacities of the patients before and after the intervention (Figure 3).

The group of monitored participants showed a statistically significant difference in all aspects analyzed. The elderly patients improved their functional capacity (value $p = 0.002$), balance (value $p = 0.000$) and all domains of quality of life before and after the intervention.

Tables 1 and 2 show the percentage of answers, dependent or independent, of the 17 participants in each of the six items of the Katz Index, respectively.

In terms of balance, there was a statistically significant improvement (value $p = 0.000$), with patients with average values in the Berg Balance Scale scoring higher at the end of the treatment than at the beginning of the intervention.

As for quality of life, these results indicate that the patients scored average SF-36 values that were higher at the end of the treatment than at the beginning of the intervention, indicating that participants significantly improved their quality of life after physical

therapy. Figure 4 shows the distribution of scores in the domain of quality of life of the elderly in the two phases of the treatment.

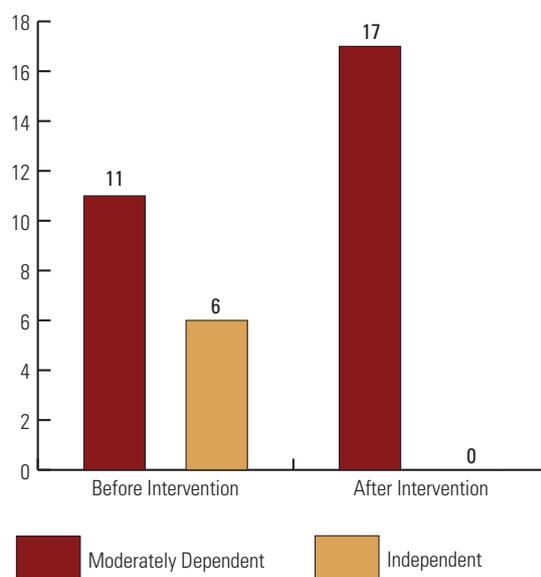


Figure 3 - Absolute frequency of the level of independence (Katz) before and after physical therapy treatment (n = 17) – Belo Horizonte, 2010.

Table 1 - Percentage of responses by item in the Katz scale before intervention – Belo Horizonte, 2010

Item	Before	Dependent	Independent
Bathing		29.41%	70.59%
Clothing		17.65%	82.35%
Hygiene		0.0%	100.0%
Transferring		47.06%	94.12%
Continence		29.41%	64.51%
Feeding		0.0%	100.0%

Table 2 - Percentage of responses by item in the Katz scale after the intervention – Belo Horizonte, 2010

Item	Before	Dependent	Independent
Bathing		0.0%	100.0%
Clothing		0.0%	100.0%
Hygiene		0.0%	100.0%
Transferring		5.88%	94.12%
Continence		35.29%	64.71%
Feeding		0.0%	100.0%

It is also important to highlight in terms of the percentage gains in the analyzed variables the emotional and physical aspects of SF-36 had the highest percentages, with improved scores of 247.4 and 208.3%, respectively (Table 3).

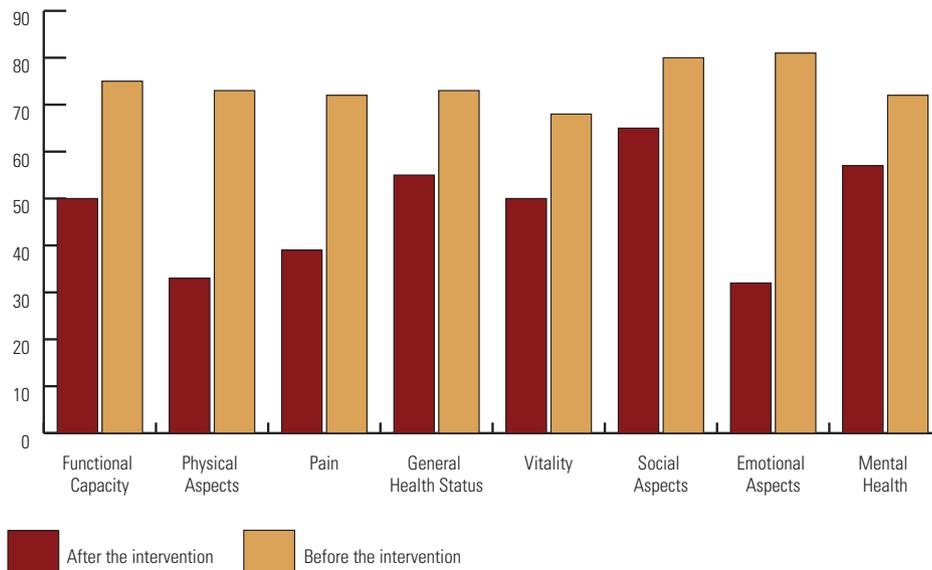


Figure 4 - Average of quality of life scores by SF-36 domains before and after physical therapy (n = 17) – Belo Horizonte, 2010.

Table 3 - Percentage of Gain in functional capacity, balance and quality of life variables (n = 17) – Belo Horizonte, 2010

	Average before intervention	Average after intervention	Percentage of Gain (%)
Functional Capacity (Katz)	4.76	5.59	117.4
Balance (Berg) SF-36	46.47	54.41	117.1
Functional Capacity	51.5	75.9	147.4
Physical Aspects	35.3	73.5	208.3
Pain	39.1	71.8	183.4
General Health Status	56.1	73.1	129.6
Vitality	51.2	68.3	133.3
Social Aspects	66.3	81.1	122.2
Emotional Aspects	33.3	82.4	247.4
Mental Health	58.1	73.4	126.3

Table 4 shows the results of the comparisons of the independent variables: functional capacity, balance, and quality of life before and after the intervention.

DISCUSSION

Populational aging is a worldwide phenomenon. The World Health Organization (WHO) predicts an elderly population of 1.2 billion by 2025. In Brazil, the number of elderly people in 1960 was over 3 million, reached 7 million in 1975, 14 million in 2002 and it is estimated that in 2020 it will reach 32 million.¹

Biological and physiological researches have demonstrated that despite individual variability structural and functional changes occur over the years. These

are found among all elderly subjects and are typical of the aging process. These changes lead to conditions in several organs and functions in their bodies, such as gait disturbances and mobility disorders.¹²

These factors have a remarkable influence in the quality of life of senior individuals.¹³ To evaluate the functional capacity of the elderly is absolutely important, since autonomy and independence are crucial components for successful aging.¹⁴

Functional capacity, especially in its motor dimension, is one of the most relevant markers of successful aging and quality of life among the elderly. Loss in that capacity is a predictor of frailty, dependence, institutionalization, increased risk of falling, death, and mobility issues, bringing about complications in the long run and generating long-term, costly care.¹⁵

Table 4 - Percentage of Gain in the functional capacity, balance and quality of life variables (n = 17) – Belo Horizonte, 2010

Measurement	Before intervention stage	After intervention stage	p value
Functional Capacity (Katz)	4,76 ± 0,96	5,59 ± 0,5	0,002*
Balance (Berg)	46,47 ± 4,34	54,41 ± 1,6	0,000*
Quality of Life (SF-36)			
Functional Capacity	51,5 ± 26,0	75,9 ± 22,3	0,001*
Limitation by Physical Aspect	35,3 ± 19,4	73,5 ± 39,0	0,002*
Pain	39,1 ± 16,4	71,8 ± 17,0	0,000**
General Health Status	56,1 ± 15,8	73,1 ± 17,8	0,000**
Vitality	51,2 ± 19,4	68,3 ± 14,9	0,001*
Social Aspects	63,6 ± 17,5	81,1 ± 18,2	0,007*
Emotional Aspects	33,3 ± 42,5	82,4 ± 31,5	0,003*
Mental Health	58,1 ± 13,2	73,4 ± 10,6	0,000**

* Wilcoxon ** Paired Student t-test.

According to the results obtained by the Katz Index, which assesses functional capacity, the monitored patients showed a statistically significant improvement in their functional capacity after the intervention (value $p = 0.002$).

The treatment protocol was based on transference and balance training, global muscle strengthening, motor coordination, and muscle stretching. A statistically significant improvement was identified in the patients in terms of independence in the items showering (29.41 to 100.0%), dressing (17.65 to 100.0%), transferring (47.06 to 94.12%) and continence (29.41 to 64.71%). Due to the fact that no patient in the treatment was dependent in the items feeding and hygiene (100%), scores in these items showed no change.

The elderly are more susceptible to falling due to functional decline associated to the process of aging, determined by an increase in reaction time and decreased effectiveness of body balance motor strategies. Imbalance is one of the main factors that confine the elderly.

Balance demands a complex interaction between the musculoskeletal and neural systems, involving coordinated efforts of afferent (visual, vestibular and proprioceptive) and efferent (power, endurance, muscle strength and flexibility) mechanisms.¹⁶

Regarding balance, a statistically significant improvement was found (value $p=0.000$) with patients showing average values in the Berg Balance Scale (BBS). The results are consistent with the proposed protocol since balance training was performed in sitting and standing positions.

According to Silva *et al.*¹⁷, it was proven that the strength training program can lead to improvements

in the functional and motor performance among the elderly. Given the results of this study, muscle strength training had a more positive gain compared with balance. With improved flexibility and muscle strength, according to the protocol, there was a readjustment in the center of body mass with consequent postural adjustment, proper realignment between the body segments and the body and the environment, facilitating the displacement of weight and generating balance gain. Transference training had direct effects on the BBS, improving both static and dynamic balance.

The concept of quality of life is quite complex, since there is no consensual definition on its actual meaning.¹⁸ Quality of life is influenced by determining and conditioning factors of the health-disease process, and economic and socio-cultural aspects associated to knowledge, experience, and values of the individuals and the collectivity interfere in the way it is interpreted.¹⁹

According to the WHO, quality of life is the individuals' perception of their position in life in the context of culture and of the system of values in which they find themselves, considering their objectives, expectations, patterns and concerns.²⁰ In Brazil, the theme of quality of life began to have significance and importance in health care research in the last decade, precisely after 1992 when the average of publications increased sevenfold as compared to the 10 first surveyed years (1982 to 1991).²¹

Quality of life can be evaluated by specific or generic instruments. Specific instruments may be conceptualized for diseases, functions or problems, and are more sensitive and responsive for these purposes.¹⁶ Generic instruments can compare the quality of life among individuals with different chronic diseases or

assess the impact of a disease on a population group. However, given the fact that they are global, these instruments are not suitable for specific diseases.²²

The *Medical Outcomes Study 36-item Short-Form Health Survey* (SF-36) was translated, adapted and validated for the Brazilian culture, and is used to assess the quality of life both of the population in general and of the elderly.²³

As for the quality of life measured by SF-36 in this study and its subsequent eight domains, a statistically significant improvement was observed on all domains including functional capacity, limitations by physical aspects, pain, general health, vitality, social aspects, emotional aspects and mental health. This demonstrates that regular participation in physical activity generates favorable responses that can collaborate in healthy aging and quality of life improvements, and can effectively intervene by reducing and preventing the psychological and functional declines related to aging.²⁴

The sampling number, albeit small, and the intervention period seem favorable due to the highly significant results obtained, with high percentages of gain in all items.

CONCLUSION

The preventive physical therapy program proposed to the elderly population enrolled at the Family Health teams at the Barreiro Health Center in Belo Horizonte demonstrated the importance of physical therapists in promoting health. Evidence of significant improvement in quality of life and balance among the elderly restated the preventive role of physical therapy in public health. These results minimize the chances of falls for the elderly and reduce the causes of morbidity due to age-related conditions. It is suggested that prevention programs such as the one performed in this study can reduce hospitalization costs and expenses with curative aid. The results achieved were highly representative: balance, quality of life, and functional capacity. Regarding functional capacity, the items physical aspects, pain, and emotional aspects had a high degree of positive evidence in percentage of gains. Previous studies have shown that physical exercise influences balance improvement and quality of life. They have also highlighted a marked gain in functional capacity during a training period of more than 12 weeks. In this work, this gain was noticeable after 16 sessions of exercises in motor coordination, balance, stretching, global muscle strengthening, and transfer-

ence training. The conclusion is that despite the favorable results of this study it is necessary to conduct further research with longer follow-up times and larger sampling so that the results may be more reliably applied to the elderly population in general.

ACKNOWLEDGMENT

To Professor Fabiana Caetano Martins Silva, occupational therapist, Specialist on Worker's Health, Master in Rehabilitation Sciences, and Doctor in Rehabilitation Sciences.

REFERENCES

1. Lima-Costa MF, Veras R. Saúde pública e envelhecimento. *Cad Saúde Pública*. 2007; 19(3):15-21.
2. Okuma SS. *O Idoso e a atividade física: fundamentos e pesquisa*. Campinas-SP: Papirus; 1998.
3. Wood-Dauphinee S, Berg K, Bravo G, Williams JI. The Balance Scale: Responding to clinically meaningful changes. *Can J Rehabil*. 1997; 10:35 AM-50.
4. Perracini MR, Ramos LR. Fatores associados a quedas em uma coorte de idosos residentes na comunidade. *Rev Saúde Pública*. 2002; 36(6):709-16.
5. American Academy of Orthopedic Surgeons-AAOS. Don't let a fall be your last trip. [Cited 2008 sept 12]. Available from: <http://orthoinfo.aaos.org/topic.cfm?topic=A00101>.
6. Gawryszewski VP, Jorge MHPM, Koizumi MS. Mortes e internações por causas externas entre idosos no Brasil: O desafio de integrar a saúde coletiva e a atenção individual. *Rev Assoc Méd Bras*. 2004; 50(1):97-103.
7. Berg K, Wood-Dauphinee S, Williams JI, Gayton D. Measuring balance in the elderly: preliminary development of an instrument. *Physiother Can*. 1989; 41:304-11.
8. Brasil. Ministério da Saúde. Portaria nº 154. Cria os Núcleos de Apoio à Saúde da Família – NASF Brasília: Ministério da Saúde; 2008.
9. Katz S, Stroud III MW. Functional assessment in geriatrics: a review of progress and directions. *J Am Geriatr Soc*. 1989; 37(3):267-71.
10. Berg K, Wood-Dauphinee S, Williams JI, Maki B. Measuring balance in the elderly: validation of an instrument. *Can J Pub Health*. 1992 July/Aug; 83(2):S7-11.
11. Ciconelli RM, Ferraz MB, Santos W, Meinão I, Quaresma MR. Tradução para a língua portuguesa e validação do questionário genérico de avaliação de qualidade de vida Medical Outcomes Study 36-item Short Form Health Survey SF-36 (Brasil SF-36). *Rev Bras Reumatol*. 1999; 39(3):143-50.
12. Maciel ACC, Guerra RO. Fatores Associados a alterações da mobilidade em idosos residentes na comunidade. *Rev Bras Fisioter*. 2005; 9(1):17-23.

13. Ramos LR. Determinant factors for healthy aging among sênior citizens in a large city: the Epidoso Project in São Paulo. *Cad Saúde Pública*. 2003; 19(3):8-14.
14. Guimarães LHCT, Galdino DCA, Martins FLM, Abreu SR, Lima M, Vitorino DFM. Avaliação da capacidade funcional de idosos em tratamento fisioterapêutico. *Rev Neurociências*. 2004 jul/set; 12(3):324-32.
15. Cordeiro RC, Dias RC, Dias RC. Concordância entre observadores de um protocolo de avaliação fisioterapêutica em idosas institucionalizadas. *Rev Fisioter*. 2002; 9:69-77.
16. Pinho L, Dias RC, Souza TR, Freire MTF, Tavares CF, Dias JMD. Avaliação isocinética da função muscular do quadril e do tornozelo em idosos que sofrem quedas. *Rev Bras Fisioter*. 2005; 9(1):93-9.
17. Silva A, Almeida GJM, Cassilhas RC, Cohen M, Peccin MS, Tufik S, Mello MT. Equilíbrio, coordenação e agilidade de idosos submetidos à prática de exercícios físicos resistidos. *Rev Bras Med Esporte*. 2008 mar/abr; 14(2):88-93.
18. Spitzer WO. State of Science 1986: Quality of life and functional status as target variables for research. *J Chronic Dis*. 1987; 40(6):465-71.
19. Seidl EMF, Zannon CMLC. Qualidade de vida e saúde: aspectos conceituais e metodológicos. *Cad Saúde Pública*. 2004; 20:580-8.
20. Fleck MPA, Leal OF, Louzada S, Xavier M, Chachamovich E, Vieira G, *et al*. Desenvolvimento da versão em português do instrumento de avaliação de qualidade de vida da Organização Mundial de Saúde (WHOQOL-100). *Rev Bras Psiquiatr*. 1999 jan/mar; 21(1):19-28.
21. Paschoal S. Qualidade de vida do idoso: elaboração de um instrumento que privilegia a sua opinião. [Dissertação]. São Paulo: Faculdade de Medicina/USP; 2000.
22. Guyatt GH, Naylor D, Juniper E, Heyland DK, Jaeschke R, Cook DJ. Users' guides to medical literature: how to use article about related quality of life. *JAMA*. 1997; 277(15):1232-7.
23. Fleck MPA. O instrumento de avaliação de qualidade de vida da Organização Mundial da Saúde (WHOQOL-100): características e perspectivas. *Ciênc Saúde Coletiva*. 2000; 5(1):33-8.
24. Nóbrega ACL, Freitas EV, Oliveira MAB, Leitão MB, Lazzoli JK, Nahas RM. Posicionamento Oficial da Sociedade Brasileira de Medicina do Esporte e da Sociedade Brasileira de Geriatria e Gerontologia: exercício físico e saúde no idoso. *Rev Bras Med Esporte*. 1999; 5(6):207-11.