

3rd icH&Hpsy 2017
3rd International Conference on Health and Health Psychology

**CORRELATION BETWEEN PHYSICAL ACTIVITY AND
NUTRITIONAL STATUS IN PORTUGUESE NON-
INSTITUTIONALIZED ELDERLY PEOPLE**

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Abstract

The individual is an active agent on his/her own aging process and decisions about his/her behavioral repertoires determine the capacity for healthy aging. So, an intervention is possible to modify intentional and positively such behaviors. An active lifestyle and healthy diet are factors that contribute to longevity and quality of life of the elderly, because of their impact in active aging. This study aims to assess the impact of individual variables of the elderly in physical activity and nutritional status, and the relationship between them. The sample included 73 participants aged 73.8 ± 6.6 , and 71.2% women. The instruments used were the Baecke Questionnaire Modified (QBM) and the Mini Nutritional Assessment Short Form (MNA-SF). While in domestic activities the highest scores were observed in women, sports activities occurred among those not living alone. The overall score showed higher values in younger participants. The subjective health correlated positively with domestic and sports activities. Health perception and marital status were shown to be related with the nutritional status ($p \leq 0.05$). Participants with normal nutritional status showed, in general, a more positive health perception. There was a positive correlation between nutritional status and household chores. We found positive effects of physical activity in this age group and recommend the need to promote interventions both in this area and in the nutritional status, particularly in certain groups of elderly people.

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Keywords: Physical activity, nutritional status, health in elderly.



1. Introduction

Elderly people constitute a growing group in the first world countries, and a new paradigm emerges: aging is not only a population phenomenon but also an individual reality and experience. So, the individual decisions are crucial for the aging healthy process (Fernández-Ballesteros, Robine, Walker, & Kalache, 2013; Wiesiolek, Foss, & Diniz, 2014). Correspondingly, in the research and political dimensions, there is a growing awareness over their health, nutritional state and physical activity patterns.

Physical activity is defined as any body movement produced by the skeletal muscles that results in energy expenditure and includes domestic tasks (DS), sports (SS) and leisure (LS). The regular practise of physical activity brings benefits to health and enhances life quality (Taylor, 2017). Governments all around the world, guided and conducted all citizens to implement several initiatives of physical activity promotion, although frequently focused on the elderly population.

Gouveia et al. (2013), using the Baecke Modified Questionnaire (QBM), which is an instrument that evaluate the three dimensions of physical activity in the elderly population and that was mentioned earlier, indicates that the results of functional training for elder people are better in active subjects by comparison with non- active pairs.

Padilha studies (2007) revealed gender differences in DS subscale, with more significant results in women; on the other hand, the different age groups distinguished themselves only in the DS and LS subscales, with higher results in younger. However, Kahan, Fogelman and Bloch (2005) did not demonstrate significant gender differences in QBM subscales scores. Regarding the age variable, it was found statistical significance only in LS and DS ($p \leq 05$). Relative to self-perception of health state (using SF-36) and total physical activity, Brochado (2011) indicates a significant positive correlation.

The nutritional state of elderly people evaluation, considering their functional capability, is necessary to promote a better life quality in this population segment and for disease and disability prevention (Ferreira, Gregório, Santos, & Graça, 2017). An inadequate diet and a lack of physical activity are risk factors for many disabling diseases or conditions (Stegeman, Otte-Trojel, Costongs, & Considine, 2012).

There is a consensus (Milner, 2013; Tesch-Roemer, 2012) about the benefits of good nutrition, complemented with active lifestyles, regarding to social integration and cognitive functioning, as a main strategy for active aging promotion. The changes associated with aging happen at the biological level, such as sensorial deficits; at the psychological level, such as mood swings; and at the social level, with family members lost, of friendship contacts and social disintegration, making this group especially vulnerable to undernourishment (Starr, McDonald, & Bales, 2015) and sedentarism (Wullems, Verschueren, Degens, Morse, & Onambélé, 2016).

Due to the importance of a healthy diet and the adoption of an active lifestyle for a longer and better life, it is fundamental to identify the specific necessities and functioning patterns of this age group, to obtain future guidance for disease prevention and health promotion programs.

Considering the available evidence, this study's aim is to analyse the degree of variation in the nutritional state and physical activity dimensions, as a function of different sociodemographic variables and of health state, in a sample of the community elder residents. The association or link between nutritional state and physical activity was also explored.

2. Problem Statement

Several socioeconomic factors, the scientific and technological advancement, and social and economic politics contribute largely to the increase of life expectancy in the last century. Therefore, the longevity is not synonymous of disease and morbidity. In fact, aging is a long process across life span resulting from a complex set of individual and socioenvironmental factors (Tesch-Roemer, 2012). Hence, because the individual and behavioral character of the aging process, we can plan a socio-educative intervention to produce behavioral changes that contribute for a healthy aging. An active lifestyle and healthy diet contribute to elderly people's longevity and quality of life, and the relationship between these factors may be an important field to support prevention and health promotion programs. To achieve this goal, we must improve the research about the factors that we can change and the ways to do this. In fact, "much more evaluation research must be conducted in order to tests active aging good practices, training, projects, or programs" (Fernández-Ballesteros et al., 2013, p.2).

3. Research Questions

Two research questions emerged from the problem statement: Do individual variables impact in the practice of physical activity of the elderly and their nutritional status? Is there an association between physical activity practice and nutritional status?

4. Purpose of the Study

This ex-post-facto study aims to assess the relationship between physical activity practice and nutritional status, as well as the impact of elderly's individual variables in them. Additionally, we want to reflect about the consequences of running health promotion programs that includes physical activity and nutrition.

5. Research Methods

A non-experimental, quantitative study of ex post facto nature, with a convenience sample, among the non-institutionalized elder people population following the WHO classification criteria, which is a habitant of a developed country with age equal or above 65 years (2005).

We used 184 non-institutionalized elderly people, from rural (66.3%) and urban (33.7%) backgrounds. The age average was 73.59 ± 6.6 , including 69% being women and 31% man. The sample is composed of 44.3% of widows, 50.3% married and 4.9% divorced or single, with 26.2% living alone. Other characteristics are in the Table 1.

Table 01. Sample characterization.

Variables		Frequency	%
Objective health (diseases)	Yes	112	63,6
	No	64	36,4
	N	176	100,0
Subjective health (perceptions)	Very bad	4	2,2
	Bad	16	8,9
	Reasonable	115	64,2
	Good	41	22,9
	Very good	3	1,7
	N	179	100,0
Live alone	Yes	48	26,2
	No	135	73,8
	N	183	100,0

Aside a sociodemographic characteristics and health state questionnaire, participants filled the Modified Baecke Questionnaire- Portuguese version validated by Azevedo (2009) that evaluates the level of physical activity in 3 domains: domestic, sports and leisure activities in the prior year. The psychometric qualities of the Baecke to assess the habitual physical activity in the elderly are recognized (Almeida & Ribeiro, 2014). The nutritional state was obtained using the Mini Nutritional Assessment Short- Form (MNA-SF). The MNA is a tracking and nutritional state evaluator, validated by Loureiro (2008), that allows to identify people older than ≥ 65 that are undernourished or in risk of undernourishment. The short form of MNA (SF) consists of 6 questions about food ingestion, weight loss, mobility, psychological stress or chronic disease, dementia or depressions occurrence, and Body Mass Index. The total score indicates the nutritional state: 12-14 normal; 8-11 undernourishment risk; 0-7 undernourishment.

The data collection was done through direct administration, in the second half of the December of 2015, in domiciliary visits, with the ethical care guarantees regarding any research process, where all participants signed an informed consent. Data analysis was done in the SPSS-24 using descriptive (average and stand deviation) and non-parametric inferential statistics (Mann-Whitney Test and Spearman's rho) since there is no resistance to normality criteria and test, with an established significance of $p \leq 0.05$.

6. Findings

In general, we emphasize the high dispersion in the physical activity scales, to be evaluated by the values of standard deviation, where domestic activities are excepted, which is not verified in the nutritional status (Table 2). The higher results in the physical activity dimension were found in the total score, followed by LS and DS, and the lowest in SS; in contrast with those reported in validation and reliability studies for the Portuguese population (Azevedo, 2009). Regarding Padilha studies (2007), the values are in an intermediary position in all parameters, except for LS (higher in our study). Leisure and Domestic activities are more influential in the general score than sport activities. As a matter of fact, it

seems that sports activity is the one with lower impact in physical activity of the elderly people in this study. The lowest score was sports activities like in previous studies (Andersen et al., 2000).

Table 02. Descriptive statistics: physical activities and nutritional status.

Variables	N	Min.	Max.	M	SD
Domestic activities (DS)	173	,00	3,10	1,6769	,70664
Sports activities (SS)	164	,00	10,62	,5941	1,81447
Leisure activities (LS)	160	,00	22,20	1,6922	3,42364
Total_Baecke (BGS)	147	,00	23,70	3,8644	3,95476
Nutritional state	181	4	14	11,97	2,189

In DS, there were statistically significant differences ($U=1715.5, p \leq 01$) in gender, corroborating the higher scores for women (Table 3). Consistent evidence with those presented by Padilha (2007), although not supportive of Kahan Fogelman and Bloch (2005), but only the first study is relative to the Portuguese population, so we might be facing cultural specificities regarding domestic tasks. In SS, there were significant differences ($U=2902, p \leq 05$) and those that do not live alone have shown higher levels of sport activities, which were not observed in Koeneman et al. (2012) studies. In LS, there were no significant differences in function of health state, neither of social and individual characteristics. Finally, in total score of Baecke, significant statistical differences among age groups were recorded ($U=1829, p \leq 01$), with higher scores for the subjects with ≤ 74 years when compared with those 75 years old or older. The higher practice of physical activity in younger people was only verified in DS and LS, especially in Padilha (2007) and Kahan, Fogelman and Bloch (2005) conclusions. In objective health, it was verified that there were no differences in those who or did not report diseases. Therefore, the health self-perception is correlated with the sports activities ($r_s=0.215; p \leq 01$), domestic ones ($r_s=0.226; p \leq 01$), and the global score ($r_s=0.234; p \leq 01$). These associations support other results (Porto, Guedes, Fernandes, & Reichert, 2012).

Regarding nutritional state, 4.45 % of the sample's total were undernourished, 35.55% in undernourishment risk and 60% in a normal state. That prevalence in our sample was lower but proximal than the verified in a recent study (*Projeto PEN-3S, 2016*) in the Portuguese elderly institutionalized population (4.8% and 38.7%). However, the results are worrying, not only for the values but also because they are much more serious compared to the values obtained in the same national study with the non-institutionalized elderly people, such as those in our sample (respectively, 0.6% and 16.9%). Another project developed in Portugal (*Projeto Nutrition UP 65, 2017*), shown more similar results to the last one (1.3% undernourished and 14.8% in undernourished risk) among elderly community. Also in Spain, an institutionalized women sample has shown an undernourishment prevalence of 7.9% (Ruiz-López et al., 2003). The significant relationship between subjective health and nutritional state ($r_s=0.212, p \leq 01$) was also found by Gouveia and Oliveira (2014) whom verified a subjective health evaluation poorer in the undernourished group.

Subjective health was significantly associated with nutritional state. A normal nutritional state in 56.25% of participants with good health self-perception was observed. On the other hand, 18.84% of the

participants that reported their health as bad were effectively undernourished or in risk of undernourishment. However, there are 62.3% who report reasonable health and are malnourished or at risk of malnutrition and 21.3% who perceive themselves in good health and are at risk of malnutrition, regardless of the correlations between health self-perceptions and nutritional status are positive ($r_s=.215$, $p\leq 01$). There was also a positive correlation between nutritional state and physical activity on domestic tasks ($r_s=0.283$; $p\leq 01$).

Table 03. Descriptive statistics of physical activities and nutritional status, by gender, objective and subjective health, age and live alone.

Variables	Male	Female	Not disease	Disease	≤ 74 years	≥ 75 years	Live alone	Not live alone
Domestic activities								
M	1.28	1.86	1.76	1.62	1.78	1.50	1.57	1.71
SD	0.67	0.64	0.71	0.71	0.65	0.74	0.71	0.70
Sports activities								
M	0.97	0.42	1.08	0.38	0.78	0.30	0.19	0.73
SD	2,57	1.31	2.37	1.43	2.10	1.20	1.1	1.99
Leisure activities								
M	2.3	1.39	1.35	1.99	1.72	1.65	1.72	1.69
SD	4.4	2.8	2.67	3.87	3.51	3.30	3.54	3.40
Baecke Global score								
M	4.57	3.53	4.02	3.85	4.30	3.16	3.30	4.07
SD	5.03	3.3	3.46	4.27	4.01	3.79	3.77	4.01
Nutritional state								
M	11.89	12.01	11.95	12.01	11.95	12	11.77	12.03
SD	2.3	2.11	2.18	2.16	2.17	2.22	2.49	2.07

In our study, there are no differences in the nutritional score in the individuals that lived and not lived alone, on the contrary of what has been shown at work where undernutrition high risk subjects revealed higher frequency of phone calls and visitants by comparison with the undernourished group (Tsubota-Utsugi et al., 2015). Quandt, McDonald, Arcury, Bell and Vitolins (2000) conclude that the marital state influence suggest that widows are nutritionally vulnerable, due to meal omission, reduced home cooking and lesser diet variety in bought food, but we didn't found this influence.

7. Conclusion

Domestic activities were the main responsible for physical activity practice in the study sample. There seems to be a distinction between mandatory (domestic) and extra (sports and leisure) activities.

This second group, specially sport activities seem to be associated to a health beneficial effect, has been show by the higher practice by individuals with lower objective health values, which may have happened thanks to medical advice.

However, sports activities are a preferential practice of the younger. The subjective health perception can influence also the physical activity practise levels, but is equally related with nutritional state. Also not living alone is a favourable condition, regarding sport practise, and nutritional state enhancement, which may indicate a “contagion” phenomenon effect.

Leisure is a transversal activity, independent from any social or individual variable, being recorded a higher impact in the presented study by comparison with previous studies.

More studies and in a multidisciplinary perspective are necessary, since there are cultural aspects engrained in the Portuguese society that must be considered, such as the association between domestic tasks and the female gender. It is consensual between the scientific community and responsible politicians, the necessity for an interdisciplinary study of aging and related aspects, in a way that provides strategies that decreases social and individual costs from population aging (Kuh et al., 2014)

The main conclusions suggest physical health benefits in this age group, which indicates it's fundamental to promote and plan activities and interventions that increase its practise, especially for people that live alone, fostering male participation in domestic activities and reinforcing collective sport practice. Furthermore, regarding nutritional state, we highlight the worrying values of undernourished and at risk elderly, especially since they are much higher than those obtained in a recent national study with dwelling community elderly. Also, the importance of social factors, reinforcing that a good nutrition must be complemented with social interaction. These conclusions are strengthened by the poor awareness of the nutritional status when the elderly are asked about their self-perception of health state. The programs of promoting physical activity and changes at the alimentary behaviours for improving the nutritional status are urgent, but there is a long way to go in this field. The changes in individual behaviors must have a crucial importance and have much to gain from socio-educational interventions. Specificities of the elderly population require that the intervention be extended to caregivers and host institutions.

Acknowledgments

To the Centre for Studies in Education, Technologies and Health (CI&DETS) at the Polytechnic Institute of Viseu, Portugal.

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