

## 22 - RELATIONSHIP BETWEEN FUNCTIONAL FITNESS AND SELF-RATED HEALTH IN ELDERLY INVOLVED IN AN INTERVENTIONAL EXERCISE PROGRAM

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### 1. INTRODUCTION

Aging consists in one phase marked by consistent changes in physical abilities and body functions. The biological aging process can result in progressive declines in the health of the elderly, affecting their ability to live independently. The reduction in mobility and independence are often serious enough to result in admission to hospital or a nursing home or even premature death (Dunn et al., 1993).

Therefore, the increasing elderly population worldwide attracted the attention of health professionals to develop strategies that can contribute to a better quality of life for these individuals.

This way, physical activity is directly associated to an increased quality of life among elderly people by increasing their functional capacity and independence, with or without prevention and rehabilitation of various diseases.

Additionally, self-rated health (SRH), based on a questionnaire composed by self-rated perceived information about general (physical and mental) health is known as a strong and independent predictor of mortality and morbidity (Dowd et al., 2007) that could be as good as collecting metabolic data (Quesnel-Valle, 2009).

Therefore, not only functional status, but also SRH are two important indicators of health in old age (Hoeymans et al., 1997). They are also essential elements of quality of life (Bowling, 1991), and are widely-used indicators to calculate healthy life expectancy or disability-free life expectancy (van de Water, 1996).

Considering that in the elderly independency and functional capacities are determinant topics for the increasing quality of life, the aim of this study was to analyze the relationship between SRH and functional fitness of the elderly.

### 2. SUBJECTS AND METHODS:

#### *Design and Sample*

This study was conducted at Porto district, Portugal, and was carried out as a part of an intervention research project (APOIAM) looking at the prevalence of CVD risk factors and the levels of physical fitness in elder people, aged 60-74, of both genders.

From a total of 900 subjects involved in physical activities proposed by the City Council, these are preliminary results of a partnership project (APOIAM) between the Higher Education Institute of Maia and the City Council project participants. For this study, 167 subjects participated in the first phase of APOIAM (45,5% men and 54,5% women) and did all measurements. All subjects approved the study protocol. The nature, benefits, and risks of the study were explained, and written informed consent was obtained by the volunteers before the study, consistent with the Helsinki Declaration. The evaluation methods and procedures were approved by the Scientific Board of the Higher Education Institute of Maia, and all measures were carried out by a specialized group.

#### *Daily Evaluation protocol*

Subjects were identified through his/her code number and code of the class to which they belong. Firstly, anthropometric measures, blood sample and blood pressure were taken, not yet used in this study. The elderly were then given breakfast, followed by a physical fitness assessment. Finally, the questionnaire to determine the SRH was answered. The variables were measured between 8:00 and 11:00am.

#### *Anthropometric Measures*

Body height was measured to the nearest mm in bare or stocking feet with the adolescent standing upright against a Holtain Stadiometer. Weight was measured to the nearest 0.1 kg, lightly dressed and after having breakfast, using an electronic weight scale (Seca 708 portable digital beam scale).

#### *Assessment of Physical Functional Tests*

The Senior Fitness Test (SFT) developed by Rikli and Jones (1999) was used to assess physical fitness. The test items include a 30-s chair stand to assess lower body strength, a 30-s arm curl to assess upper body strength, a 6-min walk test for aerobic endurance, a scratch test to evaluate upper body flexibility, a chair sit-and-reach for lower body flexibility, and a 8-ft up-and-go to assess dynamic balance and agility (Dobek et al., 2007).

#### *Medical Outcomes Study 36-item Short Form (SF-36)*

To evaluate the self-rated health, the SF-36 short version of the Medical Outcomes Study 36 – Item Short Form Health Survey, translated and validated by Ciconelli (1997), was used.

The SF-36 is a multidimensional questionnaire consisting of 36 items about 8 components or scales: physical functioning (10 items), physical aspects (4 items), pain (two items), general health (five items), vitality (4 items), social aspects (2 items), emotional aspects (3 items), mental health (5 items), and in addition, one question for comparative evaluation between current health status and one year ago.

Martinez (2002) states that the SF-36 is a generic questionnaire, with concepts not specific to a certain age, disease or treatment group and that allows comparisons between different diseases and different treatments. This questionnaire was used to consider the subjects perception, regarding their own health status and includes the most representative aspects of health. It is also an instrument easy to administer and understand, like self-administered.

**Statistical analysis**

Descriptive statistics were used in order to characterize the sample. The comparisons between genders were done by independent t-test for anthropometric measures, functional tests and self-rated health. Partial Correlations with adjustments for age and gender were used to examine the associations between functional tests and self-rated health. A cross-table was used in order to analyse the proportion of correlations between quartiles of functional tests and SRH.

Analysis was performed with the statistical software package SPSS 17.0 for Windows and level of significance was set up at p 0.05.

**3. RESULTS**

Table 1 shows descriptive statistics (mean±SD) of all variables for the total sample, separated by gender. It was observed that in general, male subjects tend to have higher mean values of almost all the variables, except for age, when comparing to female ones. Statistical significant differences between genders were observed for age, 6-minute walk, back scratch, and arm-curl. Men presented higher values for all the other functional tests, though this tendency was not significant.

TABLE 1. Descriptive sample characteristics by gender

Variables	N	FEMALE (54,5%)		N	MALE (45,5%)		P
		Mean (±SD)	Std EM		Mean (±SD)	Std EM	
Age	91	68,7 (5,45)	,571	75	66,99 (5,65)	,652	,046*
Weight	91	72,27 (13,16)	1,380	76	73,34 (11,58)	1,327	,584
Height	91	1,60 (.08)	,008	76	1,60 (.09)	,011	,799
BMI	91	28,22 (4,10)	,430	76	28,60 (4,03)	,462	,553
6 Min Walk	91	487,16 (8,55)	8,760	76	518,15 (71,20)	8,168	,012*
Back Scratch	91	-17,26 (12,70)	1,330	76	-13,16 (12,11)	1,389	,036*
Chair Sit- and- Reach	91	,57 (9,14)	,958	76	,61 (8,33)	,956	,977
Arm-Curl	91	18,07 (4,47)	,469	75	20,32 (4,58)	,529	,002*
30-Second Chair Stand	91	14,63 (4,05)	,425	76	15,79 (4,33)	,497	,075
8-Foot Up-And-Go	91	6,17 (1,48)	,155	76	6,217(1,34)	,154	,860
SRH	91	66,11(16,37)	1,735	76	63,28 (16,62)	,015	,902

\* p 0,05

Correlations between the self-rated health and different functional fitness tests are shown in table 2. The first analysis, comprised of the total sample, was adjusted for age and gender. When separated by gender, the analysis was adjusted only for age.

In this analysis, significant correlations between the SRH and 6-min walk test, chair sit and reach, 30-second chair stand and 8-foot up and go were observed for the total of the subjects evaluated.

When analyzing each gender, we observed that the female sample presented more correlation between the functional tests and perceived health than men. The strongest negative correlation for both genders was observed between perceived health and 8-foot up and go test.

TABLE 2. Correlation between SRH and functional tests

FUNCTIONAL TESTS	SF-36					
	N = 167		Female		Male	
	R	p	R	p	R	p
6 MIN WALK	.171	.031*	.155	.149	.195	.102
BACK SCRATCH	.119	.134	.090	.403	.162	.176
CHAIR SIT-AND-REACH	.243	.002*	.240	.024*	.247	.038*
ARM-CURL	-.064	.423	-.021	.845	-.112	.352
30-SECOND CHAIR STAND	.207	.009*	.215	.044*	.200	.094
8-FOOT UP-AND-GO	-.357	.000*	-.313	.003*	-.415	.000*

\* p 0,05; Analysis (N) adjusted for sex and age. Analysis by gender adjusted for age.

In table 3, correlations between quartiles of SRH and functional tests are presented, considering that the 4th quartile corresponds to those subjects who better perceive their health and better performed the physical tests. As observed in table 3, significant results were found for the 6-min walk test, chair sit and reach, 30-second chair stand and 8-foot up and go, when associated to SRH.

In addition, it was observed that excluding the chair sit and reach test, all the other results that showed significant association with the 4th quartile of SRH consist of locomotion tests (6-min walk test, 8-foot up and go), and the 30-second chair stand, which is related to the lower strength.

It is important to notice that in almost all the tests, the greatest number of subjects who better perceive their health corresponds to those that belong to the 4th quartile in relation to the functional tests.

TABLE 3. Correlation between quartiles of SRH and functional tests

FUNCTIONAL TESTS		QUARTILES SF-36				TOTAL	P
		1	2	3	4		
6 MIN WALK	1	4	5	12	5	26	,048*
	2	5	16	14	5	40	
	3	9	9	6	9	33	
	4	8	12	12	31	63	
BACK SCRATCH	1	3	9	10	4	26	,373
	2	9	12	13	6	40	
	3	4	9	11	9	33	
	4	3	20	28	12	63	
CHAIR SIT-AND-REACH	1	3	5	13	5	26	,001*
	2	7	19	7	7	40	
	3	6	7	9	11	33	
	4	11	8	9	35	63	
ARM-CURL	1	4	6	10	6	26	,273
	2	8	11	14	7	40	
	3	8	6	10	9	33	
	4	5	13	12	32	62	
30-SECOND CHAIR STAND	1	4	8	8	6	26	,000*
	2	7	20	11	2	40	
	3	2	4	13	14	33	
	4	7	9	14	33	63	
8-FOOT UP-AND-GO	1	3	7	8	8	26	,019*
	2	7	9	11	13	40	
	3	8	12	9	4	33	
	4	9	14	6	34	63	

\* p 0,05

#### 4. DISCUSSION

The aims of this study were to analyze the relationship between SRH and functional fitness of the elderly and to assess the relationship between locomotion tests and perceived health. The independent contribution of physical activity in elderly SRH has been extremely supported. Considering it, it is of great importance to examine the associated functional fitness tests in order to better prescribe exercise that have more impact in elderly SRH.

The main findings of the present study were that in general males presented better performance in functional tests than females.

On the other hand, females better perceived their health, when comparing to men. This result do not corroborate with a study developed in a western country, which women were more likely than men to describe their health as poor (Asfar et al., 2007). This fact might evidence the important role of social and cultural background in the perception of health.

SRH was significantly associated with four different functional tests, namely 6-min walk test, chair sit and reach, 30-second chair stand and 8-foot up and go ( $p < 0.05$ ). Moreover, subjects who belong to the 4th quartile (better performance) in tests related to locomotion correspond to those subjects who had the best perception of health.

A recent study suggested that regular physical activity of adults, particularly adults with diabetes, is associated with optimal SRH (Tsai et al., 2010). Nevertheless, this study did not classify the type of exercise that should be done. Reinforcing this idea, when analysing a sample of 125 elderly, Sposito and others (2010) observed that perceived health was better among the elderly participants with moderate to good physical performance. In our study, we observed in table 3 that when evaluating the association between functional tests and SRH, the tests that are associated with the locomotion capacity are those tests that presented the best association with perceived health. This fact might suggest that the regular physical activity for this population should be composed by exercises that require the dislocation of the body.

However, comparing our results with others is a hard task. The studies differ in many aspects such as age of subjects, gender (Banerjee et al., 2010), socio-economic status (Lima-Costa et al., 2005; McFadden et al., 2008). Nevertheless, some limitations should be pointed-out. Firstly, the small sample size might explain some of our lack of association. Secondly, we did not control for changes in eating or lifestyle factors. Furthermore, our study population was small and limited to healthy old men and women and thus can not be considered representative of a normal aging population. Finally, this study could benefit from additional collected data, such as combined behavioural variables and social background characteristics, which could enhance the outcomes.

#### 5. CONCLUSION

We observed that self-rated health is associated with functional fitness tests, especially in those tests related to locomotion capacity.

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## RELATIONSHIP BETWEEN FUNCTIONAL FITNESS AND SELF-RATED HEALTH IN ELDERLY INVOLVED IN AN INTERVENTIONAL EXERCISE PROGRAM

### ABSTRACT

Physical activity is directly associated to an increased quality of life among elderly people by increasing their functional capacity and independence. **OBJECTIVE:** Thus, the aim of this study was to analyze the relationship between self-rated health (SRH) and functional capacity of the elderly. We hypothesized that subjects who obtained better results in functional tests tend to have a better SRH. **METHODOLOGY:** These are preliminary results of an interventional program developed in Maia/Portugal, comprised of 900 subjects, aimed to evaluate the effects of different training methodologies. Our sample consists of 167 subjects, aged 60 to 74. The functional capacity was measured by Rikli & Jones (1999) functional fitness battery. The SRH was evaluated by the international questionnaire Medical Outcome Study – 36 items from health survey- short version (SF-36). Statistical analysis was performed using SPSS (Windows version 17.0) and the level of significance was set up at  $p < 0.05$ . **RESULTS:** SRH was significantly associated with four different functional tests ( $p < 0.05$ ). Subjects who belong to the 4th quartile in tests related to locomotion correspond to those subjects who had the best perception of health. **CONCLUSION:** We observed that SRH is associated to functional fitness, especially in those tests related to locomotion capacity.

**KEYWORDS:** Perception of health, elderly, functional ability

## RELATION ENTRE CAPACITÉ FONCTIONNELLE ET AUTOÉVALUATION DE LA SANTÉ DES PERSONNES ÂGÉES APPARTENANT À UN PROGRAMME D'INTERVENTION SUR ACTIVITÉ PHYSIQUE

### RÉSUMÉ

L'activité physique est directement associée à une meilleure qualité de vie des personnes âgées, étant responsable de l'augmentation de la capacité fonctionnelle et de l'indépendance de cette population. Le but de cette étude était d'analyser le lien entre la perception de soi des soins de santé primaires (SSP) et la capacité fonctionnelle des personnes âgées. Nous supposons que les individus qui obtiennent de meilleurs résultats dans les tests fonctionnels ont tendance à avoir une meilleure APS. **METHODES:** Cette étude est une analyse préliminaire des données recueillies dans un projet d'intervention sur l'activité physique développé dans le Maia / Portugal, comprenant une population de 900 personnes. L'échantillon étudié ici est constitué de 167 sujets, âgés de 60-74 ans. La capacité fonctionnelle des sujets a été évaluée par la batterie de tests fonctionnels Rikli & Jones (1999). L'APS a été évaluée par l'International Medical Outcome Study Questionnaire - formulaire 36 articles courts (SF-36). L'analyse statistique a été réalisée avec l'aide du Statistical Package for Social Science - SPSS (version Windows 17,0) et le niveau de signification a été fixé à  $p < 0,05$ . **RÉSULTATS:** L'APS est significativement associée à quatre des six épreuves de la capacité fonctionnelle utilisée ( $p < 0,05$ ). Les personnes qui appartiennent à quartile le plus élevé sur les tests liés à la capacité de locomotion correspondent à celles qui ont été meilleures que l'APS. **CONCLUSION:** Il y avait des rapports d'une meilleure APS sont associés à des niveaux plus élevés de l'aptitude fonctionnelle, en particulier dans les essais portant sur la capacité de locomotion.

**MOTS-CLÉS:** Perception de la santé, les personnes âgées, capacité fonctionnelle

## RELACIÓN ENTRE CAPACIDAD FUNCIONAL Y PERCEPCIÓN DE LA SALUD DE LOS ANCIANOS PERTENECIENTES A UN PROGRAMA DE INTERVENCIÓN EN ACTIVIDAD FÍSICA

### RESUMEN

La actividad física se asocia directamente con una mayor calidad de vida de los ancianos, siendo responsable del aumento de la capacidad funcional y la independencia de esta población. El objetivo de este estudio fue analizar la asociación entre la autopercepción de salud (APS) y la capacidad funcional de los ancianos. Suponemos que las personas que obtienen mejores resultados en las pruebas funcionales tienden a tener una mejor APS. **MÉTODOS:** Se realizó un análisis preliminar de los datos recogidos en un proyecto de intervención en la actividad física desarrollada en el Maia / Portugal, que abarca una población de 900 individuos. La muestra estudiada aquí consiste de 167 personas, de edades comprendidas entre 60-74 años de edad. La capacidad funcional de los sujetos se evaluó a través de la batería de pruebas funcionales Rikli & Jones (1999). El APS fue evaluada por el Organismo Internacional Medical Outcome Study Cuestionario - Formulario 36 artículos cortos (SF-36). El análisis estadístico se realizó con la ayuda del Statistical Package for Social Science - SPSS (versión de Windows 17,0) y el nivel de significación se fijó en  $p < 0,05$ . **RESULTADOS:** El SAF se asocia significativamente con cuatro de las seis pruebas de la capacidad funcional utilizada ( $p < 0.05$ ). Las personas que pertenecen al cuartil más alto en las pruebas relacionadas con la capacidad de locomoción corresponden a los que eran mejores que APS. **CONCLUSIÓN:** Se recibieron informes sobre un APS mejor se asocian con mayores niveles de aptitud funcional, especialmente en pruebas con la capacidad de locomoción.

**PALABRAS CLAVE:** Percepción de la salud, capacidad funcional

## RELAÇÃO ENTRE APTIDÃO FUNCIONAL E AUTO-PERCEPÇÃO DE SAÚDE DE IDOSOS PERTENCENTES A UM PROGRAMA DE INTERVENÇÃO EM ATIVIDADE FÍSICA

### RESUMO:

A atividade física está diretamente associada a um aumento da qualidade de vida dos idosos, sendo responsável pelo aumento da capacidade funcional e independência desta população. **OBJETIVO:** O objetivo deste estudo foi analisar a associação entre a auto-percepção de saúde (APS) e a capacidade funcional do idoso. Supomos que os indivíduos que obtêm melhores resultados em testes funcionais tendem a ter uma melhor APS. **METODOLOGIA:** Este estudo corresponde a uma análise preliminar dos dados coletados em um projeto de intervenção em atividade física desenvolvido na Maia / Portugal, composto por uma população de 900 indivíduos. A amostra aqui analisada é composta por 167 sujeitos, com idades compreendidas entre os 60-74 anos de idade. A capacidade funcional dos sujeitos foi avaliada através da bateria de testes funcionais Rikli & Jones (1999). A APS foi avaliada pelo Questionário Internacional Medical Outcome Study – 36 itens, versão curta (SF-36). O tratamento estatístico foi realizado com o auxílio do Statistical Package for Social Science - SPSS (versão Windows 17.0) e o nível de significância foi estabelecido em  $p < 0,05$ . **RESULTADOS:** AAPS está significativamente associada a quatro dos seis testes de capacidade funcional aplicados ( $p < 0,05$ ). Os indivíduos que pertencem ao quartil mais alto em testes relacionados à capacidade de locomoção correspondem àqueles que apresentaram a melhor APS. **CONCLUSÃO:** Na amostra estudada, relatos de uma melhor APS estão associados a valores mais altos de aptidão funcional, especialmente nos testes que envolvem a capacidade de locomoção.

**PALAVRAS CHAVES:** Percepção de saúde, idosos, capacidade funcional