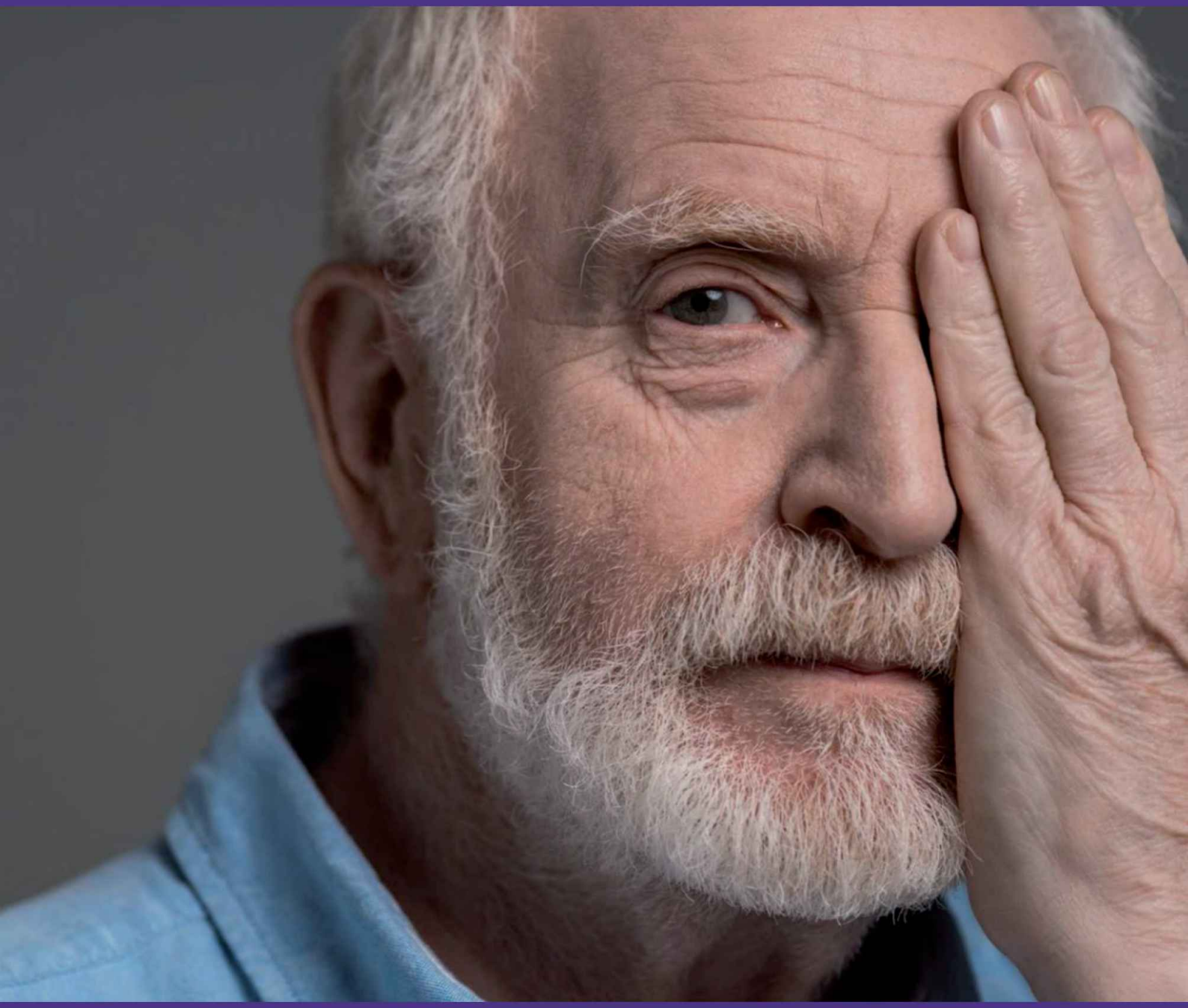
NOVOS PARADIGMAS DO ENVELHECIMENTO



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Os coordenadores

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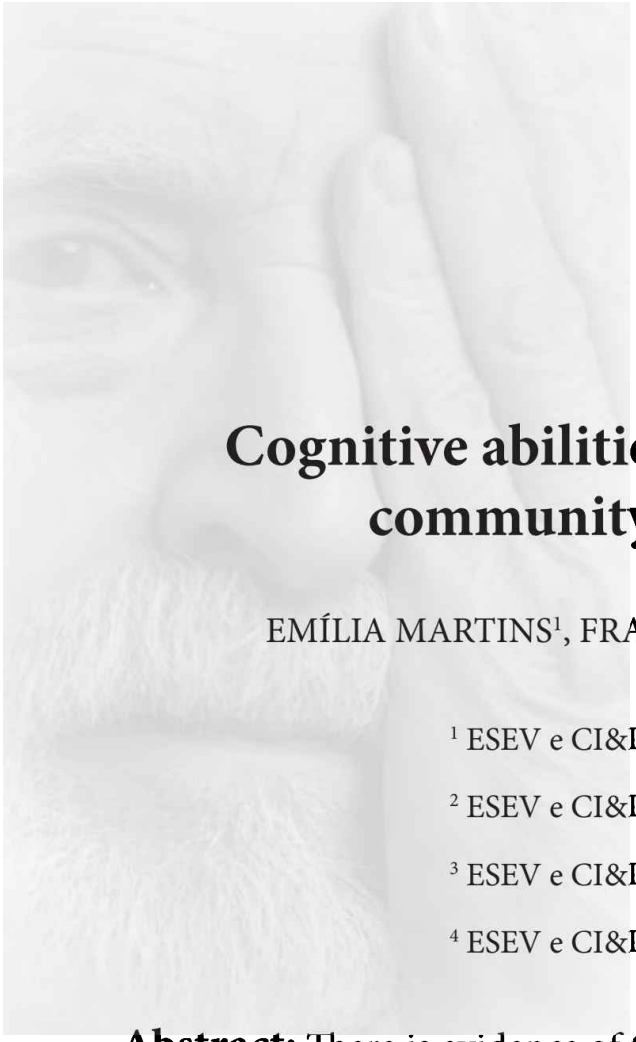

Cognitive abilities and physical activity in community-dwelling elderly

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Abstract: There is evidence of the protective role of the regular practice of physical activity (PA) in relation to the aging cognitive decline. A non-experimental quantitative study was developed to explore the relationship between physical activity and cognitive abilities in community-dwelling elderly, analysing the relevance of sociodemographic and health related variables. The convenience sample included 546 participants, aged between 63 and 94 years (72.85±6.55), mostly female (69.6%), from the inland of the country (79.5%) and rural areas (68.2%). For data collection, in addition to the sociodemographic questionnaire, the Montreal Cognitive Assessment (MoCA) and the Modified Baecke Questionnaire were used. Statistical analyses ($p<.05$) were performed using the SPSS-IBM 27. The results point to a positive and significant relationship between the global scores of MoCA and Baecke ($r_s=.138$, $p<.02$). Self-perception of health was also positively associated with both the MoCA and Baecke global scores ($r_s=.232$, $p<.001$ and $r_s=.204$, $p<.001$) and age showed a negative relationship with those two variables ($r_s= -.294$, $p<.001$ and $r_s=-.113$, $p<.001$). In the association between MoCA and Baecke, the contrast between genders was quite sharp, with males not show-

ing any statistical relevance (p>.05) in contrast to females (rs=.182, p<.05). Household (living alone or accompanied) showed significant differences in the MOCA, favourable to those living accompanied (U=-3.96, p>.001). In Baecke, only the gender contrast was statistically significant, favourable to females (U= 25395, p≤.05). These data are reinforced by scientific evidence and point to policies that promote the practice of physical activity in elderly.

Keywords: Cognitive abilities, physical activity, sociodemographic variables, elderly.

1. Introduction

The literature supports a protective role of the regular practice of physical activity (PA) in relation to the cognitive decline associated with aging (Orgeta at al., 2019; Phillips et al., 2019), including longitudinal studies (Li et al., 2016; Rosanti et al., 2014). This positive impact is evidenced either by an association of reduced risk of cognitive-related diseases, a positively cognitive influence in patients with dementia (Groot et al., 2016), or by improvement in multiple domains of cognitive function (Lü et al., 2016; Xiao et al., 2020). So, the combination of two evolutionary phenomena in Portugal, whether population aging or increased sedentarism (Ramalho et al., 2021), entails an undesirable cumulative effect, and above all, one that must be urgently addressed. According to PORDATA (2020), Portugal has an aging rate of 161,5, corresponding to 161,5 elderlies for every 100 young people.

Thus, it is important to increase research in this area, to understand the impact of PA on cognitive performance in the elderly and to identify other relevant variables. An ex-post facto exploratory quantitative study was carried out with community-dwelling elderly from the centre of Portugal, to identify levels of PA practice, as well as the effect of other sociodemographic and anthropometric variables. The purpose was to knew specificities that would allow intervention strategies to prevent cognitive decline and contribute to healthy aging, based on the PA practice.

2. Method

A non-experimental quantitative study was developed to explore the relationship between physical activity (global, domestic activities, leisure activities and sports) and cognitive abilities (executive function and visuospatial ability, nomination, attention, language, abstraction, deferred evocation and orientation) in community-dwelling elderly, and the relevance of sociodemographic (age, gender, household, urbanity and country region) and health related (Body Mass Index and health self-perception) variables.

2.1. Participants

The study included 546 elderly people, selected by convenience, aged between 63 and 94 years (72,85±6,55), mostly female (69,6%), from the interior of the country (79,5%) and from rural areas (68,2%). Only 37,3% lived alone. Regarding health-related variables, it was found that 59,1% reported illnesses and that the average perception of health, on a Likert scale from 1 (very bad) to 5 (very good), was 3,12(±.71), and only 10,3% had a normal-weight BMI.

2.2. Instruments

Participants completed a sociodemographic questionnaire with questions also related to health. For cognitive screening, the researchers used the Montreal Cognitive Assessment (MoCA) – Portuguese version by Freitas et al. (2010), a brief instrument (one-page protocol with administration time of approximately 10 minutes) that is sensitive to milder stages of cognitive decline that usually progresses to dementia (>90%). The manual includes instructions for administering the tasks and a description of the system for quoting the items, whose maximum score is 30 points, and the cut-off value for mild impairment is 26. The items include several tasks (five of the six tasks most used in screening for dementia) and are organized into different cognitive domains: executive function and visuospatial ability, nomination, attention, language, abstraction, deferred evocation, and orientation.

The practice of physical activity (global score - SG) performed in one year was evaluated using the Modified Baecke Questionnaire, validated for Portuguese elderly by Azevedo (2009), which includes three subscales: Domestic Activities (SDA), Sports Activities (SSA) and Leisure Activities (SLA). Both instruments had good psychometric qualities and are validated for the studied population (Almeida et al., 2014; Freitas et al., 2010).

2.3. Procedures

For data collection, participants from the researchers' contact network were contacted. Ethical investigation demands were ensured, namely the purpose of the study and conditions of participation were explained, including guarantee of anonymity and confidentiality, with the signing of an informed consent. The approximate administering time for the instruments was about 20 minutes. For data analysis, SPSS – IMB 27 was used, performing non-parametric techniques (Mann-Whitney and Rho de Spearman), given the violation of the assumptions of parametric tests.

3. Results

The descriptive analyses (Table 7) point to better cognitive results in the orientation subscale (doing the adjustment to the possible maximum points in each subscale), with the lowest result being the one obtained in the abstraction, less than the scale midpoint. Participants also revealed a low score in the deferred evocation subscale. Generally, the mean results in the MoCA (21,73± 5,64) are lower than the cut-off value for mild impairment (< 26), and 43,8% of the participants have cognitive impairment. It is important to explore the degree of individual impairment (mild, moderate, or severe), and specific cognitive-related diseases. We can establish a profile of individuals with better cognitive results (higher percentage of results ≥ 26): male, urban, from the interior, not lived alone, doesn't report diseases and with good or reasonable self-perceptions of health (Table 8). However, taking only the statistically significant values, the profile includes only those who

does not live alone and with better health indicators (reported or self-perceived).

In physical activity (Table 7), the score in household activities (SDA) was the higher and leisure activities (SLA) the lowest.

Table 7. *Descriptive statistics - MoCA and Baecke subscales and total*

		Min	Max	M	Sd
MoCA	Executive function and visuospatial ability	0	5	3,59	1,25
	Nomination	0	3	2,51	,72
	Attention	0	6	3,98	1,76
	Language	0	3	1,85	,88
	Abstraction	0	3	1,32	,74
	Deferred evocation	0	5	2,90	1,67
	Orientation	0	6	5,62	1,10
	Total MoCA	0	30	21,73	5,64
Baecke	Domestic Activities (SDA)	0	3,2	1,74	,6
	Leisure Activities (SLA)	0	5,11	,16	,71
	Sports (SSA)	0	4,92	1,03	2,8
	Total Baecke	0	13,23	3,04	2,89

The inferential results point to a positive and significant relationship between the MoCA and Baecke global scores (r_s=,138, p<,02), sports – SSA (r_s=,151, p=,011) and leisure activities - SLA (r_s=,124, p=,037). The correlation of the partial and global scores of the MoCA showed the deferred evocation and the orientation as the domains with the higher and lowest correlations values (r_s=,756, p<,001 and r_s=,348, p<,001, respectively). Taking the MoCA subscales, we found the highest positive correlation between the deferred evocation and the Baecke total (r_s=,159, p<,028) and least correlation (r_s=,154, p=,033) between the executive function and visuospatial ability. There are many evidence of this relationship, both in global and in specific

aspects such as recall and recognition memory (Aarsland et al., 2020; Xiao et al., 2020).

Self-perception of health status was also positively, similar in other studies (Manso et al., 2020), associated with the MoCA global scores (r_s=,232, p<,01). MoCA, like the literature (Orgeta et al., 2019), had a negative relationship with age (r_s= -,294, p<,001). In the same way, Baecke was correlated with this self-perception (r_s=-,113, p<,001), as in other studies (Gomez-Bruton et al., 2020). Correlational analyses of those variables, when segmented according to gender, showed us an invariant in terms of the results of the subscales compared to the MoCA global score, which basically replicate the tendency verified with all the participants. In the relationship between MoCA and Baecke, the contrast between genders was quite sharp, with males not showing any statistical relevance (p>,05) contrasting to females (r_s=,334, p<,05).

Table 8. *Descriptive statistics - MoCA by sociodemographic and health groups*

MoCa		< 26(F/%)	≥ 26(F/%)	X^2	p
Gender	males	56/67,5	27/32,5		
	females	154/77	46/23		
Urbanity	rural	151/77	45/23		
	urban	57/68,7	26/31,3		
Geographic location	interior	161/72,2	62/27,8		
	coast	39/81,2	9/18,8		
Live alone	yes	110/84,6	20/15,4	12,047	p≤,01
	no	102/66,7	51/33,3		
Reported diseases	yes	135/82,3	29/17,7	12,494	p≤,01
	no	80/64	45/36		
Self-perceptions of health	good	48/65,8	25/34,2	6,251	p≤,05
	reasonable	137/74,9	46/25,1		
	bad	30/88,2	4/11,8		

The analysis as a function of urbanity (urban vs. rural) or interiority (coast vs. inland) variables did not show to be statistically relevant (p>,05), either in MoCA or Baecke. In fact, there are evidence that the PA depends more on characteristics of living areas (e.g., walkability).

Regarding to MoCA, the composition of the household (living alone or accompanied) allowed to register significant differences (U=7231, p<,01), favourable to elderly people who live accompanied (Evans et al., 2019). The same happens with the health self-perceptions (Z=5,21, p<,01) and reported diseases (U=8463, p<,05), favourable to the best health indicators. Similarly, Silva et al. (2020) found better self-perceptions of health in elderly people without cognitive impairment. In Baecke, only the gender contrast was statistically significant, favourable to females (U=645, p<,01), as in other studies (Liao et al., 2021).

4. Conclusions

Cognitive and physical function are two areas of progressive impairment in aging, largely due to declining health. Indeed, poor health can lead to functional and mobility decline, affecting the elderly daily activities and decreasing cognitive stimulation activities. These data are reinforced by scientific evidence, as well as our study, that reports a strong relationship between physical activity and the prevention or reduction of cognitive elderly decline. On the other hand, it is concluded that better cognitive performances are associated with health and cohabitation rates. Aging is a process that inevitably leads to a decline in all these functions but preventing or delaying it is a way to promote the last stage of life with quality, maintaining civic participation, and desirable levels of independence/autonomy.

These results, although reinforcing already known data, show the way for policies that facilitate this desideratum. It was highlighted the importance of the environmental characteristics to promote the practice of physical activity, as well as the influence of this variable on the cognitive performance of the elderly. Indeed, the studies have shown the importance of living in areas

with high walkability (Danish Health Authority, 2020). Either, according to the WHO (2021), 4-5 million deaths a year in the world could be avoided with more physical activity. The strength of this argument led to the plan proposed by this Organization (WHO Global Plan of Action on physical activity 2018-2030).

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