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RESEARCH ARTICLE

The Relationship Between Contextual Factors and the Mobility Ability

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ABSTRACT

Objective: **To examine how the relationship between Mobility limitation is influenced by Contextual Factors in community-dwelling older adults.**

Design: **This is a cross-sectional study.**

Participants: **A total of 769 persons aged 65 years or above living in the community-dwelling of the Algarve region.**

Methods: **We study eighteen categories of Personal and Environmental Factors agreement of the International Classification of Functioning (ICF) and their relationship with six categories of the Mobility domain. Multiple logistic regression was used in analyzing functional outcomes in the Mobility.**

Main Results: **The proportion of older adults reporting disability in Mobility activities ranged from 17.4% (Moving Around Within the Home) and 53.2% (Using Private or Public Motorized Transportation). The Contextual Factors with a greater impact in explaining the limitations in Mobility outcomes were Assistance Activities of Daily Living (OR = 3.0 to OR = 11.9), Job Without Qualification (OR = 2.5 to OR = 6.3), Inadequate Nr of Meals (OR = 2.6 to OR = 3.8) and Self-Rated Physical Health (OR = 2.1 to OR = 3.1). The variable sex contributed to explaining the results of the most difficult activities to perform as Moving Around Outside the Home, Climbing and Use of Transports. The contribution of age was observed only in the Use of Transports.**

Conclusions: **Contextual Factors are important predictors of Mobility functioning, namely, those related to Behaviors and Health Events but also those related to Social and Cultural variables.**

Keywords: Contextual factors, international classification of functioning, mobility, older people.

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I. Introduction

The International Classification of Functioning, Disability and Health, known more commonly as ICF, is a classification of health and health-related domains. ICF is the WHO framework for measuring health and disability at both individual and population levels.

The ICF conceptualizes a person's level of functioning as a dynamic interaction between her or his health conditions, environmental factors, and personal factors [1]. It is a biopsychosocial model of disability, based on an integration of the social and medical models of disability. As illustrated in Fig. 1, disability is multidimensional and interactive. All components of disability are important, and anyone may interact with another. Environmental factors must be taken into consideration as they affect everything and may need to be changed.

The Contextual Factors part of the ICF are, therefore, a key feature of the classification. Contextual Factors "represent the complete background of an individual's life and living" [1, p. 16] and comprise two components: Environmental Factors and Personal Factors. While Environmental Factors refer to all aspects of the external world of an individual's life that may have an impact on his or her functioning, Personal Factors involve "features of the individual that are not part of the health condition" such as gender, age, and coping styles [1, p. 17].

The mobility is a basic activity of independent living and a collaborative process with the environment, the physical, social, and attitudinal world. On the other hand, there

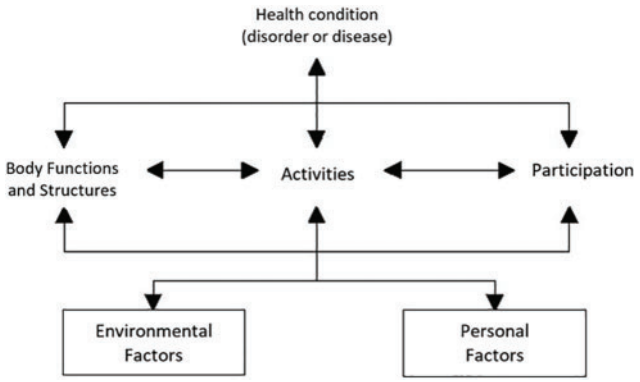

Fig. 1. The model and interactions between the components of ICF (WHO 2001:18).

are many Personal Factors which are determinants for the mobility's capacity. Both Contextual Factors can be negative (barriers), positive (facilitators), or have no effect in functioning. But just as important, they can be changeable. If we know the barriers, we can provide facilitators and so increase the functioning of people. Although the many Personal Factors that are unchangeable or difficult to change, they can make a target for prevention of the disability, if we know them.

The aim of this study is to examine the relationship between mobility limitation and its influence by Contextual Factors in the community-dwelling older adults and its contribution towards a better knowledge of the epidemiological assessment and intervention of the elderly population.

II. Methods

This is a cross-sectional study in which the sample is composed by elderly individuals, of 65 years or over, to live in the community-dwelling of the Algarve region.

The data recovery tools were a social and demographic characterization questionnaire, like the ICF checklist and the Biopsychosocial Assessment Method (BAM), the last developed by Fontes *et al.* [2].

The BAM is a "structured and standardized method, a screening type evaluation and bio-psychosocial classification tool for adults". It permits the characterization of bio-psychosocial and functioning states, as well as describing and detecting functioning disorders. It spans 3 assessment areas, with 12 specific domains (falls, locomotion, physical and instrumental autonomy, cognitive and social status, among others), combining 19 variables. Some of these variables are further subdivided into specific categories or items and add up to 56 questions. The scoring is done on a scale that can have up to 4 degrees, depending on the variable's characteristics, which combine to score different domains, profiling the functioning status of the evaluated individual.

The BAM has already been subjected to a linking process with the ICF, with good conceptual structure [2], and is the assessment questionnaire of the Portuguese National Continued Integrated Care Network, and the EPEPP study (the major socio-demographic study of aging in the Portuguese population) [3].

Different dimensions of Functioning were analysed, namely those concerning Activities and Participation–Mobility–, Environmental and Personal Factors.

We studied three domains of Mobility Activity: Walking and Moving, with three variables: Moving Around Within the Home, Moving Around Outside the Home and Climbing; Transferring Oneself, with two variables: Transferring Oneself While Sitting and Transferring Oneself While Lying; and Using Transportation with one variable: Using Private or Public Motorized Transportation. All variables were scored in "Dependent" (score 0—Unfit/Unable to perform; score 1—Dependent on others) and "Independent" (score 2—Autonomous with partial aid; score 3—Independent).

TABLE I: Contextual Factors in Analysis

Component/Domain/ Variable	Categories	Score
Personal factors		
Biographical		
Age	≥75 Years	Not favorable
	65–74 Years	Favorable
Sex	Women	Not favorable
	Men	Favorable
Marital status	Widowed/Separated/Single	Not favorable
	Married/Union fact	Favorable
Schooling	No schooling	Not favorable
	With schooling	Favorable
Social & cultural		
Cohabitation	Alone	Not favorable
	With other	Favorable
Time alone (per day)	≥8 Hours	Not favorable
	<8 Hours	Favorable
Income	≤250€	Not favorable
	>250€	Favorable
Job	Without qualification	Not favorable
	With qualification	Favorable
Religious belief	Without faith	Not favorable
	With faith	Favorable
Cult of practice	Without practice	Not favorable
	With practice	Favorable
Behaviors and health-related events		
Self-rated physical health	Bad/Unstable	Not favorable
	Favorable/Good	Favorable
Self-rated mental health	Bad/Unstable	Not favorable
	Favorable/Good	Favorable
Nr meals	≤3 ou ≥6 meals	Not favorable
	4 a 6 meals	Favorable
Smoking	With consumption	Not favorable
	Without consumption	Favorable
Alcohol	With consumption	Not favorable
	Without consumption	Favorable
Assistance activities of daily living	Yes	Not favorable
	No	Favorable
Environmental factors		
Products & technology		
Aid devices	Yes	Not favorable
	No	Favorable
Attitudes		
Having someone to talk to/	Yes	Not favorable
To confide in	No	Favorable

The Contextual Factors that were analyzed are shown in Table I. Since the Personal Factors are not described in the ICF, we organized them in three domains: Biographical Factors, Social and Cultural Factors and Behaviors and Health-Related Events. They were either scored "Favorable" and "Not Favorable" as we show in Table I.

Data analysis was made using the "Statistical Package for Social Sciences"—SPSS®—V.26. The variables were dichotomized as 0 ("Favorable") and 1 ("Not Favorable") and were described through absolute and relative frequencies. Test between dependent and independent variables was carried out using the Chi-squared test (χ^2). The multivariate logistic regression by the Forward Wald Method was used to determine independent predictors (Contextual Factors) of mobility disability. Only independent variables with P value of <0.25 at the univariate analysis were considered for logistic regression. Odd ratios with 95% confidence intervals were used to measure the strength of the association at the statistical significance level of $P < 0.05$.

The study was approved by the ethics committee of the Algarve Regional Health Administration and the individuals conceded informed consent.

III. Results

The study sample was composed by 769 individuals, with a mean age of 79.4 years, ranging from 65 to 101 years, with a standard deviation of ±7.37 years. Of these, 463 individuals (60.2%) were women. Table II shows the frequency of the different evaluated variables.

The regression results (Table III) showed that six independent variables did not enter the models: Cohabitation, Income, Self-Rated Mental Health, Smoking, Alcohol and Aid Devices. The results also showed that the variables present in all models were Self-Rated Physical Health, Assistance Activities of Daily Living and Nr Meals. The Schooling, Time Alone and Job also had a significant presence.

The variable sex contributed into explaining the results of the most difficult activities to perform as: Moving Around Outside the Home, Climbing and Use of Transports. The contribution of age was only observed in the Use of Transports.

The Contextual Factors with a greater impact in explaining the limitations in Mobility outcomes were Assistance Activities of Daily Living (OR = 3.0 to OR = 11.9), Job Without Qualification (OR = 2.5 to OR = 6.3), Inadequate Nr of Meals (OR = 2.6 to OR = 3.8) and Self-Rated Physical Health (OR = 2.1 to OR = 3.1).

The model showed that the possibility of disability in Moving Around Within the Home increased especially in individuals with No Schooling (OR = 4.1; 95% CI: 2.55–6.73; p < 0.001).

Older People with Job Without Qualification (OR = 6.3; 95% CI: 2.88–13.72; p < 0.001) and Assistance Activities of Daily Living (OR = 4.6; 95% CI: 2.80–7.55; p < 0.001) have an increased possibility of having limitation in Moving Around Outside the Home, as well as Climbing (respectively OR = 4.6; 95% CI: 2.46–8.56 p < 0.001 and OR = 4.9; 95% CI: 3.16–7.48; p < 0.001).

TABLE II: Frequency of All Variables

Component/Domain/ Variable	Categories	Frequency (%)
Personal factors		
Biographical		
Marital status	Not favorable	465 (60.5)
	Favorable	304 (39.5)
Schooling	Not favorable	293 (38.1)
	Favorable	476 (61.9)
Social & cultural		
Cohabitation	Not favorable	259 (33.7)
	Favorable	510 (66.3)
Time alone (per day)	Not favorable	290 (37.7)
	Favorable	479 (62.3)
Income	Not favorable	490 (63.7)
	Favorable	279 (36.3)
Job	Not favorable	613 (79.7)
	Favorable	156 (20.3)
Religious belief	Not favorable	139 (18.1)
	Favorable	630 (81.9)
Cult of practice	Not favorable	417 (54.2)
	Favorable	352 (45.8)
Behaviors and health-related events		
Self-rated physical health	Not favorable	287 (37.3)
	Favorable	482 (62.7)
Self-rated mental health	Not favorable	162 (21.1)
	Favorable	607 (78.9)
Nr meals	Not favorable	255 (33.2)
	Favorable	514 (66.8)
Smoking	Not favorable	118 (15.3)
	Favorable	651 (84.7)
Alcohol	Not favorable	227 (29.5)
	Favorable	542 (70.5)
Assistance activities of daily living	Not favorable	447 (58.1)
	Favorable	322 (41.9)
Environmental factors		
Products & technology		
Aid devices	Not favorable	289 (36.9)
	Favorable	485 (63.1)
Attitudes		
Having someone to talk to/ To confide in	Not favorable	216 (28.1)
	Favorable	553 (71.9)
Activities/Participation		
Mobility: Walking and moving		
Moving around within the home	Not favorable	134 (17.4)
	Favorable	635 (82.6)
Moving around outside the home	Not favorable	188 (24.4)
	Favorable	581 (75.6)
Climbing	Not favorable	236 (30.7)
	Favorable	533 (69.3)
Mobility: Transferring oneself		
Transferring oneself while sitting	Not favorable	165 (21.5)
	Favorable	604 (78.5)
Transferring oneself while lying	Not favorable	177 (33.0)
	Favorable	592 (77.0)
Mobility: Using transportation		
Using private or public Motorized transportation	Not favorable	409 (53.2)
	Favorable	360 (46.8)

On the other hand, older people requiring Assistance Activities of Daily Living (OR = 4.9; 95% CI: 2.86–8.37; p < 0.001), with Job Without Qualification (OR = 3.2;

TABLE III: Contextual Factors Predictors of Mobility Ability

				95% CI for Exp ($\hat{\beta}$)	
	$\hat{\beta}$	P value	Exp ($\hat{\beta}$)	Lower	Upper
Moving around within the home					
Schooling	1.42	<0.001	4.1	2.55	6.73
Time alone	0.82	0.001	2.4	1.45	3.93
Self-rated physical health	0.87	0.001	2.4	1.48	3.81
Nr meals	1.07	<0.001	2.9	1.79	4.78
Assistance activities of daily living	1.08	<0.001	3.0	1.75	4.99
Hosmer & Lemeshow test p = <0.001					
Moving around outside the home					
Sex	0.62	0.008	1.9	1.18	2.92
Time alone	0.49	0.046	1.6	1.01	2.64
Job	1.84	<0.001	6.3	2.88	13.72
Self-rated physical health	0.99	<0.001	2.7	1.76	4.13
Nr meals	1.15	<0.001	3.2	2.01	5.00
Assistance activities of daily living	1.53	<0.001	4.6	2.80	7.55
Having someone to talk to/To confide in	0.61	0,015	1.8	1.13	3.00
Hosmer & Lemeshow test p = 0.008					
Climbing					
Sex	0.80	<0.001	2.2	1.46	3.42
Schooling	0.46	0.032	1.6	1.04	2.40
Job	1.524	<0.001	4.6	2.46	8.56
Religious belief	0.83	0.004	2.3	1.31	4.03
Self-rated physical health	1.14	<0.001	3.1	2.12	4.62
Nr meals	0.96	<0.001	2.6	1.72	4.01
Assistance activities of daily living	1.58	<0.001	4.9	3.16	7.48
Having someone to talk to/To confide in	0.57	0.011	1.8	1.14	2.73
Hosmer & Lemeshow test p = 0.526					
Transferring oneself while sitting					
Schooling	0.82	0.001	2.3	1.43	3.60
Time alone	0.58	0.015	1.8	1.12	2.83
Job	1.18	0.003	3.2	1.50	6.98
Self-rated physical health	0.96	<0.001	2.6	1.66	4.07
Nr meals	1.16	<0.001	3.2	2.01	5.07
Assistance activities of daily living	1.59	<0.001	4.9	2.86	8.37
Hosmer & Lemeshow test p = 0.035					
Transferring oneself while lying					
Schooling	0.87	<0.001	2.4	1.51	3.74
Time alone	0.48	0.039	1.6	1.02	2.55
Job	0.95	0.007	2.6	1.29	5.18
Self-rated physical health	1.03	<0.001	2.8	1.80	4.33
Nr meals	1.22	<0.001	3.4	2.15	5.33
Assistance activities of daily living	1.68	<0.001	5.4	3.15	9.08
Hosmer & Lemeshow test p = 0.012					
Using Private or Public motorized transportation					
Age	0.59	0.009	1.8	1.16	2.83
Sex	1.00	<0.001	2.7	1.67	4.44
Marital status	0.77	0.001	2.2	1.39	3.37
Schooling	0.78	0.001	2.2	1.38	3.44
Job	0.92	0.001	2.5	1.48	4.27
Cult of practice	0.82	<0.001	2.3	1.44	3.58
Self-rated physical health	0.76	0.001	2.1	1.37	3.31
Nr meals	1.33	<0.001	3.8	2.39	6.04
Assistance activities of daily living	2.48	<0.001	11.9	7.50	18.85
Hosmer & Lemeshow test p = 0.113					

95% CI: 1.50–6.98; p = 0.003) and Inadequate Nr of Meals (OR = 3.2; 95% CI: 2.01–5.07; p < 0.001) showed higher limitation on Transferring Oneself While Sitting.

The disability in Transferring Oneself While Lying and Using Transportation was mainly increased in people requiring Assistance Activities of Daily Living (respectively OR = 5.4; 95% CI: 3.15–9.08; p < 0.001 and OR = 11.9; 95% CI: 7.50–18.85; p < 0.001).

IV. Discussion

The sample presented good results of functioning in the evaluated activities, except for Climbing and Using Transportation.

Climbing is a demanding task, and its limitations can occur due to various impairments, such as strength, sensibility, balance, coordination, or vision, but it can also be associated with certain chronic conditions such as osteoarthritis, arthritis, or depression. This group of functions may also explain the limitations on Using Transportation, to which we can add the unfavorable situation of the sample with respect to Schooling and Income.

Assistance Activities of Daily Living was the variable with the greatest impact in explaining the mobility models. Indeed, autonomy/independence in the performance of daily activities is therefore significantly associated to the performance of mobility, namely the speed of gait [4]. Moreover, this function is a basic indicator of assessment of functioning of the elderly, named for some authors the 6th vital sign [5], [6].

The Job, Schooling and Income are important determinants of longevity and mortality of individuals and establish between themselves a narrow relationship. In addition, this set also gives access to differentiated health care, and is related to health literacy, health condition and functioning of individuals [7]–[9].

The Self-Rated Health is a recommended indicator in monitoring the health of populations, and is recognized his prediction on morbidity, on functional decline and mortality of people, as well as its relationship with the Health-Related Quality of Life [10], [11].

The Self-Rated Health is significantly related to the independence of the activities, and these are associated to the walking ability; individuals who negatively perceive their state of health, present unfavorable values of gait speed (and consequently in all tasks related to mobility) [12], [13].

An appropriate Nr of Meals per day is one of the variables included on the habits and equilibrated diets ending up providing a reference in the screening of risk groups [14]. This factor, added to the quality of nutrients, can improve the control of chronic diseases, health and functioning of older people [15], [16].

To be a woman explained further limit in half of the evaluated activities, especially the most demanding, and this result is supported by others. This is the result of their greater functional vulnerability and specific health conditions more prevalent in women as osteoarthritis or arthritis [8], [17]. However, its expression in the models was limited, only observed in Moving Around the Home Outside, leading to realize that of their vulnerability compared to men is getting smaller, that is, the differences between men and older women are to decline.

The results related to age are consistent with other studies that have suggested a stabilization or reduction of functional decline [18], [19]. This is associated with further support of assistive technologies and a more effective clinical and pharmacological intervention, among others. The age was only present in the model of Using Transportation (OR = 1.4); the older ones showed more difficulties, which can relate to physical and cognitive skills needed to perform this activity.

We also observed that the complexity of activity precipitates the need for more variables into the regression models. Namely, the task complexity seems to increase the number, the interaction and the complexity of the variables needed to explain the functional outcome.

We also observed that the explanatory variables of the activities related to transfers were the same, with the difference that the strength of the association to Transferring Oneself While Lying was overall higher. There are biomechanical arguments that might justify these differences, including increased displacement of the center of mass and consequently a greater ability to control the trunk to the level of postural reflexes, the dissociation of shoulder and pelvic girdle and weight transfer.

V. Conclusion

The Contextual Factors are important predictors in Mobility functioning namely those related to Behaviors and Health Events: Self-Rated Physical Health, Assistance Activities of Daily Living and the Number of Meals.

The Biographical variable with the greatest explanatory power in the models was Schooling, while the Job had the same performance in the group of Social and Cultural variables. These two variables are significantly associated with each other, but also in behaviors related to health.

The sex variable seems to be more determinant than the age for mobility ability and the presence of Aid Devices do not seem to compromise the mobility capacity.

It is important to know the barriers and facilitators Contextual Factors that can help the evaluation process and interventions in the elderly population, especially those who can increase their functioning.

Conflict of Interest

Author declares that do not have any conflict of interest.

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