

# Assessment of Functionality and the Relationship Between Cognition and Psychological Status in Aging

## Avaliação da Funcionalidade e da Relação Entre Cognição e Estado Psicológico no Envelhecimento

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### Abstract

Aging involves a set of multiple chronic and irreversible changes, which cause loss of the individual's overall functional capacity. Cognitive, functional impairments and depressive symptoms are common as aging occurs, thus decreasing the quality of life of these individuals. To characterize the elderly through the Core Set of the International Classification of Functionality (ICF) for the health of the elderly and to assess cognitive, functional impairment and depressive symptoms. This is a study in which the sample included 60 elderly people, who were randomly selected, who attended the UBS Bonsucesso, undergoing evaluation using the ICF questionnaire, the MEEM questionnaire (Mini Mental State Examination) and the Depression Scale Geriatric - Geriatric Depression Scale (GDS). In the Functionality data, it indicated a moderate problem with the activity and participation factors. The sample showed a high level of cognitive deficit and depressive symptoms. When treating elderly patients, both psychological and physiological aspects should be considered, with the need to assess, guide and treat the psychological and functional status of the elderly.

**Keywords:** ICF. Depression. Cognitive Dysfunction. Elderly.

### Resumo

*O envelhecimento envolve um conjunto de múltiplas alterações crônicas e irreversíveis, que ocasionam perda da capacidade funcional global do indivíduo. Comprometimentos cognitivos, funcionais e sintomas depressivos são comuns conforme acontece o envelhecimento, diminuindo assim a qualidade de vida desses indivíduos. Caracterizar idosos através de Core Set da Classificação Internacional de Funcionalidade (CIF) para saúde de idosos e avaliar o comprometimento cognitivo, funcional e sintomas depressivos. Trata-se de um estudo onde a amostra incluiu 60 idosos, que foram selecionados aleatoriamente, atendidos na UBS Bonsucesso, sendo submetidos a avaliação utilizado o questionário da CIF, o questionário MEEM (Mini Exame do Estado Mental) e a Escala de Depressão Geriátrica – Geriatric Depression Scale (GDS). Nos dados da Funcionalidade, indicou moderado problema aos fatores de atividade e participação. A amostra apresentou alto nível de déficit cognitivo e sintomas depressivos. Ao tratar de pacientes idosos, deve-se considerar tanto aspectos psicológicos quanto fisiológicos, existindo a necessidade de avaliar, orientar e tratar o estado psicológico e funcional dos idosos.*

**Palavras-chave:** CIF. Depressão. Disfunção Cognitiva. Idosos.

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### 1 Introduction

Aging is characterized by a progressive deterioration of the functions of cells, tissues and organs, leading to a decline in physiological functions, such as decreased muscle mass, reduced blood flow, impaired immune system, reduced energy capacity and altered cognitive function. These age-related declines culminate in the onset of diseases, including sarcopenia, cardiovascular disease, cancer, obesity, diabetes and neurodegenerative diseases<sup>1</sup>.

Issues related to the aging process have aroused the interest of society in general, due to the rapid population aging that has been occurring in several countries, including Brazil. It is possible to say that this is basically due to the decrease in the birth rate and the increase in life expectancy, provided by technological progress in several scientific fields<sup>2,3</sup>.

Consequently, changes in cognitive functions are considered normal with the aging process, through the gradual

biological loss of reasoning, perception and memory skills<sup>4</sup>. However, when cognitive decline impairs the independence of the elderly person and their personal and social relationships, this contributes to the decrease in the capacity for self-care and autonomy, leading to feelings of insecurity, low self-esteem and social isolation and, consequently, depression<sup>5,6</sup>.

In the international classifications of the World Health Organization (WHO), health conditions (diseases, cognitive decline, disorders, injuries, etc.) are classified mainly in the International Classification of Disease - ICD, tenth revision, which provides an etiological structure. Functionality and disability associated with health status are classified in the International Classification of Functionality, Disability and Health - CIF. Therefore, ICD-10 and ICF are complementary. The ICF contains the domains of health and domains related to health. In addition, the ICF also lists the environmental factors that interact with all these constructs<sup>7</sup>.

With the understanding of these factors, we updated our knowledge and contributed to a more sophisticated study in caring for the elderly, assessing functionality, cognitive aspects and psychological symptoms for a better quality of life in this population.

## 2 Material and Method

The sample included 60 elderly people, who were randomly selected, among those who were to be cared at UBS Bonsucesso, all of them answering two questionnaires. The questionnaire used was the MMSE (Mini Mental State Examination), composed of seven categories that assess specific cognitive functions such as temporal and spatial orientation, immediate memory, attention and calculation, memory with delayed recall, language and visual constructive capacity. The score is made by grading cognitive performance on a scale from 0 to 30 points; a score below 24 indicates cognitive impairment<sup>8</sup>.

The other questionnaire used was the Geriatric Depression Scale - Geriatric Depression Scale (GDS), developed by Yesavage in 1983, it is one of the most commonly applied instruments for tracking depression among the elderly population. It is an easy-to-use scale, which can be applied even by personnel without specialized training, as it does not require specific knowledge in psychopathology<sup>9</sup>.

The elderly who participated were aware of all the agreements, answered the entire questionnaire and signed the authorization for the use of collected data. The exclusion criterion was individuals who had mental illness.

In order to characterize the sample in terms of functionality, a CIF Core Set specific to the physical health of the elderly was applied in the pre-intervention, in 4 domains and 28 categories / subcategories<sup>10</sup>.

The application occurred most of the time in the form of an interview, where the evaluator read the category and the individual evaluated responded by classifying the response in qualifiers: without any commitment (0% - 4%), slight commitment (5% - 24%), moderate impairment (25% - 49%),

severe impairment (50% - 95%) or totally impaired (96% - 100%); the answers varied according to the question, but always followed the same line of reasoning.

Only two categories were different: one, in the body functions domain - for the purpose of assessing proprioceptive function - where there were 4 proprioception tests, which the elderly person must correctly complete all of them to be classified with the highest qualifier in that category; another, still in the domain of body functions, to classify the tone of all the muscles in the body, the task was to feel the muscles of the elderly and classify them as compromised or not and what the degree of impairment was<sup>11</sup>.

## 3 Results and Discussion

The study is a cross-sectional analytical study, with the study sample consisting of 60 elderly people, registered at UBS Bonsucesso in the city of Guarapuava-PR, with 37 females (61.7%) and 23 males (38.3%), with women (64.7 years) under the age of men (65.8 years). The research was approved by the Research Ethics Committee of the State University of the Midwest - UNICENTRO, by means of Opinion No. 3.407.064, following the ethical standards in accordance with Resolution No. 466/2012 of the National Health Council. All the participants were informed about the research procedures.

For ICF data analysis, it was presented in gross values and percentage. To this end, in each ICF domain surveyed (I: Body functions; II: Body structures; III: Activity and Participation and IV: Environmental factors).

Table 1 shows the ICF domain I, which represents the body's functions. Its subcategories correspond to: energy level; sleep quality; vestibular function of movement; proprioceptive function; feeling of pain; general physical endurance; aerobic capacity; generalized mobility of joints; strength, tone and endurance of all the muscles of the body. It is observed that the qualifiers are mostly between 0 and 1, which indicate no or slight structural problem in the body, that is, from 0% to 24% of body problem.

**Table 1 - Body Function**

Category	Domain I- Body Function									
	Qualifying									
	0% - 4%		5% - 24%		25% - 49%		50% - 95 %		96% - 100%	
	n	%	n	%	n	%	n	%	n	%
Energy Level	21	35	22	36	5	8	6	10	6	10
Sleep Quality	20	33	21	35	7	11	7	11	5	8
Vestibular Function of the Movement	22	36	24	40	3	5	6	10	5	8
Proprioceptive Function	23	38	18	30	7	11	6	10	6	10
Pain Feeling	12	20	32	53	6	10	7	11	3	5
General Physical Resistance	28	46	17	28	5	8	5	8	5	8
Aerobic Capacity	25	41	21	35	2	3	7	11	5	8
Generalized Mobility of the Art	24	40	21	35	3	5	6	10	6	10
Strength of All Muscles	22	36	19	31	7	11	5	8	7	11
Tonus of All Muscles	26	43	15	25	8	13	5	8	6	10
Resistance of All Muscles	19	31	21	35	11	18	6	10	3	5

0 - No problems presented; 1- Slight problem presented; 2 - Moderate problem presented; 3 - Serious problem presented; 4 - Complete problem presented.  
Source: ressarce data.

Represented in table 2, domain II of the ICF, which is equivalent to the body structures, is subdivided into:

heart, bones, joints and muscles. Note that the values are predominantly at 0 and 1, with the same results as in domain I.

**Table 2- Body Structures**

Category	Domain II - Body Structures									
	Qualifying %									
	0% - 4%		5% - 24%		25% - 49%		50% - 95 %		96% - 100%	
	n	%	n	%	n	%	n	%	n	%
Heart	22	36	23	38	4	6	5	8	6	10
Bones	23	38	18	30	9	15	6	10	4	6
Joints	22	36	15	25	8	13	4	6	11	18
Muscles	20	33	14	23	10	16	6	10	10	16

0 - No problems presented; 1- Slight problem presented; 2 - Moderate problem presented; 3 - Serious problem presented; 4 - Complete problem presented. Source: resource data.

Table 3 shows the percentage of Domain III of the ICF, which indicates activity and participation. Its subcategories involve: concentration and attention; crouch; get up; walk; use of transport; guarantee one's own physical comfort;

control of diet and fitness; relationship with peers and playing sports. It seems that the qualifiers had between 0 and 2, which indicate a moderate problem presented linked to the activity and participation factors, that is, 25% - 49% of the problem.

**Table 3- Activity and Participation**

Category	Area III - Activity and Participation									
	Qualifying %									
	0% - 4%		5% - 24%		25% - 49%		50% - 95 %		96% - 100%	
	n	%	n	%	n	%	n	%	n	%
Focus And Attention	24	40	13	21	10	16	7	11	6	10
Drop	24	40	18	30	9	15	5	8	4	6
Get Up	24	40	25	41	1	1	7	11	3	5
Walk	21	35	12	20	11	18	5	8	11	18
Use of Transport	24	40	16	26	10	16	3	5	7	11
Guarantee one's Own Physical Comfort	21	35	17	28	1	1	11	18	10	16
Diet Control and Physical Form	31	51	2	3	11	18	7	11	9	15
Relationship With Couples	23	38	20	33	2	3	5	8	10	16
Playing Sports	22	36	13	21	13	21	4	6	8	13

0 - No problems presented; 1- Slight problem presented; 2 - Moderate problem presented; 3 - Serious problem presented; 4 - Complete problem presented. Source: resource data.

Domain IV of the ICF regarding environmental factors (table 4) was subdivided into: medications; general products and technologies for activities; cultural, recreational and

sports activities and health services. Domain IV presented percentages in qualifiers 0 and 1, presenting no or slight problems linked to environmental factors.

**Table 4 - Environmental Factors**

Category	Area III - Activity and Participation									
	Qualifying %									
	0% - 4%		5% - 24%		25% - 49%		50% - 95 %		96% - 100%	
	n	%	n	%	n	%	n	%	n	%
Medicines	21	35	26	43	3	5	6	10	4	6
Products and Technology	16	26	23	38	10	16	4	6	7	11
Health Services	20	33	18	30	10	16	6	10	6	10

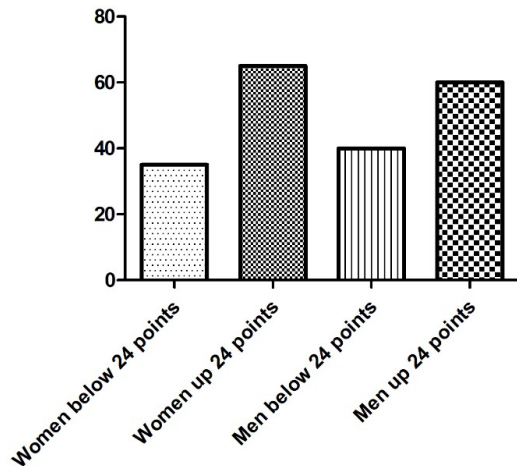
0 - No problems presented; 1- Slight problem presented; 2 - Moderate problem presented; 3 - Serious problem presented; 4 - Complete problem presented. Source: resource data.

Chart 1 shows the mean values of the assessment ratio of cognition in men and women. The sample shows a slight difference between women and men below the 24 points of the test, which indicate cognitive dysfunction, where men obtained a worse result.

In chart 2, there was no statistical difference between women and men. However, there is a high significance of depression in both sexes.

**Figure 1-** Assessment of cognition and the relationship between the sexes

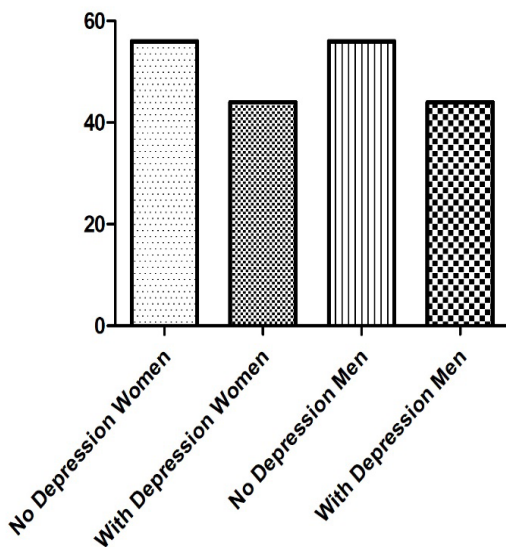
### Relationship of Cognition in Men and Women



Source: researcher data.

**Figure 2 -** Assessment of depression and the relationship between the sexes

### Relationship of Depression in Men and Women

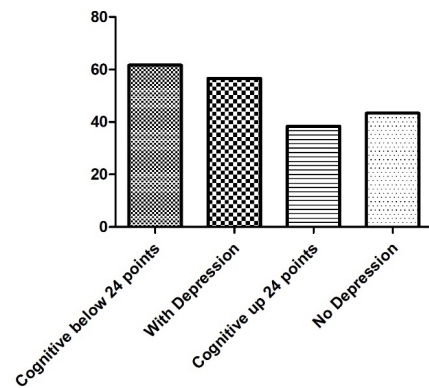


Source: resource data.

When checking chart 3, the sample showed a high rate of depression and cognitive impairment, indicating a connection among the symptoms.

**Figure 3 -** Relationship between Cognition and Depressive Symptoms

### Relationship of Cognitive Decline and Depressive Symptoms



Source: resource data.

In the present study, in relation to the Functionality data, only Domain III of the ICF (concentration and attention; crouching; getting up; walking; use of transport; guaranteeing one's own physical comfort; control of diet and fitness; relationship with peers and playing sports) presented qualifiers between 0 and 2, indicating a moderate problem with the activity and participation factors, unlike the other Domains (I, II, IV) that presented qualifiers between 0 and 1, indicating no or slight problems. Several studies demonstrate that the activities in the most affected elderly were those of ICF Activity and Participation<sup>12</sup>.

The sample showed qualifiers between 0 and 2, indicating a moderate problem with activity and participation factors, indicating a 25% to 49% problem, similar to the study by Lopes<sup>12</sup> and Quintana<sup>13</sup>, in which most of the elderly studied it was also coded with qualifier 0 and 2, with performance difficulties carrying out activities, justified by the older age group. Vale<sup>14</sup> informs that the main limitations and / or restrictions presented by the elderly are: difficulty in concentration and attention, squatting, standing up and walking, because as aging happens, the functionality gradually decreased, these difficulties in addition to causing limitations, can lead to depressive symptoms in these elderly, which is in line with the sample of this study.

In relation to the assessment of cognition and depression, men obtained a worse result in relation to women indicating cognitive dysfunction, in addition, the total sample consisted of a high significance of depression. Corroborating with studies such as those by Ramos<sup>15</sup> and Prado<sup>16</sup> that state that, as age increases, more cognitive dysfunctions and depressive symptoms are presented, subsequently worsening functionality.

The accessibility to social and health resources and the size of the place where the elderly individual lives, low qualifiers were associated in all domains. The effect of living in a municipality with 10,000 or more inhabitants, low accessibility to social and health resources, was significant for a moderate domain to the complete problem<sup>17</sup>. For this reason,

environmental and personal factors must be considered as one of the most important in terms of assessments of the elderly<sup>18</sup>.

Linnemann<sup>19</sup>, confirms in his studies that depression is often associated with cognitive deficits, as it was assessed with the level of the neurofilament light chain (NfL), which is known for clinical investigations in search of a cognitive deficit biomarker, enabling to predict a consecutive diagnosis of dementia in the elderly with depressive symptoms, which was perceived in the individuals in the sample in the present study.

The respective study showed that there is a strong connection between depressive symptoms and cognitive deficit, because in the sample, the greater the depressive symptoms and the greater the cognitive deficit. Cognitive impairment is a common symptom, often persistent in depressive disorder, however there are few studies of treatments for cognitive function in patients with depression<sup>20,21</sup>. The best evidence is based on the moderate effectiveness of some antidepressants, cognitive-behavioral therapy and physical exercise<sup>22,23</sup>. In addition, the worsening of cognitive function is associated with greater impairment of functionality, balance and increased risk of falls in the elderly with dementia compared to the elderly with mild cognitive impairment<sup>24</sup>.

The elderly population is increasing and depression in the elderly is very common and prevalent<sup>25</sup>. There may be a strong correlation among cognitive decline, depression and low quality of life<sup>26</sup>. In the data found in this research, there was no gender difference, the total sample consisted of a high significance of depression.

Currently, there is a consensus among health professionals that physical activity is a determining factor in the aging process success, scientifically the relationship among quality of life, physical activity and aging has been frequently analyzed, such as its relevance, also decreasing depressive symptoms<sup>27</sup>.

Physiotherapy has the important mission of rehabilitation and health promotion for the elderly, helping both to relieve symptoms of cognitive deficits and to promote functional independence and quality of life<sup>28</sup>.

In the sample of this research, there was a high significance of depression and cognitive deficit, indicating a correlation between these diseases, because the lower the cognition the greater the depression, and vice versa, which may also affect the functionality in the elderly population.

#### 4 Conclusion

According to the data collected and analyzed in the present study, it was found that the elderly patients evaluated in this sample had a high level of impairment of cognitive deficit and depressive symptoms. As for functionality, the individuals are within the average, having only a moderate problem with activity and participation factors.

However, as the decline in cognitive function is associated

with greater impairment of functionality, this aspect should not be neglected in this population.

This demonstrates that when treating elderly patients, psychological as well as physiological aspects must be taken into account, and therefore, there is a need to assess, guide and treat the psychological and functional status of the elderly.

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