

Relationship between Functionality and Cognitive Impairment in Older Adult Women from the Southeast of Mexico

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Abstract—This study explores the relationship between the level of functionality and cognitive impairment in older adult women from the south-east of Mexico. It is a descriptive, cross-sectional study; performed with 172 participants in total who attended a health institute and live in Merida, Yucatan Mexico. After a non-probabilistic sampling, Barthel and Pfeiffer scales were applied. The results show statistically significant correlation between the cognitive impairment (Pfeiffer) and the levels of independence and function (Barthel) ($r=0.489$; $p=0.001$). Both determine a dependence level so they need either a little or a lot of help. Society needs that the older woman be healthy and that the professionals of mental health develop activities to prevent and rehabilitate because cognitive impairment and function are directly related with the quality of life.

Keywords—Functionality, cognition, routine activities, cognitive impairment.

I. INTRODUCTION

AMONG the social determinants of health in the elderly adult population, sociodemographic and psychosocial factors such as functionality and cognition stand out. To begin with, the importance of the functionality or functional independence in the daily environment of the elderly should be recognized.

Functional independence is defined as the ability of the people to perform actions in daily living to maintain the body and to live independently. When body and mind, together, are able to perform daily life activities, it is said that the functionality is integrate [1]. The conditions of a cognitive impairment disable the elderly to do some daily life activities (DLAs) and instrumental daily life activities (IDLAs) as well. The first refers to activities such as walking in a room, dressing, bathing, eating, getting in and out of bed and using the toilet, while the latter refers to shopping, preparing food, doing housework or leaving the house to go somewhere far away. These disabilities increase significantly after 75 years of age and increase among women and in rural areas [2].

In addition to the above, cognitive impairments represent an important contribution to the burden of chronic diseases in

terms of costs and disability in the elderly population. Cognitive problems account for 31% of the years of life lost through disability among non-communicable diseases; depression is the second leading cause of disability for adults in general and dementia the first for the elderly. According to Manrique et al., depression and dementia are already public health problems that must be addressed promptly, since in relation to cognitive impairments, one in six older adults have significant depressive symptoms (17.6%), slightly more than 7% present cognitive impairment and about 8% dementia [3]. On the other hand, according to WHO recommendations, it is imminently needed to consider dementia as a priority in public health and social assistance [4].

In recent decades, there has been an interest in research related to the elderly; this is mainly due to the increase in life expectancy, which is why there is a concern for the quality of life of this population. Despite the fact that the increase in life expectancy has been an achievement for society, it does not necessarily mean an improvement in the health conditions and quality of life of the elderly. On the contrary, one of the most important problems in the older adult stage is the loss of functional, emotional and cognitive abilities. These changes are often accompanied by chronic degenerative diseases that together limit the performance in the daily life activities, with the consequent loss of their independence, disability and constant need for help [5]-[7].

In Mexico, 60 years old is accepted as the beginning of old age, while in develop countries it is 65 years old [8]. Likewise, people aged 60 and over face a variety of changes that affect their lives, in the workplace, family and economic areas, which have repercussions on their development in society [9]. Some of the losses they face are evident while others are not. On the physical side, some biological abilities diminish and deteriorate, which makes them more susceptible to suffer chronic health problems. In the psychosocial field, aging involves the loss of some social roles that had sustained their identity during many decades of their lives [10].

Due to scientific advances in medicine, life expectancy has increased, and therefore, there is an ever-increasing proportion of people in the world. According to data from the United Nations (UN), in 1975 there were about 350 million people aged 60 and over in the world, however, demographic projections for the year 2025 show that there will be more than 1,100 million, an increase of 224% from 1975 onwards. Thus, in the next 45 years, the elderly will constitute 13.7% of the world's population [11]. According to the National Population

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Council (CONAPO), in Mexico 799 people turn 60 years old every day and by the year 2050, one in four people will be an older adult [12]. Likewise, according to CONAPO, the elderly population (over 60) will continue to increase, rising 76.3% from 2000 to 2015, 83.3% in the next three periods and 63.2% in the last two decades. Thus, the number of older adults in the country will more than quadruple from 6.7 million in 2000 to 36.5 million in 2050 [13]. On the other hand, according to the National Institute of Statistic and Geography (INEGI), at the national level, of the 112.3 million inhabitants that counted in the Population and Housing Census 2010, 10.1 million are older adults, representing 9%, or one in 10 habitants in the country. Similarly, out of the total number of people aged 60 and over living in Mexico in 2010, 5.4% are women, representing 53.5%. Also, according to the National Institute of Older Adults (INAPAM), in Yucatan in 2010 the adult population of 60 and over was 196,474, out of these, 10.3% are women and 9.9% are men [14]. And according to the Latin American and Caribbean Demographic Center (CELADE), in 2000 in Mexico there was a femininity index of 113 women per 100 men, which rises as life expectancy increases, and therefore, the difference between the number of men and women is amplified in older ages [14].

Older people are one of the most vulnerable groups, which is a circumstance that increases if there are any limitations. According to the numbers presented by INEGI in Mexico, the regions with the highest percentage of older adults with some limitation are: Zacatecas (33.5%), Yucatan (33.1%), Tabasco (31.3%) and Nayarit (30.4%); and women are the ones with the greatest disability and dependence. The data shows that women represent even more than double those of males; 32.4% of females report having had some difficulty, while only 14.7% of males do, and men mention less severity in their limitations [15].

In this sense, a determinant factor in the prevalence of disability and dependence is age; as a person gets older, the severity of his or her disability and dependence increases, and it is commonly difficult to perform complex activities, and then, the simplest ones. The main problems begin in instrumental activities, such as leaving home and using transportation, and finally difficulties in activities of daily living appear. Therefore, it is necessary to know how the population of women aged 60 years and older in the state of Yucatan is in terms of functionality and cognitive impairment. Since its importance is due to the consequences that it entails, among which the decline in self-esteem and self-perceived well-being, special care delivery, caregiver collapse, institutionalization, and finally, the economic implications at the individual, family, social, and health policy levels [16]. Thus, an adequate diagnosis can create lines of action that are focused to prevent a possible cognitive and functional impairment of them.

The increasing prevalence of chronic diseases, including dementia, is a challenge because it affects functionality, generates disability and eventually leads to dependency and represents a significant increase in the cost of health care. Therefore, the importance of the functional status of the

elderly must be recognized, since it determines to a great extent the relation between the population aging and the health expenditure.

Based on all of the above, the objective of the present study is to know the functioning level and cognitive impairment of older adult women in the city of Merida, Yucatan; as well as to know if the level of functionality is related to the cognitive problems of the elderly.

II. METHOD

A. Type of Study and Design

This study was exploratory, descriptive, with quantitative methodology through the application of a survey with an interviewer.

B. Participants

A total of 172 women participated in this study, with an average age of 65, retired or pensioners from the Mexican social security institute, residents of the city of Merida, Yucatan. The women were selected through an intentional sampling by quota.

TABLE I
FUNCTIONAL LEVEL BARTHEL SCALE

Functional level	Frequency	Percentage
Total dependence	0	0%
Severe dependence	0	0%
Moderate dependence	15	8.7%
Mild dependence	157	91.3%
Independent	0	0%
Total	172	100%

C. Instruments

The Barthel Index is a hetero-administered scale that evaluates 10 basic activities of daily living: eating, washing, dressing, grooming, bowel movements, bladder, toilet use, transfers (bed to chair and back), mobility (on level surfaces) and walking up and down stairs; it is scored according to the degree of dependence or independence that a person has to perform each activity (<20 total dependence, 20-35 severe dependence, 40-55 moderate dependence, 60-90 mild dependence and 100 independent). Its application time is about 5 minutes, and the collection of information can be through direct observation and/or questioning the person or, if their cognitive ability does not allow it, the caregiver or family could be asked [17].

The Pfeiffer scale consists in 10 items that detect the presence and degree of cognitive impairment. This questionnaire explores short and long-term memory, orientation, concentration, information on daily facts and the ability to calculate. It is evaluated in function of the errors: 0-2 normal, 3-4 mild cognitive impairment, 5-7 moderate cognitive impairment, and 8-10 severe cognitive impairment [18].

D. Procedure

The application of the scale was done collectively at the meeting place of the group of older adults. The purpose of the

study was informed and their collaboration was requested through an informed consent letter (IC). Once their approval was obtained, they were explained how to respond. The participants each took about 30 minutes to respond.

III. STATISTICAL ANALYSIS

To determine the frequency of the functionality and cognitive impairment of the participants, a descriptive analysis was carried out, and the mean scores and standard deviations were obtained for each of the factors of the Pfeiffer and Barthel scales. Pearson correlations were performed to associate both variables.

IV. RESULTS

When carrying out the frequency analysis of the level of functionality of older adults, the results show that 91.3% have a mild dependency level and 8.7% have moderate dependence (see Table I). In the same way, about the level of functionality of the older adult women, the least significant frequency was found in the activities of eating (M=9.88), dressing (M=9.59), grooming (M=4.83), bowel movements (M=9.48) and toilet use (M=9.39). The lowest was in the activity of walking up and down stairs (M=7.12) (see Table II).

TABLE II
 BARTHEL SCALE RESULTS

Activity		n	%	Mean	SD
Eating	Dependent	2	1.2%	9.88	1.075
	Independent	170	98.8%		
Washing	Dependent	21	12.2%	4.39	1.642
	Independent	151	87.8%		
Dressing	Dependent	1	0.6%	9.59	1.474
	With help	12	7.0%		
	Independent	159	92.4%		
Grooming	Dependent	6	3.5%	4.83	0.920
	Independent	166	96.5%		
Bowel movements	Incontinent	3	1.7%	9.48	1.798
	Occasional accident	12	7.0%		
	Continent	157	91.3%		
Bladder	Incontinent	10	5.8%	8.87	2.708
	Occasional accident	19	11.0%		
	Continent	143	83.1%		
Toilet use	With help	21	12.2%	9.39	1.642
	Independent	151	87.8%		
Transfers	With help	50	29.1%	8.55	2.277
	Independent	122	70.9%		
Mobility	With help	57	33.1%	8.34	2.360
	Independent	115	66.9%		
	Dependent	13	7.6%		
Stairs	With help	73	42.4%	7.12	3.153
	Independent	86	50.0%		

After the assessment of cognitive impairment, the frequency analysis of the level of cognitive impairment of older adults was, 52.3% have normal cognitive functioning, and 6.5% have severe cognitive impairment (see Table III). Finally, a Pearson association analysis for each factor was performed to determine if there was a relationship between functioning or

independence level and cognitive impairment. The results indicate that statistically significant correlations were found between cognitive impairment (Pfeiffer) and functioning and independence level factors (Barthel) ($r = 0.489$; $p = 0.001$).

V. DISCUSSION

The findings presented here, demonstrate the conditions of functional status and cognition of older adult women, this information could be very useful when designing, adapting or strengthening public health programs and/or policies in favor of this group of the Mexican population. According to the analysis that was carried out through the Barthel instrument that assesses the level of independence of older adults, 8.7% presents a moderate level of dependence, while 91.3% have a mild dependency level and no participant is totally dependent. This contrasts with the results of the research carried out by González and López, since 46.1% of the study population were independent, 29 (37.2%) had mild dependence and 13 (16.7%) had a moderate dependence, and no women with severe dependence were found, and therefore, the population of the present study showed greater independence to perform activities of daily living [7].

Also, it can be observed that the activities that they perform independently are related to the activities of daily living (ADL), that is, most older women do not have difficulty eating, dressing, grooming or using the toilet. However, it is difficult for them to climb stairs, which can affect their movement within their own home or to use public transport. Functional impairment prevents older people performing ADL, so most older adults from this sample do not present functional impairment. This is similar to some other studies performed with older adult women [19]-[21].

TABLE III
 COGNITIVE IMPAIRMENT PFEIFFER

Cognitive impairment	Frequency	Percentage
Normal	90	52.3%
Mild	40	23.3%
Moderate	31	18%
Severe	11	6.5%
Total	172	100%

In relation to the cognitive damage of older adult women, 6.5% presented severe cognitive impairment, 18% moderate, 23.3% mild, and 52.3% did not present cognitive impairment. And although in old age thought is affected and global intellectual capacity rarely remains intact, many elders remain with their functional mental faculties, while others present varying degrees of cognitive impairment, called dementia, similar to some other studies performed with older adults [22], [23].

The association analysis shows that the greater cognitive impairment there is the less functionality and independence in older adult women; that is, when older adults have a high level of cognitive impairment they have less functionality and therefore it makes them prone to be cared for by other people. On many occasions added to this situation are gender

inequalities, which increase the exposure of women to certain risks that do not always recognize the manifestation, severity and consequences of the disease, limiting access to resources, information and disadvantaging this group and presenting greater barriers to their full participation in society and exposing them to double discrimination [24], [25].

In conclusion, the reduction of the physical, cognitive or sensorial capacities that occur with the aging process can lead to deterioration of the functional capacities of the elderly, which affects their possibility to live independently and feel wellness about their life in general. However, the results show that older adults have a good level of functionality and cognitive functioning, which are factors that influence the well-being of the older adult [26], [27].

In this sense, physical factors explain many cases of the absence of well-being, since the losses of physical strength, mobility, balance, resistance, etc., are associated with a decrease in the execution of basic and instrumental activities of daily living [28]. Therefore, it is necessary to expend time to prevention work on the topic of cognitive impairment in the elderly, since it affects their independence and therefore their level of well-being [29], [30].

The limitations of the present study are that the study population is small, since there were 172 participants and only women; likewise, the average age was 65 years, and so it is not possible to generalize older adults who are above this age range. Likewise, most of the participants are retired or pensioners of the Mexican social security institute, that is why the people who do not have a pension are not considered in the parameter; also, all participants are residents from the city of Mérida, Yucatán; the reason being that the level of functionality and cognitive impairment in the rural population is not known.

REFERENCES

- [1] Parra MS, Salas MC. Adultos mayores funcionales: Un nuevo concepto en salud. *Funcional elders: A new concept in health*. Ciencia y Enfermería. 2005; (2):17–21.
- [2] Estrella, D. Hidalgo, A. Evaluación de la funcionalidad en el adulto mayor. Un análisis entre cuatro instituciones de salud de Mérida, Yucatán en Estrella, et. al (comp.) *Calidad de vida en la tercera edad: Múltiples miradas*. Mérida, Yucatán, México. 2014.
- [3] Manrique Espinoza B, Salinas Rodríguez A, Moreno Tamayo KM, Acosta Castillo I, Sosa Ortiz AL, Gutiérrez Robledo LM, et al. Condiciones de salud y estado funcional de los adultos mayores en México. *Salud Publica Mex*. 2013;55(1):323–31.
- [4] Organización Mundial de la Salud. *Envejecimiento activo: un marco político**. Rev Esp Geriatr Gerontol. 2002; 37:74–105.
- [5] Xolocotzi “Determinación De La Prevalencia del Síndrome De Fragilidad En Adultos Mayores De 65 Años De La Umf 1 Orizaba” (Tesis inédita de maestría). Veracruz, México. 2014.
- [6] España DG de E y DS. *Adulto Mayor: Una Nueva Etapa de Vida*. Guía orientación para la comprensión y atención psicológica en la edad Av (Internet). 2007 (cited 2017 Jan 16). Available from: http://www.fechac.org/pdf/prodia/guia_adulto_mayor_una_nueva_etapa_de_vida.pdf
- [7] González GR, López FJ. Correlación del estado funcional y nutricional en pacientes ancianos con fractura de cadera. *Medwave* 2012 Jun;12(5) doi: 10.5867/medwave.2012.05.5425.
- [8] Sánchez Q, Estela. Condiciones socioculturales y económicas de los ancianos que sufren maltrato. INAPAM, Hidalgo. 2013.
- [9] Quezada, Juan Pablo Aguirre, et al. *Las familias en México*. 2016.
- [10] Hernández R, De la Fuente R. Análisis competencial de la atención a la dependencia en los adultos mayores desde el ámbito institucional de México. *Gestión y política pública*, 2016, vol. 25, no 1, p. 299-334.
- [11] Censo de Población y Vivienda. Perfil sociodemográfico: Estados Unidos Mexicanos: Censo de Población y Vivienda 2010 / Instituto Nacional Estadística y Geografía.-- México: INEGI, 2013 recuperado de la red: http://www.inegi.org.mx/prod_serv/contenidos/espanol/bvinegi/producto_s/censos/poblacion/2010/perfil_socio/uem/702825047610_1.pdf
- [12] González, Elizalde, Acuña, Hattori, y Ruiz Aportaciones de la psicología del envejecimiento en México. 2013 (cited 2017 Jan 16). Recuperado de: http://geracoes.org.br/novo_site/wp-content/uploads/2013/08/Aportaciones-de-la-psicologia-del-envejecimiento-en-Mexico.pdf
- [13] Arzate Salgado, Reyes F, Torres R. Desigualdad y vulnerabilidad en el colectivo de Adultos mayores en México y el Estado De México: una revisión multidisciplinaria. *Quivera Rev Estud Urbanos, Reg Territ Ambient y Soc* (Internet). 2007 (cited 2017 Jan 16); 9(2):231–62. Available from: <http://www.redalyc.org/articulo.oa?id=40190209>
- [14] Instituto Nacional de las Personas Adultas Mayores (INAPAM). *Ejes rectores de la política pública nacional a favor de las personas adultas mayores: por el México que ellos merecen* (Internet). 2010 (citado 2016 Jan 19). p. 88. Available from: <http://187.216.193.232/biblios-imdf/node/10890>
- [15] Dorantes G, Ávila JA, Mejía S, Gutiérrez LM. Factores asociados con la dependencia funcional en los adultos mayores: un análisis secundario del Estudio Nacional sobre Salud y Envejecimiento en México, 2001. *Rev Panam Salud Pública* (Internet). 2007 (cited 2017 Jan 16); 22(1):1–11. Available from: http://www.scielosp.org/scielo.php?script=sci_arttext&pid=S1020-49892007000600001&lng=en
- [16] Aguilar, S. Sigamos activos para envejecer bien. En *El nuevo paradigma en políticas de envejecimiento y salud*. Panel llevado a cabo en la Conferencia Interparlamentaria de Salud, La Habana, Cuba. 1999.
- [17] Buzzini, M., et al. Validación del índice de Barthel. *Boletín del departamento de docencia e investigación IREP*, 2002, vol. 6, no 1, p. 9-12.
- [18] Gonzalez M, Rodriguez M, Ruiperez C. Validación del cuestionario de Pfeiffer y la escala de incapacidad mental de la cruz roja en la detección del deterioro mental en los pacientes externos de un servicio de geriatría geriatria. *Rev Esp Geriatr Gerontol*. 1991;27(3):129–33.
- [19] Mancilla E, Ramos S, Morales P. Fuerza de prensión manual según edad, género y condición funcional en adultos mayores Chilenos entre 60 y 91 años. *Revista médica de Chile*, 2016, vol. 144, no 5, p. 598-603.
- [20] Cano G, et al. Evaluación de factores asociados al estado funcional en ancianos de 60 años o más de Bogotá, Colombia. *Biomédica*, 2016, vol. 37.
- [21] Borda M, et al. Dolor en el anciano: calidad de vida, funcionalidad y factores asociados. Estudio SABE, Bogotá, Colombia. *Revista Española de Geriatria y Gerontología*, 2016, vol. 51, no 3, p. 140-145.
- [22] Cerquera C. Relación entre los procesos cognitivos y el nivel de depresión en las adultas mayores institucionalizadas en el asilo San Antonio de Bucaramanga. *Universitas Psychologica*, 2008, vol. 7, no 1, p. 271-281.
- [23] Lee, Alexandra K., et al. Abstract MP76: Severe Hypoglycemia and Prevalence of Cognitive Impairment in Older Adults with Diabetes: The Atherosclerosis Risk in Communities (ARIC) Study. *Circulation*, 2016, vol. 133, no Suppl 1, p. AMP76-MP76.
- [24] Organización Panamericana de la Salud. *Determinantes e inequidades en salud*. Organ Panam la Salud (Internet). 2012; 15 (cited 2017 Jan 16). Available from: http://www.paho.org/saludenlasamericas/index.php?option=com_content&view=article&id=58&Itemid=55&lang=en
- [25] Velez C, Vidarte J, Hormaza M, Chía S. Determinantes Sociales De La Salud Y Discapacidad, Tunja 2012. *Arch Med* (Internet). 2014; 14 (1) (cited 2017 Jan 20) p51–63. Available from: <http://www.redalyc.org/articulo.oa?id=273832164006>
- [26] Gabriel Z, Bowling A. Quality of life from the perspectives of older people. *Ageing Soc*. 2004; 24(5):675–91.
- [27] Campos A, et al. Nursing practices in the primary health care context: a scoping review. *Revista Latino-Americana de Enfermagem*, 2016, vol.24.
- [28] Roza F, et al. Efecto de la implementación de un programa de estimulación cognitiva en una población de adultos mayores

- institucionalizados en la ciudad de Bogotá. Revista Chilena de Neuropsicología, 2016, vol. 11, no 1, p.12-18.
- [29] Ardelt M. Disentangling the relations between wisdom and different types of well-being in old age: Findings from a short-term longitudinal study. *Journal of Happiness Studies*, 2016, vol. 17, no 5, p. 1963-1984.
- [30] Cerrot T. Capacidad funcional del adulto mayor y su relación con sus características sociodemográficas, centro de atención residencial Geronto Geriátrico "Ignacia Rodulfo Vda. De Canevaro", LIMA-2014. *Revista Peruana de Obstetricia y Enfermería*, 2016, vol. 10, no 1.