

# Health Status of the Elderly in Life Centers\*

**Theme of the article:** Promotion and prevention.

**Contribution to the discipline:** The research results permitted enhancing nursing formation, by establishing lines for in-depth studies in the comprehensive care of the elderly in institutional and home environments. The objective is to promote care and self-care according to individual, family, and social needs to strengthen active aging and implement policy. Nursing professionals, from the primary health care consultation, and from geriatric nursing, identify elements of nursing action in caring for the elderly, starting from knowledge of the sociodemographic conditions and of the social and functional health of this population. The research will permit nursing professionals to design strategies and interventions according to the needs appertaining to this age group, which contribute to the wellbeing of social and health conditions, improving functionality levels, social and family integration, broadening support networks, coordinating routes of comprehensive health care and awareness and orientation to the authorities in charge of executing the country's public policy on aging, in search of satisfactory and active longevity. This study highlights the permanent willingness of the elderly in wanting to participate in the investigation. Research is recommended with greater coverage of the health conditions of the elderly in the region of Meta, Colombia.

## ABSTRACT

**Objective:** To identify the sociodemographic and health characteristics of the elderly in the Life Center programs in four municipalities of the department of Meta, Colombia. **Materials and Methods:** Descriptive study with quantitative variables, non-probabilistic design with selection of units by discretionary sampling, in a sample of 819 older adults. A cognitive evaluation was carried out, along with depression scale, basic activities of daily living, evaluation of gait and balance, index for the instrumental activity of daily living, and comorbidity index. **Results:** The multiple correspondence analysis indicates independent men with absence of non-depressive comorbidity and null risk of falls. In turn, women (profile: without studies, widowed) do have comorbidity, cognitive impairment, dependence, and greater fall risk. **Conclusions:** It is fundamental to work on strengthening the formation of professionals, community agents, caregivers of older adults, as well as in the development of programs for health promotion that foster active aging.


## KEYWORDS (SOURCE: DECS)

Elderly; risk factors; mental health; geriatric; aging; life centers.

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# *Estado de salud de los adultos mayores de los Centros Vida\**

## RESUMEN

**Objetivo:** identificar las características sociodemográficas y de salud del adulto mayor en los programas de los Centros Vida de cuatro municipios del departamento del Meta, Colombia. **Materiales y métodos:** estudio descriptivo con variables cuantitativas, diseño no probabilístico con selección de unidades por muestreo discrecional, en una muestra de 819 adultos mayores. Se realizó valoración cognitiva, escala de depresión, actividades básicas de la vida diaria, valoración de la marcha y el equilibrio, índice para la actividad instrumental de la vida diaria e índice de comorbilidad. **Resultados:** el análisis de correspondencia múltiple indica hombres con ausencia de comorbilidad no depresiva, independientes y con riesgo nulo de caídas. Por su parte, las mujeres (perfil: sin estudios, viudas) sí presentan comorbilidad, deterioro cognitivo, dependencia y un mayor riesgo de caídas. **Conclusiones:** es fundamental trabajar en el fortalecimiento de la formación de profesionales, agentes comunitarios y cuidadores de adultos mayores, así como en el desarrollo de programas de promoción de la salud que fomenten un envejecimiento activo.

## PALABRAS CLAVE (FUENTE: DECS)

Adulto mayor; factores de riesgo; salud mental; geriatría; envejecimiento; centros vida.

\* El estudio hace parte del macroproyecto de investigación titulado "Caracterización social, demográfica y de salud del adulto mayor de cuatro municipios del piedemonte del Meta", aprobado por la Universidad de los Llanos, Colombia.

# *Estado de saúde dos idosos dos Centros Vida\**

## RESUMO

**Objetivo:** identificar as características sociodemográficas e de saúde de idosos nos programas dos Centros Vida de quatro municípios do estado do Meta, Colômbia. **Materiais e método:** estudo descritivo com variáveis quantitativas, desenho não probabilístico com seleção de unidades por amostragem arbitrária, com 819 idosos. Foram realizados avaliação cognitiva, escala de depressão, atividades básicas da vida diária, avaliação da marcha e do equilíbrio, índice para a atividade instrumental da vida diária e índice de comorbilidade. **Resultados:** a análise de correspondência múltipla indica homens com ausência de comorbilidade não depressiva, independentes e com risco nulo de queda. Por sua vez, as mulheres (perfil: sem estudos, viúva) apresentam comorbilidade, deterioração cognitiva, dependência e maior risco de queda. **Conclusões:** é fundamental trabalhar no fortalecimento da formação de profissionais, agentes comunitários e cuidadores de idosos, bem como no desenvolvimento de programas de promoção da saúde que proporcionem um envelhecimento ativo.

## PALAVRAS-CHAVE (FONTE: DECS)

Idoso; fatores de risco; saúde mental; geriatria; envelhecimento; centros vida.

\* Este estudo faz parte do macroprojeto de pesquisa intitulado "Caracterização social, demográfica e de saúde do idoso de quatro municípios do sopé do Meta", aprovado pela Universidad de los Llanos, Colômbia.

## Introduction

In Latin America, aging generates much interest in society — and for public policy, particularly—, due to the high rate therein for this process compared with other regions of the world. According to estimates by the World Health Organization (WHO) (1), between 2015 and 2050, the proportion of the global population > 60 years of age will go from 12 % to 22 %, consequential of progress in medicine and in birth control, which has required important social changes in the regions.

For Latin America, according to the Pan American Health Organization (2), “life expectancy at 60 years of age has been calculated at 21 years; 81 % of the people born in the region will live to 60 years of age, while 42 % of them will exceed 80 years of age”. In Colombia, by 2050, life expectancy will be at 79 years of age, and individuals > 60 years of age will quintuple and exceed those < 15 years of age (3). The study adds that by 2020 it is expected that the percentage of people > 59 years of age will be around 12.64 %, until reaching 23.12 % in 2050 (3).

The impact of aging lies on the morbidity burden, health service care, and reduced wellbeing. Investigations suggest that the elderly have a positive self-perception of their health when they have no chronic diseases and need no help (4) for their mobility. That independence expression and economic self-sufficiency provide them a sense of wellbeing and fulfillment during their old age, while it is a health indicator of the functional state (5). Nevertheless, mobility limitations in the elderly have high prevalence and incidence, and studies have shown an association among those limitations and nutritional, functional, and social factors (6).

In Latin America, especially in Colombia, conditions for the elderly are not very promising. According to the PAHO (2), the prevalence of disability increases with age and, hence, the demand for long-term care in the region. This increase is due to unhealthy lifestyles, incapacitating disorders and fragility associated with aging (2). Additionally, the prevalence of chronic diseases (7) and comorbidities is associated with lower functionality (8), which leads the elderly to not fulfilling their needs in autonomous and independent manner. Furthermore, there is emphasis on the relationship between the decay of “physical function [and] increased age, generating a broad spectrum of negative

effects, like difficulty with mobility, social isolation, diminished quality of life, and disability” (8).

The impact of aging of the population in the Colombian health system (9) is significant, and in many parts of the country, knowledge gaps exist on the theme. This reason justifies production of information that permits not only understanding the process of aging in each region, but also analyzing its conditions and, with such, prevent health situations that can alter the wellbeing of the population and promote active aging, considering the context. Besides, establishing geriatric competences, both in nursing, as in other areas of knowledge (10), bearing in mind the needs of the receptors.

The purpose of the study was to identify the health status of the elderly in programs at the Life Centers (LC)<sup>4</sup> of four municipalities in the department of Meta, Colombia, and establish relationships in some social, demographic, and health aspects.

## Materials and Methods

Descriptive study with quantitative variables, using measures of central tendency and dispersion and multiple correspondence analysis. According to the study requirements, the universe of interest was stratified by the geographic variable of *municipality*. The selection established the following criteria: Municipalities belonging to the piedmont of the department of Meta with an LC in operation during 2017. The municipalities selected for the study were Villavicencio, Acacías, Guamal, and El Dorado. Selection of the older adults was made through discretionary non-probabilistic sampling. The subjects were selected on a given day with the following inclusion criteria: > 60 years of age, actively registered in the Life Center program, having accepted voluntary participation in the study, and evaluation of their mental health by applying the Mini Cognitive Exam (MCE).

In 2017, the municipality of Villavicencio enabled 30 LC, with capacity for 40 elderly in each; Guamal had on LC for 100 elderly; Acacías had two LC for 150; and El Dorado had one LC with 20 elderly. The sample corresponds to 819 elderly attending LC programs in the municipalities selected.

<sup>4</sup> Life Centers (LC) are a strategy of the Colombian Policy on Human Aging and Old Age, which gathers a series of projects, procedures, protocols, and physical, technical, and administrative infrastructure to provide comprehensive care to the elderly during daytime hours (11).

The instruments used to gather the information were basic activities of daily living (BADL) by Barthel and instrumental activities of daily living (IADL) from the scale by Lawton and Brody (12). The Tinetti subscale assessed gait and balance; the Mini-Mental cognitive exam (Spanish adaptation) was used for the cognitive evaluation (13); the affective assessment was done through the Geriatric Depression Scale by Yesavage (14); comorbidity was evaluated with Charlson's Comorbidity index. The instruments are of free use and have been applied in the population of Latin America, including Colombia. A survey was elaborated for social characterization, contemplating social and demographic variables of the target population.

Researchers and four students from the Faculty of Health Sciences in the last semesters, previously trained, collected data in the location assigned by the LC director. Through a prior introduction, the elderly were instructed on the motive for the visit, information, and objectives of the study. The study applied the ethical considerations proposed in Resolution 8430 of 1993 by the Colombian Ministry of Health (15); informed consent was requested, emphasizing on the freedom of the participants to refuse to be part of the study and guaranteeing the confidentiality of the information collected. Data collection took place from 01 October to 30 December 2017, with the same procedure in all the LC. The research adhered to the international research principles established in the 2013 Helsinki declaration by the World Medical Association and it was approved by the Bioethics Committee at Universidad de los Llanos.

## Results

### *Sociodemographic characteristics of the elderly*

47.9 % are men (392 interviewed), and the remaining 52.1 % were women (427), with a mean age of 73 years (Table 1). In this study, 17.6 % of the elderly are from the department of Meta. In this regard, a migration phenomenon was observed, given that interviewees came mostly from municipalities different from those located in the Piedemonte Llanero (Plains Piedmont).

With respect to marital status, 70.6 % are single, widowed, separated, or divorced and 19.4 % is in a marital relationship. However, reports indicate that 61.7 % live with some relative. In terms of education, 72.8 % has no academic studies or has incomplete primary education; only 27.2 % has secondary, technological, or university studies (Table 1).

**Table 1.** Sociodemographic characteristics of the elderly

Sociodemographic variables (n = 819*)		No.	%
Age	60-70	297	36.26
	71-80	334	40.78
	81-90	176	21.49
	91-100	12	1.47
Gender	Male	392	47.86
	Female	427	52.14
Marital status	Single	130	15.9
	Married	153	18.7
	Widowed	277	33.8
	Separated	158	19.3
	Divorced	13	1.6
	Common law	88	10.7
Educational level	Without studies	235	28.7
	Incomplete primary	361	44.1
	Complete primary	140	17.1
	Incomplete secondary	43	5.3
	Complete secondary	21	2.6
	Technical or technologist	12	1.5
	University	7	0.8
With whom do they live	Family	505	61.7
	Alone, tenants, or acquaintances	314	38.3

Source: Own elaboration.

### *Self-perception of the health status of the elderly*

Regarding mental health, 20 % suffers from probable depression, and 5.1 % has established depression; 53.1 % has some cognitive impairment and makes visible an important risk factor in the impaired capacity of the elderly in the region (Table 2).

According to the assessment of activities of daily living by Barthel, 59 % of the elderly has evaluation as independent, bearing in mind that with greater age, there is less autonomy to perform the basic and essential activities of daily life. In function of the IADL evaluation by Lawton and Brody, 64.7 % of the elderly

show evaluation as independent. The Tinetti scale found that 57.6 % of the elderly is evaluated with lower risk of falling, while 42.4 % report an important risk. In this study, 85.1 % of the elderly has lack of comorbidity and 14.9 % has some level of comorbidity; however, 49.9 % of those interviewed perceive their health as regular, poor, and very poor, which leads researchers to think that the elderly, even when they do not report the presence of diseases, have an impaired perception of their health (Table 2).

**Table 2.** Health status evaluation of the elderly in Life Centers in the Plains Piedmont

Variables	Evaluation	N	%
Mini Cognitive Examination (MCE) evaluation	Normality	384	46.9
	Slight deficit	230	28.1
	Slight cognitive impairment	110	13.4
	Moderate cognitive impairment	64	7.8
	Severe cognitive impairment	31	3.8
Geriatric Depression Scale by Yesavage	Normal	613	74.8
	Probable depression	164	20.0
	Established depression	42	5.1
Barthel's Index of Activities of Daily Living	Total	0	0.0
	Severe	15	1.8
	Moderate	148	18.1
	Slight	173	21.1
	Independent	483	59.0
Tinetti Scale evaluation	High risk of falling	124	15.1
	Risk of falling	223	27.2
	Lower risk of falling	472	57.6
Assessment of the instrumental activities of daily living by Lawton and Brody	Total	13	1.6
	Severe	26	3.2
	Moderate	63	7.7
	Light	187	22.8
	Independent	530	64.7
Evaluation of Charlson's comorbidity index	Lack of comorbidity	697	85.1
	Low comorbidity	99	12.1
	High comorbidity	23	2.8

Variables	Evaluation	N	%
Self-perception of health	Very poor	8	1.0
	Poor	67	8.2
	Medium term	333	40.7
	Good	351	42.9
	Very good	60	7.3

Source: Own elaboration.

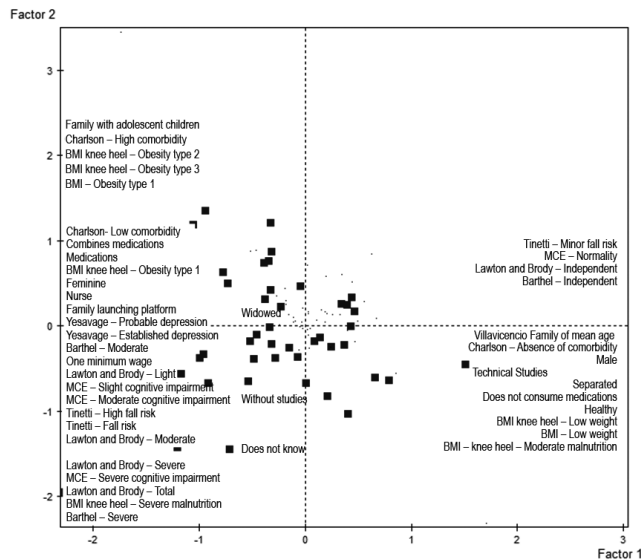
The multiple correspondence analysis shows three dimensions. The first factorial axis is defined by the presence or absence of disease and is reinforced with the self-perception of the health status; there is a marked difference shown by sick and healthy elderly. The right side of Figure 1 illustrates elderly males and the following characteristics: They have technical studies, live with a relative, have absence of comorbidity, sense no depression, are independent, and have no fall risk. The left side of the figure has principally elderly females: Widows, without academic studies and with some disease. Other aspects are also observed, like the level of cognitive impairment, low and high comorbidity, with assessment of probable depression and established depression, a level of dependence and greater fall risk.

The second factorial axis is determined by the presence of disease associated to weight, highlighting the difference between elderly with low weight and those enduring obesity with proximity to the health status, which suggests a relationship between weight and the presence of disease. Other aspects are found, like low and high comorbidity, lower fall risk, and a level of independence (Figure 1).

The lower part has mainly men without academic studies, without disease, with normal weight or with low weight or malnutrition problems. Other factors appear, like some level of cognitive impairment, presence of diseases, a level of dependence for daily living activities and high fall risk (Figure 1).

## Discussion

Women predominate with a mean age of 73 years. In Colombia, life expectancy increased from 50.6 years by the middle of the last century to nearly 74 years. Currently, the elderly population represents 10 % of the population total, with a projection toward 23 % by 2050 (16). Ten percent of the population is from

**Figure 1.** Factorial plane: Multiple correspondence analysis

Source: Own elaboration.

the plains region, information that points to important mobility, consequential of the armed violence during the last 50 years in Colombia. Some studies denote that the elderly represent 8.5 % of the displaced population, which places them as a highly vulnerable group, with different risks and affectations that make them different from younger people (17).

The study reports an important number of elderly individuals who are separated, widowed, and single. This condition is a risk factor for functional dependence, given that upon being without a partner they are more fragile (18) against disease. The partnership is a protective factor for the elderly because it contributes to improving or maintaining good health conditions.

In this study, 28.7 % of the elderly is illiterate, a figure close to the 23.4 % reported by some national studies with population > 60 years of age, located mostly in the rural area (17). The study report a higher presence of older adult women with particular social and health risk conditions. These results coincide with those from other studies (19), which show feminization of old age. Said condition implies greater insecurity by this group of women, like being victims of diverse types of violence, in different regions, with relation to men (20), and the presence of comorbidities, like hip fractures and other osteoarticular lesions

due to falls (21). However, the prevalence of women may have also been related with greater exposure to certain risk factors (22) with relation to the men, increased self-care actions, and man's more direct participation in the armed conflict, particularly of the Colombian population.

The study indicates that 53.1 % has some cognitive impairment, a figure far from the results from other research in the Colombian population that report 41.7 % of severe impairment (23) and 39 % of cognitive implication (24). The study reports a high degree of illiteracy and lack of actions, by institutions and families, which favor cognition.

Similar studies in the Colombian population report that 16.1 % (25) and 14.2 % (26) of the population had depressive symptomatology. In this study, the figure was 25.1 %, with greater presence in women, a finding also observed in some similar international studies, which report some level of depression in the elderly, of 45 % (19) and 62 % (27).

The multiple correspondence analysis reports elderly of male sex, without studies and separated, with depression. These results may be explained because, at the time of the study, the elderly from the LC were worried about the imminent closing of the places where they were welcomed during the daytime hours. The risk of depression among the elderly needs timely interventions that reduce comorbidity and tend for active aging and better quality of life.

In the assessment of daily living activities (ADLA), 41 % of the elderly is dependent, a trait that appears more in women than in men. The multiple correspondence analysis shows elderly without studies, who live alone, and have a level of cognitive impairment associated with a level of slight and moderate dependence. Some international studies report that 72.1 % (28) and 62.8 % (29) of the elderly have some degree of functional dependence. Another study indicates a significant relationship between marital status and the degree of dependence of all the cognitive and functionality indicators (30). National studies reveal a good average of basic activities of daily living (21, 31) and highlight that "physical function decreases with age and produces a broad spectrum of negative effects, like difficulty in mobility, social isolation, diminished quality of life, disability, and need for internship in a specialized institution" (32).

Although an important number of elderly subjects in the research has preserved functionality, what is important is to maintain and increase “physical activity” (28) to maintain functionality.

Of the study subjects, 35.3 % has a degree of functional dependence, according to the evaluation scale of IADL by Lawton and Brody. The multiple correspondence analysis suggests an association between cognitive impairment with elderly without studies, with high comorbidity, probable depression or established depression, and moderate and severe dependence. In a similar population group, it was found that 26.3 % had functional dependence in the performance of instrumental activities of daily living, which is why the need for help in their social setting prevails (33). Likewise, the relationship among high educational levels leads to greater independence of the elderly (34). Other studies signal that functional disability may be influenced by the elderly person’s lifestyle, infrastructure of the dwelling space, and cultural factors (35).

As found, 42.3 % of the elderly report high fall risk, according to the Tinetti scale, with equal presence of women and men. The multiple correspondence analysis shows a probable relationship between the absence of comorbidity with high fall risk, probable depression and very good or good self-perception of health, which indicates that there is no reality sensed by the elderly with relation to fall risk. Some publications report that 18.5 % had fall risk, and 71.3 % had high fall risk (26, 36). In the same direction, another study shows that 18.8 % had medium risk and 73.1 % had high risk (27, 33, 37); significantly different results in relation to those from the study presented. Other investigations with the same population show that the practice of neuromuscular training can provoke significant changes in their fall risk (22), which is not reflected in the population studied.

This study showed that 14.9 % of the elderly indicates presence of comorbidity: The most-frequent diseases are high blood pressure, diabetes mellitus, and pulmonary disease. Some studies with similar population reveal that the most-prevalent diseases are high blood pressure, with 56.7 % (19), 55.2 % (26), and 50 % (38); and diabetes mellitus, with 65 % (22), 16.8 % (23), and 23.6 % (33). The presence of chronic diseases in the population studied points to a higher possibility of having dependence and a correlation between the high fall risk and established depression, similar to a study that found a significant association among high blood pressure, depressive symptoms, and functional dependence (26).

In this study, 49.9 % of the elderly have a regular or poor perception of their health status and 50.1 % have good or very good perception. The reports are quite similar to those presented by national studies in a sample of 88 elderly subjects, which suggest that 51 % of the elderly perceive themselves as ill (not healthy), while 49 % see themselves healthy (39). In addition, in a sample of 104 elderly subjects, 64 % perceives good health (21).

The multiple correspondence analysis signals a relationship among enduring a disease, high fall risk, moderate dependence, established depression, and regular self-perception of health with progressive decay over time, which requires urgent measures that impede a progressive decay in their quality of life.

The research denotes an approach to the health status of the elderly from four municipalities of the department of Meta. However, *health status* is a very broad aspect, which is why it is recognized that it was important to have conducted a broader physical exploration, along with the analysis of the elderly individual’s family environment, to have a more complete study of the health conditions of the elderly.

## Conclusions

The elderly are considered a vulnerable group in the country. Nursing care, from the perspective of health promotion and wellbeing, is fundamental and one of the main concerns of care to the elderly in the short, medium, and long term in caring by geriatric nursing. The research shows conditions of the elderly in the region not considered in the present; it indicates risk factors, like cognitive impairment associated to low educational level; a degree of dependence more marked in women than in men; and the presence of important depression symptoms in the population. The lack of programs in the LC that promote physical activity, recreation, social participation, and family integration can be a significant trigger that compromises functionality and, hence, the wellbeing of the elderly.

The elderly have greater relevance in nursing care in the region due to the increase of the population in this age group and the scarce formation of health professionals on caring for their needs. Caring implies establishing a relationship of help with the elderly and their families, which is why it becomes necessary to know their conditions, insufficiencies, and perceptions to carry out actions that meet the specific needs of the elderly.



The results from this research will contribute with the bases to care for the elderly in the field of health promotion and in the nursing community diagnoses, as well as to generate a research process with greater coverage in the region and delve into problems, like the social and health conditions of the feminization of old age.

### Limitations

Accessibility in some LCs in the municipalities due to the geographic and law and order conditions of a municipality. Insecurity in some neighborhoods in the city where some LCs are located.

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## References

1. Organización Mundial de la Salud. Envejecimiento y salud [Internet]. 2018 [cited 2018 Oct. 31]. Available from: <http://www.who.int/es/news-room/fact-sheets/detail/envejecimiento-y-salud>
2. Organización Panamericana de la Salud. Estado de salud en la población. Salud en el Adulto Mayor [Internet]. 2017 [cited 2018 Oct. 31]. Available from: [https://www.paho.org/salud-en-las-americas-2017/?post\\_t\\_es=salud-del-adulto-mayor&lang=es](https://www.paho.org/salud-en-las-americas-2017/?post_t_es=salud-del-adulto-mayor&lang=es)
3. Pérez S, Lourdes M, Valencia-Olivero NY. Envejecer en Colombia. *América Latina Hoy*. 2015; 71: 61-81. DOI: 10.14201/alh2015716181
4. Peláez E, Acosta DL, Carrizo DE. Factores asociados a la autopercepción de salud en adultos mayores. *Revista Cubana de Salud Pública* [Internet]. 2015 [cited 2019 Feb. 19]; 41(4):638-648. Available from: <https://www.scielosp.org/pdf/rcsp/2015.v41n4/o7>
5. Jiménez-Aguilera B, Baillet-Esquivel LE, Ávalos-Pérez F, Campos-Aragón L. Dependencia funcional y percepción de apoyo familiar en el adulto mayor. *Atención Familiar*. 2016; 23(4): 129-133. DOI: 10.1016/j.af.2016.08.002
6. Torres-De Araújo JR, Tomaz-de Lima RR, Ferreira-Bendassolli IM, Costa-de Lima K. Functional, nutritional and social factors associated with mobility limitations in the elderly: a systematic review. *Salud Pública Mex* [Internet]. 2018 [n.d.]; 60:579-585. DOI: 10.21149/9075
7. Prada S, Pérez-Castaño A. Las enfermedades crónicas y el gasto asegurado en Colombia. *Salud Pública de México* [Internet]. 2017 [n.d.]; 59(3, May-June.):210-211. Available from: 10.21149/8379
8. Cano-Gutiérrez C, Bordaz MG, Reyes-Ortiz C, Arciniegas AJ, Samper-Ternent R. Evaluación de factores asociados al estado funcional en ancianos de 60 años o más en Bogotá, Colombia. *Biomédica*. 2017; 37:57-65. DOI: 10.7705/biomedica.v37i1.3197
9. Rosselli D, Hernández-Galvis J. El impacto del envejecimiento sobre el sistema de salud colombiano. *Salud Pública de México* [Internet] 2016 [cited 2018 Nov. 1]; 58(6):595-596. DOI: 10.21149/spm.v58i6.7880
10. Llanes-Betancourt C. Envejecimiento demográfico y necesidad de desarrollar las competencias profesionales en enfermería geriátrica. *Rev haban cienc méd* [Internet]. 2015 [cited 2018 May 8]; 14(1):89-96. Available from: [http://scielo.sld.cu/scielo.php?script=sci\\_arttext&pid=S1729-519X2015000100013&lng=es](http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1729-519X2015000100013&lng=es)
11. Colombia. Ministerio de Salud y Protección Social. Ley 1276 de 2009, por la cual se modifica la Ley 687 del 15 de agosto de 2001 y se establecen nuevos criterios de atención integral del adulto mayor en los Centros Vida. Santafé de Bogotá: Ministerio de Salud; 2009.
12. Gómez MJF, Curcio BCL. Salud del anciano: valoración. Asociación Colombiana de Gerontología y Geriatria. Manizales: Blanecolor; 2014.

13. Navarro E, Calero MD, Calero-García MJ. Diferencias entre hombres y mujeres mayores en funcionamiento cognitivo y calidad de vida. *European Journal of Investigation in Health, Psychology and Education* [Internet]. 2015 [cited 2018 Feb. 18]; 4(3):267-277. DOI: 10.30552/ejihpe.v4i3.79
14. Salazar AM, Reyes MF, Plata SJ, Galvi P, Montalvo C, Sánchez E. Prevalencia y factores de riesgo psicosociales de la depresión en un grupo de adultos mayores en Bogotá. *Acta Neurol Colomb*. [Internet] 2015 [cited 2019 Feb. 19]; 31(2):176-183. Available from: <http://www.scielo.org.co/pdf/anco/v31n2/v31n2a08.pdf>
15. Colombia. Ministerio de Salud. Resolución 8430 de 1993, por la cual se establecen las normas científicas, técnicas y administrativas para la investigación en salud. Santafé de Bogotá: Ministerio de Salud; 1993.
16. Llanes-Betancourt C. Envejecimiento demográfico y necesidad de desarrollar las competencias profesionales en enfermería geriátrica. *Rev haban cienc méd* [Internet]. 2015 [cited 2018 May 18]; 14(1):89-96. Available from: [http://scielo.sld.cu/scielo.php?script=sci\\_arttext&pid=S1729-519X2015000100013&lng=es](http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1729-519X2015000100013&lng=es)
17. Villar L, Martínez-Restrepo S, Gutiérrez C, Forero D, Enríquez E, González LM. Misión Colombia Envejece. Bogotá: Fundación Saldarriaga Concha Publicaciones - Fundación para la Educación Superior y el Desarrollo (Fedesarrollo). Bogotá - Colombia; 2015. 704 p.
18. Jiménez-Aguilera B, Baillet-Esquivel LE, Ávalos-Pérez F Campos-Aragón L. Dependencia funcional y percepción de apoyo familiar en el adulto mayor. *Atención Familiar*. 2016; 23(4):129-133. DOI: 10.1016/j.af.2016.08.002
19. Becerra RGC, Ríos EV, Rodríguez LG, Daza ERV, González LM. Estado de salud en el adulto mayor en atención primaria a partir de una valoración geriátrica integral. *Atención Primaria*, 2015; 47(6):329-335. DOI: 10.1016/j.aprim.2014.07.007
20. Fhon JRS, Del Río Suarez AD, Herrera SNM, Webhe SCCF, Rodrigues RAP. Violencia intrafamiliar en el adulto mayor que vive en el distrito de Breña, Perú. *Revista de la Facultad de Medicina*. 2015; 63(3):367-375. DOI: 10.15446/revfacmed.v63n3.44743
21. Quijano PD C, Portal AP, Rodríguez AP, López DD, Izaguirre AM, Herrera YR. Algunas causales relacionadas con caídas en el hogar del adulto mayor. *Revista Cubana de Medicina General Integral*. 2015; 31(1):35-41. Available from: [http://scielo.sld.cu/scielo.php?script=sci\\_arttext&pid=S0864-21252015000100006](http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0864-21252015000100006)
22. Leite MT, Castioni D, Kirchner RM, Hildebrandt LM. Capacidad funcional y nivel cognitivo de adultos mayores residentes en una comunidad en el sur de Brasil. *Enfermería Global*. 2015; 14(37):1-11. Available from: [http://scielo.isciii.es/scielo.php?script=sci\\_arttext&pid=S1695-61412015000100001](http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1695-61412015000100001)
23. Camargo-Hernández K del C, Laguado-Jaimes E. Grado de deterioro cognitivo de los adultos mayores institucionalizados en dos hogares para ancianos del área metropolitana de Bucaramanga - Santander, Colombia. *Rev Univ. Salud* [Internet]. 2017 [cited 2018 May 8]; 19(2):163-170. DOI: 10.22267/rus.171902.79
24. Paredes Arturo YV, Yarce Pinzón E, Aguirre Acevedo DC. Funcionalidad y factores asociados en el adulto mayor de la ciudad San Juan de Pasto, Colombia. *Rev Cienc Salud* [Internet]. 2018 [cited 2018 May 8]; 16(1):114-128. DOI: 10.12804/revistas.urosario.edu.co/revsalud/a.6494
25. Paredes-Arturo YV, Yarce-Pinzón E, Aguirre-Acevedo DC. Funcionalidad y factores asociados en el adulto mayor de la ciudad San Juan de Pasto, Colombia. *Rev Cienc Salud* [Internet]. 2018 [cited 2018 May 8]; 16(1):114-128. DOI: 10.12804/revistas.urosario.edu.co/revsalud/a.6494
26. Giraldo-Giraldo NA, Arturo P, Vicky Y, Idarraga-Idarraga Y, Aguirre-Acevedo DC. Factores asociados a la desnutrición o al riesgo de desnutrición en adultos mayores de San Juan de Pasto, Colombia: Un estudio transversal. *Revista Española de Nutrición Humana y Dietética*. 2017; 21(1):39-48. DOI: 10.14306/renhyd.21.1.288
27. Pérez-Cruz E, Lizárraga-Sánchez DC, Martínez-Esteves MDR. Asociación entre desnutrición y depresión en el adulto mayor. *Nutrición Hospitalaria*. 2014; 29(4):901-906. DOI: 10.3305/nh.2014.29.4.7228
28. Bejines-Soto M, Velasco-Rodríguez R, García-Ortiz L, Barajas-Martínez A, Aguilar-Núñez LM, Rodríguez ML. Valoración de la capacidad funcional del adulto mayor residente en casa hogar. *Revista de Enfermería del Instituto Mexicano del Seguro Social*. 2015; 23(1):9-15. Available from: <http://www.medigraphic.com/cgi-bin/new/resumen.cgi?IDARTICULO=55901>
29. Amblàs-Novellas J, Martori JC, Brunet NM, Oller R, Gómez-Batiste X, Panicot JE. Índice Frágil-VIG: diseño y evaluación de un índice de fragilidad basado en la valoración integral geriátrica. *Revista Española de Geriatría y Gerontología*. 2017; 52(3):119-127. DOI: 10.1016/j.regg.2016.09.003

30. Calero MJ, Cala GL, Martínez ARO, Lendínez AC. Prevención de caídas en el adulto mayor: revisión de nuevos conceptos basada en la evidencia. *EJIHPE: European Journal of Investigation in Health, Psychology and Education*. 2016; 6(2):71-82. DOI: 10.30552/ejihpe.v6i2.160
31. Silva-Zemanate MA, Pérez-Solarte SL, Fernández-Cerón MI, Tovar-Ruiz LÁ. Efectos del Tai Chi en la capacidad funcional de un grupo de mujeres ancianas. *Revista Ciencias de la Salud*. 2014; 12(3):353-369. DOI: 10.12804/revsa-lud12.03.2014.05
32. Cano-Gutiérrez C *et al.* Evaluación de factores asociados al estado funcional en ancianos de 60 años o más en Bogotá, Colombia. *Biomédica [Internet]*. 2017 [cited 2018 May 8]; 37(1). DOI: 10.7705/biomedica.v37i1.3197
33. Martínez Araya AR, Saez Selaive RA, Martínez Roco CA. Relevancia del ejercicio neuromuscular sobre el riesgo de caídas en el adulto mayor institucionalizado: estudio piloto. *MHSalud, Universidad Nacional, Costa Rica [Internet]*. 2018 [cited 2018 May 8]; 14(2). DOI: 10.15359/mhs.14-2.2
34. Nogueira PSF, Marques MB, Coutinho JFV, Maia JC, Silva MJD, Moura ERF. Factors associated with the functional capacity of older adults with leprosy. *Revista Brasileira de Enfermagem*. 2017; 70(4):711-718. 10.1590/0034-7167-2017-0091
35. Dos Santos-Tavares DM, Arduini AB, Dias FA, Dos Santos-Ferreira PC, de Oliveira EA. Homens idosos residentes na zona rural: aspectos relacionados à qualidade de vida [Elderly men living in rural areas: quality of life-related aspects] [Hombres mayores que viven en la zona rural: aspectos relacionados con la calidad de vida]. *Revista Enfermagem UERJ*. 2016; 24(3):e3785. DOI: 10.12957/reuerj.2016.3785
36. Petronila Gómez L, Aragón Chicharro S, Calvo Morcuende B. Caídas en ancianos institucionalizados: valoración del riesgo, factores relacionados y descripción. *Gerokomos*. [Internet] 2017 [cited 2018 Oct. 23]; 28(1):2-8. Available from: [http://scielo.isciii.es/scielo.php?script=sci\\_arttext&pid=S1134-928X2017000100002&lng=es](http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1134-928X2017000100002&lng=es)
37. Samper-Lamenca B, Allona-López S, Cisneros-Larrea L, Navas-Ferrer C, Marín-Labanda R. Análisis de las caídas en una residencia de ancianos y de la influencia del entorno. *Gerokomos*. 2016; 27(1):2-7. Available from: [http://scielo.isciii.es/scielo.php?script=sci\\_arttext&pid=S1134-928X2016000100002](http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1134-928X2016000100002)
38. Cardona-Arias JA, Álvarez-Mendieta MI, Pastrana-Restrepo S. Calidad de vida relacionada con la salud en adultos mayores de hogares geriátricos, Medellín, Colombia, 2012. *Rev Cienc Salud*. 2014; 12(2):139-55. DOI: 10.12804/revsa-lud12.2.2014.01
39. Castiblanco-Amaya M, Fajardo-Ramos E. Capacidad y percepción de autocuidado del adulto mayor del programa Centro día/vida, Ibagué, Colombia. *Salud UniNorte*. 2017; 33(1):58-65. Available from: <http://rcientificas.uninorte.edu.co/index.php/salud/article/viewArticle/9673>