

# We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

5,500

Open access books available

136,000

International authors and editors

170M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index  
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?  
Contact [book.department@intechopen.com](mailto:book.department@intechopen.com)

Numbers displayed above are based on latest data collected.  
For more information visit [www.intechopen.com](http://www.intechopen.com)



## Chapter

# Biopsychosocial Characteristics of Elderly Adults of Latin America: Strategies of Physical Activity for the Functional Health

*Magdalena Soledad Chavero Torres,*

*Rosa María Cruz-Castruita, Norma Angélica Borbón Castro,*

*Nancy Cristina Banda Saucedo and Oswaldo Ceballos Gurrola*

## Abstract

This chapter's approach to an emergent reality of the demographic transition related to a new paradigm of the active aging, demands strategies lead to improve a healthy life expectancy, autonomy maintenance and the promotion of changes in healthy behaviors. Information is provided to the professionals of health to evaluate the physical and functional condition of the elderly people, considering the biological, psychological, and social aspects. When moved to practice, results are presented in a study who analyzes the biopsychosocial characteristics of the elderly adults of Monterrey, Mexico. Furthermore, implemented a literature review to promote, maintain and improve the physical, psychological, and social health. In Addition, recommendations are presented to describe physical activity in the elderly adults considering the type of exercise about to perform, its intensity, volume, frequency, materials and how to structure the sessions to make easier its practice and achieve a physical exercise adherence. After all the previous, its recommended as necessary to foment in a higher recognition the importance of the regular physical activity among those who formulate the public politics for the promotion of strategies according to the characteristics and interests of this population group.

**Keywords:** elderly adult, biopsychosocial characteristics, strategies, physical activity, health

## 1. Introduction

Aging is a progressive deterioration natural process that affects to all living beings by years and generates diverse, complex, and uncontrollable biopsychosocial changes [1], those who do not have a lineal end and occasionally are influenced by other person and its direct environment [2]. Although the lack of health is not an aging characteristic nor even of the elderly, the increment of longevity is at par the augmentation of sicknesses associated to elderly [3, 4] that generates more needs and demands of health, who are not only related with the appearance of morbidity

and mortality [5], not also with an habitual polypharmacy, diminution of functional capability [6] and a deteriorated psychosocial health [7] linked with affective disorder and the impairment on quality of life [8]. Joined to this are the psychosocial changes who help to the adoption of new roles and lifestyles in the elderly adult [9], being the interaction of socioeconomical and demographics variables as the lifestyles, the level of instruction and the social support network conformed by the spouse, offspring, related family, and friends the main determinants in the quality of life in the elderly life [10, 11].

In the Latin American context, the demographic changes evidences the accelerated increase of elderly population and the serious challenges this represents for the social and health care systems [12], compared to the European and North American countries where the populational changes are also evident but with a gradual increment and the social and economical conditions, the distribution of education is markedly different among developed countries and developing countries [13]. The high prevalence of chronical ailments joined to factors of psychosocial types that increments the functional compromise and the fragility furthermore to get associated in an independent way with an self-evaluated deficient health in elderly adults that resides in Brazil [14] and Colombia [15], being this last one that the residence zone, genre and the abuse increase the possibility of suffering [16]. The independence in elderly adults who habits in Mexico [17], being the sensorial and cognitive function and the wandering who are related with the 25% of dependency in basic life activities of daily life and the 21% of dependence in instrumental life activities [18]. In a difference with Chile, where the elderly maintains a certain level of physical activity and social participation are functionals and presents lower disability [19]. However, the countries with bigger levels of inequality are Puerto Rico, Argentina, Mexico, Chile, South Africa, and Brazil [20].

As the time passes the diminution of functional capability to do basic and instrumental tasks of daily life, as the role change in the elderly adult it decreases its physical activity levels, in some in a light form but others in almost its totality [21]. Nevertheless, integral promotion of health programs has achieved that trough the prescription of physical exercise, psychological attention and teaching nutrition habits a positive impact on the functional capability and the quality of life of an elderly adult [22–24]. It suggests for this age group mainly physical recreative activities or leisure, as the standout of strolls trough walking or in a bicycle, the practice of recreative games of diverse individual or collective sports, programmed exercises in the daily, familiar, and communitarian activities, as well occupational activities who make part of the working activities or household tasks [25]. Being the motive this chapter has the principal objective to describe the biopsychosocial characteristics of elderly adults in Latin America and the activity strategies to promote, maintain or improve the physical, psychological and social health, in agree with elderly adults characteristics.

## **2. Biopsychosocial characteristics of elderly adults in Latin America and physical activity strategies for the elderly adult's health**

To show a representative context of the biopsychosocial characteristics of the elderly adults in Latin America, first it was been made a descriptive study of elderly adults in Monterrey, Nuevo Leon, Mexico and after it a literature review was made. Then, the process followed for data recollection and after it a comparison with the characteristics of the population of Mexico as the other Latin America.

## **2.1 Methodology to data recollection related to the biopsychosocial characteristics of the elderly adults**

First it was made a descriptive-type study to know functional capacity (upper and lower body strength, aerobic endurance, upper and lower body flexibility and agility, and dynamic balance), psychological status (mental and affective state), personnel characteristics (age, sex, morbidity, schooling, weight, height, and body mass index), and social resources of an elderly [26]. The focus population were comprised by elderly registered at a welfare institution in the Metropolitan Area of Monterrey, Nuevo Leon, Mexico; included in this sample, elderly from both sexes on an apparent good state of health. To calculate the sample, 9.761 elderly registered in the 15 “Casa Club del Adulto Mayor” were considered. The sample size comprised by 353 elderly was calculated using the nQuery Advisor Package, version 4.0 [27], with a maximum acceptable standard error of 5% probability of 95%, estimated sample percentage of 50, and a power of 90%. A stratified random sample was used to select the sample for each stratum (represented by each of eight municipalities), obtaining a sample size of 2–53 to per stratum. The Participant selection was performed using a table of random numbers in Excel, with the whole list of elderly who attended the first meeting as the sample frame.

Participant selection included individuals aged 60 years and older without limitations or medical contraindications about performing light physical activity, formally registered in the Casa Club del Adulto Mayor, and consented to participate in the research and signed the informed consent form. Elderly who showed cognitive deterioration (as reported by the head of the Casa Club); showed physical limitations in performing the SFT; used pacemakers; had a history of congestive heart failure; and had joint pain, chest pain, or vertigo at the time of the interview, angina during exercise, or high blood pressure (160/100 mm/Hg) according to the measurement obtained using the technique described in NOM-030-SSA2-1999 for prevention, treatment, and control on hypertension were excluded.

The biopsychosocial characteristics were evaluated on physical tests and six computerized instruments (general information sheet, MMSE, Yesavage GDS, OARS Scale, Body Composition [record designed for this investigation], and the SFT Battery). Before starting to collect data, the research project was approved by the Ethic in Health Sciences Research Committee of the Universidad Autonoma de Nuevo Leon (Approval no. 19-CEI-01920131218).

Sociodemographic information such as occupation, dependency, ailments, fear of falling, falls in the last year, fractures in the last 2 years, and blood pressure was collected in the general information instrument created for this investigation.

Cognitive state was assessed with the MMSE, it is a screening test that allows the establishment of the elderly cognitive state. This test analyzes temporal and spatial orientation, registration, attention and calculation, recall, language, repetition and comprehension, reading, writing, and drawing. The Spanish language version of the test was validated, with a sensitivity of 80% and specificity of 77.5% [28]. For interpretation of results, the cutoff points considered to be normal from 25 to 30 points, mild deterioration from 20 to 24, moderate deterioration from 16 to 19, and serious deterioration for those with 15 points or fewer [29].

The Yesavage GDS, a 15-question abbreviated version, being a hetero-administered instrument frequently used on an international scale to identify depressive symptoms in the elderly, was applied to measure the affective state [30] and to narrow down depression. It comprised questions with yes/no dichotomy answers. Initially, a self-evaluation scale with 30 questions was designed and validated for Spanish language version, reporting a sensitivity of 84% and specificity of 95%. Later, the authors proposed an abbreviated version with 15 questions (10 positive

and 5 negative). The results were interpreted as normal from 0 to 5 points and the risk for depression from 6 points onward [30].

Social resources were determined with the OARS Scale, which is a multidimensional scale comprising nine closed-ended questions and one open-ended question, frequently used to determine the social status of elderly. It evaluates the family structure, social visits, and availability of persons who can provide help and friendship to elderly. The questionnaire showed in the re-test that 91% of the items were identical after an interval of 5 weeks, and an intra-evaluator dependability test showed 80% of intra-class correlations at 0.8 or more [31]. Anthropometric measurements of weight (kg), height (m), and body mass index [(kg)/height (m<sup>2</sup>)] were obtained and recorded with calibrated equipment validated for the study.

Physical Functional and capacities were assessed with the SFT Battery, which included the following tests: sitting down and getting up from to chair, with the purpose of assessing to lower body strength, arm flexion, which assesses to upper body strength, 2 minutes walking test, to evaluate aerobic endurance, seated torso flexion, which measures lower body flexibility (primarily the biceps femoris), joining hands behind the back, which assesses upper body flexibility (primarily the shoulders), and stand up, walk, and sit down again, which evaluate agility and dynamic balance. To interpret the information, the values reported by Rikli and Jones [32] were used according to sex and age. For Reliability and validity the battery vacillate between 0,79 and 0,97 [33].

Secondly, it was made a literature review related to the study variables associated with elderly in Latin America was performed through a search on the PubMed, Google Scholar, and Dialnet databases, which was limited to 5 years old publications. The descriptors for database searching about age status were as follow: older person, elderly, Senior Fitness Test (SFT), Mini-Mental State Examination (MMSE), for depression search, the descriptors used were: Geriatric Depression Scale (GDS), Older Americans Resources and Services (OARS), to measuring the Scale, Social Support Scale, social resource, and Latin America were used. In sum, 385 articles were found; from these ones, 15 articles that were cited in the contents of this to chapter were selected.

## **2.2 Personal characteristics: sociodemographic**

Average participant age was 71.93 years (SD = 6.66): 83.30% (f = 294) were female and the rest were male (16.70%; f = 59). The average number of offspring reported by elderly was 4.78 (SD = 2.72). The level of schooling of the majority of participants was basic education, reporting an average of 5 years of study (SD = 3.74) To greater to number of elderly reported not being economically dependent on anyone (46.50%; f = 164). Those who reported to be depending on someone depended mainly on the offspring, followed by their spouse. **Table 1** shows data based on sex.

The sociodemographic data for the population in this study shows that the mean age range of participants varies between 65 and 77 years, and that the majority are women with an incomplete basic education, which is remarkable when considering that the average study range is from 1st grade in elementary school till ninth grade. The sample divided based on sex, men showed to higher mean age as well as years of study than women. The age rates do not agree with the Mexican census report, which indicates that the current life expectancy is higher for women (79.77 years) than for men (75.06 years) [34].

Levels of schooling are similar to those reported in a study that demonstrated that schooling levels in the majority of this population vacillate around 5 years,

| Sociodemographic characteristics | Female<br><i>n</i> <sub>1</sub> = 294 |      | Male<br><i>n</i> <sub>2</sub> = 59 |       |
|----------------------------------|---------------------------------------|------|------------------------------------|-------|
|                                  | <i>f</i>                              | %    | <i>f</i>                           | %     |
| Occupation                       |                                       |      |                                    |       |
| Homemaker                        | 197                                   | 67.0 | 11                                 | 18.6  |
| Pensioner                        | 28                                    | 9.5  | 6                                  | 10.2  |
| Retired                          | 9                                     | 3.1  | 5                                  | 8.5   |
| In the workforce                 | 60                                    | 20.4 | 37                                 | 62.7  |
| Economically dependent           |                                       |      |                                    |       |
| Not dependent                    | 113                                   | 38.4 | 51                                 | 86.4  |
| Spouse                           | 100                                   | 34.0 | 1                                  | 1.7   |
| Offspring                        | 91                                    | 31.0 | 8                                  | 13.60 |
| Siblings                         | 0                                     | 0.0  | 0                                  | 0.0   |
| Other                            | 3                                     | 1.0  | 0                                  | 0.0   |

*Note: n = sample; f = frequency; % = percentage.*

**Table 1.**  
 SC sociodemographic characteristics based on sex.

which is a possible cause of the above-mentioned higher number of women who dedicate the majority of their time to households and may come across fewer opportunities to finish basic studies [35]. Schooling levels were higher in the research with 84% of SCs having finished elementary school [36], as well as in the study with 66.4% of SCs having finished elementary school [37]. This data may be attributed to the higher number of male participants in these studies, which for cultural reasons present with a higher education level. The illiteracy level reported in the last national census, at 6.9%, is congruent with the results of this sample [38]. It is important to consider the positive influence of schooling on the quantity of physical activity in this age group [35], a situation that is highly related to the level of functionality among elderly.

The majority of the population in the present study reported no economic dependency, which differs from what was reported by Gomez [35], with more than half (63%) of their sample stating that they received economic assistance from family members. A possible determining factor in the lack of economic dependence in the last study was the age range of up to 101 years. The specific features of this study should be taken into consideration owing to the fact that not being economically dependent can be a protective factor against loneliness and illness.

### 2.3 Biological characteristics: anthropometrical, clinical, and morbidity

Participant anthropometric data showed an average weight of 67.95 kg (SD = 12.24), height of 152.50 cm (SD = 8.10), and BMI of 29.20 (SD = 4.71); in accordance with the body mass index, majority of the elderly can be classified as obese (Secretaria de Salud, 1998). Average blood pressure data obtained from the participants classifies them under normal systolic pressure (123.00 mm/Hg SD = 14.44) and optimal diastolic pressure (74.19 mm/Hg; SD = 8.36; Secretaria de Salud, 2009). **Table 2** shows data based on sex.

The diagnosis of obesity according to the body mass index found in this study (29.20 kg/m<sup>2</sup>) is similar to the reported in a study with more than 80% of the

| Clinical and anthropometric Characteristics | Female<br><i>n</i> <sub>1</sub> = 294 |       |       |        | Male<br><i>n</i> <sub>2</sub> = 59 |       |       |        |
|---|---------------------------------------|-------|-------|--------|------------------------------------|-------|-------|--------|
|   | m                                     | SD    | Min   | Max    | m                                  | SD    | Min   | Max    |
| Current weight (kg)                         | 69.90                                 | 11.85 | 39.30 | 108.10 | 73.19                              | 12.87 | 40.6  | 113.00 |
| Height (m)                                  | 150.26                                | 5.79  | 134.0 | 170.00 | 163.66                             | 8.78  | 138.0 | 192.00 |
| BMI (Kg/m <sup>2</sup> )                    | 29.59                                 | 4.73  | 18.37 | 46.01  | 27.29                              | 4.14  | 19.70 | 40.53  |
| SP (mm/Hg.)                                 | 122.95                                | 14.28 | 75.00 | 181.00 | 123.29                             | 15.32 | 75.00 | 162.00 |
| DP (mm/Hg.)                                 | 74.06                                 | 8.42  | 55.00 | 95.50  | 74.88                              | 8.09  | 55.00 | 94.00  |

Note: *n* = muestra; kg = kilograms; m = meters; BMI = body mass index; SP = systolic pressure; DP = diastolic pressure; mm/Hg = millimeters of mercury; M = median, SD = standard deviation; Min = minimum; Max = maximum.

**Table 2.**  
Anthropometrical and clinical characteristics of SCs based on sex.

sample constituted by women [39]. However, there is also a study that reports a greater percentage of the population classified as overweight and implying Colombians to be healthier (body mass index = 25.2; SD = 2.5) despite the similarities in cuisine [40]. The average obesity present in the sample is related to reports of 40% obesity rates present at a global level [41]. This suggests that obesity also complicates the health conditions of this population group because it is an ailment that exacerbates to other ailments, which may affect an elderly.

The musculoskeletal history reported by elderly showed that almost half of them ( $f = 172$ ; 48.7%) had a fear of falling and 42.5% ( $f = 150$ ) presented with at least one fall in the last 12 months. Upon questioning about the number of fractures in the last 2 years, 92.4% ( $f = 326$ ) did not report fractures. Reports of fear of falling and falls are in agreement with data on persons with functional dependency for daily life activities in Mexico City [42] as well as on the Nuevo Leon disability statistics reported by INEGI [34], showing 20.1% of elderly indicating advanced age being the cause of disability, with 59.7% of disabled stating that their disability is with regards to walking or movement. **Table 3** presents the musculoskeletal history for the sample based on sex.

Prevalence of elderly self-reported ailments were as follows: hypertension 53.8% ( $f = 190$ ) diabetes mellitus 38.2% ( $f = 135$ ), insomnia 34.3% ( $f = 121$ ), hypercholesterolemia 33.1% ( $f = 117$ ) gastritis 26.1% ( $f = 92$ ), depression 22.1% ( $f = 78$ ), and respiratory illness 11.9% ( $f = 42$ ). In the sample divided based on sex, a morbidity of 77.2% ( $f = 227$ ) for women and 67.8% ( $f = 40$ ) for men was observed.

Studies performed on populations living in border area provide data to infer that Mexico, particularly Nuevo Leon, being to region close to the United States to border may be a factor that encourages to high prevalence of illnesses such as diabetes and hypertension [42].

## 2.4 Social characteristics

Social resources data are presented below according to the dimensions: cohabitation, interaction, affection, and dependence. The cohabitation report showed that overall, the marital status of widow (er) predominates the sample ( $f = 165$ ; 46.7%), followed by that of married ( $f = 143$ ; 40.5%) According to sex, a greater percentage of widowed women was identified ( $f = 143$ , 48.6%), followed by that of married women ( $f = 143$ , 48.6%), whereas majority of the men reported being married,

| Musculoskeletal history      | Female<br><i>n</i> <sub>1</sub> = 294 |      | Male<br><i>n</i> <sub>2</sub> = 59 |      |
|------------------------------|---------------------------------------|------|------------------------------------|------|
|                              | <i>f</i>                              | %    | <i>f</i>                           | %    |
| Fear of falling              |                                       |      |                                    |      |
| Yes                          | 158                                   | 53.7 | 14                                 | 23.7 |
| No                           | 136                                   | 46.3 | 45                                 | 76.3 |
| Falls in the last year       |                                       |      |                                    |      |
| None                         | 168                                   | 57.1 | 35                                 | 59.3 |
| Three or less                | 116                                   | 39.4 | 20                                 | 33.8 |
| More than three              | 10                                    | 3.4  | 4                                  | 6.7  |
| Fracture in the last 2 years |                                       |      |                                    |      |
| None                         | 269                                   | 91.5 | 57                                 | 96.6 |
| One fracture                 | 21                                    | 7.1  | 2                                  | 3.4  |
| Two fractures                | 4                                     | 1.4  | 0                                  | 0.0  |

*Note: n = sample; f = frequency; % = percentage.*

**Table 3.**  
*Elderly musculoskeletal history based on sex.*

followed by being widowed ( $f = 33, 55.9\%$  and  $f = 22, 37.3\%$ , respectively). Women primarily lived with their offspring, followed by their spouse ( $f = 161, 54.7\%$  and  $f = 106, 36.0\%$ , respectively); men primarily lived with their wife and offspring ( $f = 32, 54.2\%$  and  $f = 30, 50.8\%$ , respectively).

Elderly interaction with non-relative people who they have a close interpersonal relationship to be able to be visited for elderly was reported to be with five or more persons for 60.9% ( $f = 215$ ) of the sample, whereas 78.5% ( $f = 277$ ) reported made phone callings two or more times per week and 77.6% ( $f = 274$ ) saw persons who they did not live with 2–7 days per week.

Related to affection, 12.7% ( $f = 45$ ) of elderly's were identified to feel lonely often. Upon questioning elderly's regarding if they see their family and friends as often as they would like, 62.9% ( $f = 185$ ) of the women and 62.7% ( $f = 37$ ) of the men answered yes.

In the dependency dimension, 92.1% ( $f = 325$ ) of elderly's were identified to have one person to confide in and 92.4% ( $f = 326$ ) had someone to take care of them in the event they become incapacitated, with an indefinite care period. **Table 4** shows the data based on sex.

In Mexican culture and in accordance with the OARS scale, elderly's who were married live primarily with their spouse; however, live women tend to live with their offspring, given widowhood and the fact that paid caretakers are generally not hired by relatives or elderly their selves; this shows that elderly care is the responsibility of their offspring after the spouse's death [43]. Upon comparing elderly living in their house at will (sample used for this study) with those living in nursing homes in the city of Chihuahua, Mexico [44], a predominance of widowed (43%) and single (47%) elderly can be identified as opposed to those living in nursing homes at will or in their homes, among whom the widowed marital status predominates according to sex, followed by a married status for men and widowed status for women, followed by married; 5 of 10 live with their offspring and 2 of 10 live alone.



| Dependency  | Female<br><i>n</i> <sub>1</sub> = 294 |                            | Male<br><i>n</i> <sub>2</sub> = 59 |      |
|---|---------------------------------------|----------------------------|------------------------------------|------|
|   | <i>f</i>                              | %                          | <i>f</i>                           | %    |
| Do you have anyone to confide in?   |                                       |                            |                                    |      |
| Yes   | 269                                   | 91.5                       | 56                                 | 94.9 |
| No  | 22                                    | 7.5                        | 3                                  | 5.1  |
| No response   | 3                                     | 1.0                        | 0                                  | 0    |
| If, at any point, you needed help because you became incapacitated, would you have someone to give you that help? |                                       |                            |                                    |      |
| Yes   | 270                                   | 91.8                       | 56                                 | 64.9 |
| No  | 24                                    | 8.2                        | 3                                  | 5.1  |
| Would that person take care of you?   |                                       |                            |                                    |      |
|   | <i>n</i> <sub>1</sub> = 270           | <i>n</i> <sub>2</sub> = 56 |                                    |      |
| Indefinitely  | 201                                   | 74.4                       | 40                                 | 71.4 |
| A short period of time  | 39                                    | 14.4                       | 11                                 | 19.6 |
| Just briefly  | 29                                    | 10.7                       | 5                                  | 8.9  |
| No response   | 1                                     | 0.4                        | 0                                  | 0.0  |

*Note: n = sample; f = frequency; % = percentage.*

**Table 4.**  
*Dependency according to the Older Americans Resources and Services (OARS) Scale.*

Elderly interaction in the population investigated is greater because they report greater frequencies regarding to people, they know each other well enough to visit and talk on the phone to see persons who does not live with them. Stated dependency about having someone to confide in is greater among elderly’s in the study (92%) in comparison with those in a nursing home (75%); having someone to take care of them if they become incapacitated (92.3% versus 88%); with a similar figure for care during an indefinite period, at 68.2% of SC living at will and 64% for those in a nursing home, a situation which could be influenced, in the case of the elderly in nursing homes, by the confidence they feel having a person to attend to them.

For the dimension of affection, elderly’s living at will reported a lower rate of feeling alone quite often (12.7% vs. 31% of those living in nursing homes). The advantages for elderly living at will are only valid if they maintain functional and physical independence [45].

## 2.5 Psychological characteristics

When evaluating the cognitive state of elderly’s, a normal state was identified on 48.2% of the overall population, mild risk of cognitive deterioration was found on 34.6%, moderate risk on 13.3%, and grave risk on 4% of people. Population data organized based on sex are shown in **Table 5**.

Depression assessment on overall sample showed 18.1% of elderly is at risk of depression. Population data organized based on sex are shown in **Table 6**.

Risk of cognitive deterioration in Monterrey, Nuevo Leon, Mexico population of the study shows a higher mean than obtained in the State of Mexico (22.3 ± 3.4), but lower of the obtained from the Lima population (27.6 ± 2.77).

| Risk of cognitive deterioration | Female<br><i>n</i> <sub>1</sub> = 294 |      | Male<br><i>n</i> <sub>2</sub> = 59 |      |
|---------------------------------|---------------------------------------|------|------------------------------------|------|
|                                 | <i>f</i>                              | %    | <i>f</i>                           | %    |
| Normal                          | 139                                   | 47.3 | 31                                 | 52.5 |
| Mild                            | 104                                   | 35.4 | 18                                 | 30.5 |
| Moderate                        | 38                                    | 12.9 | 9                                  | 15.3 |
| Severe                          | 13                                    | 4.4  | 1                                  | 1.7  |

*Note: n = sample; No. = number; f = frequency; % = percentage.*

**Table 5.**  
*Risk of SC cognitive deterioration based on sex.*

| Risk of depression | Female<br><i>n</i> <sub>1</sub> = 294 |      | Male<br><i>n</i> <sub>2</sub> = 59 |      |
|--------------------|---------------------------------------|------|------------------------------------|------|
|                    | <i>f</i>                              | %    | <i>f</i>                           | %    |
| Not risk           | 239                                   | 81.3 | 50                                 | 84.7 |
| At risk            | 55                                    | 18.7 | 9                                  | 15.3 |

*Note: n = sample; No. = number; f = frequency; % = percentage.*

**Table 6.**  
*Risk of depression based on sex.*

When reviewing the numbers based on category, mild and moderate cognitive deterioration was less compared to those in elderly's in Antioquia (mild deterioration at 49.6% and moderate deterioration at 31.5%). The higher rates of risk of mild or moderate cognitive deterioration may be related to the fact that elderly's present with higher rates of depression [37] in addition to the prevalence of morbidity higher than three ailments, which could function as a risk factor for decrease in functionality, occurrence of depression, and cognitive deficit [46].

The risk data for cognitive deterioration are similar for elderly's in this study and those in Queretaro, Mexico, which was expected because the variables of age, schooling, and the existence of chronic ailments in these studies presented related prevalence [47].

The rates of risk of depression among elderly's in this study are less than those reported in studies on populations in Havana [48] and Paraguay [36]. Likewise, a study performed in Bogota reported that 77.9% of men and 71.2% of women did not present a risk of depression, whereas the values were 81.3% for women and 84.7% for men in other study [35].

## 2.6 Functional physical capacity

Elderly functional physical capacity as a numerical variable showed a 9.84 repetition average for lower body strength (SD = 3.05), a 11.56 repetition average for upper body strength (SD = 3.48), aerobic endurance at 58.09 full steps (SD = 22.12), lower body flexibility at -6.02 cm (SD = 9.01), and upper body flexibility at -18.15 cm (SD = 12.38), and agility and dynamic balance at 7.55 s (SD = 2.08). The functional physical capacity assessment data based on age group for women is shown in **Table 7**.

| Variable                    | 60–69 years<br>n = 132 |      | 70–79 years<br>n = 128 |      | 80–89 years<br>n = 34 |       |
|-----------------------------|------------------------|------|------------------------|------|-----------------------|-------|
|                             | f                      | %    | f                      | %    | f                     | %     |
| Lower body strength         |                        |      |                        |      |                       |       |
| Low                         | 76                     | 57.6 | 62                     | 48.4 | 14                    | 41.17 |
| Normal                      | 54                     | 40.9 | 66                     | 51.6 | 20                    | 58.82 |
| Excellent                   | 2                      | 1.5  | 0                      | 0    | 0                     | 0     |
| Upper body strength         |                        |      |                        |      |                       |       |
| Low                         | 69                     | 52.3 | 59                     | 46.1 | 14                    | 41.17 |
| Normal                      | 61                     | 46.2 | 67                     | 52.3 | 18                    | 52.94 |
| Excellent                   | 2                      | 1.5  | 2                      | 1.6  | 2                     | 5.88  |
| Two-minute march            |                        |      |                        |      |                       |       |
| Low                         | 92                     | 69.7 | 98                     | 76.6 | 28                    | 82.35 |
| Normal                      | 39                     | 29.5 | 29                     | 22.7 | 6                     | 17.64 |
| Excellent                   | 1                      | .8   | 1                      | .8   | 0                     | 0     |
| Lower body flexibility      |                        |      |                        |      |                       |       |
| Low                         | 64                     | 48.5 | 61                     | 47.7 | 15                    | 44.11 |
| Normal                      | 67                     | 50.8 | 67                     | 52.3 | 19                    | 55.88 |
| Excellent                   | 1                      | .8   | 0                      | 0    | 0                     | 0     |
| Upper body flexibility      |                        |      |                        |      |                       |       |
| Low                         | 107                    | 81.1 | 93                     | 72.7 | 27                    | 79.41 |
| Normal                      | 21                     | 15.9 | 30                     | 23.4 | 5                     | 14.70 |
| Excellent                   | 4                      | 3.0  | 5                      | 3.9  | 2                     | 5.88  |
| Agility and dynamic balance |                        |      |                        |      |                       |       |
| Low                         | 92                     | 69.7 | 74                     | 57.8 | 15                    | 44.11 |
| Normal                      | 40                     | 30.3 | 53                     | 41.4 | 18                    | 52.94 |
| Excellent                   | 0                      | 0    | 1                      | .8   | 1                     | 2.94  |

*Note: n = sample; f = frequency; % = percentage.*

**Table 7.**  
*Functional physical capacity of senior women based on age group.*

The functional physical capacity assessment data based on age group for women is shown in **Table 8**.

The results of physical tests on elderly's in this study in Monterrey, Nuevo Leon, Mexico evidence a lower physical capacity than that, in the studies that reported average lower body strength values of  $15 \pm 4.71$  and  $17.54$  (95% CI =  $3.9-13.19$ ) repetitions, respectively; upper body strength values of  $13.76$  (95% CI =  $4.7-11.62$ ) and  $22.0$  ( $\pm 4.12$ ) repetitions, upper body flexibility values of  $-7.01$  (95% CI =  $11.5-2.08$ ) and  $-9.18$  ( $\pm 7.62$ ) cm, and  $5.7$  (95% CI =  $1.09-5.27$ ) and  $4.20$  ( $\pm 0.61$ ) s for agility and dynamic balance [29]. Study data report showed a better average value than the data reported in this study regarding lower body flexibility, with a value of  $-1.14$  cm (95% CI =  $3.6-11.04$ ) [49]. On the other hand, a study reported a value of  $-7.27$  ( $\pm 7.1$  cm), which was like the values in this population [40]. With respect to flexibility, a study reported that women may be between 20% and 40% more flexible than men [50]. At the same time, given the predominance of females in our population, when comparing

| Variable                    | 60–69 years<br>n = 14 |       | 70–79 years<br>n = 28 |       | 80–89 years<br>n = 17 |       |
|-----------------------------|-----------------------|-------|-----------------------|-------|-----------------------|-------|
|                             | f                     | %     | f                     | %     | f                     | %     |
| Lower body strength         |                       |       |                       |       |                       |       |
| Low                         | 9                     | 64.28 | 16                    | 57.1  | 3                     | 17.64 |
| Normal                      | 4                     | 28.57 | 12                    | 42.9  | 14                    | 82.35 |
| Excellent                   | 1                     | 7.14  | 0                     | 0     | 0                     | 0     |
| Upper body strength         |                       |       |                       |       |                       |       |
| Low                         | 8                     | 57.14 | 14                    | 50.0  | 8                     | 47.05 |
| Normal                      | 5                     | 35.71 | 14                    | 50.0  | 8                     | 47.05 |
| Excellent                   | 1                     | 7.14  | 0                     | 0     | 1                     | 5.88  |
| Aerobic capacity            |                       |       |                       |       |                       |       |
| Low                         | 9                     | 64.28 | 18                    | 64.3  | 12                    | 70.58 |
| Normal                      | 4                     | 28.57 | 10                    | 35.7  | 4                     | 23.52 |
| Excellent                   | 1                     | 7.14  | 0                     | 0     | 1                     | 5.88  |
| Lower body flexibility      |                       |       |                       |       |                       |       |
| Low                         | 3                     | 21.42 | 15                    | 53.6  | 7                     | 41.17 |
| Normal                      | 9                     | 64.28 | 13                    | 46.4  | 10                    | 58.82 |
| Excellent                   | 2                     | 14.28 | 0                     | 0     | 0                     | 0     |
| Upper body flexibility      |                       |       |                       |       |                       |       |
| Low                         | 9                     | 64.28 | 20                    | 71.4  | 9                     | 52.94 |
| Normal                      | 5                     | 35.71 | 8                     | 28.6  | 6                     | 35.29 |
| Excellent                   | 0                     | 0     | 0                     | 0     | 2                     | 11.76 |
| Agility and dynamic balance |                       |       |                       |       |                       |       |
| Low                         | 7                     | 50.00 | 13                    | 46.42 | 3                     | 17.64 |
| Normal                      | 6                     | 42.85 | 13                    | 46.42 | 13                    | 76.47 |
| Excellent                   | 1                     | 7.14  | 2                     | 7.14  | 1                     | 5.88  |

Note: n = sample; f = frequency; % = percentage.

**Table 8.**  
*Functional physical capacity of senior men based on age group.*

the study performed only on women, our average values were lagging by 4.88 cm, which indicates a lower functional physical capacity among our population [49].

According to the classification by Rikli and Jones, the results show values lower than normal for both sexes, with the best values for aerobic capacity and upper body flexibility and for agility and dynamic balance only in women; this situation suggests the need to implement intervention programs that will contribute to and/or improve elderly functional and physical capacities [33].

## 2.7 Strategies for promoting, maintain or improve elderly adults health

In the actuality, the social interaction dynamics and the activities of daily life have been modified leading to a sudden change of the activities that are realized in special vulnerable groups as the elderly adults because of the social restriction, situation that has affected the practice of the physical exercise due to the temporary

closure or the reduction of capacity in public places and more in closed spaces intended to the physical activity practice [51], as well as other recreational, educational and cultural activities that are usually taught in centers for retired, pensioners, clubhouses, geriatric stays and institutes for the care of the elderly [52]. This has led to changes in the lifestyle due to the modification of the type, amount, intensity, and frequency of physical activity performed, as well as the adoption of irregular eating and sleep patterns [53–55].

The dissemination of measures to promote the health in the elderly adults focuses mainly to increment the volume of physical activity because it is inversely associated with the risk of death [56], other measures include the healthy diet, meditation, relaxing, reading and in case of living in alone, the daily programming of telephone calls with friends and relatives [57].

An important strategy that can be used to promote the health among the elderly adult population are to adapt programs of physical activity for the home, which are an accessible and efficient tool in the modification of the conduct by their influence on the people and their biopsychosocial health [58]. When making physical exercise in a regular and controlled form we help to the improvement of a healthy physical condition in their cardiorespiratory, metabolic, morphological and motor components, as well as reduce the symptoms, anxiety and stress [59–61], and slowing the aging effects at the motor, physiological and mental levels. Besides to prevent chronic diseases, to favor the post-surgical recovery and the maintenance of the basic measures of security and hygiene in the execution of movements [62].

The World Health Organization promotes the active aging through the practice of physical activities by a minimum of 30 minutes per day [63], which is due to organize in a program of physical exercise according to the functional capacity of the elderly adults, specifying the type of exercise, intensity, volume and frequency [64], besides to orient on the structure that must have the session of exercises and use materials readily accessible in the home. In attention to these recommendations it is considered pertinent to use multicomponent programs by its positive impact in the functionality and the improvement of the physical capacities of aerobic resistance, force, balance, agility and amplitude to articulate, besides to contain activities that stimulate the cognitive functions and help to improve the mental health [65–67]. Proceeding, we will summarize the recommendations to prescribe physical activities in the home for elderly adults:

- Type of exercise: slight walks or with change of the speed inside the home, dance that implies low impact moves, to go up and low on stairs, flexion of arms using resistance bands or small bottles with water, push-ups against the wall, to seat down and stand of a chair, extension of legs in chair, rise of leg backwards and to the flanks, standing on toes, exercises of articular mobility through rotation, flexion or extension of the diverse joints of the body (mainly neck, shoulders, elbows, wrists, hip, knees and ankles), exercises of monopodal and bipodal balance, in addition to exercises of deep breathing.
- Intensity: To guarantee that the physical exercise is safe to be practiced by healthy elder adults or with a controlled chronic disease and to optimize its protective function, it is suggested to include low intensity exercises, but with a predominance of moderately intense exercises (40–60% of heart rate reserve or 65–75% of maximum heart rate), in a range of three to six degrees in the Rating of Perceived Exertion [53].
- Volume: in normal situations the World Health Organization [68], suggests to practice for 150 minutes weekly of moderate physical activity or 75 minutes

of intense physical activity, also, with the goal to obtain greater benefits for the health of the elderly it encourages to make up to 300 minutes of moderate physical activity per week. However, due to the increase of sedentary behaviors by the confinement one sets out to fit to an average of 350 minutes of physical exercise per week, which could be divided in seven sessions of 50 minutes each one, during the seven days of the week.

- Frequency: from five to seven days per week.
- Materials: the exercises could be made using self-carry, bands of resistance, balls, canes, chairs, small bottles with water, among other materials readily accessible in the home, and in case that availability exists, machines for cardiovascular exercises can be used. In addition, to add fun to the exercise routine it is recommended to listen to music.
- Structure of the physical activity sessions: the order of execution of the exercises during a session is based on the phase; initial phase: exercises of mobility are made to articulate and calisthenics; medullar phase: the exercises that represent a greater degree of complexity like those of balance or greater physical effort like the cardiovascular ones and of force are included. Later, in the final phase: exercises of breathing and stretching's are made. The duration of the initial, medullary and final phases is recommended to be adjusted to 10, 30 and 10 minutes respectively.

### 3. Conclusions

Now that the biopsychosocial characteristics and functional status of elderly's in Mexico and some Latin American countries have been evaluated, we can critically identify values that are lower compared to those obtained in other countries; furthermore, it is of utmost importance that government authorities take these findings into consideration and implement social and healthcare strategies to improve physical, mental, and social conditions for a satisfactory aging process and better life quality for elderly's.

Within the characteristics identified in the elderly adults, it is important to consider sociocultural and environmental conditions that allow a worthy and safe aging in the community. In Latin American countries, studies have observed the relation of the surroundings of the EA with its health and the few information is related more to the characteristics of the house and on the other hand its networks of familiar and non-familiar support like components that rebound in their well-being. In other countries mainly in Europe the collaboration of the EA in third age clubs has been contemplated, attendance to cinemas, theaters, museums, cafeterias, bars, celebrations of district among others, which consider like part of the incorporation to the society [69].

In Latin America despite doing the effort to unify the criteria considering the social participation, as much in civil associations as voluntary activities, as a part that repels in the quality of life of the EA, the results until now demonstrates that differences are presented in the collaboration of the EA in organizations, excelling the low participation in Mexico in comparison with Chile and Spain. The sociodemographic characteristics of the active population do not vary much between countries, so it seems that these are not determining factors for the elderly population to remain active in organizations, however, health conditions should be more controlled as a determining component in their participation, since those active

elderly people in the community show a level of satisfaction with the community and its important as a means of integration and coexistence with society and their perception of the quality of life [69].

A risk factor that deteriorates the unfolding of the potential of the EA is the internationalization of the ageism since it influences the perception of the EA in the society and how the EA on itself is perceived. It is considered essential to exhaustively observe our representations of the aging in the society and to have possibility of being able to question those that are implanted under the tradition and the common sense [70].

### **3.1 Recommendations for the readers**

Habitually the boarding of this problematic of the public health has been in a corrective sense treating the symptoms or complications derived from the own aging of the body and mind. Without a doubt some of the immediate actions are centered in the physical and mental rehabilitation in search of the social reintegration of the EA (Elderly Adult) with autonomy and independence, leaving in background the prevention. In that sense, there is too much to do, one of the best allies of the prevention is the promotion of the health and the access to the information, prescribed from the consultation by a multi-disciplinary group in the institutions of the Secretaría de Salud and institutions of social welfare like part of a public policy of social welfare that emphasizes in the following points:

1. The maintenance and development of the muscular mass and the articular capability with activities like basic gymnastics and yoga.
2. Fortification of the cardio-respiratory system through playful activities as the dance, long walks, bicycle strolls, visits to public parks and natural parks.
3. To develop the balance to diminish the fear to fall [68] and to help in the prevention of falls and injuries as fracture of hip, shoulders and arms [71], derived from the own fall.
4. Promote, maintain or improve levels of physical activity in general, because in a physical level it improves rest and sleep in elderly adults, blood glucose level, and cardio vascular resistance. In psychological level it reduces stress and the anxiety sensations, it improves the mood. In the social subject, it promotes the interpersonal and intergenerational relations, increase the social relations and improves integration in the community, aid to maintain the cognitive capacities like the memory, the attention and the language, as well as to generate positive emotions, it improves the self-esteem and aid to the greater adults to feel useful.
5. To make a valuation and nutritional direction, with a food preparation-balance course to help to prevent the loss of muscular mass without apparent reason, to maintain mineral density, as well as the appearance of other symptoms because of deficit of micro and/or macronutrients

All these activities guided by professionals of the physical activity and the health, taken to the practice on a group form favor the development of social interaction and bows of friendships, at the same time that promote an active aging that allow the EA to reach the maximum physical, mental and social well-being with independence and autonomy.

The gerontological investigation, is an option that can contribute to scientific discernment, that must be transmitted and extended to contribute the growth of public policies of the active aging. The transformation can be done day with day from the language with which the society talks about the EA, finding out as they wish that they speak to them and treat; eliminating the negative representations like the absence of roles and to encourage the creation of a project of life in the oldness [70].

## Acknowledgements

Our acknowledgements to the Sistema Nacional para el Desarrollo Integral de las Familias (DIF) for the facilities provided for access to the sample and data collection.

## Conflicts of interest

The authors declare no conflicts of interest.

## Author details

Magdalena Soledad Chavero Torres<sup>1</sup>, Rosa María Cruz-Castruita<sup>1\*</sup>,  
Norma Angélica Borbón Castro<sup>2</sup>, Nancy Cristina Banda Saucedo<sup>1</sup>  
and Oswaldo Ceballos Gurrola<sup>1</sup>

<sup>1</sup> Universidad Autónoma de Nuevo León, San Nicolás de los Garza, Nuevo León, México

<sup>2</sup> Universidad Estatal de Sonora, Hermosillo, Sonora, México

\*Address all correspondence to: [rosa.cruzst@uanl.edu.mx](mailto:rosa.cruzst@uanl.edu.mx)

## IntechOpen

© 2021 The Author(s). Licensee IntechOpen. This chapter is distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. 



## References

- [1] Galvis L, López L, Velásquez V. Patrones culturales de cuidado familiar al adulto mayor en condición de discapacidad y pobreza. *Index of Infirmary*. 2018;170-174.
- [2] Alvarado A., Salazar Á. Análisis del concepto de envejecimiento Gerokomos. 2014; 57-62. DOI: 10.4321/S1134-928X2014000200002
- [3] Manrique B, Salinas A, Moreno K, Acosta I, Sosa A, Gutiérrez L, Téllez M. Condiciones de salud y estado funcional de los adultos mayores en México. *Salud Pública de México* 2013;323-331. DOI: 10.21149/spm.v55s2.5131
- [4] Ochoa J, Cruz M, Pérez M, Cuevas C. El envejecimiento: Una mirada a la transición demográfica y sus implicaciones para el cuidado de la salud. *Revista de Enfermería del Instituto Mexicano del Seguro Social*. 2019;273-280.
- [5] García M, Cala G, Martínez A, Lendínez A. 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;71-82.
- [6] Reis K, Costa de Jesús C. Relationship of polypharmacy and polypathology with falls among institutionalized elderly. *Texto & Contexto-Enfermagem*. 2017; e3040015. DOI: 10.1590/0104-07072017003040015
- [7] Sánchez CC, Madrid GG, Flores M, Hernández FJ, Reyes AT, López MA. Síntomas depresivos versus depresión en adultos mayores de una comunidad rural. *EJIHPE: European Journal of Investigation in Health, Psychology and Education*. 2014;321-327. DOI: 10.1989/ejihpe.v4i3.79
- [8] Sánchez-García S, Juárez-Cedillo T, Gallegos-Carrillo K, Gallo JJ, Wagner FA, García-Peña C. Frecuencia de los síntomas depresivos entre adultos mayores de la Ciudad de México. *Salud mental*. 2012;71-77. DOI: 10.1989/ejihpe.v4i3.79
- [9] Boyaro F, Tio A. Evaluación de la condición física en adultos mayores: desafío ineludible para una sociedad que apuesta a la calidad de vida. *Revista universitaria de la educación física y el deporte*. 2014;7-79.
- [10] Rondón L, Aguirre B, García F. El significado de las relaciones sociales como mecanismo para mejorar la salud y calidad de vida de las personas mayores, desde una perspectiva interdisciplinaria. *Revista Española de Geriatria y Gerontología*. 2018; 268-273. DOI: 10.1016/j.regg.2018.01.005
- [11] Schnettler B, Miranda H, Sepúlveda J, Orellana L, Denegri M, Mora M, Lobos G. Variables que influyen en la satisfacción con la vida de personas de distinto nivel socioeconómico en el sur de Chile. *Suma psicológica*. 2014;54-62. DOI: 10.1016/S0121-4381 (14) 70007-4
- [12] Jones A, Mitchel D, Goza F. Lifecourse socioeconomic status and cardiovascular illness in Latin America. *Current Sociology*. 2014;1055-1078. DOI: 10.1177/0011392114537003
- [13] Custodio N, Wheelock A, Thumala D, Slachevsky A. Dementia in Latin America: epidemiological evidence and implications for public policy. *Frontiers in aging neuroscience*. 2017;221. DOI: 10.3389/fnagi.2017.00221
- [14] Santiago L, Gobbens R, Echenique I, Bittencourt D. A comparison between physical and biopsychosocial measures of frailty: prevalence and associated

- factors in Brazilian older adults. Archives of gerontology and geriatrics. 2019;111-118. DOI: 10.1016/j.archger.2018.12.003
- [15] Ocampo-Chaparro J, Zapata-Ossa H, Cubides-Munévar Á, Curcio C, Villegas J, Reyes-Ortiz A. Prevalence of poor self-rated health and associated risk factors among older adults in Cali, Colombia. Colombia Médica. 2013;224-231.
- [16] Curcio C, Payán-Villamizar C, Jiménez A, Gómez F. Abuse in Colombian elderly and its association with socioeconomic conditions and functionality. Colombia Médica. 2019;77-88. DOI: 10.25100/cm.v50i2.4013
- [17] Estrella D, Olais I, Uicab G. Relationship between Functionality and Cognitive Impairment in Older Adult Women from the Southeast of Mexico. International Journal of Psychological and Behavioral Sciences. 2017;1766-1770. DOI: 10.5281/zenodo.1131175
- [18] Duran-Badillo T, Salazar-González B, Cruz-Quevedo J, Sánchez-Alejo E, Gutierrez-Sanchez G, Hernández-Cortés P. Sensory and cognitive functions, gait ability and functionality of older adults. Revista Latino-Americana de Enfermagem. 2020;e3282. DOI: 10.1590/1518-8345.3499.3282
- [19] Sepúlveda-Loyola W, Ganz F, Pires R, Tricanico M, Dos Santos R, Negri P, Solorza E, González H, Probst V. Social participation is associated with better functionality, health status and educational level in elderly women. Brazilian Journal of Development. 2020;20690-20701. DOI: 10.34117/bjdv6n4-299
- [20] McEniry M. Cross-national comparisons of health disparities among aging populations in Latin America, the Caribbean, Asia and Africa. Population Studies Center, University of Michigan. 2013.
- [21] Tomás MT, Galán-Mercant A, Carnero EA, Fernandes B. Functional capacity and levels of physical activity in aging: a 3-year follow-up. Frontiers in medicine. 2018;244. DOI: 10.3389/fmed.2017.00244
- [22] Guerrero N, Yépez M. Factores asociados a la vulnerabilidad del adulto mayor con alteraciones de salud. Universidad y Salud 2015;121-131.
- [23] Lok N, Lok S, Canbaz M. The effect of physical activity on depressive symptoms and quality of life among elderly nursing home residents: Randomized controlled trial. Archives of gerontology and geriatrics. 2017;92-98. DOI: 10.1016/j.archger.2017.01.008
- [24] Tarducci G, Gárgano S, Paganini A, Vidueiros S, Gandini A, Fernández I, Nápoli C, Pallaro A. Condición física saludable y su relación con habilidades básicas para la independencia del adulto mayor. Hacia la Promoción de la Salud. 2020;84-93. DOI: 10.17151/hpsal.2020.25.2.10
- [25] World Health Organization. Informe mundial sobre el envejecimiento y la salud. 2015. Available at: [https://apps.who.int/iris/bitstream/handle/10665/186466/9789240694873\\_spa.pdf?sequence=1](https://apps.who.int/iris/bitstream/handle/10665/186466/9789240694873_spa.pdf?sequence=1) [Accessed: July 6, 2020].
- [26] Hernández R, Fernández C, Baptista P. Metodología de la investigación. 6th ed. México: Mc Graw Hill; 2014.
- [27] Elashoff JD. (2000). nQuery Advisor (Version 2.0: user's guide) [Software of Power-Analysis]. Los Angeles, CA

- [28] Ostrosky-Solís F, López-Arango G, Ardila A. Sensitivity and Specificity of the Mini-Mental State Examination in a Spanish-Speaking Population. *Applied Neuropsychology*. 2000;25-31.
- [29] De León-Arcila R, Milián-Suazo F, Camacho-Calderón N, Arévalo-Cedano RE, Escartín-Chávez M. Factores de riesgo para deterioro cognitivo y funcional en el adulto mayor. *Revista Médica del Instituto Mexicano del Seguro Social*. 2009; 277-284.
- [30] Yesavage JA, Brink TL, Rose TL. Development and validation of a geriatric depression screening scale: A preliminary report. *Journal of Psychiatric Research*. 1982;37-49. DOI: 10.1016/0022-3956 (82) 90033-4.
- [31] Fillenbaum GG, Smyer MA. The Development, Validity, and Reliability of the Oars Multidimensional Functional Assessment Questionnaire. *Journal of Gerontology*. 1981; 428-434.
- [32] Rikli RE, Jones CJ. *Senior Fitness Test Manual*. Canada: Human Kinetics; 2013.
- [33] Rikli RE, Jones CJ. Development and Validation of Criterion-Referenced Clinically Relevant Fitness Standards for Maintaining Physical Independence in Later Years. *Gerontologist*. 213;255-267. DOI: 10.1093/geront/gns071
- [34] Expansión. 2013. México: Esperanza de vida al nacer. Recuperado el 3 de septiembre de 2015 de. Available at: <http://www.datosmacro.com/demografia/esperanza-vida/mexico>
- [35] Gómez L, Moreno J, Gómez O, Carvajal R, Parra D. Physical activity and health related quality of life among adult women in Cali, Colombia: a cross-sectional study. *Quality of Life Research*. 2013;2351-2358.
- [36] Piñáñez MC, Re ML. Perfil clínico, epidemiológico y valoración geriátrica funcional en el barrio San Miguel de Asunción, Paraguay. *Revista Virtual Sociedad Paraguaya de Medicina Interna*. 2015;63-69. DOI: 10.18004/rvs pmi/2312-3893/2015.02(02)63-069
- [37] Cortés-Muñoz C, Cardona-Arango D, Segura-Cardona Á, Garzón-Duque MO. Factores físicos y mentales asociados con la capacidad funcional del adulto mayor. Antioquia, Colombia, 2012. *Revista Salud Pública*. 2016;167-178. DOI: 10.15446/rsap.v18n2.49237
- [38] Instituto Nacional de Estadística y Geografía INEGI. 2010. Población. Esperanza de vida. Recuperado el 15 de octubre del 2013 de. Available at: <http://cuentame.inegi.org.mx/poblacion/esperanza.aspx?tema=P>
- [39] Rodríguez-Hernández M, Araya F, Ureña P, Wadsworth DD, Solano L. Aptitud Física y su Relación con Rasgos Depresivos en Personas Adultas Mayores que Realizan Actividad Física. *Revista Movimiento Humano y Salud*. 2014; 35-46. DOI: 10.15359/mhs.11-1.4
- [40] Quintero-Burgos CG, Melgarejo-Pinto VM, Ospina-Díaz JM. Estudio comparativo de la autonomía funcional de adultos mayores: atletas y sedentarios, en altitud moderada. *Revista MHSalud*. 2017;1-16. DOI: 10.15359/mhs.13-2.6
- [41] García-Zenón T, Villalobos-Silva JA. Malnutrición en el anciano. Parte II: obesidad, la nueva pandemia. *Medicina Interna de México*. 2012;154.
- [42] Manrique-Espinoza B, Salinas-Rodríguez A, Moreno-Tamayo K, Téllez-Rojo MM. Prevalencia de dependencia funcional y su asociación con caídas en una muestra de adultos mayores pobres en México. *Salud Pública de México* 2011;26-33.

- [43] Bazo MT. Personas mayores y solidaridad familiar. *Política y Sociedad*. 2018;73-85.
- [44] Ornelas M. Activación física para adultos mayores en residencias de estancia permanente [Tesis doctoral]. Granada, España: Universidad de Granada, Granada; 2010.
- [45] Ceballos-Gurrola O. Actividad física en el adulto mayor. México: El Manual Moderno; 2012.
- [46] Arias-Merino ED, Mendoza-Ruvalcaba NM, Ortiz GG, Velázquez-Brizuela IE, Meda-Lara RM, Cueva-Contreras J. Physical function and associated factors in community-dwelling elderly people in Jalisco, Mexico, *Archives of Gerontology and Geriatrics*. 2012;e271–e278. DOI: 10.1016/j.archger.2012.02.010
- [47] Cervantes RG, Villarreal E, Galicia L, Vargas ER, Martínez L. Estado de salud en el adulto mayor en atención primaria a partir de una valoración geriátrica integral. *Atención Primaria*. 2014. DOI: 10.1016/j.aprim.2014.07.007 Chong2012
- [48] Hernández G, Carrasco MR, Rosell F, Gómez M. Incidencia de factores de riesgo social en adultos mayores del Municipio Cerro. *GeroInfo*. 2014;1-22.
- [49] Correa-Bautista JE, Sandoval-Cuellar C, Alfonso-Mora ML, Rodríguez-Daza KD. Cambios en la aptitud física en un grupo de mujeres adultas mayores bajo el modelo de envejecimiento activo. *Revista de la Facultad de Medicina*. 2012;21-30.
- [50] De Araujo CG. Avaliação da flexibilidade: valores normativos do flexiteste dos 5 aos 91 anos de idade. Avaliação da flexibilidade: valores normativos do flexiteste dos 5 aos 91 anos de idade. 2008; 280-287. DOI:10.1590/S0066-782X2008000400008.
- [51] Schrack JA, Wanigatunga AA, Juraschek SP. After the COVID-19 Pandemic: The Next Wave of Health Challenges for Older Adults. *J Gerontol A Biol Sci Med Sci*. 2020: e121-e122. Doi: 10.1093/gerona/glaa102
- [52] Mills JP, Kaye KS, Mody L. COVID-19 in older adults: clinical, psychosocial, and public health considerations. *JCI insight*. 2020; 5: e139292. DOI: 10.1172/jci.insight.139292
- [53] Jiménez-Pavón D, Carbonell-Baeza A, Lavie CJ. Physical exercise as therapy to fight against the mental and physical consequences of COVID-19 quarantine: Special focus in older people. *Prog Cardiovasc Dis*. 2020; 63: 388-388. DOI: 10.1016/j.pcad.2020.03.009
- [54] Balanzá-Martínez V, Atienza-Carbonell B, Kapczinski F, et al. Lifestyle behaviours during the COVID-19–time to connect. *Acta Psychiatr Scand*. 2020; 141: 399-400. DOI: 10.1111/acps.13177
- [55] Naja F, Hamadeh R. Nutrition amid the COVID-19 pandemic: a multi-level framework for action. *Eur J Clin Nutr*. 2020; 74: 1117-1121. DOI: 10.1038/s41430-020-0634-3
- [56] Sun S, Cao W, Qiu H. Benefits of physical activity not affected by air pollution: a prospective cohort study. *Int J Epidemiol*. 2020; 49: 142-152. DOI: 10.1093/ije/dyz184
- [57] Montero-Odasso M, Goens S, Kamkar N, et al. Canadian Geriatrics Society COVID-19 Recommendations for older adults--What do older adults need to know?. *Canadian Geriatrics Journal*. 2020; 23: 149-151. DOI: 10.5770/cgj.23.443

- [58] Echeverria I, Amasene M, Urquiza M, et al. Multicomponent Physical Exercise in Older Adults after Hospitalization: A Randomized Controlled Trial Comparing Short-vs. Long-Term Group-Based Interventions. *Int. J. Environ. Res. Public Health*. 2020; 17: 666. Doi:10.3390/ijerph17020666
- [59] Hammami A, Harrabi B, Mohr M, et al. Physical activity and coronavirus disease 2019 (COVID-19): specific recommendations for home-based physical training. *Managing Sport and Leisure*. 2020: 1-6. Doi: 10.1080/23750472.2020.1757494
- [60] Nieman DC. COVID-19: A tocsin to our aging, unfit, corpulent, and immunodeficient society. *Journal of Sport and Health Science*. 2020; 9: 293-301. doi:10.1016/j.jshs.2020.05.001
- [61] Luzi L, Radaelli MG. Influenza and obesity: its odd relationship and the lessons for COVID-19 pandemic. *Acta Diabetol*. 2020; 57: 759-764. DOI: 10.1007/s00592-020-01522-8
- [62] Vasta S, Papalia R, Torre G, et al. The Influence of Preoperative Physical Activity on Postoperative Outcomes of Knee and Hip Arthroplasty Surgery in the Elderly: A Systematic Review. *J. Clin. Med*. 2020; 9: 969. DOI: 10.3390/jcm9040969
- [63] World Health Organization. Be active at home during the #COVID19 outbreak. Available at: <https://www.who.int/es/news-room/detail/05-04-2020-beactive-for-the-un-international-day-of-sport-for-development-and-peace> [Accessed: May 5, 2020].
- [64] Rodríguez MÁ, Crespo I, Olmedillas H. Exercising in times of COVID-19: what do experts recommend doing within four walls?. *Rev Esp Cardiol (Engl Ed)*. 2020; 73: 527-529. DOI: 10.1016/j.rec.2020.04.001
- [65] Borbón-Castro NA, Castro-Zamora AA, Cruz-Castruita RM, et al. The effects of a multidimensional exercise program on health behavior and biopsychological factors in Mexican older adults. *Front. Psychol*. 2020; 10: 2668. DOI: 10.3389/fpsyg.2019.02668
- [66] Haripriya S, Dhanesh KK, Sanjay ES, et al. The effect of a multicomponent exercise program on cognitive function and functional ability in community dwelling older adults. *International Journal of Research in Pharmaceutical Sciences*. 2020; 11: 109-114. doi: <https://doi.org/10.26452/ijrps.v11i1.1793>
- [67] Lemos ECWM, Guadagnin EC, Mota CB. Influence of strength training and multicomponent training on the functionality of older adults: systematic review and meta-analysis. *Revista Brasileira de Cineantropometria e Desempenho Humano*. 2020; 22: e60707. DOI:10.1590/1980-0037.2020v22e6070
- [68] Villegas SG, Rodríguez-Rodríguez V, Montes-de-Oca V, Rojo-Pérez F, Peralta LPG, Fernández-Mayoralas G. Envejecimiento activo, participación social y calidad de vida. Estudio comparativo entre Chile, España y México. *Anais*. 2017: 1-9.
- [69] Cisternas N, Plaza V, Gómez V, Arellano O, Sarabia L, Bruna B, Caro S, editors. *Necesidades Emergentes en Chile: Avances en investigación y propuestas de intervención para la promoción del envejecimiento activo desde la psicología*. Universidad Autónoma de Chile. 2018
- [70] Keskin D, Borman P, Ersöz M, Kurtaran A, Akyüz M. Los factores de riesgo relacionados con las caídas en mujeres mayores. *Enfermería geriátrica*. 2008; 29: 58-63.
- [71] Tobias JH, Gould V, Brunton L, Deere K, Rittweger J, Lipperts M, Grimm B. Physical activity and bone: may the force be with you. *Frontiers in Endocrinology*. 2014: 51-55. DOI: 10.3389/fendo.2014.00020