DOI 10.26773/jaspe.211004

Journal of Anthropology of Sport and Physical Education

REVIEW PAPER

The Impact of Recreational Exercises on Older Women: A Systematic Review

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Abstract

The aim of this study was to determine the effectiveness of regular exercise in the prevention system or the elderly in order to improve the quality of their life. The four electronic databases are researched for collecting articles (PubMed, ScienceDirect, Scopus and Web of Science). A search was conducted by title, taking a predefined combination of the following keywords into account: recreational exercise, Senior Fitness Test, older women. The search was undertaken in accordance with the PRISMA guidelines. 136 studies were identified, of which 18 met the inclusion criteria. It has been determined that regular physical activity enables the improvement of the quality of life and positively affects the health of the examined groups, but older people represent a physically inactive part of the population.

Keywords: *Recreational Exercise, Senior Fitness Test, Older Women*

Introduction

Since disability, non-communicable and degenerative diseases have become one of the biggest health problems, the extended life or longevity of people in the world directly depends on them. A state of well-being with a low risk of premature and without major health problems is important for successful aging. Even if the impact of physical activity and exercise on daily life activities is still poorly understood, regular training is very important for the physical and cognitive functioning of a healthy elderly population. Combined workouts that include strength, balance, flexibility, and activities that improve cardiorespiratory fitness are important to ensure the independence of older people.

Various electronic platforms today abound in studies that support the idea that physical activity and exercise can help mitigate the negative effects of age on the body and mind (McPhee et al., 2016). Together, all of these findings suggest that physical exercise is a promising nonpharmaceutical intervention to prevent cognitive decline and neurodegenerative diseases (Bherer, Erickson, & Liu-Ambrose, 2013).

The world's population is aging and the percentage of older people is constantly increasing. In 2015, the percentage over the age of 65 was about 8% of the global population. The projection for 2050 will be about 16%, which will be attended by about 1.5 billion people (World Health Organization, 2015). It is known that aging causes gradual changes in the body, which leads to loss of function, weakness, illness and death. There is also evidence that older people are among the most sedentary and physically inactive segments of society (Bajramovic et al., 2019). Focusing on the age of the population, we know that there is a loss of muscle mass of 0.5% -1% per year, which results in a decrease in strength and a decrease in rapid force production, which is crucial for preventing falls in the elderly.

Therefore, one of the main questions is related to the elderly: can we stop the negative changes in the body? No, we can't stop it, but we can suppress or slow down the decline in physical fitness and functional ability. We know that, with a proper and balanced diet, physical activity is the most effective way to combat the decline in functional abilities associated with aging (World Health Organization, 2000).

The World Health Organization (WHO) has published guidelines on the importance of physical activity in the elderly (World Health Organization, 2000). According to these guidelines, exercise is an effective and cost-effective way to prevent the decline in functional abilities of older people. Physical activity can help prevent and manage certain chronic diseases

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and conditions (Corluka, Krivokapic, Milosevic, Masanovic, & Bjelica, 2019). Strength, balance and flexibility exercises are the most effective strategies for preventing falls in older adults. The positive effects of physical activity are longer independence in care activities, higher self-esteem, better quality of life, longer life expectancy and reduced mortality. Also, a 42% reduction in the risk of a fall is another positive effect for older people (World Health Organization, 2000).

Today we know that some activity is better than none and that it is never too late to start. This means that older people will also benefit from activities even when they have been inactive most of their lives. Important findings are that even the smallest recommended amount of physical activity provides 30-50% of health benefits. More activity, up to a certain point (300 min / week), is better than a shorter duration of activity. The recommendation is 150 minutes of moderate-intensity physical activity per week, or 75 minutes if a strong intensity or equivalent combination is applied (World Health Organization, 2000).

WHO recommendations do not share one-week trainings. The amount of training does not have a prescription, but the minimum duration of exercise is 10 minutes. Additional health needs require 300 minutes of moderate training or 150 minutes of intense intensity or equivalent. The WHO recommends resistance exercises two or more days a week for major muscle groups. Elderly people with poor mobility, in order to reduce or prevent the number of falls and improve their balance, should exercise three or more days a week. Also, older people with disabilities should be physically active to the extent that conditioning allows them to do so (World Health Organization, 2000).

The aim of this study was to determine the impact of physical exercise on quality of life in women older than 60 years.

Methods

Search Strategy

To ensure a transparent and complete report, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed for conducting a systematic review (Moher, Liberati, Tetzla, & Altman, 2009). Four electronic databases explored for article collection were PubMed, ScienceDirect, Scopus and Web of Science. The combination of used keywords was the following: recreational exercise, Senior Fitness Test, older women. The screening processes have been summarized via the PRISMA flow diagram shown in Figure 1.

Inclusion Criteria

Scientific articles containing data on the impact of recreational exercises on older women were included. Eligibility criteria were the following: that they were written in English, that they were done in the period from 2012 to 2019, and that the respondents were women older than 60 years. Critical information on the included studies is described in the tables.

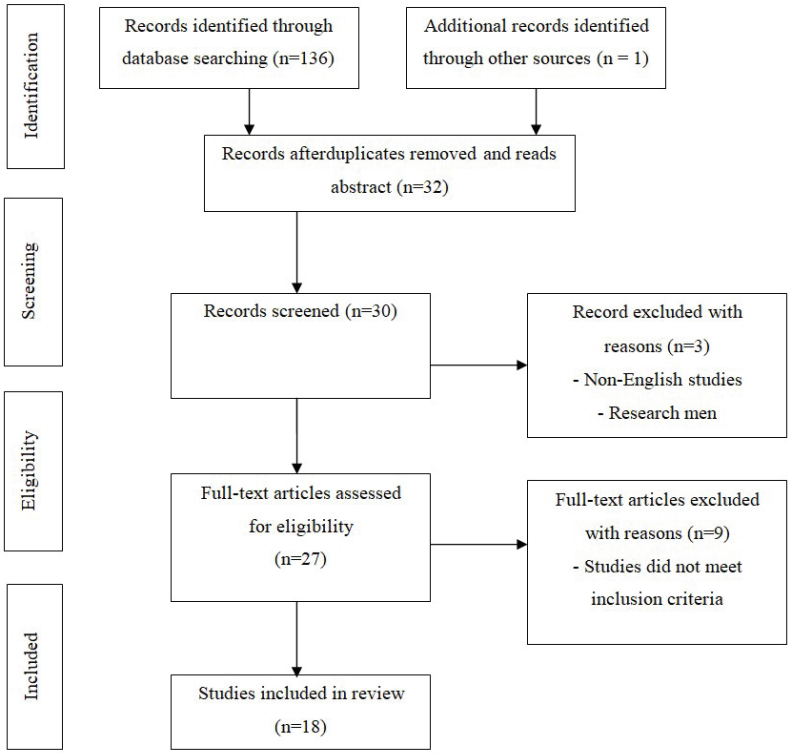

FIGURE 1. PRISMA flow diagram (Moher et al., 2009)

Exclusion criteria

Various publication formats are excluded such as reviews, meta-analyzes, abstracts, citations, abstracts of scientific conferences, books, book reviews, editorials, articles, and comments that have not been reviewed. Both qualitative and quantitative articles were taken into account. The analysis of functional conditions had to be done with a Senior Fitness Test (SFT) (Rikli & Jones, 2013).

Data Extraction and Selection

After performing a search in the databases, the necessary data were transferred to a software tool for publishing and managing bibliographies. The articles were downloaded from the databases, after which duplicates identified by title and author, were removed. The article screening was carried out in a three-step procedure: title reading, abstract reading, and then full-text reading, to decide whether or not to include them in the systematic review. Two researchers screened titles and abstracts of the remaining records. The following information was extracted from each study: author's name and year of publication, number of participants, procedure and conclusion.

Table 1. Brief descriptions of senior fitness test items (Rikli & Jones, 2013).

Assessment category	Test item	Test description
Lower body strength	30s chair stand	Number of full stands in 30s with arms folded across chest
Upper body strength	30s arm curl	Number of bicep curls in 30s holding hand weight (women 5lb; men 8lb)
Aerobic endurance	6 minutes walk or	Number of yards walked in 6 min around 50-yard course
	2 minutes step test (alternate aerobic test)	Number of full steps completed in 2 minutes, raising each knee to point mid-way between patella and iliac crest (score is number of times right knee reaches target)
Lower body flexibility	Chair sit-and-reach	From sitting position at front of chair, with leg extended and hands reaching toward toes, number of inches (+ or –) from extended fingers to tip of toe
Upper body flexibility	Back scratch	With one hand reaching over shoulder and one up middle of back, number of inches between extended middle fingers (+ or –)
Agility/dynamic balance	8-foot up-and-go	Number of seconds required to get up from seated position, walk 8 foot, turn, and return to seated position on chair
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Agility/dynamic balance	8-foot up-and-go	Number of seconds required to get up from seated position, walk 8 foot, turn, and return to seated position on chair

Results

Preliminary title and the abstract search revealed 136 articles both through PubMed, ScienceDirect, Scopus and Web of Science. After reviewing the abstract, duplicates were removed and 30 articles were considered acceptable for further examination. In addition, an article was added to the entire text that was not found during my initial search, but which was considered relevant. This one article was suggested by another researcher, who found them in the appropriate bibliography. Moreover, two other articles were removed due to the use of non-English language and without translation. Of the 27 articles analyzed, 9 were excluded from the review because thay did not meet inclusion criteria or unavailability of relevant data. Therefore, a total of 18 studies were included in this review.

Distribution of research from scientific journals on the effects of recreational exercises on older women according to years of publication is given in Figure 1.

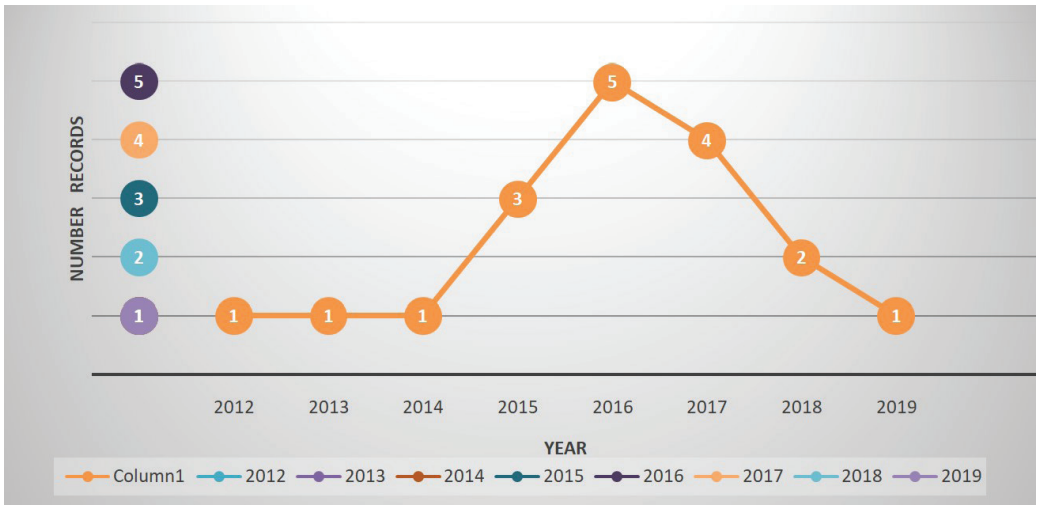

FIGURE 2. Distribution of research from scientific journals on the effects of recreational exercises on older women

In Table 2, the studies' characteristics are presented. Of the 18 studies included in the qualitative synthesis, a total sample of 8629 women over the age of 60 from the 10 countries was presented. Three studies were conducted in the United States, two in Portugal, Brazil, Spain, Hong Kong and Korea, and one each in the following countries: Thailand, Finland, Poland and Slovakia. The study period was between 2012 and 2019. Overall, the effects of participants in various tests were recorded, but the common test for all participants was the Senior Fitness Test. The test itself is explained in more detail in Table 1.

Table 2. Study design and characteristics

Author	Number of participans	Effects of recreational exercise	
		Procedure	Conclusion
Seguin et al. (2012)	367	This study assessed change in physical fitness following participation in a strength training ST program implemented and evaluated by community leaders. The Strong Women Program is a nationally disseminated, research-based, community ST program active in 40 states. Attendance is approximately 10 weeks of twice-weekly.	Significant improvements were observed ($p < .01$) in all Senior Fitness Test measures.
Gouveia et al. (2013)	401	The purposes of this study were to generate functional-fitness norms for Portuguese older adults, to determine age differences, and to analyze the physical activity-associated variation in functional fitness.	Active participants scored better in functional-fitness tests than their average and nonactive peers. This study showed a decline in functional fitness with age and increased proficiency of inactive participants.
de Oliveira Brito et al. (2014)	37	This study investigated the relationship between functional capacity and the estimated cardiovascular capacity in elderly women, as assessed by the Veterans Specific Activity Questionnaire (VSAQ). The assessment protocols used were the following: Anamnesis, VSAQ, and nomogram (age-adjusted), Senior Fitness Test.	The Spearman test showed a significant correlation ($p<0.001$) between the functional tests and the VSAQ. Adjustment of the results by age improved the correlation.
Furtado et al. (2015)	674	The purpose of this study to compare functional fitness (FF) levels among independent-living (IL) and daycare (DC) elderly women of different age groups and to analyze changes in FF after 8 months of participation in an exercise program intervention for the IL elderly women. The intervention consisted of multimodal exercise training, 3 days per week for 8 months.	The multimodal training was effective in improving all FF components related to daily living activities, in all age groups. In contrast, institutionalized elderly showed a clear tendency to worsen their FF over time.
Ruiz-Montero et al. (2015)	127	The aim of this study was to compare the physical fitness and quality of life-related to the health of a sample population of older adult women from Spain and Serbia (60-69 years). The physical fitness program comprised exercise of strength, agility, and aerobic capacity, centering on the Pilates program and Aerobic.	In conclusion, Serbian women were found to have better levels of physical fitness and quality of life than Spanish women.
Adamo et al. (2015)	88	The aim of this study was to identify age-related changes in physical abilities, such as strength and flexibility that contributed to functional losses. Three groups of women, aged 60 to 69, 70 to 79, and 80 to 92, were administered the Senior Fitness Test (SFT) to determine differences in physical abilities related to age and risk of functional loss.	The result of this study highlights differences in physical abilities related to age and the risk of losing independence in later life.
Marques et al. (2016)	3121	This cross-sectional study was designed to develop normative functional fitness standards for the Portuguese older adults, to analyze age and gender patterns of decline, to compare the fitness level of Portuguese older adults with that of older adults in other countries, and to evaluate the fitness level of Portuguese older adults relative to recently published criterion fitness standards associated with maintaining physical independence.	Results indicate that women experience age-related losses in all components of functional fitness, with their rate of decline being greater than that observed in other populations, a trend which may cause Portuguese older adults to be at greater risk for loss of independence in later years.
Noradechanunt et al. (2016)	29	Compare two 12-week low-intensity exercise regimens on components of physical function and quality of life in community-dwelling healthy yet sedentary adults aged over 60. This study used a randomized, multi-arm, controlled trial design.	The findings suggest that older adults can make significant improvements in their health and well-being by engaging in low-intensity Thai Yoga exercise.

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Author	Number of participans	Effects of recreational exercise	
		Procedure	Conclusion
Chung et al. (2016)	522	This study aimed to establish normative data for older adults in Hong Kong and explore age differences in functional fitness.	The results of this study may facilitate the understanding of functional fitness for the elderly in Hong Kong and helping out early detection of the risk of loss of functionality in elderly individuals. Differences in the degradation of the functional connection with aging fitness as well as differences in the milestones of degradation emphasize the need for the specific prevention of exercise for older adults.
Jantunen et al. (2016)	379	Helsinki Cohort Study. The aim was to explore the association between objectively measured PA and physical performance in old age.	The volume of objectively measured physical activity among older people was positively associated with the physical performance measured with a validated fitness test battery (SFT).
Chung et al. (2017)	449	This study aimed to explore the relationship between the functional fitness (FF) and health-related quality of life (HRQoL) in older adults and to identify the key subdimensions of FF and HRQoL influencing their overall relationship.	The overall FF was positively correlated with the overall HRQoL in women (canonical correlation=0.456). Physical functioning contributed the most to HRQoL in women. The main FF components influencing the relationship between FF and HRQoL whereas in women they are balance and agility and lower extremity muscle strength.
Nawrocka et al. (2017)	61	The aim of the study was to determine the number of older women who meet the guidelines of physical activity, and their level of functional fitness compared to women who are not physically active enough. Physical activity was monitored seven times in a row day of the week, using the ActiGraph GT3X three-meter acceleration meter.	In the examined group, 36.1% achieved the recommended level of physical activity. Women who met the recommendations on physical activity achieved significantly better results in experimental trials.
Kim et al. (2017)	21	This study aimed to identify the effects of 24 weeks of the Growing Stronger program on hippocampus volume and functional fitness of older women.	The results of this study suggest that strength exercise has beneficial effects on hippocampus volume and functional fitness. Therefore, strength exercise can be an effective exercise for older women.
Viladrosa et al. (2017)	171	The aim of this study was to compare fitness levels in women aged 60 and over participating in a supervised exercise program (involving tai chi, recreational gymnastics, and/or aquatic fitness) with those in a sedentary group.	Significant differences in fitness levels were observed when we compared the exercise groups with the sedentary group. Women with better fitness levels had a lower risk of suffering falls and greater autonomy in performing activities of daily living and instrumental activities of daily living. Agility and gait control were found to be independently associated with exercise groups.
Krčmárová et al. (2018)	31	The purpose of this study was to compare the effects of a 12-week strength training program performed in the morning and evening.	This study showed that the improvement of maximum strength, functional ability and some metabolic biomarkers were regardless of whether the training was performed in the morning or in the evening.
Ofei-Dodoo et al. (2018)	101	The purpose of this study was to investigate the lowest dose of MVPA (moderate/vigorous physical activity) to maintain functional fitness. The accelerometer determined by the level of daily activity was assessed for 7 days while the participants performed their usual daily activities.	The results indicate that an MVPA threshold of 20 min/day for 5 days is required to maintain lower body function in older women.

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Author	Number of participans	Effects of recreational exercise	
		Procedure	Conclusion
Nawrocka et al. (2019)	2013	The aim of this study was to identify the differences in functional fitness and quality of life among women over 60 years of age depending on their level of objectively measured physical activity (PA) according to Global Recommendations on Physical Activity for health.	Women who met the Physical Activity recommendations performed slightly better in most functional tests. Significant differences were found in the upper part of physical strength, dynamic balance.
Cho et al. (2019)	37	The purpose of this study was to investigate the effects of regular taekwondo training on physical fitness, neurotrophic growth factors, cerebral blood flow velocity, and cognitive function in elderly women.	These findings suggest that regular TKD training may be effective in improving not only fitness but also cognitive function in elderly women. The latter effect may be due to increased neurotrophic growth factor levels.

Discussion

Previous research on physical activity in the third age is very consistent and their conclusions are as follows: the increased amount of physical activity is associated with overall better quality of life (Wanderley, Silva, Marques, Oliveira, Mota, & Carvalho, 2011; Canuto Wanderley et al., 2015); the benefits of physical activity in the elderly reduce the risk of cardiovascular disease (Verret, Trouche, Zervas, & Rampon, 2007) and type 2 diabetes (Uritani et al., 2013); the benefits of physical activity in the reduced body fat are also evident (Krause et al., 2007), and in addition the elderly retain independence (Bouchard, Beliaeff, Dionne, & Brochu, 2007) and their risks of falls are reduced (Balzi et al., 2010).

Among the factors of a healthy lifestyle, physical activity is the most important determinant of active life (Chang et al., 2004). Physical activity for the elderly can be varied and includes the physical activity in their free time and during class physical activity (for example walking, dancing, gardening, long walks, swimming), housework and family activities, and community activities (Ostojić et al., 2009). Physical exercise for the elderly includes planning and programming training aimed at maintaining or improving certain components of physical fitness, such as aerobic training, muscle strength training, flexibility, balance, and fall prevention, which use health improvement and prevention of various diseases (Garber et al., 2011).

By reviewing the articles that were included into the qualitative synthesis of this study, which determines the impact of recreational physical activity on older women, we can group several results. One group of researchers analyzed the functional capacity of older women in their country and compared them with the results of older women from other countries (Gouveia et al., 2013; Ruiz-Montero et al., 2015; Marques et al., 2013). Based on the results, they were able to plan new projects to improve the quality of life of women in their country. The second group of authors dealt with the analysis of programmed training that was realized over a longer period of time (several months). Very positive results have appeared after the implemented programs and this type of health prevention in older women can be recommended as a cheap way to improve the quality of life of older women (Seguin et al., 2012; Furtado et al., 2015; Noradechanunt et al., 2017; Kim et all., 2017; Krcmarova et al., 2018; Cho & Roh, 2019). The next group of authors dealt with the generation of norms for the assessment of functional fitness and general condition in older women. By establishing, norms provide guidelines for the organization of future projects aimed at improving the functional abilities of the elderly (Gouveia et al., 2013; Chung et al., 2016). Based on functional fitness testing, a group of authors assessed the autonomy and independence of older women in everyday life, as well as the quality of life of these women. Based on the results, they concluded that with the increase in the number of years, functional abilities in humans also decrease (de Oliveira Brito et al., 2014; Adamo et al., 2015; Jantunen et al., 2017; Chung et al., 2017). One group of authors researched the activities of older women in everyday life based on World Health Organization (WHO) recommendations. They also investigated the minimum dose of physical activity in the daily lives of older people that are needed to meet the WHO recommendation on the physical activity of older women (World Health Organization, 2015).

Conclusion

The paper identifies an assessment of the effectiveness of including regular exercise in the prevention system for the elderly over the age of 60, in order to improve the quality of life. The researches cited in the paper used the SFT (Senior Fitness Test) as an analysis tool. Different analyzes of the quality of life of older and older people who regularly engage in various forms of physical activity and those who lead a physically passive lifestyle were compared. It has been determined that regular physical activity enables the improvement of the quality of life and positively affects the health of the examined groups, but older people represent a physically inactive part of the population. The main reasons for the physical inactivity of older people are the presence of illness, fear of injuries and falls, lack of energy and weakness, low level of motivation, lack of partners or friends for joint activities, etc. They have shown that regular physical activity improves the quality of life of older and older people. This was shown not only by the results and analyzes when the intervention and control groups were compared but also by the age differences in the quality of life in all examined groups. In the population that records regular physical activity, an increase in quality of life was noted by assessing the scales of physical functioning, overall health, emotional functioning, vitality, psychological health, and social functioning, which are correlated with physical and psychological components of health.

These results provide an opportunity to recommend physical activity as the simplest and most affordable prevention for the elderly population. Physical activity helps to overcome the main causes and deprives the body of functional abilities and aging. Gerontotechnologies based on regular physical activities are one of the most effective ways to improve and maintain quality of life, as a result of which activity, mobility, and the ability to function independently in the elderly are diagnosed.

The proposal of future research is to investigate and compare physical activity in the population older than 60 years, living in rural areas, and in the population living in urban areas. The limitation of this study is that it does not divide the urban-rural so we recommend it for the next studies.

Acknowledgments
There are no authors acknowledgments.

Conflict of Interest
The authors declare that there is no conflicts of interest.

Received: 26 April 2021 | **Accepted:** 20 July 2021 | **Published:** 15 October 2021

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