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Promoting social inclusion and quality of life in older adults through aerobic exercise programs

Promoção da inclusão social e da qualidade de vida em idosos por meio de programas de exercícios aeróbicos

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ABSTRACT

Background: Aging is an individual and collective process that alters health and quality of life of older adults. It deteriorates the musculoskeletal, neuromuscular and cardiovascular systems and causes damage to functionality. In the same way, the main risk factors for chronic diseases are overweight and sedentary lifestyle. The key to improve the quality of life is to be physically and mentally active. **Objective:** to apply an intervention to improve the life quality of older adults through an aerobic exercise program. **Methods:** a quantitative, observational and longitudinal approach was applied. The program lasted 12 weeks with an initial and final evaluation. The population consisted of 30 older adults, who underwent a warm-up, aerobic exercise (dance therapy) and flexibility and stretching exercises. The SF-36 quality of life questionnaire and the International Physical Activity Questionnaire (IPAQ) were used. **Results:** it was established with a value $p<0.001$ that the dimensions evaluated by the SF-36 questionnaire improved. There was a change in physical function, physical role, bodily pain, general health, vitality, social function, emotional role and mental health, as well as in the level of physical activity. **Conclusions:** a positive change was observed. The aerobic exercise program reduces the musculoskeletal pain associated with aging and produces an increase in physical functionality. As a consequence, it favors an improvement in self-efficacy and self-esteem.

Keywords: Quality of Life; Exercise; elderly; social inclusion;

RESUMO

Antecedentes: O envelhecimento é um processo individual e coletivo que altera a saúde e a qualidade de vida dos idosos. Deteriora os sistemas musculoesquelético, neuromuscular e cardiovascular e causa prejuízos à funcionalidade. Da mesma forma, os principais fatores de risco para doenças crônicas são o sobrepeso e o sedentarismo. A chave para melhorar a qualidade de vida é ser fisicamente e mentalmente ativo. **Objetivo**: aplicar uma intervenção para melhorar a qualidade de vida de idosos por meio de um programa de exercícios aeróbicos. **Métodos**: foi aplicada uma abordagem quantitativa, observacional e longitudinal. O programa durou 12 semanas com uma avaliação inicial e final. A população foi composta por 30 idosos, que realizaram aquecimento, exercícios aeróbicos (dançaterapia) e exercícios de flexibilidade e alongamento. Foram utilizados o questionário de qualidade de vida SF-36 e o Questionário Internacional de Atividade Física (IPAQ). **Resultados**: constatou-se com valor $p<0,001$ que as dimensões avaliadas pelo questionário SF-36 melhoraram. Houve alteração na função física, papel físico, dor corporal, saúde geral, vitalidade, função social, papel emocional e saúde mental, bem como no nível de atividade física. **Conclusões**: observou-se uma mudança positiva. O programa de exercícios aeróbicos reduz as dores musculoesqueléticas associadas ao envelhecimento e produz um aumento na funcionalidade física. Como consequência, favorece a melhora da autoeficácia e da autoestima.

Palavras-chave: Qualidade de Vida; Exercício Físico; Idoso; inclusão social.

INTRODUCTION

The World Health Organization (WHO) defines Quality of Life (QoL) as "a person's appreciation of life in the context of the culture and value system in which they live in relation to their goals". In the same way, the main risk factors for chronic diseases are overweight and physical inactivity, which are particularly worrying in older adults since they deteriorate QoL (Parsuraman et al., 2021).

Aging worldwide is on the rise. It is expected that by the year 2050 the elderly population will increase to 1.5 billion. It is a universal, natural and irreversible process. This alters, considerably, areas such as health and quality of life (Henskens et

al., 2018). Because of this, it becomes difficult for the individual to interact in their context since it also affects abilities in different biological areas (Izquierdo et al., 2021). The QoL is deteriorated and it is necessary to optimize this parameter. The purpose of the programs is to control the deterioration of the musculoskeletal, neuromuscular, and cardiovascular systems, so that the human being is independent and functional (Welford et al., 2022).

In Ecuador, according to the National Institute of Population and Housing Census (INEC), in 2018 there was an average of 1,229,089 older adults. This indicates that between 2020 and 2050 the proportion will increase from 7 to 28%. But the conditions they have are poverty and extreme poverty with basic needs. 14.6% of households are made up of abandoned elderly people in vulnerable conditions who do not have access to any State benefit (Fernández et al., 2022).

In the Province of Bolivar, in Ecuador, there are 3825 older adults in a situation of extreme poverty and conditions of solitude. With this, a deterioration in the activities of daily living is identified, such as cognitive ones, and with a decline in their QoL. Based on this background, projects are created in favor of vulnerable people. In order to provide comprehensive care to this population, participation spaces are opened and also centers that benefit them through home care, among other modalities. (Social, 2021).

Aerobic Exercise (AE) can reduce susceptibility to certain preventable chronic diseases, decrease mortality, and improve health in older adults. The AE program must be individualized in terms of frequency, time, intensity, volume, and progression (Espejo Antúnez et al., 2018). So cardiovascular, respiratory, skeletal muscle, and neuromuscular responses can be obtained. For this reason, aerobic training should be continued as a long-term treatment to maintain this favorable effect (López-Téllez et al., 2022). It has been demonstrated that sports and non-conventional physical activities can improve the health of the elderly (Costa & Dias, 2023).

One of the activities is dancing which improves physical function, and quality of life. They also show that it can be significant to optimize self-esteem. The state of health and aerobic fitness was evaluated. Positive results were obtained, revealing that QoL itself improves lifestyle (Slimani et al., 2018). At present, the findings show that AE significantly restores physical and mental functioning of sedentary older adults, as well as walking and running slowly, with an intensity of 20 to 30 minutes. This contributes to reducing activity limitations and increasing health. Therefore, it enables well-being in the elderly (Font-Jutglà et al., 2020).

The main purpose of the AE is to reduce the loss of strength, mobility, balance and resistance caused by a sedentary lifestyle, which makes daily activities of older adults inadequate. The National Institute on Aging states that it is vitally important to perform 4 types of exercises: resistance, strength, balance, and flexibility (Bai et al., 2022). By combining them they have shown more benefits. A main activity recommended by the American College of Sports Medicine (ACSM) is dancing. This helps older adults get distracted and improve their QoL (Martínez-Moreno et al., 2020). Likewise, muscular strength exercises are important for the elderly to prevent muscle loss, improve functional performance, maintain bone mineral density and prevent falls (Mishra & Shukla, 2022).

The key to improving QoL is to stay active both physically and mentally. It helps to delay chronic diseases in older adults and improve the psychological part (Evaristo et al., 2019). A study in Europe indicates that moderate intensity of daily exercise has positive changes in QoL, in mental well-being at an advanced age (Federici & Palanca, 2019). The relationship between intensity and exercise produces an optimal emotional change resulting in a healthy lifestyle (Shams et al., 2021). But older adults are unable to maintain physical activity for a long time due to age, due to their retention capacity, bodily functions degenerate and can make it difficult for older people to maintain exercise in different environmental circumstances. So it is advisable to be supervised or have a guide for the elderly to maintain their physical condition (Langhammer et al., 2018).

With all the aforementioned problems, there is a need to promote physical activity (PA); which presents beneficial factors especially in the skeletal muscle part. Exercise promotes healthy aging. In research projects, AE is meant to have an impact on the volume of the anterior hippocampus, helping improve spatial memory that is affected by age-related atrophy (De Jesús Martínez Pérez et al., 2018). In the same way, in QoL they indicate a recovery of 22.5% in the evaluation and suggest promoting physical activity programs for older adults (Daimiel et al., 2020).

As mentioned above, the objective of this research is to apply an intervention for the life quality of the elderly through an aerobic exercise program.

METHODS

The current project is descriptive with a quantitative approach, longitudinal cut. The exercise protocol was tested to establish its utility in the quality of life. The study population was made up of 30 older adults without physical limitations from the "Años Dorados" Unit. It is located in the San Sebastián Parish, Bolívar Province, Ecuador. It is a census sample and we

worked with the entire population.

The inclusion criteria are: older adults without functional limitation, previously evaluated with the Barthel Index Scale. Scores of 100, which is independence, and 91 to 99, which is low dependence were accepted. Also, older adults without hypertension problems were included. The exclusion criteria are: older adults with respiratory and cardiac diseases, and with serious physical disabling diseases.

The tests used were the Health-Related Quality of Life Questionnaire (SF-36) Version (V2) to assess the state of health and health-related quality of life. It is applicable to both patients and general population. For each dimension of the SF-36, the items are coded, aggregated, and transformed into a scale ranging from 0 to <50 (worst state of health) and 51 to >100 (best state of health). It uses algorithms e indications offered by the scoring and interpretation manual of the questionnaire. Therefore, a higher score in the different dimensions indicates a better state of health and quality of life (Vilagut et al., 2017). This questionnaire was found coded using the formula Transformed Scale (real raw score, lowest possible raw real score/maximum possible range of the raw score) *100 which becomes a value over 100 (Alonso, 2003). It highlights the level of reliability, and validity. A Cronbach's alpha coefficient was obtained with a value ranging between 0.90, proving its usefulness to assess the quality of life (Lugo & García, 2018). The International Physical Activity Questionnaire (IPAQ) is an adequate instrument for the evaluation of the physical activity of older adults. It consists of 7 questions about the frequency, duration and intensity of the activity (moderate and intense) carried out in the last seven days, as well as walking and sitting time. Weekly physical activity is measured by recording the unit of measurement of the metabolic rate in METs-min-week. After calculating the physical activity index, whose value corresponds to the product of the intensity (in METs), by the frequency, and by the duration of the activity, the subjects are classified into 3 categories. This is according to certain conditions such as low, moderate or high. The reliability and validity is 0.95, which indicates that it is useful for evaluation (Arango Vélez et al., 2020).

An aerobic exercise protocol was applied based on the Physical Exercise Guide for older adults of the Spanish Society of Geriatrics and Gerontology (Sociedad Española de Geriatría y Gerontología, 2012). It had a duration of three months. The frequency was three times a week with a duration of 60 minutes. They underwent a warm-up, aerobic exercise (dance therapy with different rhythms such as San Juanito and National Music) and ended with exercises of flexibility and stretching. It was divided into weeks which are detailed below.

The first week, the patient was informed about the treatment that was going to be carried out and the process that would be carried out during the 3 months was explained. If the patient wishes to participate, they will sign the informed consent. And if they do not wish to participate, they will be asked for the reason they do not want to. After that, the initial evaluation was carried out with the SF-36 and IPAQ scale.

From the second to the tenth week, warm-up was performed. Aerobic exercises, stretching exercises, and flexibility of the upper and lower extremities were gradually increased as the older adults were monitored. The final evaluation was carried out with the SF-36 and IPAQ scale in the eleventh and twelfth week.

For the statistical analysis, the IBM SPSS Statistics 29.0 program was used. For each dimension of health, they were calculated with descriptive statistics where the mean and standard deviation were analyzed. And to check the significance $p<0.05$, the student's T test for paired samples was used. Regarding ethical aspects, the project was approved by the Ethics Committee of the Faculty of Health Sciences of the Technical University of Ambato with the resolution COD. 036-CEISH-UTA-2023. It guarantees autonomy and confidentiality, good clinical practices. And a standardized informed consent was made requesting the patient's signature.

RESULTS

Table 1. Sociodemographic characteristics of older adults at the "Años Dorados" Care Unit

Sociodemographic characteristics		Frequency	Percentage (%)
Age	65 a 74	17	57
	75 a 90	13	43
Genre	Female	17	57
	Male	13	43
Anthropometric evaluation	Normal	10	33
	Overweight	16	53
	Mild obesity	2	7
	Moderate obesity	2	7

Source: SF-36 Questionnaire

Analysis and interpretation

It was observed that the older adults who participated in the research presented a higher frequency of age between 65 to 74 years with 57% considered as advanced age. Most of the study population corresponds to the female group with 57% and the male group with 43%. 53% of the elderly are overweight, 33% with a normal weight and 7% with moderate obesity and mild obesity respectively.

Table 2. Descriptive statistics of the initial and final evaluation of the dimensions of the SF-36 Questionnaire

Quality of life	Initial evaluation Mean / Standard Deviation	Final evaluation Mean / Standard Deviation
Physical Function	48,53 ± 7,87	56,27 ± 7,31
Physical Role	42,73 ± 4,84	49,40 ± 5,73
Bodily Pain	40,67 ± 6,13	48,73 ± 6,33
General Health	40,23 ± 6,17	52,37 ± 5,71
Vitality	39,63 ± 7,14	52,33 ± 9,43
Social Function	40,20 ± 5,93	56,87 ± 7,54
Emotional Role	39,23 ± 7,14	65,33 ± 10,12
Mental Health	42,80 ± 5,22	56,43 ± 8,26

0 a < 50 (worst state of health) up to 51 to >100 (best state of health)
Source: SF-36 Questionnaire

Analysis and interpretation

The descriptive data of the different dimensions of the SF-36 Questionnaire of the pretest were analyzed. The means of the scores that evaluate the quality of life were demonstrated. The most affected dimensions were found in emotional role with 39.23 ± 7.14; vitality with 39.63 ± 7.14; general health with 40.23 ± 6.17; social function 40.20 ± 5.93 and bodily pain with 40.67 ± 6.13. It assures that, in the pretest the different dimensions of older adults have a worse state of health since it is < 50. In the posttest, the means of the scores that evaluate the quality of life. Compared to the pretest, the best perceptions were found in the emotional role with 65.33 ± 10.12; physical function with 56.27 ± 7.31; the social function with 56.87 ± 7.54; mental health with 56.43 ± 8.26 and general health with 52.37 ± 5.71. It shows that in most dimensions they have a better state of health.

Hypothesis contrast:

H_0 (Null hypothesis) = The Aerobic Exercise Program does not improve the quality of life of older adults.

H_1 (Alternative hypothesis) = The Aerobic Exercise Program does improve the quality of life of older adults.

Significance level: 5% = (p<0.05)

Statistical Test: Student's T test for related samples

Table 3. Test of related samples pre and post SF-36 Questionnaire

Quality of Life	Paired samples test Paired differences					Significance	
	Mean	Standard Deviation	Mean standard error	95% confidence interval of the difference Inferior	Superior	P of 1 factor	P of 2 factors
Physical function _POST TEST - Physical function _PRE TEST	7,733	5,304	,968	5,753	9,714	<,001	<,001
Physical Role_POST TEST - Physical Role _PRE TEST	6,667	4,482	,818	4,993	8,340	<,001	<,001
Bodily pain_POST TEST - Bodily pain_PRE TEST	8,067	5,119	,935	6,155	9,978	<,001	<,001
General Health_POST TEST - General Health _PRE TEST	12,133	7,310	1,335	9,404	14,863	<,001	<,001
Vitality_POST TEST - Vitality_PRE TEST	12,700	8,832	1,613	9,402	15,998	<,001	<,001
Social Function_POST TEST - Social Function _PRE TEST	16,667	5,628	1,028	14,565	18,768	<,001	<,001
Emotional Role_POST TEST - Emotional Role _PRE TEST	26,100	10,118	1,847	22,322	29,878	<,001	<,001
Mental Health_POST TEST - Mental Health_PRE TEST	13,633	10,301	1,881	9,787	17,480	<,001	<,001

Source: SF-36 Questionnaire

Analysis and interpretation

After comparing the data obtained before and after applying the aerobic exercise program, it is possible to observe that in all the dimensions evaluated by the SF-36 questionnaire there is a significant change in physical function, physical role, bodily pain, general health, vitality, social function, emotional role and mental health. A statistical test called t-student for related samples was used to evaluate the significance of the results, and it was found that the value was $p<0.001$. It indicates that it had a statistically significant effect in improving the quality of life of the elderly of the San Sebastián Parish.

Table 4. Descriptive statistics of the initial and final evaluation of the level of physical activity and Test of related samples

	Initial evaluation		Final evaluation		Sig. (bilateral)
Physical activity level	Frequency	Percentage (%)	Frequency	Percentage (%)	PHYSICAL ACTIVITY LEVEL _PRE TEST - PHYSICAL ACTIVITY LEVEL _POS TEST
Low	28	93	-	-	,000
Moderate	2	7	22	73	
High	-	-	8	27	

Source: IPAQ Questionnaire

Analysis and interpretation

The frequency of physical activity according to the assessment of the IPAQ questionnaire in the pretest is 93% of older adults with a low level and 7% with a moderate level. In the posttest it is 27% of older adults with a high level and 73% with a moderate level. In comparison with the data obtained before and after applying the aerobic exercise program, it is evident that physical activity improves significantly. The t-student test for related samples was used to evaluate the significance of the results and it was found that the value was $p<0.001$. This shows that the level of physical activity in older adults increases.

DISCUSSION

Once the information was selected and the data detailed, it was possible to analyze that the aerobic exercise program improves the elderly's quality of life.

In the results obtained, a greater participation of female older adults was identified, representing 57%. Concerning the Body Mass Index (BMI) a high percentage of overweight elderly was found. It represented 53% of the population. In correlation with the research by Maung et al., (2022) on the impact of aerobic exercise and the strengthening of the quality of life of older adults, it indicates that their sociodemographic data were a high percentage of women with 54% and they were overweight in 61. It established that the quality of life deteriorates more in women and being overweight is the cause of it.

The SF-36 health-related quality of life questionnaire was completed. The different dimensions were evaluated and an improvement in physical function, physical role, bodily pain, general health, vitality, social function, emotional role, mental health was evidenced in the post-test. It proved that, in most dimensions they have a better state of health. In relation to other research projects and with similar results. Amini et al., (2018) states that the aerobic exercise program significantly improves the general quality of life with physical and mental functioning in sedentary older adults of healthy age. They affirm that aerobic exercises can increase the potential of the elderly to perform their daily tasks. The findings showed that regular walking and slow running improve physical and mental quality of life. So it can be adopted by health specialists as a safe and economical strategy.

Likewise, Oliveira et al., (2019) show that the higher scores obtained by physically active older adults indicated a better quality of life. Therefore, the high scores observed in the various domains of this group (physical and social aspects, vitality and functional capacity) positively influenced the functional independence of the elderly. In addition, they were statistically associated with a better general state of health, physical activity. When performed collectively, it promotes both physical and psychological progress. In the same way, aerobic exercise benefits older adults by helping joint mobility that allows preserving joint function and its range of movement, as well as improving muscle tone. This recovery of strength and resistance will allow us to reduce general body fatigue and gain independence in the elderly (Avers, 2018).

Lo et al., (2021) point out that 12-week individualized aerobic exercise training combined with motivational telephone interviewing had significant beneficial effects on physical activity. Aerobic exercise can reduce susceptibility to certain preventable chronic diseases, decrease mortality, and improve health in the elderly. They recommend that the aerobic exercise program should be individualized in terms of frequency, time, intensity, volume, and progression. This should be

performed altogether in order to obtain cardiovascular, respiratory, skeletal muscle, and neuromuscular responses. Therefore, it must be continued as a long-term treatment to maintain this favorable effect.

Regarding the IPAQ questionnaire, and through the data obtained before and after applying the intervention during the pre-test, the level of physical activity of the elderly was low with 93% and 7% with a moderate level. In the post-test, a progress of 27% high level and 73% with moderate level was seen. It tells us, that physical activity increased significantly, benefiting muscle strengthening, which directly affects the physical functionality of the individual.

Lepsy et al., (2021) showed that the quality of life, in physical, psychological, social and environmental domains, was significantly better in older adults with higher levels of physical activity by 80%. They were evaluated with the use of the International Questionnaire of Physical Activity (IPAQ). This type of activity helps cardiorespiratory, metabolic and musculoskeletal processes and thus improves quality of life.

CONCLUSIONS

Regarding the evaluation of the elderly's life quality of the San Sebastián Parish through the SF-36 questionnaire, the data collected showed that the most affected dimensions were the emotional role, vitality, general health, social function and bodily pain. This ensures that older adults have a worse state of health. The level of physical activity, through the International Physical Activity Questionnaire (IPAQ), showed that 93% of older adults had a low level and 7% had a moderate level.

By applying the aerobic exercise program, based on the Physical Exercise Guide for older adults of the Spanish Society of Geriatrics and Gerontology, a positive change was evidenced. It reduced musculoskeletal pain associated with aging and produced an increase in physical functionality. As a consequence, it promotes an improvement in self-efficacy and self-esteem.

In the results obtained with the application of the aerobic exercise program in the final evaluation, characteristic improvements were presented in all the dimensions evaluated by the SF-36 questionnaire. There is a change in physical function, physical role, body pain, general health, vitality, social function, emotional role and mental health. It was found that the p-value was 0.001, which indicates that it had a statistically significant effect in improving the quality of life of the elderly in the San Sebastián Parish. And in the IPAQ questionnaire, there was 27% of older adults with a high level and 73% with a moderate level, which proves that the physical activity increased. In summary, aerobic exercises help to improve the quality of life.

REFERENCES

Alonso, J. cols. (2003). Versión española de SF-36. *Health Survey*, *2*(2), 1–8. https://ginvestigaciontmo.files.wordpress.com/2018/07/sf-36-cuestionario.pdf

Amini, M., Mirmoezzi, M., Salmanpour, M., & Khorshidi, D. (2018). Effect of 8-Week of Selected Aerobic Exercises on Improving the Quality of Life in Healthy Aged Sedentary Men. *International Journal of Sport Studies for Health*, *10*(2), 0–4. https://doi.org/10.5812/intjssh.67514

Arango Vélez, E. F., Echavarría Rodríguez, A. M., Aguilar González, F. A., & Patiño Villada, F. A. (2020). Validación de dos cuestionarios para evaluar el nivel de actividad física. *Revista Facultad Nacional de Salud Pública*, *38*(1), 1–11. https://doi.org/10.17533/udea.rfnsp.v38n1e334156

Avers, D. (2018). Aerobic exercise for older adults. *Annual Review of Gerontology and Geriatrics*, *36*(1), 123–154. https://doi.org/10.1891/0198-8794.36.123

Bai, X., Soh, K. G., Omar Dev, R. D., Talib, O., Xiao, W., Soh, K. L., Ong, S. L., Zhao, C., Galeru, O., & Casaru, C. (2022). Aerobic Exercise Combination Intervention to Improve Physical Performance Among the Elderly: A Systematic Review. *Frontiers in Physiology*, *12*(1), 1–13. https://doi.org/10.3389/fphys.2021.798068

Costa, A. V., & Dias, M. F. S. (2023). Desafios para o ensino dos esportes não convencionais com pessoas idosas: a realidade de um Centro de Referência de Assistência Social. *Ibero-American Journal of Health Science Research*, *3*(1), 27-33.

Daimiel, L., Martínez-González, M. A., Corella, D., Salas-Salvadó, J., Schröder, H., Vioque, J., Romaguera, D., Martínez, J. A., Wärnberg, J., Lopez-Miranda, J., Estruch, R., Cano-Ibáñez, N., Alonso-Gómez, A., Tur, J. A., Tinahones, F. J., Serra-Majem, L., Micó-Pérez, R. M., Lapetra, J., Galdón, A., … Ordovás, J. M. (2020). Physical fitness and physical activity association with cognitive function and quality of life: baseline cross-sectional analysis of the PREDIMED-Plus trial. *Scientific Reports*, *10*(1), 1–12. https://doi.org/10.1038/s41598-020-59458-6

De Jesús Martínez Pérez, T., María González Aragón, C., León, G. C., & Aguiar, B. G. (2018). El envejecimiento, la vejez y la calidad de vida: ¿éxito o dificultad? Aging, Elderly and Quality of Life: Success or Difficulty? *Artículos Especiales*, *8*(1), 50–65. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S2221-24342018000100007&lng=es&tlng=es

de Oliveira, L. D. S. S. C. B., Souza, E. C., Rodrigues, R. A. S., Fett, C. A., & Piva, A. B. (2019). The effects of physical activity on anxiety, depression, and quality of life in elderly people living in the community. *Trends in Psychiatry and Psychotherapy*, *41*(1), 36–42. https://doi.org/10.1590/2237-6089-2017-0129

Espejo Antúnez, L., Cardero Durán, M. Á., Caro Puértolas, B., & Téllez de Peralta, G. (2018). Efectos del ejercicio físico en la funcionalidad y calidad de vida en mayores institucionalizados diagnosticados de gonartrosis. *Revista Espanola de Geriatria y Gerontologia*, *47*(6), 262–265. https://doi.org/10.1016/j.regg.2011.06.011

Evaristo, S., Moreira, C., Lopes, L., Oliveira, A., Abreu, S., Agostinis-Sobrinho, C., Oliveira-Santos, J., Póvoas, S., Santos, R., & Mota, J. (2019). Muscular fitness and cardiorespiratory fitness are associated with health-related quality of life: Results from labmed physical activity study. *Journal of Exercise Science and Fitness*, *17*(2), 55–61. https://doi.org/10.1016/j.jesf.2019.01.002

Federici, A., & Palanca, R. (2019). Home-fitness: Physical exercise and elderly's quality of life. *Journal of Physical Education and Sport*, *19*(5), 1852–1855. https://doi.org/10.7752/jpes.2019.s5273

Fernández, D. O., Tamayo, A. A., Costa, C., & Pérez, D. C. (2022). *ecuatorianos Physical activity and its impact on the quality of life in Ecuadorian older adults EL envejecimiento saludable comprende el fomento y mantenimiento de la capacidad funcional*. *26*(2), 1–16. https://revcocmed.sld.cu/index.php/cocmed/article/view/4403/2119

Font-Jutglà, C., Mur Gimeno, E., Bort Roig, J., Gomes da Silva, M., & Milà Villarroel, R. (2020). Effects of mild intensity physical activity on the physical condition of older adults: A systematic review. In *Revista Espanola de Geriatria y Gerontologia* (Vol. 55, Issue 2, pp. 98–106). Ediciones Doyma, S.L. https://doi.org/10.1016/j.regg.2019.10.007

Henskens, M., Nauta, I. M., Drost, K. T., & Scherder, E. J. A. (2018). The effects of movement stimulation on activities of daily living performance and quality of life in nursing home residents with dementia: A randomized controlled trial. *Clinical Interventions in Aging*, *13*, 805–817. https://doi.org/10.2147/CIA.S160031

Izquierdo, M., Merchant, R. A., Morley, J. E., Anker, S. D., Aprahamian, I., Arai, H., Aubertin-Leheudre, M., Bernabei, R., Cadore, E. L., Cesari, M., Chen, L. K., de Souto Barreto, P., Duque, G., Ferrucci, L., Fielding, R. A., García-Hermoso, A., Gutiérrez-Robledo, L. M., Harridge, S. D. R., Kirk, B., … Singh, M. F. (2021). International Exercise Recommendations in Older Adults (ICFSR): Expert Consensus Guidelines. *Journal of Nutrition, Health and Aging*, *25*(7), 824–853. https://doi.org/10.1007/s12603-021-1665-8

Langhammer, B., Bergland, A., & Rydwik, E. (2018). The Importance of Physical Activity Exercise among Older People. *BioMed Research International*, *3*(2), 13–15. https://doi.org/10.1155/2018/7856823

Lepsy, E., Radwańska, E., Żurek, G., Żurek, A., Kaczorowska, A., Radajewska, A., & Kołcz, A. (2021). Association of physical fitness with quality of life in community-dwelling older adults aged 80 and over in Poland: a cross-sectional study. *BMC Geriatrics*, *21*(1), 1–15. https://doi.org/10.1186/s12877-021-02421-5

Lo, Y. P., Chiang, S. L., Lin, C. H., Liu, H. C., & Chiang, L. C. (2021). Effects of individualized aerobic exercise training on physical activity and health-related physical fitness among middle-aged and older adults with multimorbidity: A randomized controlled trial. *International Journal of Environmental Research and Public Health*, *18*(1), 1–17. https://doi.org/10.3390/ijerph18010101

López-Téllez, A., Río Ruiz, J., López-Martí, H., Calderón Río, V., Molinero Torres, F., & López-Martí, A. M. (2022). Quality of life after a social-physical activity community intervention in elderly people with social risk. *Semergen*, *48*(6), 394–402. https://doi.org/10.1016/j.semerg.2022.03.005

Lugo, L., & García, H. (2018). Confiabilidad del cuestionario de calidad de vida en salud SF-36 en Colombia. *Revista Facultad Nacional de Salud Publica*, *24*(2), 37–50. http://www.scielo.org.co/pdf/rfnsp/v24n2/v24n2a05.pdf

Martínez-Moreno, A., Ibáñez-Pérez, R. J., Cavas-García, F., & Cano-Noguera, F. (2020). Older adults' gender, age and physical activity effects on anxiety, optimism, resilience and engagement. *International Journal of Environmental Research and Public Health*, *17*(20), 1–15. https://doi.org/10.3390/ijerph17207561

Maung, T. M., Jain, T., Madhanagopal, J., Naidu, S. R. L. R., Phyu, H. P., & Oo, W. M. (2022). Impact of Aerobic and Strengthening Exercise on Quality of Life (QOL), Mental Health and Physical Performance of Elderly People Residing at Old Age Homes. *Sustainability (Switzerland)*, *14*(17), 10881. https://doi.org/10.3390/su141710881

Mishra, S. S., & Shukla, S. (2022). Effect of Indian folk-dance therapy on physical performances and quality of life in elderly. *Scientific Reports*, *14*(1), 244–251. https://doi.org/10.2478/bhk-2022-0030

Parsuraman, G., , Pooja Vijayakumar , V.M. Anantha Eashwar , Ruma Dutta, Y. M., , Timsi Jain, D. K., Chandru, N., & Sivakumar, K. (2021). An epidemiological study on quality of life among elderly in an urban area of Thirumazhisai, Tamilnadu. *Journal of Family Medicine and Primary Care*, *6*(2), 169–170. https://doi.org/10.4103/jfmpc.jfmpc

Shams, A., Nobari, H., Afonso, J., Abbasi, H., Mainer-Pardos, E., Pérez-Gómez, J., Bayati, M., Bahrami, A., & Carneiro, L. (2021). Effect of Aerobic-Based Exercise on Psychological Well-Being and Quality of Life Among Older People: A Middle East Study. *Frontiers in Public Health*, *9*(1), 1–10. https://doi.org/10.3389/fpubh.2021.764044

Slimani, M., Ramirez-Campillo, R., Paravlic, A., Hayes, L. D., Bragazzi, N. L., & Sellami, M. (2018). The effects of physical training on quality of life, aerobic capacity, and cardiac function in older patients with heart failure. *Frontiers in Physiology*, *9*, 1564. https://doi.org/10.3389/fphys.2018.01564

Social, M. de I. E. y. (2021). *Informe de indicadores de la Población Adulta Mayor atendida por el MIES*. https://servicios.inclusion.gob.ec/Lotaip_Mies/phocadownload/02_feb_2022/k_Planes y programas en ejecucion/PROYECTO Incremento de cobertura y calidad de los servicios Mision Mis Mejores Años.pdf

Sociedad Española de Geriatría y Gerontología. (2012). *Guía de ejercicio físico para mayores*. https://www.segg.es/media/descargas/GUÍA DE EJERCICIO FÍSICO PARA MAYORES.pdf

Vilagut, G., Ferrer, M., Rajmil, L., Rebollo, P., Permanyer-Miralda, G., Quintana, J. M., Santed, R., Valderas, J. M., Ribera, A., Domingo-Salvany, A., & Alonso, J. (2017). The Spanish version of the Short Form 36 Health Survey: a decade of experience and new developments. *Gaceta Sanitaria / S.E.S.P.A.S*, *19*(2), 135–150. https://doi.org/10.1157/13074369

Welford, P., Östh, J., Hoy, S., Diwan, V., & Hallgren, M. (2022). Effects of yoga and aerobic exercise on wellbeing in physically inactive older adults: Randomized controlled trial. *Complementary Therapies in Medicine*, *66*(1), 102815. https://doi.org/10.1016/j.ctim.2022.102815