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Levels of physical activity and psychological well-being of the elderly in rural areas
Niveles de actividad física y bienestar psicológico de las personas mayores en zonas rurales

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Abstract. Physical activity is considered of vital importance for maintaining an optimal health status in the different facets of humans. Therefore, the purpose of this study is to analyze the benefits of the relationship between physical activity and psychological well-being in the elderly in rural areas. Methods: an intentional sampling method was used by means of face-to-face self-perception instruments (survey) at the home of each of the participants (n = 96), through the application of the international physical activity questionnaire short version (IPAQ-S), and the psychological well-being index (PGWB-S). The results showed a positive effect between higher levels of physical activity in the psychological dimensions of the respondents, determined by a greater effect size (ES: >0.8). We concluded that the elderly who have higher levels of physical activity tend to improve their levels of psychological well-being, especially in the dimensions of positive well-being and self-perceived general health.
keywords: the elderly, distress, anxiety, body mobility, quality of life.

Resumen. La actividad física se considera de vital importancia para mantener un estado de salud óptimo en los diferentes campos integrales del ser humano. Por lo tanto, el propósito de este estudio es analizar los beneficios en la relación entre la actividad física y el bienestar psicológico en los adultos mayores en áreas rurales. Métodos: se utilizó un muestreo intencional mediante instrumentos de autopercepción puerta a puerta (encuesta) en el hogar de cada uno de los participantes (n = 96), aplicando el Cuestionario Internacional de Actividad Física versión corta (IPAQ-S) y el índice de bienestar psicológico (PGWB-S). Los resultados muestran un efecto positivo entre niveles más altos de actividad física en las dimensiones psicológicas de los encuestados determinadas por un mayor tamaño de efecto (ES: >0.8). Concluimos que los adultos mayores que tienen niveles más altos de actividad física tienden a mejorar los niveles de bienestar psicológico, especialmente en las dimensiones de bienestar positivo y salud general auto-percibida.
Palabras claves: adultos mayores, angustia, ansiedad, movilidad corporal, calidad de vida.

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Introduction

Physical activity is defined as any type of movement performed by skeletal muscles spending energy, and it is considered as an important factor in the prevention of noncommunicable chronic diseases worldwide (Dasso, 2019; Dominguez et al., 2021; Monterrosa-Quintero et al., 2022). Currently, high levels of physical inactivity (sedentary lifestyle) and unhealthy lifestyle habits have been observed within the general population, and are considered the fourth highest mortality factor worldwide. They are also responsible for the worldwide increase in noncommunicable chronic diseases (NCDs) that afflict citizens, highlighting cardiovascular problems (6%), diabetes mellitus type 2 (7%), and breast and colon cancer (10%), with high mortality values, as well as 9% of premature mortality of the 57 million deaths that occurred worldwide in 2008 (Arocha Rodulfo, 2019; Castellanos-vega et al., 2023)

In Latin America, research findings show that the highest prevalence of physical inactivity is found in the Caribbean (39.1%), followed by Western (36.8%), and Asian countries with a high economic income (35.7%) (Celis-Morales et al., 2019). Other studies have shown that a sedentary behavior is associated with depressive symptomatology generated by leisure time in front of the screen of electronic devices in adolescents, along with high levels of psychological distress (Hoare et al., 2016). The collective evidence of several review studies suggests that physical activity may help improve cognitive function, consequently helping to slow the progression of cognitive decline in the elderly, such as dementia and depression states (Lautenschlager et al., 2008).

Presently, the world population is experiencing higher rates of aging, and many different countries are experiencing an increase in the number and proportion of elderly individuals, although positive research results show that life expectancy is equal to or greater than 60 years of age, and according to different studies, it is expected that there will be 236 million people over the age of 65 worldwide by the year 2050 (Wan et al., 2016).

In Latin America, especially in Colombia, policies and programs have been established that seek to increase the welfare of the elderly population, due to several studies conducted at renowned universities, as well as national studies on Health, Welfare and Aging (HWA), and organizations such as the Colombian Association of Gerontology and Geriatrics (ACGG, 2023), which show that the elderly population in Colombia is growing at very high levels, with more than half of the population having cognitive impairments (Fernandez, 2018).

At present, studies that relate physical activity and psychological well-being in older adults in rural areas are scarce (Segura-cardona et al., 2018). Therefore, the aim of the present study is to describe and analyze the levels of physical activity and psychological well-being of a population of elderly people residing in a rural area in Colombia, through the use of validated instruments.

Materials and methods

Study Design

This is an observational and analytical cross-sectional research study, where surveys were given face-to-face at the study participants' homes. A non-probabilistic sampling method was used. The study was approved by the ethics committee of the Universidad Católica de Oriente through Resolution 8430/1993 of the Ministry of Health and Social Protection of Colombia.

Participants

The total sample consisted of 96 older adults from the rural area from the East of Antioquia area, Colombia, who were as active housewives, church collaborators and workers, farmers, shopkeepers, day laborers and retired, of whom 50 (52.1%) were women: age 70.2±7.0 years old and 46 (47.9%) were male: age 67.4±6.4 years old.

Instruments and procedures

The study was conducted by means of a survey containing validated instruments to measure the levels of physical activity (IPAQ) and psychological well-being index (PGWBI) as well as sociodemographic data of the participants, who were visited in person door-to-door, between September and October, 2021.

International Physical Activity Questionnaire -Short Version (IPAQ-S)

To measure the metabolic equivalent of tasks (METs) and physical activity levels, the Spanish version of the International Physical Activity Questionnaire "IPAQ" (http://www.ipaq.ki.se) was utilized. This questionnaire asks participants to state how many minutes per day and days per month they are physically active, by identifying their level of physical activity and categorizing them on a scale comprised of low, moderate or very active.

In order to determine the levels of physical activity, the recommendations by IPAQ were utilized, in which values (<600 MET–minutes/week) are considered low activity; (600 MET-minutes/week) are considered moderate activity, and (3000 MET-minutes/week) are considered vigorous activity (Van Poppel et al., 2010).

Psychological Well-Being Index Short Version (PGWBI-S)

The psychological well-being index-short version (PGWBI-S) was used to assess the levels of distress. The dimensions that comprise this psychometric instrument are: anxiety, vitality, deep depression, self-confidence, positive well-being and general health (Grossi et al., 2006). The instrument consists of 6 Likert scale questions whose values range from 0 to 5 for a total score of 30 points (De la Rosa et al., 2022).

For the similarity between the original version and the short version of the PGWBI, each value of each response was multiplied by 3.66 (De la Rosa et al., 2022; Monterrosa-Quintero et al., 2022). The total score was compared to a six-item scale, in which values below 60 reflected severe distress, between 60 to 69, moderate distress, between 70 to 89, without any distress at all, and values above 90, a state of positive well-being. For the analysis and reliability of the instrument, Cronbach's Alpha was utilized, yielding a value of 0.89, which indicates a good validity of the data (Saalim et al., 2020)

Sociodemographic variables

After having read and improved the informed consent form, people were asked the following sociodemographic variables in a printed survey-type instrument: e.g., sex, pathologies, and their location of residence (rural or urban). The characteristics of the sociodemographic variables are shown in Table 1.

Table 1.
Sociodemographic characteristics of the population

Vain	Male	Female	ES
Age (years)	67.4±6.4*	70.2±7.0*	0.2
METs	10123±12712*	2880±2709*	0.8
Sex	46 (47.9%)	50 (52.1%)	NA
PGWIS	85.3±9.2*	79±11.5*	0.6
Physical activity level			
Not very active	2 (4.3 %)	7 (14.0%)	NA
Moderately active	14 (30.4 %)	28 (56 %)	NA
Very active	30 (65.2 %)	15 (30.0%)	NA
Pathologies			
No pathology	24 (52.2 %)	20 (40 %)	NA
Hypertension	11 (23.9 %)	19 (38 %)	NA
Diabetes	6 (13 %)	7 (14 %)	NA
Others	5 (10.9 %)	4 (8 %)	NA

*= p≤0.05; METs= metabolic equivalent of task; PGWIS= sum dimensions psychological well-being index; ES= effect size; NA= not applicable.

Statistical analysis

The Jamovi software® version 1.6 (https://www.jamovi.org) was used for the analyses. The results of the ordinal and nominal variables were presented in percentages and analyzed through contingency tables. For continuous data, values were presented as mean ± standard deviation in a descriptive manner. The Kolmogorov-Smirnov test was used to verify the normality of the data, and the homogeneity of the variance was tested using the Levene's test.

The interaction between the variables was analyzed by means of an ANOVA test with a mixed component. A multivariate analysis of variance (MANOVA) was used to evaluate the different dimensions that shape the PGWBI. Spearman's test was used to identify correlations between the data, as normality was not found in the data.

The reliability of the PGWBI responses was analyzed by Cronbach's alpha test (α), where values greater than 0.7 meet the homogeneity requirement (Taber, 2018) Effect Size (ES) was used to compare and measure mean differences. According to Cohen's scale, trivial values (<0.20), small (0.20 to 0.30), medium (0.40 to 0.70) or large (>0.80) were considered (Monterrosa. A & Pereira-Moro, 2020). For all analyses, a significance level of p≤0.05 was considered.

Results

The highest value found in the sociodemographic variables corresponds to the metabolic index units, where the males obtained a large size effect when compared to the females, according to Cohen's scale.

Descriptive data of the population by sex and comparisons between the study variables

The highest values according to gender were found in men, where a positive well-being was observed in the different psychological dimensions; likewise, when analyzing the physical activity levels, differences were found in the dimensions of positive well-being and general health. At the level of pathologies, no significant differences were found between the factors and the intervening variables based on the psychological well-being index (Table 2).

No significant differences were evident when comparing the factors of gender vs. pathology factors with the psychological dimensions, where the findings did not show an inference of sex at the disease level.

Table 2.
Description of the results according to gender, levels of physical activity and pathologies compared to psychological dimensions.

	Anxiety	Vitality	Depression	Sc	Pw	Gh	PGWBIS
			Sex				
Female	15.9±3.6	13.7±3.3*	14.6±3.7*	17±2.6	15.5±3.1*	12.9±3.2	79±11.5*
Male	16.7±2.7	15.3±2.4*	16.9±2.3*	17.6±1.9	17±2.3*	14.1±4.2	85.3±9.2*
			Physical activity level				
Not very active	15.5±3.0	15.0±2.2	15.0±3.4	16.7±3.7	13.8±3.5[ab]	11.0±2.5[c]	76.1±12.5[ab]
Moderately active	15.8±3.6	14.1±3.4	15.3±3.8	16.9±2.4	16.4±2.7[a]	13.0±3.8	80.4±11.3[a]
Very active	16.9±2.8	14.6±2.8	16.3±2.8	17.7±.1.9	16.6±2.6[b]	14.4±3.7[c]	84.7±9.5[b]
			Pathologies				
No pathology	15.5±2.7	14.6±2.6	16.3±3.3	17.2±1.6	14.9±2.3	13.5±3.9	83.5±9.6
Hypertension	15.7±3.4	14.9±3.3	14.9±3.7	17.2±2.5	15.9±2.6	13.1±3.6	80.8±10.7
Diabetes	17.1±3.0	14.1±3.6	16.1±2.8	17.4±.3.1	17.0±3.4	13.6±3.4	80.2±12.6
Others	15.5±4.7	14.2±3.4	16.3±2.6	17.1±.3.6	15.9±4.0	14.2±4.6	81.3±14.8

*= p≤0.05; Sc= self-control; Pw = positive well-being; Gh= general health; PGWIS= sum dimensions psychological well-being index.

Table 3.
Comparison of the effect of gender vs pathologies on psychological dimensions.

Sex *pathologies		Anxiety	Vitality	Depression	Sc	Pw	Gh	PGWBIS
Female	Diabetes	15.7±3.4	16.2±2.8	16.2±3.5	16.7±4.1	14.1±3.9	13.1±3.5	80.2±16
	Hypertension	15.8±3.2	13.7±3.1	14.1±3.9	16.8±3.0	15.4±2.8	12.9±3.0	78.4±9.6
	None	16.5±3.4	13.0±3.2	14.6±3.9	17.0±1.7	16.1±3.0	12.6±3.6	79.2±11.6
	Others	13.7±6.9	12.8±4.7	14.6±2.9	18.3±0.0	15.6±3.5	13.7±1.8	78.1±14.8
Male	Diabetes	15.3±2.7	12.8±3.8	16.5±2.0	17.7±1.4	15.9±2.9	14.0±3.6	80.1±8.7
	Hypertension	15.6±4.0	17.0±2.4	16.3±3.0	18.0±1.1	16.6±1.9	13.3±4.7	85±11.6
	None	17.5±1.8	15.1±1.6	17.2±2.2	17.7±1.3	17.7±1.3	14.3±4.0	87.1±5.8
	Others	16.8±2.0	15.4±1.6	17.6±1.6	16.1±4.9	16.1±4.9	14.6±6.3	83.9±16.1

Sc= self-control; Pw = positive well-being; Gh= general health; PGWIS= sum dimensions psychological well-being index.

Table 4.
Comparison of the effect of gender vs dimensions of psychological well-being.

Sex*PAL		Anxiety	Vitality	Depression	Sc	Pw	Gh	PGWBIS
Female	NVA	14.6±2.99	15.2±2.53	14.1±3.29	16.2±4.15	12.5±2.88	10.5±2.53	72.9±12.4
	MA	16.1±3.77	13.5±3.46	14.5±4.16	16.7±2.71	16.1±3.04	12.9±3.52	79.3±12.5
	VA	16.1±3.86	13.4±3.57	15.1±3.35	17.8±1.29	15.9±2.65	13.9±2.47	81.2±8.2
Male	NVA	18.3±0.00	14.6±0.00	18.3 ± 0.00	18.3±0.00	18.3±0.00	12.8±2.59	87.3±2.5
	MA	15.2±3.47	15.4±3.27	17.0 ± 2.32	17.3±1.72	17.0±1.82	13.1±4.47	82.5±8.2
	VA	17.3±2.13	15.3±2.17	16.8 ± 2.47	17.7±2.17	17.0±2.63	14.6±4.30	86.5±9.7

PAL= Physical activity level; NVA= not very active; MA= moderately active; VA= very active; PGWIS= sum dimensions psychological well-being index.

Table 5.
Correlations between study variables in the elderly population according to gender, physical activity levels and psychological dimensions.

Variable	Age	METs	PGWBIS
Age (years)	1		
METs	-0.16	1	
PGWIS	-0.17	0.28**	1
Anxiety	-0.07	0.19	0.61***
Vitality	-0.04	0.12	0.51***
Depression	-0.21*	0.16	0.69***
Sc	-0.02	0.14	0.45***
Pw	-0.19	0.20*	0.67***
Gh	-0.04	0.23*	0.75***

Note. * p < .05, ** p < .01, *** p < .001; Sc=self-control; Pw=positive well-being; Gh=general health; PGWIS= sum dimensions psychological well-being index.

Small negative correlations were present between age and depression (r = -0.21; p≤0.05); a small positive correlation was observed between METs with the sum of dimensions psychological well-being index (PGWBIS) value (r = 0.28; p≤0.05), positive well-being (r = 0.20; p≤0.05) and general health (r = 0.23; p≤0.05) with a small scale, according to the provisions of the Hopkins scale (2018).

In the present study, we conducted a comprehensive, multiple linear regression analysis to investigate the relationship between the dependent variable, PGWBIS, and the independent variables, specifically METs, in conjunction with the dimensions of psychological well-being as outlined in table 5.

The findings indicate that the coefficient of determination (R^2) stands at 0.96, signifying that approximately 96%

of the variability in the dependent variable can be elucidated by the multiple linear regression model. Notably, the dimension of general health exhibited higher values, whereas the variable METs failed to present significant evidence within the model (p=0.98).

Upon performing a simple linear regression between the PGWBIS results and METs, it was evident that this model yielded an adjusted coefficient of determination (R^2: 0.035; P=0.036), accounting for 3.5% of the psychological well-being observed among the older adults within our study cohort.

Discussion

Our findings showed large differences evidenced by the size effect on the METs between men and women. Hypothetically, we believe that this result was influenced by the activities performed in their day-to-day life, such as field activities, high-exertion work (lifting heavy elements), traders in farmer collection centers, and in turn, some shortcomings of the urban area, such as poor urban planning, mechanization of life activities, lack of playgrounds, parks, walkways, unsafe roads for bicycles, can negatively contribute to this type of variable (Moniruzzaman et al., 2017; Teixeira et al., 2021). Other studies have described a similar trend, where rural work has almost double the METs when comparing urban and rural populations in Bangladesh (Moniruzzaman et al., 2017), and China (Cui et al., 2022) The level of intense physical activity is evident when comparing the genders, for which significant differences were found in men, being 28.4% higher than women, results that vary from other studies that compared the sexes, in which women may obtain higher or lower values than men. (Bauman et al., 2009, 2011).

Psychosocial correlations with physical activity are numerous and encompass a variety of factors, such as self-efficacy, perception of competence, outcome expectations, attitudes, perceived barriers and risks, subjective norms, social support, motivation, enjoyment, decisional balance, and body image (Martínez et al., 2020).

The psychosocial components related to physical activity across different genders are diverse and encompass various aspects, including perception of competence, outcome expectations, attitudes, perceived barriers and risks, subjective norms, social support, motivation, enjoyment, decisional balance, and body image. These factors play a significant role in decision-making for engaging in physical activity progressively and in a planned manner. In the context of physical activity, self-efficacy, social support, and motivation have been identified as the most studied constructs, considering this three-component perspective (Edwards & Sackett, 2016).

The results of the hierarchical linear regression analysis confirmed that gender indeed moderates the relationship between self-efficacy and physical activity, with this association being more pronounced in the case of women. However, it was observed that when higher levels of self-efficacy were reported, men also engaged in higher levels of physical activity than their female counterparts. Drawing upon the self-efficacy theory and relevant literature, the hypothesis was raised that this relationship could be attributed to women having fewer opportunities to experience mastery in this domain, facing a greater risk of associated injuries, and having less support for their participation in physical activities (Bandura, 1978).

When analyzing the psychological well-being index, the results of the dimensions in terms of gender showed a moderate effect between men and women on vitality (ES: 0.56), depression (ES: 0.75) and positive well-being (ES: 0.55) where men had a better tolerance to situations that could produce anxiety, and a better self-perception. We hypothetically believe that women may generally be affected in their moods, worries and idle thoughts by decreasing their physical activity, and increasing their preoccupation with daily duties, leading to physical and mental exhaustion (Mehrsafar et al., 2021; Monterrosa-Quintero et al., 2022).

Although other studies suggest the women's higher ability to express their emotions in consultation instruments, in which men were less expressive due to cultural factors (De la Rosa et al., 2022) new controlled studies are suggested with a larger number of participants to clarify the scientific gaps found in this study, to reduce the bias in the information.

When investigating the levels of physical activity and effect size, significant differences were observed in relation to various psychological dimensions among the elderly population. Notably, substantial differences were observed positive well-being (Pw) when comparing low with moderate activities (ES: 0.9) and highly active (ES: 1.0) individuals. Similarly, the general health dimension (Gh) showed a notable effect size when examining the contrast between individuals with a low activity and those who are highly active (ES: 0.98), underscoring the favorable impact of consistent physical activity.

These findings suggest that maintaining optimal levels of physical activity can significantly contribute towards the overall health and well-being of the elderly population. It is important to highlight that our study revealed positive correlations between age and certain psychological dimensions, indicating improved self-perception and lower levels of depression among older individuals. These correlations may be influenced by various factors, including social aspects such as interpersonal relationships, living conditions, equal opportunities, and broader socio-political, economic, and cultural factors. Additionally, biological factors, encompassing physical aspects, organ function, and bodily systems, play a role in the psychological well-being of the elderly (Castañeda-Lechuga et al., 2020). These factors include physical limitations, diseases, self-care practices, healthy lifestyle habits, spirituality, environmental considerations, and cognitive aspects such as reasoning, creativity, and innovation.

Furthermore, our research highlights the dependency of

the elderly population's quality of life on their level of physical activity. A higher physical activity is associated with improved physical and emotional states among the elderly (Yen & Lin, 2018).

Conclusions

From our perspective, this is the first study that relates levels of physical activity with psychological well-being, composed of 6 dimensions in the elderly population by means of face-to-face surveys. The authors conclude that the mobility of the elderly, translated into higher levels of physical activity, shows a positive influence on mental health. The authors recommend that physical activity strategies should be sought in this type of population, due to the evidence of general well-being observed. An increase in physical activity can result in active and healthy lifestyles, which in turn may lead to a better quality of life, preventing chronic non-communicable diseases due to a sedentary lifestyle and low mobility.

Limitations

A limitation of our study is the subjectivity of the questionnaire answers due to the ability to comprehend the questions by some elderly individuals who cannot read or write. Another type of limitation is the topography and distances between the houses where these individuals live, resulting in difficult access, which translates into a smaller sample size. Lastly, the daily occupations of the participants are reflected in fewer responses to the researchers' requirements.

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