

## Influence of physical activity on self-esteem and risk of dependence in active and sedentary elderly people

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**Título:** Influencia de la actividad física en la autoestima y riesgo de dependencia en personas mayores activas y sedentarias.

**Resumen:** El objetivo del estudio fue conocer cómo influye la práctica de actividad física en la autoestima y en el nivel de riesgo de dependencia de las personas mayores, diferenciándose entre el grupo control (sedentarios) y grupo experimental (activos). Participaron 168 personas mayores de 65 años, de las cuales 84 personas fueron catalogadas como activas y las 84 restantes fueron completamente sedentarias. Para analizar la autoestima se ha utilizado la Escala de Autoestima Personal de Rosenberg y para evaluar el riesgo de dependencia se utilizó el test de Barber. La autoestima positiva es más elevada en las personas activas (GE:  $3.25 \pm .45$  vs. GC:  $3.14 \pm .47$ ) y la negativa superior en el grupo de sedentarios (GC:  $2.23 \pm .48$  vs. GE:  $2.20 \pm .52$ ). Existen diferencias significativas ( $p \leq .001$ ) entre los sujetos del GC ( $2.93 \pm 1.67$ ) y los del GE ( $1.65 \pm 1.03$ ), evidenciando estos últimos un menor riesgo de dependencia. Se encontró una positiva entre la práctica de actividad física y la autoestima positiva ( $r = .244$ ;  $p \leq .01$ ), así como entre la práctica de actividad física y el índice Barber ( $r = -.425$ ;  $p \leq .001$ ). En conclusión, se debe fomentar la práctica regular de actividad física para mejorar el nivel de autoestima y minimizar el riesgo de dependencia en personas mayores.

**Palabras clave:** actividad física; programa físico-deportivo; autoestima; dependencia; personas mayores.

**Abstract:** The objective of the study was to know how the practice of physical activity influences self-esteem and the level of risk dependence in old age, differentiating between the control group (sedentary) and experimental group (active). Participants were 168 people over 65 years of age, 84 of whom were classified as active and the remaining 84 were completely sedentary. To analyze self-esteem, Rosenberg's Personal Self-Esteem Scale was used whereas Barber's helped to assess the risk of dependence. Positive self-esteem is higher in the active (GE:  $3.25 \pm .45$  vs. GC:  $3.14 \pm .47$ ) but negative in the sedentary group (GC:  $2.23 \pm .48$  vs. GE:  $2.20 \pm .52$ ). There were significant differences ( $p \leq .001$ ) between the subjects of the CG ( $2.93 \pm 1.67$ ) and those of the EG ( $1.65 \pm 1.03$ ), with the latter showing a lower risk of dependence. There was a positive association between physical activity and positive self-esteem ( $r = .244$ ;  $p \leq .01$ ), as well as between physical activity and the Barber index ( $r = -.425$ ;  $p \leq .001$ ). In conclusion, regular physical activity should be encouraged to improve the level of self-esteem and minimize the risk of dependence on older people.

**Keywords:** Physical activity; physical-sport program, self-esteem, dependence, elderly people.

### Introduction

The introduction and maintenance of healthy habits is very important due to their influence on people's behaviours, patterns, habits and actions since they contribute to their health improvement (Pullen, Noble & Fiandt, 2001; Sánchez-Ojeda, 2015). Physical activity (PA) leads to physical, social and psychological benefits regardless of age, which also increases the quality of life of the subjects engaged in it (Rosa, 2013; Romo & Barcala, 2012).

An active lifestyle has a positive impact on the individual's self-esteem because of the subsequent higher level of independence although that really depends on the various health and social changes experienced during old age. Independence is linked to usefulness, decision-making, leisure activities, physical autonomy and health perception during old age. Consequently, PA enhances self-esteem (Herrera, Barranco, Melián, Herrera, Rodríguez & Mesa, 2004; López et al., 2006; Bergland, Thorsen and Loland, 2010; García, 2012) and is associated with positive self-esteem levels as it reinforces it (Tajfel & Turner, 1986; Eliezer, Major & Mendes, 2010; Troyano & García, 2013) and improves the quality of life of the elderly (Uribe, Padilla & Ramírez, 2004; Rodríguez, Valderrama & Uribe, 2010).

Self-esteem is defined as one's psychological and positive perception of oneself involving relevant factors such as social support and functional autonomy (Masso, 2001; Nanthamongkolchai, Makapat, Charupoonphol & Munsawaengsub, 2007; Guerrero-Martelo et al., 2015), which may also be affected by gender and age (Escarbajal, Martínez & Romero, 2015; Goñi, Fernández-Infante & Zabala, 2012). Additionally, self-concept is strongly related to self-esteem, which is perceived as a series of someone's beliefs about their own person, resulting from the analysis of personal experiences and self-esteem feedback, hence its multidimensional focus including cognitive parameters (self-image) as well as emotional (self-esteem) (González-Pienda, Núñez, González-Pumariega & García, 1997; Marsh & Craven, 2006; Rodríguez & Caño, 2012). There are different components such as the physical, academic, personal and social contexts (Esnaola, Infante & Zulaika, 2011). One instrument, Rosenberg's Self-esteem Scale, allows experts to establish the connection between self-concept and self-esteem. It was validated for the Spanish population by Martín, Núñez, Navarro y Grijalvo, (2007).

PA can only be an efficient tool at increasing elderly people's independence level if its type and intensity are kept under control by adapting physical exercises to each person's characteristics (Lesende, et al, 2010). There is evidence that greater functional independence results in a higher quality of life for the subjects (Casals et al, 2015) since it reduces the possibility of health problems (Pavón, 2008). Therefore, Barber's questionnaire proves very useful for the evaluation

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of dependence risks among the elderly (Barber et al, 1980; Lesende, 2005).

This research paper aims at analysing and understanding the impact of PA on self-esteem and dependence level in elderly people establishing a boundary between the control group (sedentary subjects) and the experimental group (active subjects). It is conducted based on a premise: the double hypothesis linking higher physical exercise level with more positive self-esteem and fewer dependence risks in old age.

## Methodology

**Participants.** The whole sample included 168 people aged over 65 years, 84 of whom are classified as active (EG: experimental group) since they take part in PA and sport programmes organised by daytime centres in urban areas establishing a minimum 6 month-participation in the PA sessions as requirement. The remaining 84 people are totally sedentary as they do not engage in any sports or physical activities. A simple random sampling technique was used to select the sample avoiding any possible inconsistent results. A preliminary filtration of their physical state (elimination of subjects with a medium-high dependence level) as well as educational and cultural characteristics (exclusion of people with poor reading and writing skills) was performed to guarantee a satisfying level of autonomy before the different tests were carried out. A confidence level of 95% and margin of error of 3% were used.

The sociodemographic characteristics of the sample show that 76.8% of the subjects are women, all the participants are aged over 65 years ( $73.57 \pm 5.85$ ), the marital status reveals that the majority of them are married (53%), followed by widows and widowers (26.8%), singletons (18.5%) and those who are divorced (1.8%). As regards PA practice level, 50% of the subjects do it, at least 2 hours every week whereas the rest remain sedentary taking no physical exercise whatsoever.

**Instrument.** Two questionnaires were used to analyse self-esteem and dependence risk self-perceived by elderly people, which also allowed for the collection of demographic data about the gender, age and marital status of the participants.

- a) Self-esteem was evaluated using Rosenberg's Individual Self-esteem Scale (1965), which analyses one's self-perception as well as that of others. It consists of ten questions based on a Likert scale with four options (from 1 "I strongly disagree" to 4 "I totally agree"). Positive (items: 1, 3, 4, 6 and 7) and negative (items: 2, 5, 8, 9 y 10) self-esteem can be analysed separately. Previous versions of this scaled were applied to a sample with the results  $\alpha = .79$  (Fernández, 2002) and  $\alpha = .89$  (García and Rodríguez, 2009).
- b) Dependence risk was evaluated using Barber's test that consists of nine items involving a dichotomic answer ("true" or "false"). Every affirmative answer is worth one

point as opposed to zero points for each negative answer. A total score of one or over suggests the presence of a dependence risk (Martínez & Rodríguez, 2005).

**Procedure.** The same researcher, who had previously been trained in the use of this scale, was in charge of administering the questionnaires. The permission and informed consent of all the adults participating in the study was also obtained. Some brief instructions were given to the participants and confidentiality was also guaranteed for their answers. Participation in the study was completely voluntary and no compensation was offered in exchange for any contribution. The research was conducted according to the ethical principles from the current Declaration of Helsinki in an effort to comply with all the highest professional safety and ethical standards for this type of projects.

**Data analysis.** First of all, Cronbach's alpha which shows the reliability of the scale for this sample was obtained. Secondly, a descriptive analysis (average, standard deviation, variance, asymmetry and kurtosis) and scoring (percentiles) of the self-esteem scale were performed through the analysis of frequencies using the chi square test. Then, a descriptive and variance analysis (ANOVA) was carried out to describe the underlying connection between the practice of PA and dependence risk. Finally, the bivariate Pearson correlation descriptive analysis was performed and it generated a bilateral significance linking self-esteem variables, dependence risk and PA. All the data was handled anonymously using a series of codes and a confidence level of 95% for all the results ( $p < .05$ ). The analysis was carried out using the statistical computer software SPSS, v. 21.0 for WINDOWS (SPSS Inc, Chicago, USA).

## Results

Despite Rosenberg's self-esteem scale being a validated tool, an exploratory factor analysis was performed resulting in the same factor structure as in the original version, which is taken into consideration for this study. The reliability test revealed a Cronbach's alpha coefficient for the entire scale of .73, .78 for the positive self-esteem factor and .63 for the negative self-esteem factor. Table 1 shows data obtained from the descriptive analysis and the scaled score whose results allow the subjects to be classified according to the level of PA practice for a specific population group. In general, the results show higher positive self-esteem in elderly people with at least 2-hour-weekly PA practice (EG: 3.25 vs. CG: 3.14). Indeed, they obtained higher scores in questions involving negative self-esteem (CG: 2.23 vs. EG: 2.20).

Positive self-esteem is more appreciated by subjects from the EG, revealing higher scores compared to the CG considering, for instance, the items where they say that they perceive themselves as valuable as the others (3.25 vs. 3.07) or that they can do things as well as the others (3.23 vs. 3.00). Subjects from the CG only have higher scores when they say that they have some good things (3.36 vs. 3.30). However,

the negative self-esteem analysis shows a different reaction pattern since subjects from the CG present higher scores compared to the EG, especially when they see themselves as a failure (2.04 vs. 1.75) or think they should show themselves

more respect (2.50 vs. 2.46) although this tendency is reversed when they recognise that sometimes they feel a bit useless (2.36 vs. 2.52).

**Table 1.** Descriptive analysis and scaled scores of Rosenberg’s self-esteem according to the level of PA practice.

		Positive Self-esteem					Negative Self-esteem						
		1	3	4	6	7	General	2	5	8	9	10	General
<b>CONTROL GROUP</b> (Sedentary)	Average	3.07	3.36	3.00	3.07	3.18	3.14	2.04	2.36	2.50	2.36	1.89	2.23
	Standard deviation	0.76	0.55	0.66	0.66	0.60	0.47	0.69	0.72	0.74	0.67	0.82	0.48
	Variance	0.57	0.31	0.43	0.43	0.37	0.22	0.47	0.52	0.54	0.45	0.68	0.23
	Asymmetry	-0.12	-0.07	0.00	-0.07	-0.10	0.21	-0.05	-0.07	0.00	-0.57	0.60	-0.04
	Kurtosis	-1.23	-0.80	-0.63	-0.62	-0.36	-0.96	-0.82	-0.32	-0.24	-0.69	-0.25	-0.11
	Percentiles	25	2.25	3.00	3.00	3.00	3.00	2.65	2.00	2.00	2.00	1.00	2.00
	50	3.00	3.00	3.00	3.00	3.00	3.10	2.00	2.00	2.50	2.00	2.20	
	75	4.00	4.00	3.00	3.75	4.00	3.55	2.75	3.00	3.00	2.00	2.55	
<b>GROUP</b> (PA practice pro-grammes)	Average	3.25	3.30	3.23	3.20	3.26	3.25	1.75	2.32	2.46	2.52	1.94	2.20
	Standard deviation	0.60	0.56	0.65	0.62	0.58	0.45	0.67	0.87	0.81	0.90	0.92	0.52
	Variance	0.36	0.31	0.42	0.38	0.34	0.20	0.46	0.75	0.66	0.81	0.85	0.27
	Asymmetry	-0.50	0.00	-0.53	-0.15	-0.11	0.20	0.59	0.23	-0.23	-0.23	0.69	0.13
	Kurtosis	1.34	-0.54	0.63	-0.48	-0.45	-0.81	0.34	-0.54	-0.49	-0.70	-0.40	0.35
	Percentiles	25	3.00	3.00	3.00	3.00	3.00	3.00	1.00	2.00	2.00	2.00	2.00
	50	3.00	3.00	3.00	3.00	3.00	3.10	2.00	2.00	3.00	3.00	2.20	
	75	4.00	4.00	4.00	4.00	4.00	3.60	2.00	3.00	3.00	3.00	2.75	

1. I feel as important as others; 2. I tend to see myself as a failure or disaster; 3. I think I have some good things; 4. I can do things well just like other people; 5. I do not think I have many things to be proud of; 6. I have a positive attitude towards myself; 7. I am generally satisfied with myself; 8. I would like to show myself more respect; 9. Actually I feel useless at times; 10. I sometimes think I am completely useless.

The analysis of variance (ANOVA) (Table 2) reveals significant differences: the active subjects (EG: 1.65±1.03) pre-

sent a lower dependence risk than the sedentary ones (GC: 2.93±1.67).

**Table 2.** Descriptive and variance analysis of Barber’s index according to the level of PA practice.

	Descriptive		ANOVA				
	Average	Stand. Dev.	Sum of squares	D.F.	Squared Average	F	Sig.
Control Group	2.93	1.678	68.149	1	68.149	35.072	.000
Experimental Group	1.65	1.035					

Convergent correlation (between factors: positive and negative self-esteem) and predictive correlation (between PA practice, self-esteem and dependence risk) were analysed. The results show that both positive and negative self-esteem dimensions have a significant and negative correlation ( $r = -.289, p \leq .001$ ). Additionally, there is a positive and statistically significant correlation between PA and positive self-

esteem ( $r = .244; p \leq .01$ ). Subsequently, an improved perception of oneself is produced in line with increased PA practice as subjects from the EG present greater self-esteem. That correlation also exists between PA and Barber’s index ( $r = -.425; p \leq .001$ ), which shows that the more PA (EG), the less dependence risk in old age (Table 3).

**Table 3.** Correlation between self-esteem, Barber’s dependence index and PA practice.

		Positive Self-esteem	Negative Self-esteem	PA Practice (CG and EG)	Barber’s Index
Positive Self-esteem	Pearson Correlation	1	-.289**	.244**	-.121
	Sig. (bilateral)		.000	.001	.119
Negative Self-esteem	Pearson Correlation		1	-.051	.129
	Sig. (bilateral)			.508	.097
PA Practice (CG and EG)	Pearson Correlation			1	-.425**
	Sig. (bilateral)				.000
Barber’s Index	Pearson Correlation				1

\*\* The correlation is significant at level 0.01 (bilateral).

## Discussion

The main goal of this study was to analyse and understand the impact of PA practice on self-esteem and dependence level in elderly people with a difference between the control group (sedentary subjects) and the experimental group (active subjects).

An acceptable general Cronbach's alpha coefficient was obtained using Rosenberg's self-esteem scale, which was slightly higher for the positive self-esteem factor than for the negative self-esteem. This data was similar to that obtained by Maroco & García-Marques (2013).

In this study, elderly people who engage in regular PA practice present higher positive self-esteem. As demonstrated in the study carried out by Troyano & García (2013) or García et al. (2012), the people with higher self-perceived self-esteem are certainly those who practise PA more frequently. In this study sedentary people present a higher negative self-esteem than active people, a tendency similar to that described by also described Teixeira et al. (2016), Elavsky et al. (2005) and Pereira et al. (2008).

PA is positively connected with the prevention of dependence risk as well as improved quality of life and acquisition of autonomy (González, 2003). In this study, elderly people from the EG present a lower risk than subjects from the CG, which is a confirmation of the results obtained by Poblete, Bravo, Villegas and Cruzat (2016). This correlation

was confirmed not only in our study due to the positive impact of PA on positive self-esteem, but also with Barber's index. In fact, a recent study by Battaglia, Bellafiore, Alesi, Paoli, Bianco and Palma (2016) showed that certain variables associated with mental health improved within the group of elderly people taking part in a training programme in contrast with the control group (sedentary people).

## Conclusions and limitations

This study was not exempt from limitations. For example, some questions may have been misunderstood by the elderly although this possibility was under control since anonymity was at all time guaranteed and the subjects were always accompanied by researchers trained in the control and supervision of the instrument.

Regarding future lines of research, the sample used here could be extended or the study could be conducted from a longitudinal approach, which would bring more causality relationships.

As a conclusion, there is no doubt that PA presents a positive correlation with self-esteem and dependence risk in elderly people. Rosenberg's self-esteem scale is a valid and reliable tool that gives researchers insight into one's self-perception in old age. Barber's test is a useful and adequate instrument for determining dependence risk within this part of the population.

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