

SELF-PERCEIVED PHYSICAL FITNESS AND PHYSICAL ACTIVITY DEMAND IN THE SPANISH ELDERLY

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ABSTRACT

The importance of establishing how the elderly subjectively perceive their physical fitness has been studied so that future action plans may be established to improve their quality of life. The main goal of this research was to evaluate how Spanish people aged 65 years and over, perceive their level of physical fitness and the relationship this has with the different types of demands (established, latent, absent), for physical activity. Cross-sectional research was conducted involving face-to-face interviews using a standardised questionnaire and involving 907 elderly persons (male=428; female=479), aged over 65 years (74.12±6.55). The results suggest that the majority of the elderly perceived their fitness as good or very good, with this variable being most positively perceived among people who exercise, the males and the younger persons among those interviewed. However, nearly half of the participants perceived their physical fitness as being somewhat poor and considered that they should start participating in physical activity.

Key words: Elderly; Physical activity; Fitness; Self-perception; Established, latent, absent demand; Spain.

INTRODUCTION

A slow and unavoidable process of demographic ageing of the population is currently being witnessed on an international level, especially in developed countries (Weinert & Timiras, 2003; Giannakouris, 2008). This is indicative of a special interest in the field of research on the elderly as a population group. One of the main goals of aging-related research is to promote 'active ageing' (Denk & Pache, 2003; Martínez del Castillo *et al.*, 2010), where the aim is to ensure that the elderly enjoy an adequate quality of life. Many studies have shown the benefits of physical activity (PA) and sport for the elderly, not only physically, but also psychologically, emotionally and socially (Laurin *et al.*, 2001; Strawbridge *et al.*, 2002; Lemmens *et al.*, 2008).

Despite the fact that the elderly regard PA as very important according to research conducted by the Centre for Sociological Research [Centro de Investigaciones Sociológicas] (CIS, 2010), the rate of inactivity within this population is still very high (Nelson *et al.*, 2007; CIS, 2010). This is of great concern because of the positive relationship between PA and fitness in the elderly (Van Heuvelen *et al.*, 1998; Kinugasa *et al.*, 2003; Kazuo, 2006). In this regard, Castillo *et al.* (2005) state that there is a progressive structural deterioration over the years, as

well as a slow and inevitable decline in functional capacity, which influences fitness and constitutes the main feature of the ageing process. It should be considered that PA could slow down this functional decline by improving fitness (Kinugasa, 2003).

In a South Korean study, Misook and Kiyoji (2011), showed a positive relationship between fitness and health as perceived by the elderly, and Huang *et al.* (1998) observed a relationship between physical fitness and the functional independence of the elderly. Castillo *et al.* (2005) pointed out that research has highlighted the interest in learning more about physical fitness among the elderly, as it is an excellent predictor of life expectancy and, more importantly, quality of life, with a clear and direct relationship between longevity and fitness. Additionally, different epidemiological studies and predictions have shown a clear association between physical fitness and the morbidity and mortality index of the population (Blair *et al.*, 2001).

After reviewing the scientific literature, Chodzko-Zajko (1996) reported a positive relationship between fitness and cognitive processing among the elderly, although he suggests that this relationship may be secondary to improvements in cerebral circulation, nerve cell regeneration and/or changes in neurotransmitter synthesis and degradation. Furthermore, Schwartzmann (2003) and Fernández-Mayoralas *et al.* (2007) point out the importance of including people's subjective perception in scientific research to predict future situations and needs, like health problems, and to serve as a basis for designing and assessing intervention programmes.

PURPOSE OF THE RESEARCH

The goal of the present study was to evaluate physical fitness as perceived by the elderly in Spain and to determine potential differences depending on the group's demand status for PA. To this end, the definition of Jiménez-Beatty *et al.* (2007) of the three 'types of demand' applies. The levels of present and potential participation that differentiate the population are Established Demand (ED) [individuals who currently engage in some PA], Latent Demand (LD) [individuals who do not engage in any PA but would like to do at least one activity and are interested in becoming active] and Absent Demand (AD) [individuals who do not engage in any PA and are not interested in doing so].

METHODOLOGY

Ethical clearance

All the participants gave their consent to take part in this study. Additionally, a protocol was followed in which it was stated that the project submitted did not pose any ethical or bio-security implications. The main researcher of the project also had to sign an affidavit in which he committed to respecting all current legislation about human rights, ethics and bio-security. Furthermore, the University Committee and the Ministry of Education and Science in Spain (UPM05-C-11203) approved this research.

Participants

A cross-sectional, descriptive quantitative study was conducted via face-to-face interviews with a random sample (N=933). The final number of participants was 907 (loss of 26). The

study sample included persons aged 65 years and older (74.12 ± 6.55) that were legal residents in Spain (males=428; females=479). According to the Municipal Electoral Roll, this population, aged 65 or over, consisted of 7,484,392 people, with males comprising 42.28% and females 57.72%.

Sampling

The sampling type was multistage probability (Miquel *et al.* 2000; Rodríguez-Osuna, 2000; Bryman, 2004), because, as stated by Fowler (1988:27), "When there is no adequate list of the individuals in a population and no way to get at the population directly, multistage sampling provides a useful approach".

In this sampling type, the sample units are selected in successive stages (Bryman, 2004). In Stage I, 8 municipalities were chosen at random and 2 were specifically chosen for each of the following demographic sizes: fewer than 10,000 inhabitants; 10,001 to 50,000; 50,001 to 100,000; and more than 100,001. The National Statistics Institute provided these demographic sizes.

In Stage II, the neighbourhoods in each of the municipalities, where the questionnaires would be administered, were chosen by a simple random system without replacement. In each of the selected neighbourhoods, the units of Stage III were the streets at the start of the route (group of 10 interviews to be conducted in this zone). This selection was performed at random using the local street map. In stages IV, V and VI, each interviewer selected the front door, floor number and door of the apartment block respectively, using the provided random route criteria procedure (Fowler, 1988:33). Finally, the units of the last stage were the elderly who were interviewed.

Sample size

Given the large population and working with a 95.5% confidence interval, a $\pm 3.08\%$ permitted sampling margin error and supposing the least favourable case of p in population variance equals 50, hence $q=50$, the sample size needed to be 1056 elderly people (Sierra-Bravo, 1999).

$$n = \frac{Z^2 \cdot c \cdot P \cdot q}{e^2}$$

During and after the fieldwork an appraisal of the questionnaires were carried out to check and verify that all of them had been completed correctly (Miquel *et al.*, 2000; Cea D'Ancona, 2004). A total of 123 questionnaires were cancelled because they had been completed incorrectly. For this reason, the final sample $\pm 3.08\%$ consisted of 933 elderly people and the permitted sampling margin error was increased to $\pm 3.27\%$.

With regard to the *sample allocation*, it was decided to opt for an allocation proportional to the distribution according to the gender of the population being researched and a simple allocation for each demographic size. With reference to the sample ages, 54.75% (494) of the elderly were aged between 65 to 74 years and 45.75% (413) were 75 years or older. In other words, the distribution was very similar to that observed in the population (National Statistics Institute).

Measurement instrument

The instrument used was the *Standardised Questionnaire on Physical Activity and the Elderly* designed by Graupera *et al.* (2003) to measure the demand for PA in the elderly and other related variables. This instrument includes 5 dimensions, namely socio-demographic variables, the type of demand for PA, lifecycle variables, socialisation agents and a provision of PA variable (Graupera *et al.*, 2003). The variables from the questionnaire used for this research were perceived fitness and type of demand for PA and sport (Established demand, Latent demand and Absent demand). For the perceived fitness variable, the instrument presents a Likert-type scale from 1 to 4 in which 1 is poor, 2 is somewhat deficient, 3 is good and 4 is very good.

This questionnaire has been administered and validated in a number of studies, some of which have been published in high impact journals (Jiménez-Beatty *et al.*, 2002; Jiménez-Beatty *et al.*, 2007; Martínez del Castillo *et al.*, 2010). Four experienced sociologists who were not members of the research team validated the questionnaire. In a subsequent pre-test, before the fieldwork was done, the questionnaire was administered to 30 elders from the target population to test its comprehensibility. All the subjects understood the questions and response alternatives and there were no missing values. With regard to tests for convergent validity and given that the variables were categorical with different survey response alternatives, the phi coefficient was used (Latiesa, 2000).

A retest procedure was employed to determine the stability and reliability of the survey question items. Two weeks after completing the fieldwork, 63 (10%) respondents were asked the same survey questions by different interviewers under the same conditions as in the first interview. Given that the variables are categorical, the alternative responses were compared using Cramer's V correlation coefficients (Cea D'Ancona, 2004). The estimated values ranged from 0.83 to 1.0. According to Cea D'Ancona (2004), when the correlation coefficient between the 2 sets of responses is 0.8 or greater, the question or indicator can be accepted as reliable.

Procedure

The interviewers were chosen and then trained in the administration of the standard research questionnaire. The routes or itineraries that had to be followed to contact potential interviewees and the selection criteria to choose the elderly subjects to be interviewed (to be 65 or older and to be resident in Spain), were explained. The interviewers administered the questionnaire in structured personal face-to-face interviews in the home of the subjects. If the person was not at home or did not consent to be interviewed, the following house was chosen, until the sample units were completed, following the methodology of sampling with replacement (Fowler, 1988).

On the planning sheets, the interviewers recorded the steps followed until the sample subject was located. They included the interview number, the home address, the selection of the house, the time of the interview, as well as the gender and age of the interviewee. In the cases where conducting the interview was not possible, the reason was noted (Cea D'Ancona, 2004).

Statistical analysis

A univariate and bivariate descriptive analysis, and an inferential analysis for processing the survey data, was applied. With regard to inferential statistics, the Kolmogorov-Smirnov test was used to confirm the normality of the distributions. It was found that the variables used in this study did not conform to a normal distribution, hence the Kruskal-Wallis H test was used as an inferential test for more than 2 independent samples, as well as contingency tables, including the phi coefficient and Pearson's Chi-squared value of $\alpha < 0.05$ for significance. Windows SPSS (V 15.0) software was used to do the calculations.

RESULTS

Interviews were conducted with 933 Spanish people aged 65 years and older. The results of the Kruskal-Wallis H test for more than 2 independent samples determined that there were significant differences between the perception of physical fitness and the 3 groups of PA demand ($p=0.000$).

Table 1 indicates that 51.6% of the elderly considered their fitness to be good, 27.9% perceived it to be somewhat deficient, 11% said it was very good and 9.5% considered their fitness to be poor. When considering the variables, fitness and gender, it can be seen that in general males perceived themselves to be more physically fit than females, although it should be noted that there was no significant statistical relationship between the 2 variables.

Table 1. **FITNESS AS PERCEIVED BY THE GROUP OF SPANISH ELDERLY**

Perceived fitness	Whole population N(%)	Gender		Age	
		Male n(%)	Female n(%)	<=74yrs n(%)	>=75yrs n(%)
Very good	100(11.0)	52(12.1)	48(10.0)	64(13.0)	36(8.7)
Good	468(51.6)	232(54.2)	236(49.3)	274(55.5)	194(47.0)
Somewhat deficient	253(27.9)	109(25.5)	144(30.1)	121(24.5)	132(32.0)
Poor	86(9.5)	35(8.2)	51(10.6)	35(7.0)	51(12.3)
Total	*907(100)	428(100)	479(100)	494(100)	413(100)

Gender: [$\chi^2(3)=5.161$; $p=0.1600$; $\Phi=0.07$] Age: [$\chi^2(3)=17.879$; $p=0.000$; $\Phi=0.14$]

*=26 invalid questionnaires

The analysis of the relationship between age and fitness as perceived by the elderly (Table 1) indicates that the group of people aged 74 years or less were more likely to consider their fitness to be good than people aged 75 years and older. The relationship between these variables was significant, although it is low or slight.

Table 2. FITNESS AS PERCEIVED BY THE ELDERLY IN ESTABLISHED DEMAND (ED) GROUP (n=157)

Perceived fitness	ED group N(%)	Gender		Age	
		Male n(%)	Female n(%)	<=74yrs n(%)	>=75yrs n(%)
Very good	31(19.7)	10(15.6)	21(22.6)	22(19.3)	9(20.9)
Good	107(68.2)	46(71.9)	61(65.6)	80(70.2)	27(62.8)
Somewhat deficient	17(10.8)	6(9.4)	11(11.8)	11(9.6)	6(14.0)
Poor	2(1.3)	2(3.1)	–	1(0.9)	1(2.3)
Total	*157(100)	64(100)	93(100)	114(100)	43(100)

Gender: [$\chi^2(3)=3.215$; $p=0.36$; $\Phi=0.16$]

Age: [$\chi^2(3)=1.119$; $p=0.77$; $\Phi=0.09$]

*=5 invalid questionnaires

In relation to fitness as perceived by the elderly in the Established Demand (ED) group, 68.2% consider it to be good, 19.7% said it was very good, 10.8% perceive their fitness as somewhat deficient, and 1.3% considered their fitness to be poor (Table 2). The females scored higher than the males in perceiving their fitness to be very good (22.6 and 15.6%, respectively), and the latter scored higher percentages in perceiving it to be good (71.9% males and 65.6% females). It is also important to note that in the Established Demand (ED) group, no woman considered her fitness to be poor and only 3.1% of males did. Despite this, no significant relationship was found between these variables.

The results obtained after relating fitness as conceived by the elderly with their age in the ED group, people aged 75 years or over had similar percentages to people aged 74 years or younger in perceiving their fitness as very good (20.9 and 19.3%, respectively). However, the people in the latter group were more likely to perceive their fitness as good (70.2%). Additionally, people in the older age group scored higher than their younger counterparts in perceiving their fitness as somewhat deficient or poor, 14 and 2.3% respectively, in the older group, compared to 9.6 and 0.9% among people aged 74 years or younger in the ED group. In this case, there was no significant relationship between the 2 variables.

Considering the perception of fitness by the elderly in the Latent Demand (LD) group, Table 3 shows that more than half of the group perceived their fitness as good, 32% as somewhat deficient, 8.5% as very good and 6.8% as poor.

The males and females scored similar percentages in the LD group with regard to the perception of their fitness as good (54.4% males and 50.8% females), and very good (7% males and 9.8% females). Greater differences were found between the genders in relation to the perception of their fitness as somewhat deficient (28.1% males & 36.1% females) or poor (10.5% males and 3.3% females), with a low percentage of females who perceive their fitness as poor within the LD group is of particular note. Despite this, there was no statistically significant relationship between these 2 variables.

Table 3. FITNESS AS PERCEIVED BY THE ELDERLY IN LATENT DEMAND (LD) GROUP (n=118)

Perceived fitness	LD group N(%)	Gender		Age	
		Male n(%)	Female n(%)	<=74yrs n(%)	>=75yrs n(%)
Very good	10(8.5)	4(7.0)	6(9.8)	7(9.1)	3(7.3)
Good	62(52.7)	31(54.4)	31(50.8)	38(49.4)	24(58.5)
Somewhat deficient	38(32.0)	16(28.1)	22(36.1)	27(35.1)	11(26.8)
Poor	8(6.8)	6(10.5)	2(3.3)	5(6.4)	3(7.3)
Total	*118(100)	57(100)	61(100)	77(100)	41(100)

Gender: [$\chi^2(3)=3.215$; $p=0.36$; $\Phi=0.16$]

Age: [$\chi^2(3)=1.119$; $p=0.77$; $\Phi=0.09$]

*=1 invalid questionnaire

For fitness, according to age of the LD group, the group aged 75 years and older had higher percentages with regard to perceiving their fitness as good or poor (58.5% and 7.4% respectively), although in the latter item the results were very similar to the younger age group. The group of people aged 74 years or younger had higher percentages concerning the perception of their fitness as somewhat deficient or very good (35.1% and 9.1%, respectively). Once again, no significant relationship between these 2 variables was observed.

Table 4. FITNESS AS PERCEIVED BY THE ELDERLY IN ABSENT DEMAND (AD) GROUP (n=632)

Perceived fitness	AD group N(%)	Gender		Age	
		Male n(%)	Female n(%)	<=74yrs n(%)	>=75yrs n(%)
Very good	59(9.3)	38(12.4)	21(6.4)	35(11.5)	24(7.2)
Good	299(47.3)	155(50.5)	144(44.3)	156(51.5)	143(43.5)
Somewhat deficient	198(31.3)	87(28.3)	111(34.2)	83(27.4)	115(35.0)
Poor	76(12.1)	27(8.8)	49(15.1)	29(9.6)	47(14.3)
Total	*632(100)	307(100)	325(100)	303(100)	329(100)

Gender: [$\chi^2(3)=14.079$; $p=0.000$; $\Phi=0.15$]

Age: [$\chi^2(3)=11.000$; $p=0.01$; $\Phi=0.13$]

*=20 invalid questionnaires

Regarding fitness as perceived in the Absent Demand (AD) group (Table 4), almost half of the elderly people perceived their fitness as good, 31.3% as somewhat deficient, 12.1% as poor and 9.3% as very good. Considering the gender variable, males in the AD group perceived their fitness as good or very good (50.5% and 12.4%, respectively), while 44.3% and 6.4% females respectively, had the same perception. There was a low relationship between these variables, yet this relationship was statistically significant. Table 4 also shows that in the AD group, people aged 74 years or younger were more likely to perceive their fitness as good or very good (51.5% and 11.5% respectively), compared to people aged 75

years and older (43.5% and 7.2% respectively). There was a low relationship between these variables and yet again, this relationship was statistically significant.

DISCUSSION

In relation to physical fitness, as perceived among the population as a whole, around 60% of people perceived their fitness to be good or very good, and about 40% as somewhat deficient or poor. These figures are similar to those obtained in the survey on the sport habits of Spaniards (CIS, 2010), where 63% of the elderly considered their fitness to be acceptable or good (35.5% acceptable; 27.5% good), and around 33% as deficient or poor (26.3% deficient; 6.7% poor). It is important to mention that just 3.1% perceived their fitness as excellent in this research. In another study, Lanning *et al.* (2004) found that people aged 60 years or older, perceived their level of fitness to be average or above average.

In terms of the relationship between fitness and gender, Spanish men in general perceive themselves to be more fit than females, with both presenting fairly similar percentages, although the relationship was not statistically significant. Similarly, in a study conducted in Japan with (apparently healthy) males and females aged between 65 and 84 years, where the PA taken over the course of a year was measured using accelerometers, Aoyagi *et al.* (2009) found that the physical fitness variable was greater for males than females. The relationship between these variables was significant, although low. Similar results were obtained by Van Heuvelen *et al.* (1998), who suggests that older persons get worse results in all variables related with physical fitness than younger persons. Aoyagi *et al.* (2009) also reported that fitness was better in the 65- to-74-year age group than the 75- to-84 age group.

It should be remembered that physical fitness, being an ability or aptitude of the individual, which is determined according to the development of their physical or motor capabilities, can be modified through PA and make it possible for people to undertake their daily activities without excessive fatigue (Castillo *et al.* 2005). This may explain why the people in the ED group scored higher percentages in terms of perceiving their fitness as good or very good, compared to the figures obtained from the population as a whole and the other groups of demand for PA.

These results also corroborate the research by Van Heuvelen *et al.* (1998), Blair *et al.* (2001), Denk and Pache (2003), Kinugasa *et al.* (2003) and Kazuo (2006), who suggest that the fitness of active elderly people is better than the fitness of sedentary people. The processes of loss, typical to old age, affect the active person less than inactive people of the same age. Blair *et al.* (2001) support this by saying that PA and fitness are closely related. However, it is important to keep in mind that PA is not the only aspect that influences fitness and health. Cochrane *et al.* (1998) and Seguin *et al.* (2010), found that people who take part in PA programmes improve different components of fitness and the perception of their health.

Regarding the relationship between the socio-demographic variable *gender* and the variable *type of demand*, unlike what occurs in the population as a whole and in the Absent Demand (AD) group, the females in the Established Demand (ED) and Latent Demand (LD) groups scored higher percentages than the males when perceiving their fitness as very good, with a larger difference between the two in the ED group. However, in both cases males had a

higher percentage for considering their fitness to be good, as occurred at the general level and in the AD group too, although this relationship was not statistically significant. In the group who exercised, and those who want to, the differences with regard to perception of fitness between males and females were smaller.

Furthermore, research has reported that people who exercise not only improve their physical fitness, but also their functional capacity compared to people with poorer fitness levels (Kinugasa *et al.*, 2003; Kazuo, 2006). Considering the socio-demographic variable of *age*, similar to what happened when analysing the overall figures, people aged 75 years and older in the ED group, scored similar percentages to people aged 74 years and younger in perceiving their fitness as good or very good with 83.7 and 89.5% respectively. These percentages for the ED group were higher than the percentages scored for the other groups. It is worth noting that in the LD group, 65.8% of the older age group perceived their fitness as good or very good, compared to 58.5% for the younger age group. Scientific literature reports that the difference in fitness of active and non-active persons in the younger and older groups is greater in the latter group (Van Heuvelen *et al.*, 1998).

In relation to the PA undertaken by the elderly, it should be noted that the results in relation to fitness would be much better if qualified professionals supervise the activity (Campos *et al.*, 2011). In a study with a control group conducted in Finland over a two-year period, Mänty *et al.* (2009), found that those who were advised about the PA they should do, increased their levels of PA (at least keeping themselves moderately active), and improved their mobility, thus improving their fitness. This suggests the importance of considering the needs of each individual.

PRACTICAL APPLICATION

Most elderly people in Spain perceive their fitness as good or very good. Because of the relationship between fitness and functional capacity and the demographic ageing of the population, they are potential customers for businesses and institutions that run PA programmes. Furthermore, people who perceive their fitness as somewhat deficient or poor should be made aware that it could be improved by doing PA. Institutions should, therefore, promote and implement PA programmes for the elderly.

CONCLUSIONS

By addressing the variables *fitness* and *types of demand*, it was found that people who engage in PA and sport (ED) had the most positive perception of their fitness, while people who did not pursue PA and did not wish to (AD) were more likely to perceive their fitness as somewhat deficient or poor. This could be one of the reasons why they did not want to participate in PA. These persons could fall prey to a dangerous 'vicious circle' where their fitness declines, further reducing their desire to exercise. This would negatively influence their quality of life.

Finally, although males in general and the elderly perceived their fitness as being good or very good, the *gender* variable and the *age* variable recorded lower percentages in this regard

in the group of the elderly who exercised (ED), and those who want to (LD), but who for some reason were unable to exercise.

LIMITATIONS

Due to following the criterion of random selection, it was a limitation of this study that the size of the sample for each of the three types of demand groups was different, with the Established Demand and the Latent Demand groups being smaller. It would be interesting in the case of further research to conduct a study, with an equal number of subjects in the three types of demand groups, which could deliver results that are more significant.

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