



Journal of Human Sport and Exercise

E-ISSN: 1988-5202

jhse@ua.es

Universidad de Alicante

España

Zurita-Ortega, Félix; Fernández-García, Rubén; Cepero-González, Mar; Zagalaz-Sánchez, M<sup>a</sup> Luisa;  
Valverde-Cepeda, Matías; Ramírez-Domínguez, Patricia

THE RELATIONSHIP BETWEEN PAIN AND PHYSICAL ACTIVITY IN OLDER ADULTS THAT BEGIN  
A PROGRAM OF PHYSICAL ACTIVITY

Journal of Human Sport and Exercise, vol. IV, núm. III, septiembre-diciembre, 2009, pp. 284-297

Universidad de Alicante

Alicante, España

Available in: <http://www.redalyc.org/articulo.oa?id=301023511010>

- How to cite
- Complete issue
- More information about this article
- Journal's homepage in redalyc.org

redalyc.org

Scientific Information System

Network of Scientific Journals from Latin America, the Caribbean, Spain and Portugal

Non-profit academic project, developed under the open access initiative

## Journal of Human Sport and Exercise *online*

*J. Hum. Sport Exerc.*

*Official Journal of the Area of Physical Education and Sport*

*Faculty of Education. University of Alicante. Spain*

**ISSN 1988-5202 / DOI 10.4100/jhse**

An International Electronic Journal

**Volume 4 Number 3 October 2009**

### Research Article

#### THE RELATIONSHIP BETWEEN PAIN AND PHYSICAL ACTIVITY IN OLDER ADULTS THAT BEGIN A PROGRAM OF PHYSICAL ACTIVITY

Félix Zurita-Ortega <sup>1</sup>, Rubén Fernández-García<sup>1</sup>, Mar Cepero-González<sup>2</sup>, M<sup>a</sup> Luisa Zagalaz-Sánchez<sup>3</sup>, Matías Valverde-Cepeda<sup>1</sup>, Patricia Ramírez-Domínguez<sup>4</sup>

<sup>1</sup>School of health Sciences. University of Almería. Spain. <sup>2</sup>Faculty of Education Sciences, University of Granada. Spain. <sup>3</sup>Faculty of Education Sciences, University of Jaén. Spain. <sup>4</sup>Institute of Health and Physical Exercise Physician, "Corpore Sanum", Almería. Spain.

Received: 20 July 2009; received in revised form: 5 September 2009; accepted: 10 September 2009

#### ABSTRACT

There is no doubt that the population is progressively aging. This study evaluates the relationship between the variables of the level and type of physical activity and the degree of pain, with a series of socio-demographic variables, such as age, gender, civil status and occupation. The final selection of the sample, composed of 564 participants, with an average age of 61.05 years and an age range between 40 and 88 years from the province of Almería, Southern Spain, was made by a sampling technique intended to provide a natural composition with a criterion of inclusion, that is to say, people aged 40 or older. Various measuring instruments were chosen (pain scale and questionnaire) to collect the variables selected. The results indicated that 80.9% of the participants presented with a moderate degree of pain, the cervical area and knees being the structures most affected. On the other hand, 73.2% of the sample population habitually carried out physical and sporting tasks, with no differences according to gender, but showing differences according to age and occupation. The most common activities were walking (88.64%) and keep fit (25.65%). There was no correlation between physical activity and the degree of pain. The main conclusions highlight the need to create exercise and health protocols and programmes with a multidisciplinary approach, adapted to the individual needs of each person and the promotion of the construction of new, modern sporting facilities in rural areas so that people may enjoy better sporting opportunities.

**Key words:** *Old age, pain, physical activity, old people, keep fit.*

**Reference Data:** Zurita-Ortega F, et al. The relationship between pain and physical activity in older adults that begin a program of physical activity. *J. Hum. Sport Exerc.* 2009; 4(3):284-297.



**Corresponding author.** C/Sainz Cantero n° 1 2° Izquierda. CP 18002 Granada, Spain

Phone: +34 605644962

E-mail: felixzo@ual.es

© 2009 University of Alicante. Faculty of Education.

**DOI:10.4100/jhse.2009.43.10**

## INTRODUCTION

Our concept of the meaning of old age is changing. The aging of the population and the lifestyle in the western world encourage the development of new needs within the psychosocial context, bringing about what can be called a new “culture of longevity”: special importance is given here to the improvement in the quality of life, that is to say, to live both longer and, above all, with better quality. It is calculated that by the year 2031, 20% of the Spanish population will be more than 65 years old (Canellas et al., 1995). This situation has strengthened the development of a new “grey market, that of the older person”, many aspects of which are still unknown and, on occasions, this attitude can prejudice the adequate care and protection of our “older people” (Brewer et al., 1995; Carbonell, 1994; Cockerell, 1993).

There is no doubt of the relationship that nowadays society establishes between old people and aging. Hernández (2008), sets out three criteria to consider that a person is “old”: chronological, social and physical. In turn these aspects can be influenced by a multitude of factors and variables.

When people age, they do so progressively. Little by little, due to several factors such as sex -for example, a woman has a greater predisposition to lose bony mass (Medina, 1997)- people develop a series of physical limitations and mental deficits inherent in the aging process (Armada et al., 1996). At the physical level, anatomical and physiological changes are produced, as for example the reduction in the transport of oxygen (McArdle, 2002), which makes daily activities more difficult. In this connection, Saltin (1990) speaks of the difficulties of getting up or sitting in a chair after the age of 50; by the eighties, it is sometimes practically impossible. Bassols et al. (1999) and Catalá et al. (2002) both indicate that the presence of pain is very frequent in the older adult.

Since the 1980s special attention has been paid to concept of aging, exercise and quality of life. Among others, Hagberg et al. (2001) have commented on the similarity between the effect due to the passing of time and those resulting from a sedentary life. There are also many studies that show the influence of physical exercise (P.E) in people of retirement age; thus, Blair (1984) indicates that the effect of P.E. in old age is an important factor in the prevention of illnesses and the promotion of good health. Bruce (1984) also highlights the exceptional performances that sportspersons of middle and advanced age can achieve, and Costil et al. (1998), Gutiérrez et al. (1997) and Zurita et al. (2008) confirmed the positive effect of the practice of long-term, regular physical activity on the adequate functioning of the body’s physical and physiological processes. In addition, the influence of exercise in the prevention of chronic illnesses must not be forgotten (Lamb, 1985; Herr et al., 2001).

Based on this, we have proposed a series of aims to be considered in this research:

- To determine the degree of pain presented by the people selected in the present study and to establish a possible relation between this first variable with other socio-demographic ones (age, gender, civil status and occupation), as well as whether or not they practise physical activity, and if so, what type of activity.
- To check the relationship between the practice and type of physical activity, with the socio-demographic factors; age, gender, civil status and occupation.

## MATERIAL AND METHODS

### *Participants and design*

A quantitative descriptive and transversal design was used in this research to record various relevant variables obtained from a sample of 564 people with an average age of 61.05 years (ranging between 40 and 88 years), from 38 towns and villages in the Province of Almeria, Southern Spain. Subsequently a correlation study was developed to analyse the degree of dependence between the different variables of the study.

### *Variables*

The participants were selected using techniques of stratification, proportionality and randomness in the following variables:

- Age Groups. This variable was divided into various subcategories, spanning 5 age ranges: 40-49 years, 50-59 years, 60-69 years, 70-79 years and 80-89 years.
- Genders. Male and female.
- Work or occupation. Structured into five levels: worker, retired or pensioner, unemployed, housework and student.
- Civil Status. Divided into four categories: married or with a partner, divorced or separated, widowed or single.
- Degree of Pain. Split up into three categories: without pain, moderate and very intense.
- Level of Physical activity. Structured into two categories: practising physical activity and not practising physical activity.
- Type of Physical activity, defined in the following categories: walking, keep fit, combination of both, other modalities of physical-sporting conditioning.

### *Instruments*

The variables of this study were recorded by two evaluation instruments:

- Modified questionnaire used by González et al. (2008) and Jiménez-Beatty et al. (2003). Apart from the variable of habitability, this questionnaire recorded the socio-demographic variables described in that section later in this article.
- EVA scale; this is a Likert type of scale with numbers from 1 (minimum pain) to 10 (intense pain), which registered the intensity of pain experienced by each participant (Castel et al., 2007; Fernández et al., 2008). Furthermore, when the person indicated some type of pain, we suggested that the specific part of the body where that pain was felt should be noted down.

### *Procedure*

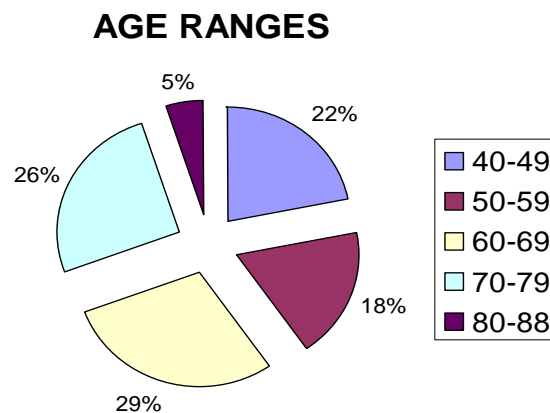
The population used in this research was taken from 38 towns and villages from the Province of Almería. The urban and rural characteristics were studied; through the selection of these latter variables a personal interview was arranged with the respondent.

We explained the whole procedure to follow in a letter-request asking for the collaboration of people interested. In all cases, to maintain anonymity, the participants were identified through a numerical code registered in a record file.

The records were compiled between September and December 2008. The definitive selection was made by consecutive sampling, following the natural composition and with a criterion of inclusion, namely, to be 40 years or older.

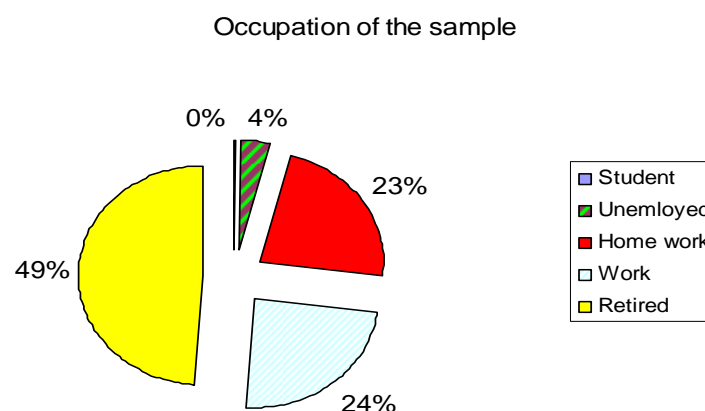
## RESULTS

Of the 564 people analyzed, 9.2% (n=52) were men and 90.8 % (n=512) were women. The sample was divided into five age groups, each of 10 natural years, observing proportional heterogeneity among the various groups.



*Figure 1. Percentage of participants by age range.*

The occupations of the sample are set out in [figure 2](#), of the five groups, number 2, retired people and pensioners, is the biggest (48.8%) and the smallest that of the students; 0.2% (n=1).



*Figure 2. Occupation of the sample.*

The breakdown of the civil status of the sample showed that 71.3% (n=399) of the participants were married or living with a partner, 19.3% were widows or widowers, 6.4% were single and 3% (n=17) were separated.

Of the total of people analyzed, 456 referred to pain in some part of the body (80,9%) at that time, while the rest, that is to say, 108 people (19,1%) claimed to be pain-free. The results obtained in relation to the scale of pain are set out in [table 1](#).

**Table 1.** Degree of pain according to gender and age ( $p=0,371$ ).

Gender	Present Pain	Age Range					Total
		40-49 years	50-59 years	60-69 years	70- 79 years	80- 88 years	
Men	YES	Number	4	6	10	16	39
		% presently in pain	10.3%	15.4%	25.6%	41.0%	100%
	NO	Number	1	0	6	4	13
		% presently in pain	7.7%	0.0%	46.2%	30.%	100%
Women	YES	Number	96	83	116	103	417
		% presently in pain	23.0%	19.9%	27.8%	24.7%	100%
	NO	Number	23	15	30	23	95
		% presently in pain	24.2%	15.8%	31.6%	24. %	100%

Highlighting here the most representative data, 36.6% (n=167) of the individuals had moderate pain and 15.6% (n=71) very intense pain, [table 2](#). It should be mentioned that the strongest pain was felt in the lumbar area (n=170; 30.64%), followed by the cervical zone and the knees (n=126; 22.34% and n=119; 21.09% respectively). On the other hand, forearms and thighs were the areas where fewest people experienced it with 3 (0.53%) and 12 (2.12%) participants respectively.

**Table 2.** Distribution of the degree of pain in the population.

Degree of pain	Frequency	Percentage
<b>Pain-free</b>	6	1.2%
<b>Almost without pain (2)</b>	11	2.4%
<b>Some pain (3)</b>	19	4.2%
<b>Almost moderate pain (4)</b>	19	4.2%
<b>Moderate pain (5)</b>	167	36.6%
<b>Rather more than moderate pain (6)</b>	29	6.4%
<b>Almost intense pain (7)</b>	54	11.8%
<b>Intense pain (8)</b>	55	12.1%
<b>Almost very intense pain (9)</b>	25	5.5%
<b>Very intense pain (10)</b>	71	15.6%
<b>Total</b>	456	100%

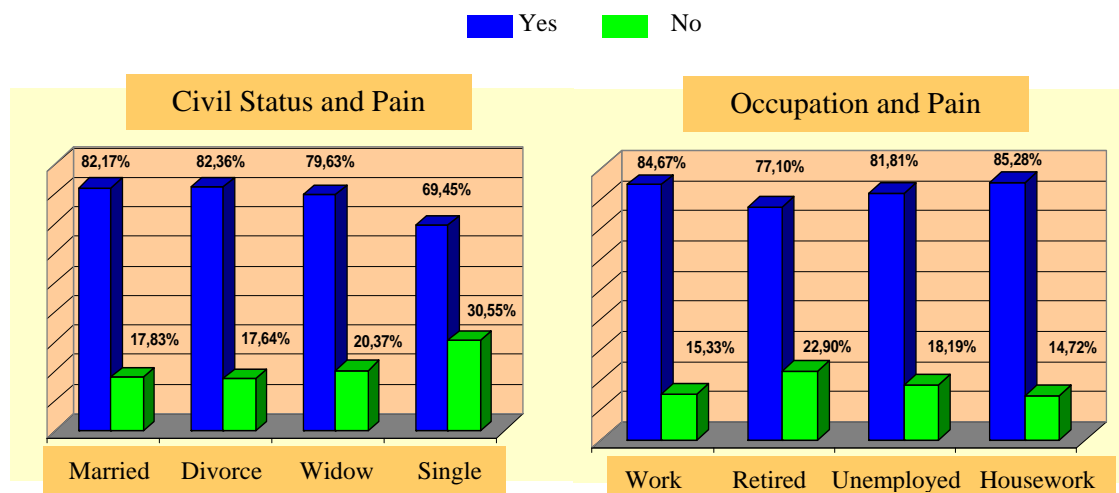
The results showed that 73.2% (n=413) of the people surveyed habitually took some form of P. E. with only 26.8% (n=151) not doing so. By gender, the numbers obtained in relation to this variable are fairly similar; women 73.4% (n=376) and men 71.2% (n=37). The statistically significant differences found between the variable for the level of physical activity and the age group 60-69 years should be noted ( $p=0.002$ ).

**Table 3.** Distribution of the variable of level of physical activity in relation to age range. ( $p=0,002$ )

Physical activity		Age Range					Total
		40-49 years	50-59 years	60-69 years	70- 79 years	80- 88 years	
SI	Number	74	75	130	114	20	413
	% of Range	59,7%	72,1%	80,2%	78,1%	71,4%	73,2%
NO	Number	50	29	32	32	8	151
	% of Range	40,3%	27,9%	19,8%	21,9%	28,6%	26,8%
Total	Number	124	104	162	146	28	564
	% of Range	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

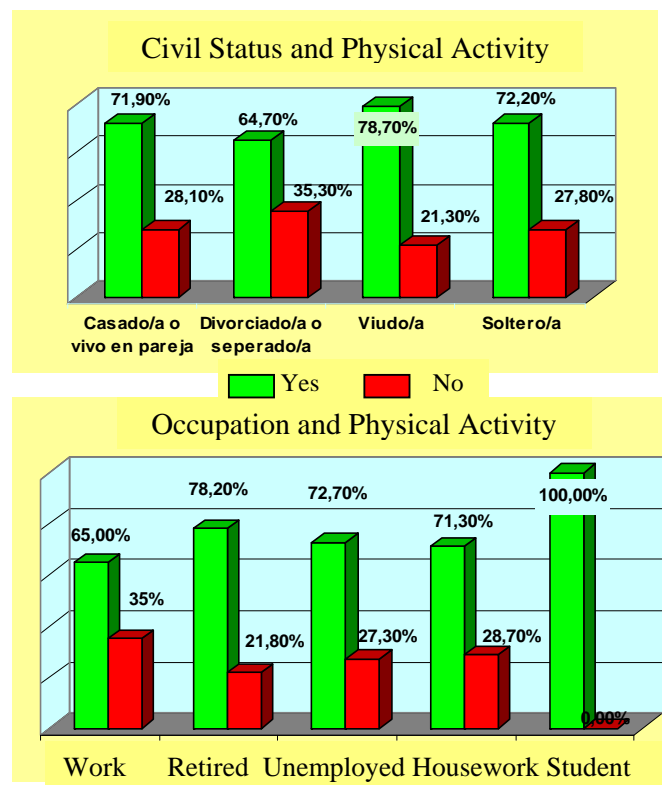
The fact that walking (88.6%; n=366) and keep fit (25.65%; n=106) were the most frequently indicated activities should be taken into account. Both activities, in numerous cases, were found to be related to the practice of other exercises (table 3). Only 9 people, 2.17% of the total, did any exercise distinct from those already mentioned.

The correlation analysis showed that the results obtained indicate that there are no significant differences between the degree of pain and the variables of civil status and occupation ( $p=0.308$  and  $p=0.222$ ) (figure 3).



**Figure 3.** Civil status and Occupation in relation to pain ( $p=0,308$  y  $p=0,222$ ).

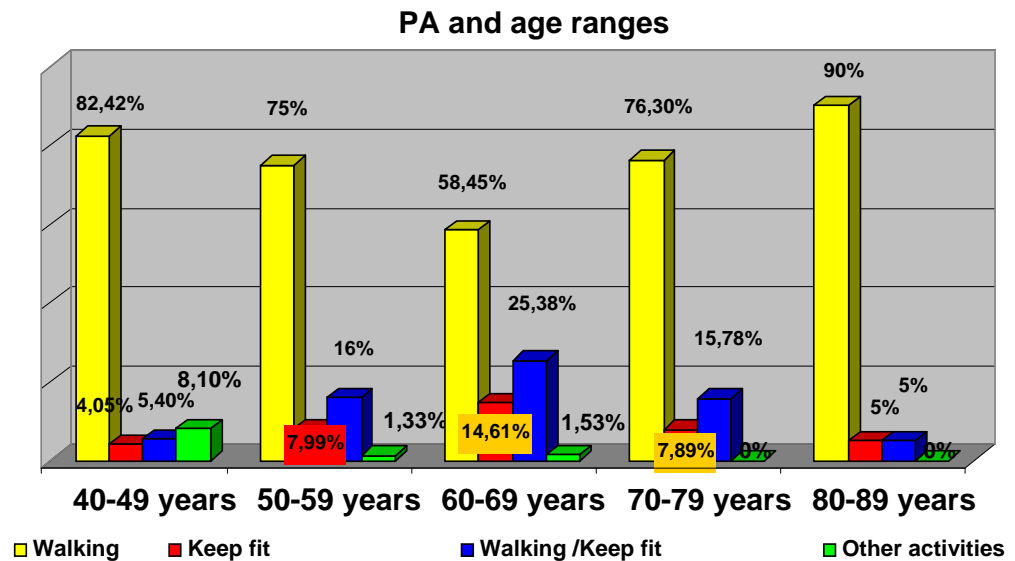
Moreover, both the individual's civil status and occupation yielded no significant differences in relation to the variable of the type of physical activity undertaken ( $p=0.449$  and  $p=0.066$ ) (figure 4). Gender was also not significant in the latter variable ( $p=0.0080$ ).



**Figure 4.** Distribution of type of physical activity according to civil status and occupation ( $p=0,449$  and  $p=0,066$ ).

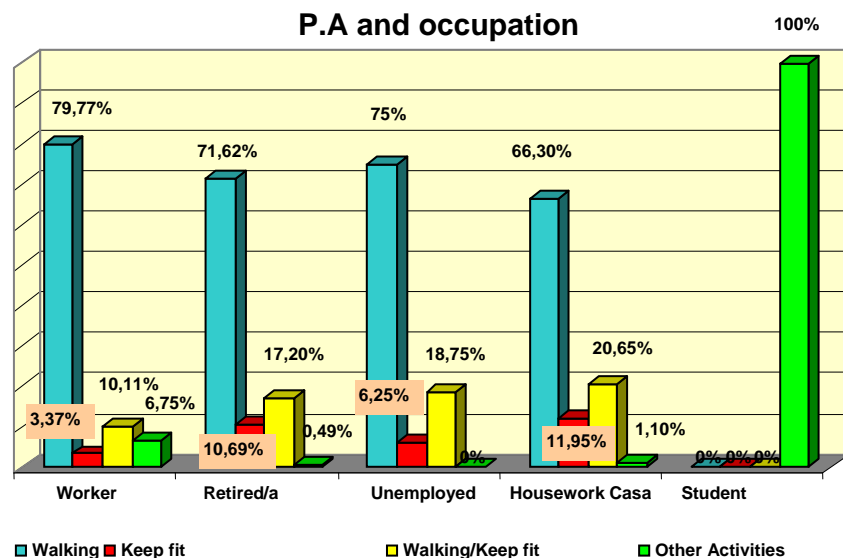
However, differences were found in the variable for age group and type of physical activity ( $p=0.000$ ), fundamentally due to the large number of participants who based their PA on walking. It should be pointed out that, with rare exceptions, when dealing with the older age ranges, the participants did not usually carry out any other type of PA distinct from those referred to, except in the case of walking (figure 5).





*Figure 5. Distribution of the typology of physical activity according to age range.*

When examining the relation between occupation and type of physical activity, in all occupations (with the exception of the student), walking becomes the most common type of activity with values higher than 66% in all cases; statistically we found no significant differences between the distinct activities and occupation groups ( $p=0.232$ ) (figure 6).



*Figure 6. Relation between the type of physical activity undertaken and occupation.*

## DISCUSSION

In the first place, looking at the variable of degree of pain, 80.9% (n=456) of the participants stated that they suffered moderate pain. The data in this study agree with the findings of Bassols et al. (1999) and Catalá et al. (2002) in a study with patients aged over 65. In this sense, other authors such as Weiner et al. (1999) and Herr et al. (2004) equally found a prevalence of moderate pain close to 80%, and intense pain in some 20% of the cases. However, Gibson et al. (2001) indicated that in their research half of the participants suffered intense pain, while Miró et al. (2007) confirmed that in a population of older people 94.2% suffered chronic pain. All these data indicate the high prevalence of moderate and intense pain in old people, which has negative repercussions in carrying out the normal activities basic to daily life.

It is interesting to note that the areas of the body where the participants refer with greatest frequency to intense pain are the cervical column and the knee joint. Authors like Robaina (1998) and Torreblanca et al. (2002) indicated that both structures usually present more degenerative problems than other areas of the body, which may explain this finding.

The presence of pain does not show significant differences in socio-demographic variables ( $p=0.371$  in gender and age,  $p=0.222$  in occupation and  $p=0.308$  in civil status).

It should be mentioned that the data obtained in this study do not agree with those given by Crook et al. (1984), Brattberg et al. (1989) and Bassols et al. (1999) when they claim that the prevalence of pain increases with age, above all in women. In any event, the fact that our study did not include a sufficient number of men has to be taken into account, and this situation has not enabled conclusive results to be drawn when comparing both genders.

Dealing with the variable of physical activity, only 26.8% of the participants took no continuous physical or sporting exercise, as against 73.2% who did so regularly. Navas et al. (2006) obtained an even higher prevalence and Croft et al. (1999) found that 95% of their participants systematically undertook physical activity. On the other hand, Armadans et al. (1996) stated that only 50% of their participants practiced P.E.

One of the reasons that people give as a main reason for not practising physical activity was that they were not accustomed to it. With respect to this fact, González et al. (2008) commented that the lack of sporting tradition in rural areas was often caused by the lack of sufficient and adequate sporting facilities, the lack of sporting habits and social, working and organic factors (Alexandris et al., 2003; Wang et al., 1997).

Similar values for the socio-demographic and physical practice variables were obtained for both men and women (73.4% and 71.2% respectively). The similarity of these results may be consistent with the contribution of Martínez et al. (2009) when he states that, although in the first stages of the lifecycle, males enjoy sporting practice more than women, on reaching old age there are a significant number of women (more than men) who incorporate weekly physical activity into their lifestyle. It may be said that in this sense that as they get older women adopt a more “sporting culture” in their lives (Puig et al., 2004).

Another aspect to consider in relation with physical activity is the significance found in the variable of age group ( $p=0.002$ ), specifically in the 40-49 year age range, where 40.3% of people practise no P.E. These data may result from the possible influence of working in the mornings, with the limitations of space and time –restricted timetables - (Martínez et al., 2009), in the regular practice of PA. This idea, however, does not accord with the findings of Jiménez-Beatty et al. (2003) and Graupera et al. (2003) who observed greater indices of P.E. in morning hours.

Equally, no significance was found between civil status and occupation in relation to physical activity ( $p=0.449$  y  $p=0.066$ ). The retired, the unemployed and housewives had the highest values, over 71%, for taking exercise (the group of students is not mentioned as there was only one representative), fundamentally due to their having more free time available, so coinciding with what Jiménez-Beatty et al. (2007) had said previously.

Among the 413 participants who routinely took physical activity, walking was the most practised activity, both alone and combined with another type. 88.64% of the participants analysed did this type of PA (above all, people in the 80-89 year-old age range -90%-); this figure is higher than that given by Molero et al. (2002) and Valero et al. (2007). This suggests that the practice of walking makes it possible to carry out a non-aggressive, aerobic type of exercise, with social benefits, where the participants choose the time and place for doing it (Wang, 1997). Here Almeria's excellent climate is also a factor that encourages and predisposes people to practise open air activities.

Looking at the variable of keep fit, we found it is practised by 25.65% of the population as an exercise by itself or in combination with others (18.63%), agreeing with the findings of García (2006). One of the reasons why the people in this study practised this sport (notably housewives with 32.6%), may be due, among other things, to its enjoyable character and previous medical advice (Barnett et al., 2009). This type of activity may delay the natural degenerative processes of the organism (Wark, 1996; Delgado et al., 2009).

When considering the variables of the degree of pain and the type of physical activity there are very significant statistical differences ( $p=0.019$ ). Thus, of the 456 individuals who referred to distinct forms of pain, only 29.16% ( $n=133$ ) undertook no physical activity, while of those who claimed to have no pain ( $n=108$ ), 16.66% ( $n=18$ ) admitted doing no P.A; these data show the lack of any connection between pain and the practice of P.A, since both groups (those who referred to pain and those who did not) there were similar percentages for the practice of physical activity; however, we found the lack of this association is determined by the high number of participants who chose walking as against other physical-sporting activities.

## CONCLUSIONS

- 80.9% of the target population studied suffered from generalized pain, with the knees and the cervical zone being the most affected structures. Therefore, it seems evident that it is necessary to design programmes of physical exercise with positive and efficient effects on health, adapted to each individual, to lessen the painful symptoms associated with old age.

- 73.2% of the population carry out physical-sporting activities, above all walking. This significant datum highlights the need and the interest in the creation of new sporting infrastructures that promote other physical activities; the information obtained indicates that walking is probably not an adequate activity for all participants.
- The lack of a relationship between the degree of pain and the level of physical activity must be emphasised. This datum confirms even more the need to adapt the type and form of exercise to the individual needs of each person. Furthermore, it should be understood that the degree of pain is a variable that is not totally determined by whether or not a person practises P.E. In this case, in relation to the previous conclusions, we would stress the importance of the development of protocols and action programmes with a multidisciplinary and holistic perspective.

## ACKNOWLEDGEMENTS

The present research study has been possible thanks to the work carried out jointly between the Instituto de Salud Ejercicio Físico “Corpore Sanum”, C/Andalucía Nº8. Ciudad Jardín (Almería) -web: [www.corporesamun.com](http://www.corporesamun.com)- and the University of Almería.

## REFERENCES

1. ALEXANDRIS K, BARKOUKIS V, TSORBATZOUKIS H, GROUNIOS G. A study of perceived constraints on a community-based physical activity program for the elderly in Greece. *Journal of Aging and Physical Activity*. 2003; (11):305-318. [[Back to text](#)]
2. ARMADANS I, CRUZ A, FRANCO N. *Actividad deportiva recreativa y tercera edad: algunos criterios de gestión para potenciar su demanda*. Monografías Psico/Socio/Ambientales. Publicacions de la Universidad de Barcelona: Barcelona; 1996, 140-45. [[Abstract](#)] [[Back to text](#)]
3. BARNETT L, GREEN S, VAN BEURDEN, CAMPBELL E, RADVAN D. Older people playing ball: What is the risk of falling and injury. *Journal of Science and Medicine in Sport*. 2009; 12(1):177-184. [[Abstract](#)] [[Back to text](#)]
4. BASSOLS A, BOSCH F, CAMPILLO M, CAÑELLAS M, BAÑOS JE. An epidemiological comparison of pain complaints in the general population of Catalonia (Spain). *Pain*. 1999; 83:9-16. [[Abstract](#)] [[Back to text](#)]
5. BLAIR SN. *Behavioral health: A handbook of health enhancement and disease prevention*. Edit: John Wiley & Sons: New York; 1984. [[Abstract](#)] [[Back to text](#)]
6. BRATTBERG G, THORSLUND M, WIKMAN A. The prevalence of pain in a general population. The results of a postal survey in a county of Sweden. *Pain*. 1989; 37:215-222. [[Abstract](#)] [[Back to text](#)]
7. BREWER KP, POFFLEY JK, PEDERSON EB. Travel interest among special seniors: continuing care retirement community residents. *Journal of Travel & Tourism Marketing*. 1995; 4:93-98. [[Back to text](#)]
8. BRUCE R. Exercise, functional aerobic capacity and aging, another view point. *Med. Sci. Sport Exer.* 1984; 16:8. [[Abstract](#)] [[Back to text](#)]
9. CANELLAS A, ROVIRA J. Los hábitos deportivos de la población adulta barcelonesa (15 a 59 años). *Apunts: Educación Física y Deportes*. 1995; 42:75-79. [[Back to text](#)]

10. CARBONELL P. *Estudi: La Gent Gran i el Consum*. Conferència Europea de les persones grans com a consumidors. Generalitat de Catalunya, Institut Català del Consum; 1994. [[Back to text](#)]
11. CASTEL A, MIRO J, RULL M. La escala de dolor BS-21: datos preliminares sobre su fiabilidad y validez para evaluar la intensidad del dolor en geriatría. *Rev Soc Esp Dolor*. 2007; 14(4):274-283. [[Abstract](#)] [[Full text](#)] [[Back to text](#)]
12. CATALÀ E, REIG E, ARTÉS M, ALIAGA L, LÓPEZ JS, SEGÚ JL. Prevalence of pain in the Spanish population: telephone survey in 5,000 homes. *Eur J Pain*. 2002; 6:133-140. [[Abstract](#)] [[Back to text](#)]
13. CHIROSA L, CHIROSA I, PADIAL P. La actividad física en la tercera edad. *Lecturas: Educación Física y Deportes*. 2000; 5(18):febrero. [[Abstract](#)] [[Full text](#)] [[Back to text](#)]
14. COCKERELL N. Market Segments. *Travel & Tourism Analyst*. 1993; 4:37-56. [[Back to text](#)]
15. COSTIL D, WILMORE J. Fisiología del esfuerzo y del deporte. Edit. Paidotribo. Barcelona. 1998. [[Abstract](#)] [[Back to text](#)]
16. CROOK J, RIDEOUT E, BROWNE G. The prevalence of pain complaints in a general population. *Pain*. 1984; 18:299-314. [[Abstract](#)] [[Back to text](#)]
17. DELGADO O, MARTÍN MA, ZURITA F, ANTEQUERA JJ, FERNÁNDEZ M. Evolutividad de la capacidad flexora según el género y el nivel de enseñanza. *Apunts Med Esport*. 2009; 161:10-7. [[Abstract](#)] [[Back to text](#)]
18. FERNÁNDEZ R, FORNIELES I, MUYOR JM, SUAREZ JD. *Consideraciones teóricas y empíricas de la demencia y/o enfermedad de Alzheimer: dolor crónico del anciano*. Edit. Universitaria de Almería: Almería; 2008. [[Back to text](#)]
19. GARCÍA M. *Posmodernidad y Deporte: Entre la individualización y la masificación. Encuesta sobre hábitos deportivos de los españoles 2005*. CSD-CIS.2006: Madrid; 2006. [[Abstract](#)] [[Full text](#)] [[Back to text](#)]
20. GIBSON SJ, HELME RD. Age-related differences in pain perception and report. *Clin Geriatr Med*. 2001; 17:433-456. [[Abstract](#)] [[Back to text](#)]
21. GONZÁLEZ MD, MARTIN M, JIMÉNEZ-BEATTY, JE, CAMPOS A, DEL HIERRO D. Las necesidades de actividades físicas de las personas mayores en España. Diferencias según la condición social. *Rev. Habilidad Motriz*. 2008; 31:16-24. [[Abstract](#)] [[Back to text](#)]
22. GRAUPERA JL, MARTÍNEZ DEL CASTILLO J, MARTÍN B. Factores motivacionales, actitudes y hábitos de práctica de actividad física en las mujeres mayores. *Serie ICD de Investigación en Ciencias del Deporte*. 2003; 35:181-222. [[Back to text](#)]
23. GUTIÉRREZ A, DELGADO M, CASTILLO M. Entrenamiento físico - deportivo y alimentación. De la infancia a la edad adulta. Edit. Paidotribo: Barcelona; 1997. [[Abstract](#)] [[Back to text](#)]
24. HAGBERG JM, MOORE GE, FERRELL RE. Specific genetic markers of endurance performance and VO<sub>2</sub>max. *Exercise and Sport Science Reviews*. 2001; 29(1):15-19. [[Abstract](#)] [[Back to text](#)]
25. HERNÁNDEZ E. Actividad física en la tercera edad: los parques geriátricos. *Lecturas: Educación Física y Deportes*. 2008; 13(124):septiembre. [[Back to text](#)]
26. HERR KA, GARAND L. Assessment and measurement of pain in older adults. *Clin Geriatr Med*. 2001; 17:457-478. [[Abstract](#)] [[Back to text](#)]
27. HERR KA, SPRATT K, MOBILY PR, ET AL. Pain intensity assessment in older adults. Use of experimental pain to compare psychometric properties and

- usability of selected pain scales with younger adults. *Clin J Pain*. 2004; 20:207-219. [[Abstract](#)] [[Back to text](#)]
28. JIMÉNEZ-BEATTY JE, GRAUPERA JL, MARTÍNEZ DEL CASTILLO J, MARTÍN M, CAMPOS A. Motivational factors and physicians' advice in physical activity in the older urban population. *Journal of Aging and Physical Activity*. 2007; 15(3):241-256. [[Abstract](#)] [[Back to text](#)]
  29. JIMÉNEZ-BEATTY JE, GRAUPERA JL, MARTÍNEZ DEL CASTILLO J. Hábitos y demandas deportivas de las mujeres mayores en el municipio de Madrid. *Serie ICD de Investigación en Ciencias del Deporte*. 2003; 35:223-253. [[Back to text](#)]
  30. LAMB DR. *Fisiología del ejercicio. Respuestas y adaptaciones*. Augusto Edit. Pila Teleña: Madrid; 1985. [[Abstract](#)] [[Back to text](#)]
  31. McARDLE W. *Exercise physiology: energy, nutrition and human performance*. Edit. Williams and Wilkins: Baltimore; 2002. [[Abstract](#)] [[Full text](#)] [[Back to text](#)]
  32. MARTÍNEZ J, JIMÉNEZ-BEATTY JE GONZÁLEZ MD, GRAUPERA, JL, MARTÍN M, CAMPOS A, DEL HIERRO D. Los hábitos de actividad física de las mujeres mayores en España. *Revista Internacional de Ciencias del Deporte*. 2009; 14(5):81-93. [[Abstract](#)] [[Full text](#)] [[Back to text](#)]
  33. MEDINA J. *El Reloj de la Edad*. Edit. Drakantos: Barcelona; 1997. [[Abstract](#)] [[Back to text](#)]
  34. MIRÓ J, PAREDES S, RULL M, ET AL. Pain in older adults: a prevalence study in the Mediterranean region of Catalonia. *Eur J Pain*. 2007; 11:83-92. [[Abstract](#)] [[Back to text](#)]
  35. MOLERO JJ, GUILLÉN M. La actividad física y patologías del aparato locomotor en las personas mayores: estudio de una población de entre 65 y 85 años. En A. Merino, R. Castillo, J. Vázquez y P. Montiel (Coords.) *Actas del Primer Congreso Internacional de actividad física y Deportiva para Personas Mayores. Perspectivas del Deporte, el Ocio y la Salud en la Tercera Edad* [CD ROM]. Junta de Andalucía: Málaga; 2002. [[Back to text](#)]
  36. NAVAS FJ, FERNANDEZ DE SANTIAGO FJ, BAYONA I. Prevalencia de osteoporosis en ancianos institucionalizados, mediante ultrasonografía de calcáneo. *An. Med. Interna*. 2006; 23(8):374-378. [[Abstract](#)] [[Back to text](#)]
  37. PUIG N, SOLER S. Mujer y deporte en España: estado de la cuestión y propuesta interpretativa. *Apunts Educación Física y Deportes*. 2004; 76:71-78. [[Abstract](#)] [[Back to text](#)]
  38. ROBAINA FJ. Esguince cervical. Características generales y aspectos médicos legales. *Rev Soc Esp Pain*. 1998; 5:214-223. [[Abstract](#)] [[Full text](#)] [[Back to text](#)]
  39. SALTIN B. *Aging, health and exercise performance*. Provost Lecture Series: Ball State University; 1990. [[Back to text](#)]
  40. TORREBLANCA R, QUINTANA A, ROSALES A. Influencia del ejercicio físico en el adulto mayor. Área cruce de los baños, 2001-2002. *Medisan*. 2002; 6(3):49-53. [[Back to text](#)]
  41. VALERO A, GÓMEZ M, RUIZ F, GARCIA ME, CABRERA A. Comparación entre la actividad físico-deportiva realizada por los adultos mayores durante su tiempo libre en Almería (España) y la Ciudad de la Habana (Cuba). <http://www.aiesepguadalajara2007.com/ponencias/Trabajos%20Libres/Actividad%20Fisica%20y%20Health/Comp.%20Cub%20Esp%20Valero.doc>. [[Abstract](#)] [[Full text](#)] [[Back to text](#)]



42. WANG Z, OLSON E. Present status, potential and strategies of physical activity in China. *International Review for the Sociology of Sport*. 1997; 32:69-85. [[Abstract](#)] [[Back to text](#)]
43. WARK J. Osteoporotic fractures: background and prevention strategies. *Maturitas*. 1996; 23:193-207. [[Abstract](#)] [[Back to text](#)]
44. WEINER D, PETERSON B, LADD K. et al. Pain in nursing home residents: an exploration of prevalence, staff perspectives and practical aspects of measurement. *Clin J Pain*. 1999; 15:92-101. [[Abstract](#)] [[Full text](#)] [[Back to text](#)]
45. ZURITA F, RUIZ L, MARTÍNEZ A, MARTÍN MA, FERNÁNDEZ R. Valoración de la capacidad flexora de los escolares de Primaria en la Provincia de Granada mediante la aplicación de la prueba de flexión profunda. *Rev Habilidad Motriz*. 2008; 31:25-32. [[Abstract](#)] [[Full text](#)] [[Back to text](#)]