

# A Survey on the Relationship Between Tobacco Use and Physical Exercise Among University Students

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**OBJECTIVE:** To determine the prevalence of tobacco use among university students who participate in sports activities.

**MATERIALS AND METHOD:** This was a descriptive, cross-sectional study based on a self-administered questionnaire completed by students who participated in activities at a university sports center. The variables studied were age, sex, tobacco use, cigarettes/day, prior history of physical exercise, awareness of the regulations concerning tobacco use in force on the university campus, opinion on the relationship between smoking and reduced physical performance, and desire to quit smoking.

**RESULTS:** A total of 406 completed questionnaires were received (41.2% of the target population); 71.7% were from women and 28.3% from men. The mean (SD) age of the sample was 22 (3.6) years, and the prevalence of smoking was 30.3%. The mean number of cigarettes smoked per day was 10.5 (6.7) for the sample as a whole, 9.3 (6.1) for women, and 14.7 (7.4) for men; the differences were statistically significant. No significant differences were found with respect to the relationship between exercise and tobacco use. A total of 98.8% of the subjects were of the opinion that smoking reduced physical performance, and 46.3% expressed a desire to quit.

**CONCLUSIONS:** The practice of physical exercise during adolescence as part of a prevention program might interfere with the factors that lead young people to start smoking and thereby contribute to a reduction in the prevalence of tobacco use in the population as a whole.

**Key Words:** *Tobacco use. Students. Physical exercise. Prevention.*

Encuesta sobre tabaquismo en estudiantes universitarios en relación con la práctica de ejercicio físico

**OBJETIVO:** Conocer la prevalencia de tabaquismo en estudiantes universitarios que practican ejercicio físico.

**MATERIAL Y MÉTODOS:** Estudio descriptivo transversal con encuesta autoadministrada a la población universitaria que realiza ejercicio físico en el Servicio de Actividades Deportivas de la Universidad. Las variables de estudio son: edad, sexo, consumo de tabaco, cigarrillos/día, práctica de ejercicio físico previo, conocimiento de la legislación vigente en la Universidad sobre tabaco, opinión sobre la relación entre fumar y disminución del rendimiento físico y deseo de cesación tabáquica.

**RESULTADOS:** Se recogieron 406 cuestionarios (el 41,2% de la población diana), un 71,7% respondidos por mujeres, y un 28,3% por varones. La media de edad  $\pm$  desviación estándar de la muestra era de  $22 \pm 3,6$  años, y la prevalencia de fumadores, del 30,3%. La media de cigarrillos/día del total de la muestra era de  $10,5 \pm 6,7$ ; en mujeres, de  $9,3 \pm 6,1$ , y en varones, de  $14,7 \pm 7,4$ , existiendo diferencias estadísticamente significativas. No se encontraron diferencias significativas al relacionar la práctica de ejercicio con el consumo de tabaco. El 98,8% opina que el consumo de tabaco disminuye el rendimiento físico y el 46,3% quiere dejar de fumar.

**CONCLUSIONES:** La práctica de ejercicio físico durante la adolescencia, incluida dentro de los programas de prevención, podría interferir con los factores de inicio en el consumo de tabaco y contribuir a disminuir la prevalencia de tabaquismo en la población.

**Palabras clave:** *Tabaquismo. Estudiantes. Ejercicio físico. Prevención.*

## Introduction

A review of the data on smoking in Spain reveals a slow but gradual decline in tobacco use in recent years. According to the 2001 National Health Survey, 34% of

the adult population were smokers,<sup>1</sup> which represents a decline of 2% from the prevalence of 36% reported in the previous survey carried out in 1997.<sup>2</sup> In general, such a change could be the result of either an increase in the number of ex-smokers or a decrease in the number of new smokers.<sup>3</sup> In the case of Spain, the decline seems to be essentially the result of an increase in the number of ex-smokers, and it is gender related. An analysis of the most recent health surveys reveals that the decrease in prevalence has occurred mainly among men, while smoking has increased among women, and in particular among the youngest age groups.<sup>4,5</sup>

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Research has shown that the majority of adults who use tobacco started smoking at an early age. People learn to smoke during childhood and adolescence; 60% of smokers have begun to smoke by the time they are about 13, and over 90% start before their 20th birthday.<sup>6</sup> In Spain, a trend towards a decrease in the age of initiation has been observed in surveys carried out by the National Drug Program. This figure was reported to be 13.3 years in the 1996 survey.<sup>7</sup> In the USA, more than 6000 children and adolescents try their first cigarette each day, and every day over 3000 more children and adolescents become regular smokers.<sup>8</sup> For this reason, the primary task of smoking prevention programs is to target this population, and one of the main objectives of anti-smoking campaigns is to prevent new users from starting smoking.<sup>9</sup> A number of authors have recognized that the protection of adolescents, which is a priority objective and the one on which there is the greater consensus at all levels of society, is, nonetheless, the most difficult to achieve.<sup>10</sup> In recent decades, many prevention programs aimed at adolescents have been implemented,<sup>11-15</sup> but despite all the efforts made, the prevalence of smoking among young people remains very high.<sup>16</sup> A lower prevalence of tobacco use has been reported among adolescents who do physical exercise.<sup>17</sup> If young people who do some kind of physical exercise tend to smoke less, the establishment during school years of healthy habits, such as enjoying physical exercise, could be a useful tool for prevention.

On the basis of findings reported by other investigators concerning the inverse association between physical activity and smoking among adolescents and young people,<sup>17-19</sup> we surveyed the population of students who enrolled in the university sports center (USC) in order to ascertain the prevalence of smoking among university students who do some kind of physical exercise.

### Materials and Method

This was a descriptive, cross-sectional study based on a self-administered questionnaire completed by students who participated in activities organized by the USC at the University of Saragossa. The primary aim of this center is to facilitate athletic and fitness activities among the members of the university community (students, faculty, and researchers as well as administrative and service personnel), in order to contribute to their personal development and improve their quality of life. To this end, the center organizes various activities and services in different areas, such as competition sports, the promotion of fitness activities, and outdoor sports in the natural environment. The USC also fosters and supports the organization of activities by the sports committees on each campus. These include both competitive team activities and noncompetitive activities supervised by monitors.

In September and October 2002 (the period during which individuals wishing to participate in these organized sports activities had to enroll), a self-administered survey on smoking was distributed to all of the people who enrolled in the USC. The questionnaires, comprising 8 multiple-choice

questions, were handed out together with the enrollment forms. Participants voluntarily and anonymously completed the form on the spot and dropped it into a collection box provided for this purpose. The target population of this study was students, so that only the questionnaires completed by students were used.

The variables studied were: age, sex, smoking status, number of cigarettes smoked per day, prior history of physical exercise, awareness of university regulations on smoking, opinion on the relationship between smoking and reduced physical performance, and desire to stop smoking (Table).

According to the criteria drawn up by the World Health Organization,<sup>20</sup> a smoker is defined as a person who smokes daily (at least 1 cigarette per day) or occasionally (less than 1 cigarette per day) at the time the survey is carried out, and a non-smoker is defined as a person who has never smoked or has quit.

All of the data obtained was recorded in a Microsoft Access 97 database (Microsoft Corporation, Redmond, USA), which was subsequently imported into SPSS for Windows 11.0 (SPSS, Chicago, Illinois, USA) for statistical analysis.

Results are expressed as means (SD) with 95% confidence intervals (CI) and as percentages. The  $\chi^2$  test was used to determine statistically significant differences for qualitative variables and the Student *t* test for quantitative variables. A *P*

TABLE  
Survey on Smoking Among Students who Use the Sports Center at the University of Saragossa\*

<p>Mark the appropriate answer with an X</p> <p>1. Age..... years</p> <p>2. Sex</p> <p>a. Male</p> <p>b. Female</p> <p>3. Current university status</p> <p>a. Student</p> <p>b. ASP/TRS</p> <p>4. Do you participate in any sports activity or do some kind of exercise?</p> <p>a. No</p> <p>b. Yes, occasionally</p> <p>c. Yes, regularly</p> <p>5. Did you know that smoking is prohibited in these facilities?</p> <p>a. No</p> <p>b. Yes</p> <p>6. Do you think that smoking reduces a person's physical performance?</p> <p>a. No</p> <p>b. Yes</p> <p>7. Are you or have you ever been a smoker? (Mark one of the following options)</p> <p>a. I have never smoked</p> <p>b. I am an ex-smoker</p> <p>c. I am an occasional smoker (weekends)</p> <p>d. I am a current daily smoker (number of cigarettes/day.....)</p> <p><b>Only for smokers</b></p> <p>8. Do you want to quit smoking?</p> <p>a. No</p> <p>b. Yes</p> <p><b>For any further information please contact us at <a href="mailto:tabaquis@posta.unizar.es">tabaquis@posta.unizar.es</a></b></p> <p><b>Thank you for your collaboration</b></p>
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\*ASP indicates administrative and service personnel; TRS, teaching and research staff.

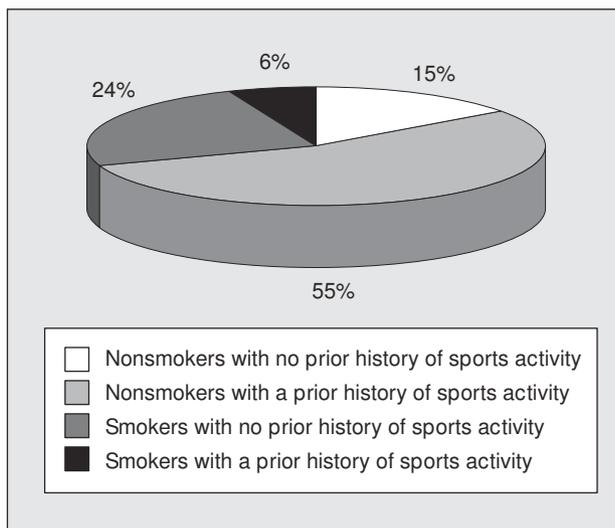


Figure 1. Tobacco use among students participating in the activities of the sports center at the University of Saragossa.

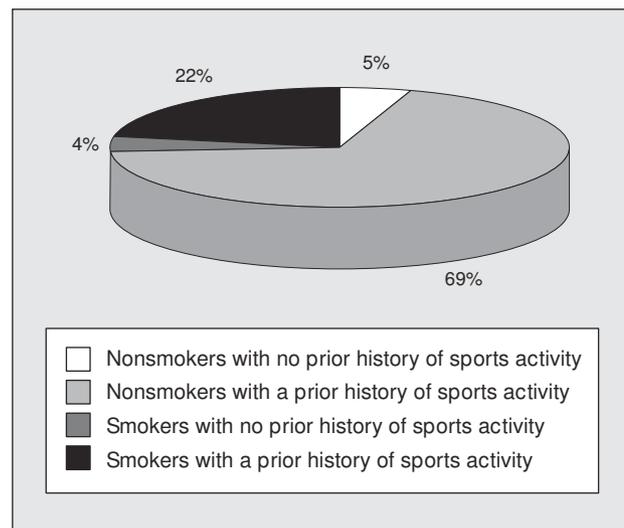


Figure 2. Sport and tobacco use in males.

value of  $<.05$  was considered significant.

## Results

During the 2002-2003 academic year, 985 students signed up at the USC. Of these, 75% were women (n=740), 21.7% were men (n=214), and gender was not coded for 3.1% (n=31). The mean age of the population was 22.9 (range 17-56) years old.

In total, 406 questionnaires were completed by students (representing 41.2% of the target population). The mean age of this sample was 22 (3.6) years (95% CI, 21.6-22.3). Of the respondents, 71.7% were women (n=291), and 28.3% were men (n=115).

The prevalence of smoking was 30.3% (n=123). Of the women, 32.3% were smokers (n=94) and of the men, 25.2% (n=29). No significant difference was found between these values.

The mean number of cigarettes per day consumed by the regular (daily) smokers was 10.5 (6.7) (95% CI, 8.3-12.6); daily cigarette consumption was not reported in 5 cases. The women smoked a mean 9.3 (6.1) (95% CI, 7-11.5) cigarettes/day, and men smoked a mean 14.7 (7.4) (95% CI, 9-20.3). The difference between these 2 means was statistically significant.

Of the students in the study, 79.1% (n=321) stated that they had taken part in some sports activity before enrolling in the USC. Of the students who had no history of sports activity, 88.2% were women (n=75) and 11.8% were men (n=10). Statistically significant differences were found ( $P<.05$ ).

The relationship between tobacco use and prior sports activity is shown in Figure 1. No significant differences with respect to tobacco use were found between the group of people who reported prior sports activity and those who did not.

Figures 2 and 3 show the analysis of the same

variable by sex. No statistically significant differences were found between men and women when the relationship between prior sports activity and current smoking status was analyzed.

Of the students who answered the questionnaire, 98.8% (n=401) related smoking with a decrease in physical performance. Only 14.5% (n=59) stated that they were not cognizant of the university regulations in force concerning smoking. Of these, 59.3% (n=35) were women and 40.7% (n=24) were men. No significant difference between the sexes was found in this respect.

Of the students who were current smokers at the time they answered the questionnaire (30.3%), 46.3% (n=57) reported that they wished to quit, 26% (n=32) did not want to quit, and 27.6% (n=34) did not answer this question. Statistically significant differences ( $P<.05$ ) were found between the sexes in this respect: 73.7%

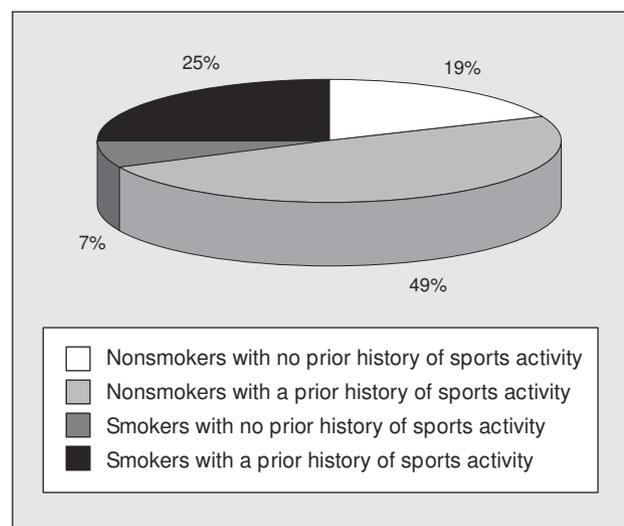


Figure 3. Sport and tobacco use in females.

(n=42) of women and 26.3% (n=15) of men said they wanted to quit smoking.

## Discussion

The two main characteristics defining the population who completed the questionnaire in this study were that they were university students and that they did some kind of physical or athletic activity.

The prevalence of smoking in the population studied was 30%, a figure that differs significantly ( $P<.05$ ) from the prevalence reported for the same age group (16-24 years) in the general population (41.7%) in the 2001 Spanish National Health Survey.<sup>1</sup> Comparison by sex also revealed significant differences in prevalence: 32.3% of women and 25.2% of men in this study, as compared to 42.7% and 40.8% respectively in the general population in the same age group (16-24 years). Various Spanish authors have reported smoking prevalences among young people (14-24 years) higher than those found in this study.<sup>21</sup> This difference between the prevalence of smoking in the present study group and that found in the regional and national population overall could be explained by various factors relating to the profile of the population studied, including their participation in an athletic or fitness activity, or at least their intention to do so as evidenced by the fact that they enrolled in the USC. Educational level could also be a factor since the prevalence of smoking tends to be lower at higher educational levels and this survey was carried out among university students.

Various authors have reported a lower prevalence of smoking among young people who do physical exercise and a lower daily cigarette consumption among smokers who participate in sports.<sup>18,19</sup> This lower daily consumption was also observed in the present study, in which the mean number of cigarettes smoked per day was 10.5 (6.7), as compared to 16.8 for the population over 16 years old reported in the 1997 Spanish National Health Survey.<sup>2</sup> Specific analysis of the data from that survey by age groups is not possible, however, so despite the fact that the figures for our population were lower, we cannot draw any conclusions from the comparison. With respect to gender, a lower consumption of cigarettes per day was observed among women, a finding in line with the results of studies of women in general.<sup>22</sup>

It has been reported that adolescents who participate in various types of athletic activities or get physical exercise are less likely to become smokers.<sup>23,24</sup> This decreased risk of becoming a smoker has been attributed to diverse factors related with the practice of sports. These include greater self-confidence, advice received from trainers, sports discipline, a more complete understanding of the harmful effects of smoking on health, the desire to have a healthy appearance, and the belief that smoking impairs athletic performance.<sup>19</sup> In this study, 98.8% of the students who completed the questionnaire related tobacco use with a

decrease in physical performance. This awareness has already been cited as a good argument against starting smoking for use among students participating in high level sports activity,<sup>25</sup> but it could be generalized to all adolescents and young people as a possibly useful tool in the struggle to prevent them from starting to smoke. The questionnaire used in our study established two categories (occasionally and regularly) to describe the students' level of physical activity. However, since an objective measurement of each student's level of physical activity was not available, we subsequently decided to combine these two categories because the aim was to identify the students with healthy habits rather than to evaluate the findings in relation to the individual's level of physical activity.

The predominance of women among the students who signed up at the USC in order to get physical exercise is interesting. This may have been related to expectations associated with weight control, as some authors have reported, although among the younger age groups, it is boys who more often participate in organized sports.<sup>17</sup>

The contradiction inherent in the smokers' attitude towards their tobacco habit found in the population studied (as indicated by their stated desire to quit) is similar to that found in the general population,<sup>22</sup> although it is found more often among women smokers. Tobacco cessation programs that include physical exercise have been described in the literature.<sup>26</sup> This approach may be particularly relevant to women since a higher proportion of young women are starting to smoke than young men<sup>4</sup> and physical exercise could prove to be a useful tool in tobacco cessation programs targeting women. Moreover, physical exercise helps to reduce the quitting smokers' withdrawal symptoms, increases their feeling of well-being, and helps them to control their weight,<sup>27</sup> another aspect of particular interest to women.

Various authors have suggested promoting physical exercise as a useful strategy in smoking prevention and have pointed out that sports activities should be included in smoking prevention programs aimed at adolescents.<sup>19,24</sup> One type of prevention program carried out in recent decades has been the so-called "educational campaign" targeting children and young people. The aim of these campaigns has been to prevent the members of the target groups from starting to smoke. During this period, these programs have evolved considerably, from the rather ineffective information campaigns of the 1960s to the latest programs, which teach young people strategies for resisting the social pressure to smoke and combine in-school campaigns with other initiatives carried out in the community.<sup>27</sup> Recent reviews and meta-analyses have confirmed that these modern campaigns are more effective. However, the effects of such interventions are limited and short-term.<sup>15-28</sup> The practice of physical exercise in the school is a healthy habit which, if begun at an early age, can have a long term effect that can last

until the individual is an adult. The popularity and positive image of sports in the adolescent "culture" make sports one more resource that should be included in programs that aim to modify smoking-related behavior in this population.<sup>25</sup>

Smoking initiation is a long and complex process involving the formation of attitudes towards tobacco. It is a generally little-understood process, for which diverse theoretical models have been proposed.<sup>29</sup> Various risk factors have been identified in relation to the initiation into smoking and habitual tobacco use in young people. These include the feeling of relaxation and pleasure obtained, personal image, stress, boredom, self-affirmation, rebellion, and parental pressure.<sup>29,30</sup> The practice of physical exercise in a controlled and systematic manner during adolescence, possibly more in the form of a leisure activity rather than a competitive one, may interfere with some of the motivating factors mentioned above and could help to modify some of the risk factors that attract children and adolescents to try out, experiment with, and become addicted to nicotine, factors which lead them to become long-term smokers. In short, it could help to prevent them from becoming addicted to tobacco, thus easily forming a habit that later turns out to be not so easy to break when they reach adulthood.

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