

## The relationship between physical aspects of quality of life and extreme levels of regular physical activity in adults

Relação entre os aspectos físicos da qualidade de vida e níveis extremos de atividade física regular em adultos

Relación entre la calidad de vida y niveles extremos de actividad física regular en adultos

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### Abstract

*This study aimed to check for any significant differences in perceived quality of life, specifically aspects of a physical nature, among volunteers who are more physically active and those less physically active in a university community. The sample consisted of 1,966 volunteers in a university community in Brazil. To assess physical activity levels, volunteers responded to the International Physical Activity Questionnaire (IPAQ), and to analyse the perception of quality of life they responded to WHOQOL-bref, which is classified into three groups according to level of physical activity, taking into account the metabolic equivalent index (MET) over a full week. For comparison, consideration was given to the first and third tertiles, respectively, namely groups of more and less active students. The results indicated that individuals who engaged in more physical activity had a more positive perception of quality of life compared to those who were less active in physical aspects related to the ability to work, energy for day-to-day activities and locomotion.*

*Motor Activity; Quality of Life; Health Promotion; Adult*

### Resumo

*O objetivo desse estudo foi avaliar a percepção da qualidade de vida, entre os voluntários mais fisicamente ativos e os menos fisicamente ativos de uma comunidade universitária. A amostra foi formada por 1.966 voluntários entre estudantes e servidores de uma comunidade universitária do Brasil. Para a avaliação do nível de atividade física foi utilizado o Questionário Internacional de Atividade Física (IPAQ) e para análise da percepção da qualidade de vida o WHOQOL-bref. Os participantes foram classificados em três grupos considerando o índice de equivalente metabólico (MET) ao longo de uma semana completa. A análise do nível de atividade física indicou, dentre os 1.966 avaliados, 51,5% ativos, 14% muito ativos, 21,3% insuficientemente ativo B; 4,7% insuficientemente ativo A e 5,8% sedentários. Os dados sugerem associação entre a prática da atividade física e percepção positiva da qualidade de vida nos aspectos do domínio físico que estão relacionados com a capacidade para o trabalho, energia para as atividades do dia a dia e locomoção.*

*Atividade Motora; Qualidade de Vida; Promoção da Saúde; Adulto*

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## Introduction

Engaging in activity has been linked to health promotion and cited as a key factor in improving quality of life. Participation in sport by groups of people of different ages is increasing, as well as the search for different types of physical activity <sup>1</sup>.

Regular physical activity has been seen as one of the most effective initiatives to promote quality of life in populations <sup>2,3</sup> in marked contrast to the sedentary lifestyle that represents an important risk factor for the development of chronic non-communicable diseases (NCDs) <sup>4</sup>.

The regular practice of moderate and high levels of physical activity is positively correlated with disease prevention and control and health promotion <sup>5,6</sup> and is often prescribed in association with diet and medication to treat NCDs, assisting in the motivation and adoption of healthy habits and behaviour <sup>7</sup>.

Other evidence suggests that low levels of physical activity, coupled with a modern lifestyle, is a risk factor that is as important as a poor diet in the etiology of obesity, regardless of the body mass index or family history <sup>8</sup>. The practice of physical activity and exercise are largely related to positive impacts on well-being, regardless of age and health status <sup>9</sup>.

It is also known that regular physical activity is associated with a lower incidence of cardiovascular disease, stroke and diabetes mellitus, a reduction in risk factors of metabolic syndromes, such as hypertension, dyslipidemia and obesity, as well as mood improvement, including depression and anxiety <sup>10</sup>.

It is worth noting that the beneficial effects of physical activity on both physical and mental aspects seem to arise regardless of the study design and sample characteristics such as age, gender, nationality or type of intervention.

In spite of all the evidence, most people show a low physical activity level and are exposed to hazardous conditions for contracting NCDs, which can be minimised by doing at least 30 minutes of regular physical activity of moderate intensity five days a week <sup>11,12</sup>.

The American College of Sports Medicine (ACSM) recommends for adults of all ages personalized exercise programs, cardiorespiratory endurance, flexibility and neuromotor stimulation, under the guidance of qualified professionals to adopt strategies of adherence to physical activity and change unhealthy habits <sup>13</sup>.

The practice of physical exercise is influenced by environmental, social and psychological factors, however, motivation seems to be one of the main aspects that lead people to exercise regularly and maintain this behaviour <sup>14,15</sup>.

Despite the benefits derived from regular physical activity as widely reported, a prevalence of physical inactivity has been observed, having a need to identify the factors that are associated with a sedentary lifestyle and the real possibility of intervention and to be able to carry out more effective action planning <sup>16</sup>.

Because of the time required for their studies, academics tend not to have the time they once had for the systematic practice of physical exercise, and, also, some students take up temporary jobs, which further impacts on the availability of leisure time or the willingness to engage in activities that require further exertion of energy, such as sports <sup>17</sup>.

The multiple pressures on a university community can have an impact on health and well-being, influencing behaviours related to disease prevention and health promotion, with the likelihood of such behaviour being kept for life <sup>18</sup>.

The prevalence of overweight and obesity in college students has been identified in a study conducted in Pernambuco State, Brazil, and was associated with various habits including consumption of high calorie snacks and physical inactivity, reinforcing the knowledge of association of these habits with a lifestyle not aimed at the promotion of health or prevention of health problems and chronic diseases <sup>19,20</sup>.

Thus, the lack of physical activity in university communities is really evident and stems from the tremendous amount of hours in classroom and other activities related to preparation work and study. Academic communities comprise young people and adults with a low prevalence of NCDs, however, they may accumulate risk conditions related to the physical aspects of pain, fatigue, impaired mobility, difficulties sleeping or with alertness, time, caring for their health and impairment in daily activities and work.

The assessment of the perception of aspects of the quality of life of young people and adults is increasing in importance since the data obtained could be useful in making decisions about the areas that deserve more attention in health care and social assistance, and also support the development of programmes and actions to improve living conditions and lifestyles <sup>21</sup>.

Faced with this scenario, this study sought to compare the perception of quality of life, namely physical aspects, among the volunteers that were more physically active and less physically active in a university community, expanding the database on this portion of the population for the development of strategies for health promotion and prevention of risk conditions for NCDs, taking into account the characteristics of our

sample in a university with different age groups, geographic locations and levels of education.

## Methods

### Sample

This was a cross-sectional study that used a non-probability sample of convenience, taken from seven campuses in the community of the São Paulo University (USP), São Paulo State, Brazil, totalling 1,966 volunteers, undergraduates and graduates, faculty and teaching staff.

Considering the university population of 108,636 people in 2010, a sample size was estimated in order to determine the amount of instruments that should be filled with a sampling error of 2% and a significance level of 95%, resulting in an ideal number of 8,305 questionnaires to be answered, corresponding to 7.64% of the entire university community.

Based on this calculation, we applied the stratification by categories, resulting in 2,299 undergraduate students, 2,233 graduate students, 1,700 teachers and 2,073 staff. A stratification by geographical location resulted in the need for a sample of 2,216 people in São Paulo, 1,431 in Ribeirão Preto, 1,226 in São Carlos, 1,116 in Piracicaba, 827 in Bauru, 748 in Pirassununga and 741 in Lorena (USP. Anuário estatístico. <http://sistemas3.usp.br/anuario/>, accessed on 10/Nov/2010).

However, it was impossible to calculate random sampling because we did not gain access to the list of all students and employees within the university community. We could not send specific messages as we did not have access and control of all USP users' email accounts.

Thus, it was decided to release the survey invitation via e-mail to the units, students and employees who had electronic contact in their home page, reaching the largest possible number of invitations sent to system users and USP-mail.

### Assessment tools

Some of the information used in the evaluation was obtained by filling out forms available on the World Wide Web at a specific site for this purpose. The objectives of the research project were widely reported in USP and volunteers were invited to participate in the survey by e-mail. Criteria for inclusion were to belong to the university community, in terms of being a student or staff member, and also having an email subscription with the suffix @usp.br. The only exclusion criterion considered was not to belong to the USP com-

munity. When accessing the survey information, the volunteer could choose either to fill out the form immediately or stop the session and return to it at a later time. The respondent was also given the option to withdraw at any time by simply not providing information.

The e-mail address and registration number were used to ensure that only the university community of USP had access to the tools available. The information about the research, as well as the instruments were hosted on the site of the Study Group and Extension of Technological Innovation and Quality of Fish (GETEP), at the Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ), USP.

The quality of life indicators – the dependent variables considered here – were collected by means of World Health Organization (WHO) questionnaires, WHOQOL-bref<sup>22</sup>, a tool available in approximately 20 languages, which was translated and validated for Brazil<sup>23</sup>. The development and translation of the Portuguese version followed the methodology proposed by WHO with the participation of bilingual staff. The form consists of 26 items, with two general questions about quality of life and the remainder divided into four areas: (a) physical, (b) psychological, (c) social and (d) environmental. The psychometric properties of WHOQOL-bref met the criteria for internal consistency, discriminant validity, concurrent validity, content validity and test-retest reliability in Brazil<sup>23</sup>.

In order to assess the overall levels of independent variables for physical activity that were considered here, we made use of the *International Physical Activity Questionnaire* (IPAQ). It is a tool developed to estimate the habitual practice of physical activity in groups and populations from different countries and socio-cultural contexts. This formulation was proposed by the International Group for Consensus on Measures of Physical Activity, under WHO and representation from 25 countries<sup>24</sup>. We applied version 8, short form and normal week, validated, evaluated and used in Brazil and other countries<sup>24,25</sup>, containing 8 questions regarding the frequency and duration of moderate and vigorous physical activity and walking with reference to the last week or a typical week.

### Statistical analysis

The data analysis of the quality of life followed the methodology proposed by the WHO. To check the reliability of the scale, a calculation was done using Cronbach's alpha coefficient ( $\alpha$ ), where values above 0.6 are regarded as acceptable. Although not a rule for the overall assessment of

WHOQOL, the *WHOQOL User Manual* <sup>26</sup> proposes the conversion of results to a scale of 0 to 100, corresponding to the same values as the end result from the use of all equations provided.

The 1966 subjects were classified into three symmetric groups, taking a cut-off value of 33.33 and 66.66 tertiles of the independent variable obtained by means of the total weekly metabolic equivalent index value (MET) and only the two extreme groups were considered for statistical analysis, the less active (the first tertile 33.33) and the most active (the third tertile 66.66) which totalled 1,312 people.

Statistical analysis consisted of a descriptive analysis based on measures of the central tendency, dispersion and frequency distribution for raising the profile of subjects. After forming the groups, these were subjected to statistical tests to detect differences between the averages of the independent variables.

To check possible differences between the most active groups compared to the least active, non-parametric tests were used for two independent samples, the Mann-Whitney test for continuous variables and chi-square test for categorical and nominal variables. The significance level was 5%. The null hypothesis took into account that there is no difference in the dependent variable among the most active compared to the least active. The data were analyzed with SPSS version 15.0 (SPSS Inc., Chicago, USA).

To classify the physical activity level the criteria described by Matsudo et al. <sup>25</sup> were used and these classified each individual according to the activities he/she engages in during weekdays as follows: (i) Sedentary – an individual who did not perform any physical activity for at least 10 continuous minutes during the week. (ii) Insufficiently active – an individual who performs physical activity lasting at least 10 minutes a week, but insufficient to be classified as active. These individuals may also be classified into two groups, namely: (a) a group formed by subjects who achieve at least one of the criteria recommendation for the frequency (5 days per week) or duration (150 minutes per week); and (b) a group of individuals that does not meet any of the recommended criteria. (iii) Active – one that meets the recommendations for vigorous activity (greater than or equal to 3 days per week and greater than or equal to 20 minutes per session) and/or moderate activity or walking (greater than or equal to 5 days per week and at least 30 minutes per session) and/or total activity greater than or equal to 5 days a week and at least 150 minutes per week. (iv) Very active – an individual who satisfies the recommendations for vigorous activity ( $\geq 5$  days per week and 30 minutes per

session) or vigorous activity (at least 3 days per week and 20 minutes per session plus moderate activity or walking should be at least five days per week and 30 minutes per session). The physical activity level was determined according to the IPAQ protocol, taking into account the time spent on each activity in minutes multiplied by the total number of days of the week and for each value of MET <sup>24</sup>.

In the quantification of the total volume of each activity, we used the MET for each activity, regardless of body weight. For walking MET - minutes/week (min/week) = 3.3 x minutes of walking x days of the week. Moderate activity MET - (min/week) = 4.0 x minutes of walking x days of the week. Vigorous activity MET - (min/week) = 8.0 x minutes of walking x days of the week <sup>27</sup>.

This research was approved by the Ethics Committee of the ESALQ, USP and filed under paragraph 21 (COET/046). The research was conducted within the ethical standards according to the *Resolution n. 196/1996* of the Brazilian National Research Council.

## Results

The sample of 1,966 participants indicated that the majority were single (65.9%) and female (61.6%) with the overall average age of 30.4 years ( $\pm 12.4$ ).

Of all subjects who voluntarily participated in data collection, the stratification is of 1,035 undergraduate students, 380 graduate students, 303 servers and 248 teachers.

When we consider the stratification by campuses, we obtain values of 1,000 respondents located in the São Paulo campus, 482 in Piracicaba, 240 in Ribeirão Preto, 84 in Pirassununga, 62 in Lorena, 59 in San Carlos, 23 in Bauru and a further 16 in advanced fields or laboratories located in cities other than those mentioned.

Based on sample calculations, we can assume that there was a response rate of 43.1% compared to sampling estimated as ideal for the Piracicaba campus, 8.3% for Lorena, 11.2% in Pirassununga, 16.7% for Ribeirão Preto, 4.8% in São Carlos, 45.1% in São Paulo and 2.7% in Bauru.

In the entire sample, the average age was 30.42 years ( $\pm 12.41$ ), with the highest assigned to the Campus of Bauru 42.27 ( $\pm 11.98$ ). The campuses of Lorena and Piracicaba had the lowest mean age, 29.08 years ( $\pm 12.65$ ) and 29.23 years ( $\pm 11.70$ ) respectively. In São Paulo the average age was 30.21 years ( $\pm 12.67$ ), in Ribeirão Preto and Pirassununga, the average was 31.67 years ( $\pm 11.53$ ) and 31.70 years ( $\pm 12.26$ ), respectively and in São Carlos it was 32.91 years ( $\pm 13.05$ ).

Regarding physical activity, 51.5% of respondents were considered active, 14% were very active, 21.3% insufficiently active B, 4.7% insufficiently active A and 5.8% sedentary according to Brazilian recommendations for classifying the IPAQ method 34.

These results indicate that, although 65.5% of people meet the recommendations for regular physical activity (active and very active), when considering individuals who were classified as sedentary and insufficiently active A and B, we observed a percentage of 34.5% of participants who do not meet the minimum recommendation for weekly physical activity.

The analysis of the WHOQOL-bref, given the overall average, converted into 0-100 scale in each domain, shows scores of 63.8% for the environment domain, 67.9% for the social relationships domain, 68.04% for the psychological domain, 73% for the physical domain and 68.4% for the evaluation of the individual on their quality of life (overall).

The average for the facets of the physical domain was also calculated based on the scale of 0-100 (Table 1).

The overall average of total amount of physical activity measured in METs was 2114.5 ( $\pm$  3191.07). The classification of individual values in tertiles resulted in a stratification of the sample where the first tertile reaches 655 METs, followed by the second tertile ranging from 656 to 1978 METs and finally the third tertile that adds up the levels above 1978 METs.

This classification resulted in three strata of physical activity level with 657 people in the first tertile, 654 people in the second tertile and 655 in the third tertile. For comparison, consideration was given to the extreme groups, the first and third tertile, a total of 1,312 subjects in the sample, with the first tertile being regarded as the most active and the third tertile the least active.

The data concerning the quality of life domains showed consistent results according to Cronbach's alpha with  $\alpha = 0.82$  in a total instrument with 26 items, and  $\alpha = 0.62$  for two items to overall quality of life, followed by analysis of the physical domain with  $\alpha = 0.76$  with 7 items, psychological domain with  $\alpha = 0.78$  with 6 items, social relationships domain with  $\alpha = 0.70$  with 3 items and the environment domain with  $\alpha = 0.75$  with 8 items.

The results of the Mann-Whitney test (Table 2) were shown to highlight the differences between the most active groups and the least active in the facets that make up the physical domain, indicating significant differences ( $p < 0.001$ ) mainly for the most active individuals, suggesting that physical activity was a factor responsible

for ensuring more positive perception of quality of life, especially with regard to aspects related to energy, transportation and willingness to carry out everyday chores.

## Discussion

The findings show that most of the participants are active and have a positive perception of the physical aspects of quality of life that are related to the ability to work, energy levels for daily activities and locomotion. Several studies reinforce the view that physical activity brings both immediate and long-term health benefits, wellness and physical independence in contrast with a sedentary lifestyle which is associated with physical symptoms of musculo-skeletal pain, the feeling of a lack of energy to carry out daily tasks, difficulties in walking as well as disturbed sleep 28,29,30. A recent study showed that musculo-skeletal pain is more frequent among women than among men and was, in both genders, related to a high BMI, a sedentary lifestyle and impaired physical function 30.

Physical activity was part of the weekly routine of most people in the sample group of young and active or very active adults. This statement, however, must be qualified by considering that, especially in interior campuses, students tend to use bicycles or walk as a means of transportation within the city or inside the university and this could influence the high proportion of active individuals, although students were the majority that made up the sample that also comprised teaching staff and other staff members.

The authors of this study held as an original hypothesis that in the university communities physical activity levels would prove to be lower due to the intense involvement in the classroom and studying, however, the sample revealed that a high proportion (65.5%) meets the recommendations for regular physical activity per week, a fact that is surprising since it shows a very different behaviour from that shown in population surveys in Brazil of physical activity levels, which indicate high rates of physical inactivity as in Joaçaba, Santa Catarina State (57,4%), Pelotas, Rio Grande do Sul State (80,7%) and Florianópolis, Santa Catarina State (41.1%) 31,32. We believe that this sample is differentiated due to the inclusion of specific and relational elements, including motivation, as one of the main factors that led people to exercise regularly 14. In view of this, we analysed the types of access that the participants had to the registration form and noted that the motivation to participate in the research seemed to have been greater when the subjects received

Table 1

Average percentage values and standard deviations (SD) in physical attributes of the WHOQOL-bref.

Facet	Average (%)	SD (±)
3. To what extent do you feel your (physical) pain prevents you from doing what you need to?	81.6	19.2
4. How much do you need medical treatment for your daily life?	84.2	18.2
10. Do you have enough energy for your daily chores?	72.6	15.6
15. How well are you able to get around?	89.2	14.6
16. How satisfied are you with your sleep?	71.0	21.2
17. How satisfied are you with your ability to perform your everyday chores?	75.0	17.0
18. How satisfied are you with your ability to work?	75.0	17.2

Table 2

Comparison of groups of individuals in the first and third tertile of METs in relation to physical aspects of quality of life (WHOQOL-bref).

Physical aspects	Physical activity groups	n	Mean	SD	p-value
3. To what extent do you feel your (physical) pain prevents you from doing what you need to?	Least active	657	3.98	1.15	0.064
	Most active	655	3.95	1.14	
4. How much do you need medical treatment for your daily life?	Least active	657	2.59	1.03	0,133
	Most active	655	2.66	1.03	
10. Do you have enough energy for your daily chores?	Least active	657	1.64	0.76	< 0.001 *
	Most active	655	1.65	0.78	
15. How well are you able to get around?	Least active	657	1.50	1.93	< 0.001 *
	Most active	655	1,67	1.98	
16. How satisfied are you with your sleep?	Least active	657	1.48	1.90	0,137
	Most active	655	1.64	1.91	
17. How satisfied are you with your ability to perform your everyday chores?	Least active	657	1.45	1.89	< 0.001 *
	Most active	655	1.69	1.99	
18. How satisfied are you with your work ability?	Least active	657	1.14	1.53	< 0.001 *
	Most active	655	1.28	1.58	

MET: metabolic equivalent index; SD: standards deviations.

\* Significant differences between the most active groups and the least active in the physical aspects, least active = up to 655 METs, most active  $\geq$  1978 METs (n = 1,312).

an invitation through social networks than one received by individual e-mail.

This gives us an indication that people tended to be motivated to practice regular physical activity when welcomed by a group or community where the activities can collectively improve the adherence or strengthening of behaviour. In this regard, it seems interesting to suggest further studies on the practice of physical activity and ways of integrating the use of social networks in the stimulus and motivation for an active life. It is also worth noting that at no time during our research, even during the call, was any information given about the potential benefits of regu-

lar physical activity or that by responding to the questionnaire access would be offered to sports and leisure programmes for the respondents.

The fact that the people making up the sample were volunteers who received no guidance on the benefits of regular physical activity leads us to the question of a possible bias where participants would inevitably be persons who have a greater affinity with the theme, in this case physical activity. However, this may not be an absolute truth if we consider that promoting physical activity and healthier lifestyles has been widely reported in the media and that there has been a raising of awareness by means of a dissemina-

tion of educational information about healthy lifestyles. Another possibility taken into account was the fact that the volunteers involved in the research are from a specific part of the population with a high intellectual background and a good level of general knowledge, a cohort that regularly engages in physical activity as a way of minimising the negative effects on daily academic life.

In analysing the results, it must be noted, with regard to the method used to assess the physical activity level, that the locomotion activities are based on body movement, such as walking or cycling, and are also scored as physical activity in a community that spends most of its time using this form of movement which is not regarded as a practice guided by professionals, or related to sports or leisure, and is mainly carried out on campuses by students who formed the majority of the sample.

On the other hand, 34.5% of sample participants, who were classified as sedentary and insufficiently active A and B, did not meet the minimum recommendation of weekly physical activity and therefore they present a risk condition for NCDs since regular physical activity is seen as one of the most effective procedures to promote quality of life in populations<sup>2,3,33</sup>. Our results also contrast with a study conducted with college students in Brazil which identified the majority (65.5%) as sedentary<sup>34</sup> and also with undergraduates in the USA where 46% were inactive or exercised irregularly<sup>35</sup>.

Several studies indicate a strong relationship between physical exercise and physical fitness and physical fitness with quality of life and, more recently, physical activity has been positively associated with improvements in psychological, social and cognitive aspects<sup>36</sup>. This association is also evident in the present study, which showed high indicators of overall quality of life (68.46%) and even higher in the aspects that make up the physical domain (73.03%).

Reichert et al.<sup>16</sup> observed that lack of money and fatigue in individuals with low socioeconomic status and lower education (7 years) from southern Brazil, are the most important barriers to physical activity, in contrast to what we observed in our sample. This observation shows that higher socioeconomic status and more education may be associated with a more active population. However, high levels of education and use of the IPAQ may have overestimated the data, as suggested in another study on the characteristics of this questionnaire<sup>37</sup>.

The physical inactivity is the fourth-leading global risk factor for mortality and is one of the most important modifiable risk factors for NCDs,

such as heart disease, diabetes and cancer, contributing substantially to the global burden of disease, disability and death. Moreover, low levels of physical activity have been associated with high health care costs.

These aspects are noteworthy since they relate to an adult community that is highly productive and has a low incidence of health issues. However, it should be noted that it is precisely during the adult phase of life that old habits exert enormous influence on future behaviours, thus impacting the quality of life throughout the aging process.

A healthy lifestyle, with its behavioural emphasis might not depend only on the individuals' decisions. Individuals can make choices in a social context, and the actions that can change unhealthy behaviour should always be part of the health promotion<sup>38</sup>.

A recent study indicates that the largest declines in physical activity levels with age occur in adolescents and young adults and above the age of 65 years and this decreasing physical activity levels at younger ages are of special concern<sup>39</sup>.

The sample appears to have a different physical activity level compared with Brazil's adult population, which shows a high prevalence of sedentary lifestyles<sup>33</sup>. However, one must take into account that these habits seem to be more related to the daily mode of transportation than with the regular practice of physical activity. During the time that young people study at university, they tend to reduce their physical activity due to their dedication to studying, sometimes associated with work, leading to a lower availability of free time for sports and leisure<sup>4</sup>. In Brazil, the universities have released information through elective classes in undergraduate courses, especially about the importance of physical activity and its contribution to the change of lifestyle and good health promotion.

The broader view of the results, which indicate the most active participants and those with a high overall quality of life, does not discard the need for interventions in the university environment to encourage healthier lifestyles, but the results reinforce the idea that the university should create conditions for this practice by implementing health promotion strategies that can be consolidated over the years. Universities can promote and encourage healthier lifestyles by creating the conditions for the practice of physical activities and associate this practice with other health interventions. In the university environment there is the possibility for interaction between multidisciplinary health teams and the consolidation of preventative health actions. However, this concern should be part of the rou-

tine in the university environment, where health-care for the domestic population may be the focus of a set of actions, including periodic analysis of health indicators, and also designing specific interventions to minimise conditions that pose a risk to health and quality of life.

A limitation of this study that should be considered is the convenience sampling. Although the technique makes better use of the method of data collection via the Internet, the results are limited to the university academic community and therefore do not reflect the profile of the Brazilian population.

This sampling technique consumes less time and is less expensive, the sampling units are affordable, easy to measure and cooperating. However, there are serious limitations regarding the representativeness of the population, and great care must be taken in generalizing the results <sup>40</sup>.

Guidelines to maximize the sample size is now questioned because although it is true that large samples produce solutions that are more

stable and more easily replicable, the decision of sample size must consider several factors to ensure an accurate solution.

We conclude that subjects with high physical activity levels practice regular physical activity that is associated with a positive perception of the physical aspects of quality of life, a high capacity for work, greater disposition and energy to perform everyday tasks and a good ability for movement. Probably the economic, social and intellectual characteristics of the sample contributed to the good levels of physical activity, thus suggesting that the level of education may be key to the change in lifestyle, because it would allow a greater focus on health and well-being. Universities can reflect on the relevance of the stimulus and enhancement for physical activity, promotion of specific actions and provide appropriate environments for this purpose. Encouraging the use of bicycles, building bike paths, and a policy of traffic education is valuable for improving living conditions in this environment.

## Resumen

*El objetivo de este estudio fue comprobar la calidad de vida percibida por los voluntarios que son físicamente más activos y los menos activos en una comunidad universitaria. La muestra, constituida por 1.966 voluntarios, estaba formada por estudiantes y personal docente en una comunidad universitaria en Brasil. Para evaluar el nivel de actividad física, se utilizó Cuestionario Internacional de Actividad Física (IPAQ), y para la percepción de la calidad de vida: WHOQOL-bref. Los participantes se clasificaron en tres grupos, según el nivel de actividad física, teniendo en cuenta índice equivalente metabólico (MET) durante una semana completa. El nivel de actividad física mostró que la muestra se clasificó como un 51,5% activo; un 14% muy activo; B un 21,3% insuficientemente activo; un 4,7% insuficientemente activo A y un 5,8% eran sedentarios. Las personas que participan en más actividades físicas tenían una percepción más positiva de la calidad de vida, en los aspectos físicos relacionados con la capacidad de trabajo, energía para las actividades del día a día y la locomoción, en comparación con aquellos que eran menos activos.*

*Actividad Motora; Calidad de Vida; Promoción de la Salud; Adulto*

## Contributors

E. S. Maciel participated in the design and preparation of the research project, supervision and research development, data collection and data analysis, and final writing. R. Vilarta and G. B. Vilela Junior were reviewers who shared in producing the final draft. D. M. Modeneze, J. G. Sonati and J. S. Vasconcelos participated in the design, collection and data analysis, and final writing. M. Oetterer participated in guiding the research project and in producing the final draft.

## Acknowledgements

The authors wish to thank the Post-Graduation Program of the Center of Nuclear Energy in Agriculture, São Paulo University, Piracicaba, São Paulo State, Brazil. Many thanks to CNPq for the scholarship provided to the first author. The authors give thanks to FAPESP financial support.



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Submitted on 16/Dec/2012

Final version resubmitted on 24/Apr/2013

Approved on 8/May/2013