

Comparison of perceived barriers to physical activity between Ecuadorian university students in physical activity and sports pedagogy and other social science majors

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Abstract:

Background. Research suggests a relationship between university majors and the perception of contextual barriers to physical activity (PA). This study aims to identify and compare, differentiating by the sexes, the perceived barriers to PA among students of Physical Activity and Sport Pedagogy (PASP) and students from other social science majors at the Technical University of Machala. **Methods.** This research is descriptive and cross-sectional with a quantitative approach. A convenience sample of 526 students (168 men and 358 women) was obtained using a non-probabilistic intentional sampling technique by accessibility. Of these, 100 were PASP students (68 males and 32 females) and 426 were studying other majors (100 males and 326 females). The instrument used was the Barriers to Being Active Quiz (BBAQ) scale adapted to Spanish. The 21 items and the seven instrument categories were analyzed according to their nature and scale. **Results.** Female PASP students did not perceive barriers in any of the seven BBAQ categories, while women from other majors perceived barriers in four categories: *lack of energy*, *lack of time*, *lack of will*, and *lack of resources*. Significant differences were found in only one of the 21 scale items and in the associations of barriers with studies in the categories of *lack of time* ($p<0.023$) and *lack of energy* ($p<0.042$), with lower perception of barriers in PASP students. In male students, the main barriers for both groups were *lack of time* and *lack of energy*. *Lack of resources* was a barrier for men in other majors, while *lack of willingness* was a barrier for PASP students. Significant differences were found in four of the 21 scale items and in the associations in two categories: *social influence* ($p<0.036$) and *fear of injury* ($p<0.016$), with a higher perception of barriers in men from other majors. **Conclusions.** The type of university major affects the perception of barriers to PA among university students. This should be addressed with specific university policies to reconcile academic life with regular physical exercise programs.

Key Words: physical exercise, undergraduate students, self-perception, higher education, sedentary behavior.

Introduction

Low levels of PA and increased sedentary behaviors in young university students are studied because of their high impact on physical and mental health and the associated costs on the future development of adult populations. According to the World Health Organization (WHO, 2022) report on the global situation of physical activity (PA), there is projected a significant increase in chronic non-communicable diseases and mental illnesses over the next decade, with serious repercussions for public health costs and morbidity.

The situation is particularly alarming in Ecuador. Estimates for American countries and those with medium levels of development indicate that these regions will experience the largest increases in chronic non-communicable diseases by 2030 (Santos et al., 2023). The 2023 report by the National Institute of Statistics and Census (INEC, 2023) on PA and sedentary behavior in Ecuador highlighted that in 2022, 23.7% of the adult population aged 18-69 in urban areas, and 16.6% in rural areas, engaged in insufficient PA. Furthermore, the median sedentary behavior during a typical day for young adults (18 to 29 years) measured by the time-spent sitting or reclining, exceeded 180 minutes. The transition from secondary education to university is a critical period for the establishment of unhealthy habits and lifestyles (Castro et al., 2020; Edelman et al., 2022). During this time, high percentages of young people fail to meet WHO PA recommendations (Alkhaldeh et al., 2024) and exhibit sedentary behaviors that greatly surpass those of office workers (Castro et al., 2018), largely due to technological dependence (Ndupu et al., 2023). Academic pressure and the cease of aerobic exercise are the basis for developing mental anxiety disorders in university students of both sexes (Arnau-Mollá & Romero-Naranjo, 2024).

At this vital moment, important academic, personal and social changes occur that make young people especially vulnerable to perceive obstacles and to the abandonment of PA practice (Luque & del Villar, 2019). Especially in those who have not consolidated the habit of physical exercise before university entrance (Castro et al., 2018; Corder et al., 2019; Mella-Norambuena, 2020; Peñarrubia-Lozano et al., 2021; Sierra-Díaz et al., 2019). The relationships between PA of the student body and sedentary behavior are moderated by the characteristics of the university, the type of studies, the place of residence, lifestyle, academic pressure, sports programs, the supply of facilities, etc. (Santamaría et al., 2018). Universities, as educational institutions for personal and professional development, should implement healthy sports policies that make it possible to reconcile academic life with the regular practice of PA and instrumentalize sport as a socializing element and active occupation of leisure time (Luis de Cos et al., 2023).

Several studies have highlighted sedentary behaviors and revealed barriers to the regular practice of PA with Ibero-American university students. They distinguish variables like sex, academic year, major studied, level of PA practice, country of origin and demographic and sociocultural context (Arboleda et al., 2016; Blanco et al., 2019; Carcelén, 2021; Ceron et al., 2023; Ferreira et al., 2022; García, 2020; Mella-Norambuena, 2020; Mira et al., 2019; Ortega et al., 2021; Prada-Rozo & Cuevas-Gómez, 2020). However, the methodological heterogeneity, the study contexts and the use of different instruments and data collection procedures make it difficult to draw conclusions generalized to the Latin American university population.

Recent quantitative and qualitative studies confirmed that the main barriers to PA in university students corresponded to the following dimensions: psychological, emotional, cognitive (lack of time, motivation); environment (lack of facilities); and socioeconomic and demographic (lack of resources). Among all of them, lack of time was the most cited barrier, and in the case of the studies that included only females, sociocultural and environmental barriers linked to gender stereotypes stood out (Ferreira et al., 2023).

Brown et al. (2024) mapped barriers and facilitators to PA in a framework of theoretical domains (constructs) associated with a behavior change model. The results yielded fifty-six barriers and facilitators in twelve domains. Three of these: environmental context and resources (i.e., time constraints), social influences (i.e., exercising with others), and goals (i.e., prioritizing physical activity) were considered to be of greatest relative importance in college students. No effects were attributed to demographic characteristics, but the disproportionate impact of numerous barriers in women's groups derived from gender stereotypes associated with social norms, religious beliefs, attitudes towards embodiment and the practice of PA, as well as the masculinized content of sports practices stood out.

In addition to gender and age, the field of university study, level of studies (undergraduate, graduate, master's, doctorate) and semester of the study showed a relationship with PA practice levels in German students. Lower levels were found in students taking natural sciences, computer science, mathematics, languages, humanities, and cultural studies compared to those of students of social sciences, communication, and sport, medicine, and education, respectively (Eddelman et al., 2021). A comparison of Chilean sports science students with Spanish education science students showed that the former were more active and presented fewer barriers to PA practice (Moral et al., 2024).

There have been no conclusive studies within the same Latin American university comparing PASP students, whose vocation, field of study, and professional purpose is the adherence and regular practice of PA in the population (Martínez-Sánchez et al., 2024), with students of other majors, nor has the impact of the field of study on the perception of barriers been identified.

In the Ecuadorian university context, the perceived barriers to regular PA practice have not been identified nor characterized. The effect of the chosen field of study on the number and typology of barriers, and whether these relate to internal factors (lack of interest, motivation, liking to practice, perceived ability, etc.) and/or external factors (academic load, type of studies, influence of family, friends, occupations, professional pressure, availability of facilities and resources, etc.) is unknown.

The objective of this study is to identify and compare, differentiating by the sexes, the perceived barriers to PA practice among students of PASP and students from other social science majors at the Technical University of Machala.

Material & methods

Participants

This is a descriptive, cross-sectional research with a quantitative approach. A non-probabilistic intentional sampling technique by accessibility was used, with a convenience sample that included 526 students of the Faculty of Social Sciences in the Technical University of Machala (168 men and 358 women). The sample included students of PASP, plastic arts, communication, law, basic education, initial education, pedagogy of experimental sciences, pedagogy of national and foreign languages, clinical psychology, psycho-pedagogy, sociology, and labor and social work, representing 22.18% of the total student body, who freely and voluntarily answered the questionnaire. Of the students analyzed, 100 were PASP students (68 men and 32 women) and 426 students were studying other majors (100 men and 326 women).

Even though for this type of study, there is no criterion on a minimum number of participants, we followed the suggestion of Morales (2013), considering the proportion of the sample concerning the number of

variables, that at least the number of people exceeds the number of variables by more than twice. In this case, there are 526 subjects and 21 variables, far exceeding the double and reaching a ratio of 25. The minimum number of subjects recommended in absolute terms is 150 subjects, to minimize errors (Garduño-Durán, et. al. 2024).

Instruments

The instrument used to measure the barriers to PA practice was the Barriers to Being Active Quiz (BBAQ) scale in its adaptation to Spanish and validated for Latin American university students. The reliability of the instrument, measured with Cronbach's alpha, ranged from 0.812 to 0.844, depending on the item, with a positive and statistically significant correlation ($p < 0.05$). Validity was measured with the *scree test* by which a single factor explaining 52.91% of the variance was determined (Rubio-Henao et al., 2015).

The questionnaire consists of 21 items measured on a Likert scale (from 0 to 3) corresponding to the labels “Very unlikely”, “Somewhat unlikely”, “Somewhat likely”, and “Very likely”. The 21 items are grouped into seven categories (each composed of three items): *lack of time* (1, 8, 15), *social influence* (2, 9, 16), *lack of energy* (3, 10, 17), *lack of will* (4, 11, 18), *fear of injury* (5, 12, 19), *lack of ability* (6, 13, 20), and *lack of resources* (7, 14, 21). Thus, each of the categories scores between zero and nine, and a barrier exists when the sum of the three items in a category equals or exceeds the value of five.

Variables

The independent variables were sex and university major and the dependent variables were the 21 items of the questionnaire and the 7 categories of barriers resulting from the grouping of items. To compare the results of PASP students with the rest of the students, the variable studies were recoded into a dichotomous variable in which the rest of the majors were grouped into a single value.

Procedure

The Ethics Committee of the Technical University of Machala, Ecuador approved the study. The BBAQ instrument was sent by official e-mail to the students of the different social science majors of the Technical University of Machala, through Google Forms. The older adults surveyed signed the informed consent form, which explained the objective and importance of the study. Confidentiality and anonymity of the information were guaranteed. Data collection took place in April and May 2022.

Statistical analysis

A descriptive study was carried out (for the two types of university studies) of the 21 items and the 7 categories according to their nature and scale, calculating the mode and median for variables on an ordinal scale. The Mann-Whitney test was used to compare the values of the 21 items of the BBAQ and its seven categories among the PASP students with the rest of the students.

Contingency tables were used (for each type of study) and as a measure of association Phi for dichotomous variables on a nominal scale. Associations were sought between the types of studies completed and the seven categories that explained the presence of barriers, analyzing the measures of association and the typed residuals greater than or equal to one in absolute value in the contingency tables.

For the statistical analysis, the IBM SPSS version 29 program licensed by the Universidade da Coruña was used. The level of significance was established for values of $p < 0.05$ in all cases.

Results

The age of the participating students was mainly between 20 and 23 years of age (62.7%), with 15.2% of those under 20 years of age and 22.1% of those over 23 years of age. Table 1 shows the distribution of the sample according to university studies and sex.

Table 1. Distribution of the sample according to studies attended

Major	Total		Females		Males	
	N	%	N	%	N	%
Physical Activity and Sport Pedagogy (PASP)	100	19.0	32	8.9	68	40.5
Plastic Arts	15	2.9	8	2.2	7	4.2
Communication	66	12.5	48	13.4	18	10.7
Law	43	8.2	29	8.1	14	8.3
Basic education	28	5.3	24	6.7	4	2.4
Initial education	39	7.4	37	10.3	2	1.2
Pedagogy of experimental sciences	24	4.6	11	3.1	13	7.7
Pedagogy of national and foreign languages	11	2.1	11	3.1	0	0
Clinical psychology	111	21.1	84	23.5	27	16.1
Psychopedagogy	46	8.7	39	10.9	7	4.2
Sociology	21	4.0	14	3.9	7	4.2
Social work	22	4.2	21	5.9	1	0.6
Total	526	100.0	358	100.0	168	100.0

The description of the 21 items of the BBAQ scale, as well as the comparison by type of studies, is shown in Table 2 for men and Table 3 for women.

Table 2. Description and comparison of the BBAQ scale items between studies for men

Item	Description	Major	Me	Mo	MR	Sig. ¹
1	My day is so busy right now, I don't think I can make time for physical activity in my normal schedule	Other	2	2	87.1	0.377
		PASP	2	2	80.8	
2	None of my family or friends like to do physical activity/sports, so I have no opportunity to exercise	Other	1	0	87.5	0.315
		PASP	1	0	80.1	
3	I am too tired after college to exercise	Other	2	2	90.5	0.043*
		PASP	1	0	75.6	
4	I have been thinking about starting to exercise, but have not been able to take the first step	Other	2	2	84.8	0.909
		PASP	2	2	84.0	
5	Exercising can be risky at my age	Other	0	0	84.7	0.951
		PASP	0	0	84.3	
6	I don't exercise enough because I have never learned any sports	Other	0	0	85.0	0.855
		PASP	0	0	83.8	
7	I don't have access to jogging trails, swimming pools, bike paths, etc.	Other	1	0	88.1	0.233
		PASP	1	0	79.3	
8	Doing physical activity takes a lot of time away from other obligations I have such as my studies, family, schedule, etc.	Other	2	2	91.8	0.014*
		PASP	1	1	73.7	
9	I feel embarrassed about how I will look when I exercise in front of other people	Other	1	0	88.2	0.196
		PASP	1	0	79.0	
10	I don't even get enough sleep. I couldn't get up earlier or go to bed later to exercise	Other	2	2	85.7	0.691
		PASP	1,5	2	82.8	
11	It's easier for me to find excuses not to exercise than to actually do it	Other	1	2	92.4	0.007*
		PASP	1	0	72.8	
12	I know a lot of people who have hurt themselves because they have exercised too much	Other	1	0	85.5	0.744
		PASP	1	0	83.1	
13	I really don't see myself learning a new sport at my age	Other	1	0	87.5	0.285
		PASP	0	0	80.0	
14	It's just too expensive. You have to take a class, join a club, or buy the right equipment	Other	1	2	87.5	0.310
		PASP	1	0	80.1	
15	I have very little free time during the day to exercise	Other	2	2	85.9	0.642
		PASP	2	2	82.5	
16	My usual social activities with my family and friends do not include physical activities	Other	2	2	87.9	0.260
		PASP	2	2	79.6	
17	I am very tired during the week and need to rest during the weekend to recuperate	Other	2	2	86.0	0.618
		PASP	2	2	82.3	
18	I want to exercise more, but I can't seem to make myself do it	Other	1	2	86.7	0.467
		PASP	1	1	81.3	
19	I'm afraid of getting injured or having a heart attack	Other	1	0	92.8	0.005*
		PASP	0	0	72.4	
20	I am not good enough at any physical/sports activity to keep me entertained	Other	1	0	86.8	0.430
		PASP	1	0	81.1	
21	If there was a place to exercise and showers on campus, I would be more likely to exercise	Other	2	3	79.6	0.084
		PASP	3	3	91.8	

Physical Activity and Sport Pedagogy: **PASP**; Median: Me; Mode: Mo; Very Unlikely: 0; Somewhat Unlikely: 1; Somewhat Likely: 2; Very Likely: 3; Mean Rank: MR; ¹: Mann-Whitney test signification; * **Statistically significant difference**

In the male population, the lowest values, which correspond to the “Very unlikely” category, are found in item 5 “Exercising can be risky at my age” and in item 6 “I do not exercise enough because I have never learned any sport”, with a minimum mode and median in both cases. Item 13 “Really, I don't see myself learning a new sport at my age” and item 19 “I'm afraid of getting injured or having a heart attack” present minimum values in the mode and median in PASP students, with a lower median than the rest of the students (“Somewhat likely”).

On the other hand, maximum values (3) “Very likely” are observed in the mode of item 21 “If there were a place to exercise and showers at the university, I would be more likely to exercise”, both for PASP students and the rest. However, the median is maximum in PASP students and presents higher values than the rest of the students.

As can be seen, significant differences are found between male PASP students and the rest of the students in four of the 21 items. Thus, item 3 “I am too tired after college to exercise”; item 8 “Doing physical activity takes a lot of time away from my other obligations such as my studies, family, schedule, etc.”; item 11 “It is easier for me to find excuses not to exercise than to start doing it”, and item 19 “I am not good enough at any physical/sports activity to entertain myself”, show significantly lower values in the PASP students compared to the rest of the students.

Tabla 3. Description and comparison of the BBAQ scale items between studies for women

Item	Description	Major	Me	Mo	MR	Sig. ¹
1	My day is so busy right now, I don't think I can make time for physical activity in my normal schedule	Other	2	2	181.3	0.260
		PASP	2	2	161.0	
2	None of my family or friends like to do physical activity/sports, so I have no opportunity to exercise	Other	1	0	179.1	0.791
		PASP	2	2	183.9	
3	I am too tired after college to exercise	Other	2	2	181.5	0.218
		PASP	2	2	159.0	
4	I have been thinking about starting to exercise, but have not been able to take the first step	Other	2	2	181.7	0.172
		PASP	2	2	156.7	
5	Exercising can be risky at my age	Other	0	0	177.9	0.282
		PASP	0,5	0	195.8	
6	I don't exercise enough because I have never learned any sports	Other	1	0	179.7	0.922
		PASP	1	1	177.9	
7	I don't have access to jogging trails, swimming pools, bike paths, etc.	Other	1	0	178.1	0.412
		PASP	1	1	193.3	
8	Doing physical activity takes a lot of time away from other obligations I have such as my studies, family, schedule, etc.	Other	1	2	183.3	0.023*
		PASP	1	0	141.3	
9	I feel embarrassed about how I will look when I exercise in front of other people	Other	1	0	181.0	0.355
		PASP	1	1	164.0	
10	I don't even get enough sleep. I couldn't get up earlier or go to bed later to exercise	Other	2	2	180.7	0.467
		PASP	2	2	167.3	
11	It's easier for me to find excuses not to exercise than to actually do it	Other	1	2	180.8	0.448
		PASP	1	1	166.7	
12	I know a lot of people who have hurt themselves because they have exercised too much	Other	1	0	179.3	0.895
		PASP	1	1	181.7	
13	I really don't see myself learning a new sport at my age	Other	1	0	177.2	0.150
		PASP	1	1	203.0	
14	It's just too expensive. You have to take a class, join a club, or buy the right equipment	Other	1	0	181.1	0.346
		PASP	1	0	163.7	
15	I have very little free time during the day to exercise	Other	2	2	180.3	0.639
		PASP	2	2	171.7	
16	My usual social activities with my family and friends do not include physical activities	Other	2	2	180.4	0.586
		PASP	2	2	170.4	
17	I am very tired during the week and need to rest during the weekend to recuperate	Other	2	2	180.7	0.484
		PASP	2	2	167.8	
18	I want to exercise more, but I can't seem to make myself do it	Other	2	2	180.8	0.439
		PASP	1,5	2	166.6	
19	I'm afraid of getting injured or having a heart attack	Other	1	0	177.8	0.288
		PASP	1	1	197.0	
20	I am not good enough at any physical/sports activity to keep me entertained	Other	1	1	179.1	0.820
		PASP	1	2	183.3	
21	If there was a place to exercise and showers on campus, I would be more likely to exercise	Other	2	3	177.9	0.324
		PASP	2	3	195.6	

Physical Activity and Sport Pedagogy: **PASP**; Median: Me; Mode: Mo; Very Unlikely: 0; Somewhat Unlikely: 1; Somewhat Likely: 2; Very Likely: 3; Mean Rank: MR; ¹: Mann-Whitney test signification; * **Statistically significant difference**

In women the lowest values, which correspond to the “Very unlikely” category, are found in item 5 “Exercising can be risky at my age”.

Results show a minimum mode and median in the group of female students of other majors and a minimum mode and a slightly higher median than the rest of the students (between “Somewhat unlikely” and “Somewhat likely”) in the PASP women students.

On the other hand, the maximum (3) “Very likely” values are observed in the mode of item 21 “If there were a place to exercise and showers at the university, I would be more likely to exercise”, both for female PASP students and the rest, however, the median is lower (“Very likely”) in both cases.

Significant differences are only found between female PASP students and the rest of the students in 1 of the 21 items. It is the case of item 8 “Doing physical activity takes a lot of time away from the other obligations I have such as my studies, family, schedule, etc.” which presents significantly lower values in PASP students compared to the rest of the students.

Tables 4 (males) and 5 (females) show the description of the 7 categories of the BBAQ scale, as well as the comparison between PASP students and the rest of the students (Other).

Table 4. Description and comparison of the categories of the BBAQ scale between studies in men

#	Category Description	Me	Other			B	MR	Me	PASP			Sig. ¹
			Mo	Σ					Mo	Σ	B	
1	Lack of time	5	5	5.0±2.5	Yes	89.4	5	2	4.4±2.4	Yes	77.3	0.109
2	Social influence	4	2	3.9±2.4	No	89.5	3	4	3.3±2.2	No	77.1	0.102
3	Lack of energy	5	6	4.7±2.5	Yes	89.2	5	5	4.2±2.4	Yes	77.7	0.130
4	Lack of willpower	4	3	4.1±2.5	No	89.0	3	3	3.5±2.3	Yes	77.9	0.146
5	Fear of injury	2	0	2.6±2.2	No	88.2	2	0	2.0±1.7	No	79.0	0.221
6	Lack of ability	2	0	2.4±2.2	No	87.1	2	0	2.0±1.8	No	80.1	0.389
7	Lack of resources	5	3	4.5±2.2	Yes	85.4	4.5	3	4.4±2.3	No	83.2	0.779

Physical Activity and Sport Pedagogy: **PASP**; Category average sum (Mean±SD): Σ ; Barrier (median and mode): B; Mean Rank: MR; Sig.¹: Mann-Whitney test signification; * **Statistically significant difference**

In men, minimum values (0) are observed only in the mode of the categories *fear of injury* and *lack of ability*, regardless of the studies pursued, while the median presents a higher value (2) in both categories for all students. As for the highest values (6), they are found in the mode of the category *lack of energy* of the group of other studies, a higher value than the PASP students (5).

No significant differences were found between male PASP students and the rest of the students in any of the seven categories of barriers.

Table 5. Description and comparison of the categories of the BBAQ scale between studies in women

#	Category Description	Me	Other			B	MR	Me	PASP			Sig. ¹
			Mo	Σ					Mo	Σ	B	
1	Lack of time	5	6	5.1±2.5	Yes	182.2	4	4	4.5±2.1	No	151.8	0.110
2	Social influence	4	3	4.2±2.3	No	180.8	4	5	3.9±1.9	No	166.7	0.459
3	Lack of energy	6	6	5.2±2.7	Yes	181.4	4	4	4.8±2.3	No	160.6	0.274
4	Lack of willpower	5	6	4.8±2.5	Yes	181.7	4	4	4.3±2.3	No	157.6	0.206
5	Fear of injury	2	0	2.3±1.9	No	177.5	3	2	2.7±1.6	No	200.4	0.225
6	Lack of ability	2	0	3.0±2.2	No	178.8	3	3	3.2±2.0	No	186.7	0.676
7	Lack of resources	5	3	4.6±2.2	Yes	178.7	5	3	4.8±2.1	No	188.0	0.624

Physical Activity and Sport Pedagogy: **PASP**; Category average sum (Mean±SD): Σ ; Barrier (median and mode): B; Mean Rank: MR; Sig.¹: Mann-Whitney test signification; * **Statistically significant difference**

In women, minimum values (0) are observed only in the mode of the categories *fear of injury* and *lack of ability* in the students of the other studies group, while the median presents a greater value (3) in the PASP students than in the rest (2). The highest values (6) are found in the median and the mode of the category *lack of energy* of women in other studies, a higher value than the PASP students (4). Maximum values (6) are also observed in the mode of the categories' *lack of time* and *lack of will*, which are higher than those observed for female PASP students (4) in both categories.

No significant differences were found between female PASP students and the rest of the female students in any of the seven categories.

To try to understand how the differences due to the type of studies pursued behave about the barriers perceived in the different categories of the BBAQ scale, significant associations were calculated.

In Tables 6 and 7 (men and women) can be observed only the categories whose association with studies has shown statistical significance, or those that even without significance presented typified residuals (at least 50%) greater or equal to 1 in absolute value.

Table 6. Significant associations between the presence or absence of perceived barriers on the BBAQ scale and the type of studies pursued in men

Social influence		No Barrier	Barrier	Value ¹	Sig. ²
Other	Count	61	39	0.162	0.036*
	EF	67.3	32.7		
	TR	-0.8	1.1		
PASP	Count	52	16		
	EF	45.7	22.3		
	TR	0.9	-1.3		
Fear of injury		No Barrier	Barrier	Value ¹	Sig. ²
Other	Count	79	21	0.185	0.016*
	EF	84.5	15.5		
	TR	-0.6	1.4		
PASP	Count	63	5		
	EF	57.5	10.5		
	TR	0.7	-1.7		
Lack of ability.		No Barrier	Barrier	Value ¹	Sig. ²
Other	Count	81	19	0.140	0.069
	EF	85.1	14.9		
	TR	0.4	1.1		
PASP	Count	62	6		
	EF	57.9	10.1		
	TR	0.5	-1.3		

Physical Activity and Sport Pedagogy: **PASP**; Expected frequency: EF; Typified Residual; TR; ¹ Strength of association measured with Kendall's Tau-b; ² Significance of Kendall's Tau-b; * **Statistically significant associations**

About the *social influence* category, fewer male PASP students perceive barriers than expected, with a typified residual (TR -1.3). Students from other majors present an inverse behavior, with more than the expected number of students perceiving barriers (TR 1.1). The strength of the association is weak (0.162) but significant.

When we assess the category *fear of injury*, fewer PASP students than expected are observed to perceive barriers (TR -1.7). Students from other majors present an inverse behavior; finding more than expected who perceive barriers (TR 1.4). The strength of the association is weak (0.185) and significant.

Finally, in the *lack of ability* category, fewer PASP students than expected are observed to perceive barriers (TR -1.3). The students of other majors present an inverse behavior, finding more than expected who perceive barriers (TR 1.1), although in this case statistical significance is not reached.

In the case of women, the values are presented in Table 7.

Table 7. Significant associations between the presence or absence of perceived barriers on the BBAQ scale and the type of studies pursued in women

Lack of time		No Barrier	Barrier	Value ¹	Sig. ²
Other	Count	126	200	0.120	0.023*
	EF	132.0	194.0		
	TR	-0.5	0.4		
PASP	Count	19	13		
	EF	13.0	19.0		
	TR	1.7	-1.4		
Lack of energy		No Barrier	Barrier	Value ¹	Sig. ²
Other	Count	114	212	0.108	0.042*
	EF	119.3	206.7		
	TR	-0.5	0.4		
PASP	Count	17	15		
	EF	11.7	20.3		
	TR	1.5	-1.2		

Physical Activity and Sport Pedagogy: **PASP**; Expected frequency: EF; Typified Residual; TR; ¹ Strength of association measured with Kendall's Tau-b; ² Significance of Kendall's Tau-b; * **Statistically significant associations**

Regarding the *lack of time* category, fewer female PASP students are found to perceive barriers than expected, with a typed residual (TR -1.4), and more than expected are found to perceive no barriers (TR 1.7). The strength of the association is weak (0.120) but significant.

Finally, in the *lack of energy* category, fewer PASP women perceive barriers than expected, with a typed residual (TR -1.2) and more than expected who do not perceive barriers (TR 1.5). The strength of the association is weak (0.108) but significant.

Discussion

This study seeks to compare the perceived barriers to PA practice in Ecuadorian university students of PASP and other degree programs and to identify differences and similarities to determine the effect of the type of university studies and the associated variables.

Given that sex is a determining variable in Ecuadorian students, with women perceiving more barriers to the practice of PA (Bobo et al., 2024), the discussion of the results focuses on the distribution by sex of the sample analyzed. The novelty of the study lies in the fact that the perceived barriers to PA are analyzed simultaneously in students studying different majors at the same university. This allows simultaneous comparisons by sex (women and men) and type of studies (students of the Technical University of Machala studying PASP and students of other Social Sciences majors).

The most noteworthy findings in women are:

- Women who study PASP do not score at the minimum level in any of the 7 categories of barriers of the BBQA, while women who study other majors score in 4 categories of barriers: *lack of energy*, followed by *lack of time*, *lack of willpower* and *lack of resources*.
- In women, significant differences between types of studies were found in only one of the 21 items of the BBQA scale, specifically in item 8 “Doing physical activity takes a lot of time away from the other obligations I have such as my studies, family, schedule, etc.”
- In women, significant differences were found in the associations between barriers and the type of studies pursued in the categories of *lack of time* and *lack of energy*.

The most remarkable findings in men are:

- All of them score in barriers in the categories of *lack of time* and *lack of energy*, with higher scores for students from other majors, and they differ in that PASP students also score in the category of *lack of willpower* while men from other majors score in the category *lack of resources*.
- In men, significant differences between PASP and other majors were found in four of the 21 items. Specifically in item 3 “I am too tired after university to exercise”, in item 8 “Doing physical activity takes a lot of time away from my other obligations such as my studies, family, schedule, etc.”, in item 11 “It is easier for me to find excuses not to exercise than to start doing it” and in item 19 “I am afraid of injuring myself or having a heart attack”.
- In men, significant differences were found in the associations between barriers and the type of studies pursued in the categories of *social influence*, *fear of injury*, and *lack of ability*.

The most notable findings for the sample as a whole are as follows:

- None of the groups of students, women and men, PASP and other majors, scored at the minimum value established to reach the level of consideration as a barrier to PA in the categories of *social influence*, *fear of injury*, and *lack of ability*.
- No statistically significant differences were obtained in the comparison of barrier categories between women from different university majors nor in the case of men.

Lack of time is a barrier for the entire sample except for female PASP students.

The results indicate that the category *lack of time* is a perceived barrier for the entire sample except for female PASP students. Being the most cited barrier, with the highest incidence in women (Brown et al 2024.; Ferreira et al., 2022), for the PASP women of the Technical University of Machala (8.9% of the total sample of women and 30% of PASP students in the study) the score on *lack of time*, although high, does not reach the barrier level. This barrier incorporates three dimensions of time use: usual daily schedule, schedule of obligations, and schedule of free time, which are included in the three items that comprise it. Significant differences are detected, both in the case of women and men, between PASP students and other majors in item 8 “Doing PA takes a lot of time away from the other obligations I have such as my studies, family, schedule, etc.” with greater importance in students of other majors. While the obligations of PASP students could link to the practice of PA, in the case of students from other majors, obligations could get in the way of the decision to practice PA or interfere with the motives or opportunities for PA for both women and men (Muñoz-Donoso et al., 2023). Along these lines, time constraints in university students are exacerbated by academic load and participation in curricular activities (Thomas et al., 2019), long commutes to the university (Teuber et al., 2020), family responsibilities (Mella-Norambuena et al., 2021), and work commitments (Brown et al., 2024).

In the particular case of the associations between the type of studies and the perception of *lack of time* among PASP women and women from other majors, fewer PASP women were found to perceive barriers than expected and the inverse behavior was observed in women from other majors. The results coincide with those of Mexican sportswomen (Mondaca et al, 2020) and those of Latin American countries’ studies that highlight the weight of obligations attributed by gender bias (domestic, family and care tasks) in women's perception of the *lack of time* for PA practice.

Social influence is not a barrier but is more important in the case of men pursuing other studies.

The results in the *social influence* category confirm it is not perceived as a barrier to the practice of PA in the case of women and men, in both PASP and other majors. However, in all groups the scores are high, and close to the limit established in the scale to consider the existence of the barrier, finding differences in the associations with greater weight in the particular case of men studying other majors.

The social influence construct incorporates variables that can simultaneously facilitate or inhibit the practice of PA in university students (Ferreira et al., 2022). In the analysis of the items that make up this barrier, in item 2 “None of my relatives or friends like to do PA/Sports, so I do not have the opportunity to exercise” there are no significant differences between the types of studies, but the highest scores are reached in the median and mode of female PASP students. This result seems to indicate that in the family circle or the close social group of PASP women there are no friends who like to practice sports, so they cannot perform PA in the closest social environment (Sevil et al., 2017). Neither are differences found when comparing majors among women and among men in item 16 “My usual social activities with my family and friends do not include PA” and in item 9 “I feel sorry for how I am going to look when I exercise in front of other people”. The analysis of significant associations revealed fewer PASP men than expected and more men from other majors than expected in the perception of the *social influence* barrier. This behavior indicates the complexity of the theoretical construct of this dimension of social opportunity for practice (Brown et al., 2024). New social roles, independence from the family home, changes in the environment, and economic circumstances (Corder et al., 2019) define a context of adaptation to a new lifestyle that those who have not entrenched the habit perceive as an obstacle and not as an opportunity for regular physical exercise. Even though the effects of numerous variables are confirmed in the literature, they are unknown in terms of university field of study. That is the case of body self-image, clothing, fear of being observed during practice, spaces and types of practice (Brown et al., 2024), social physical anxiety generated by practicing in public (Niñerola i Maymí et al. 2006) and negative physical and emotional self-concept (Carcelén, 2021).

Lack of energy is a barrier for the entire sample except for female PASP students.

Except for female PASP students, the category *lack of energy* is a perceived barrier with high values in the mode in all cases. Significant differences are among women in the associations between type of studies and *lack of energy*, finding fewer PASP women than expected who do not perceive barriers and the reverse behavior in women students of other majors. In the case of men, significant differences were found for studies in item 3 “I am too tired after college to exercise”. The results are consistent with the qualitative study by Fernández-Prieto et al. (2020) who indicate that laziness and lack of motivation are barriers to PA. Franco-Idárraga et al. (2022) emphasize the fatigue and tiredness that physical exercise generates, particularly for students without habit, as is the case of fine arts students compared to other studies such as education. Carcelén (2021) states that the state of tiredness or fatigue usually during the day makes it impossible for them to practice physical activity.

Lack of energy is the barrier with the highest score in the study. The interpretation of this result would require a complementary qualitative analysis to establish causal relationships in the sample analyzed. Lack of energy relates to physical capacity and this in turn depends on physical condition, the habit of regular physical exercise and the state of physical and mental health (Martínez-Sánchez et al., 2024). It is also related to changes in university lifestyle, diet, sleep hygiene, technologies, use of screens, time organization, and social life (Brown et al., 2024) as well as to the demands of the type of university study and the course and evaluation period in which the student is (Franco-Idárraga et al., 2022; Ferreira et al., 2022). *Lack of energy*, laziness, tiredness, boredom, or perceived competence in practice performance reflect intrapersonal barriers (Luque & del Villar (2019). It is also noted that barriers to physical exercise are more variable in the long term than motives and that these are more linked to specific personal needs derived from the state of the person, in this case, lack of energy or fatigue, in the period in which the questionnaire is answered (Niñerola i Maymí et al., 2006).

Lack of willingness is a barrier for women in other studies and for male PASP students.

In the case of women, those studying PASP do not perceive *lack of willpower* as a barrier while women in other studies perceive it as a very important barrier with high scores. On the contrary, in the case of men, those who study PASP perceive it as a barrier while the group of men from other studies do not perceive it as such. In turn, no statistically significant differences were found in the case of women in the three items that make up this barrier. In the case of men only in item 11 “It is easier for me to find excuses not to exercise than to start doing it” which corroborates the gap between intention and behavioral change as a predictor of physical inactivity in university students (Ndupu et al., 2023).

Intentions and motivation to enroll in a PA program are a recurring theme in studies with university students, the main barrier being the absence of self-motivation for the practice that directly affects the *lack of willpower* (Brown et al., 2024). According to Mella Norambuena et al. (2021), the level of PA mediates the relationship between socio-cognitive variables and positive affectivity, and in their study with Chilean university students, they corroborated the inverse relationship between the level of PA practice and the perception of this barrier. The PASP degree usually entails an extensive load of physical exercise and sport so it is likely that its students have a higher level of PA than students of other degrees do. That, in turn, would result in a lower perception of this barrier (Martínez et al, 2024) as is the case of the women in the sample, but not that of the men. In terms of sex, the results are not conclusive either, since differences are evident in the lack of willingness and sedentary lifestyle of university students from the Dominican Republic (Prada-Rozo and Cuevas-Gómez, 2022), contrary to those that relate the lack of willingness and low willingness to engage in physical exercise in Mexican students (García Sandoval, 2020). In young Spanish women, the inherent motivations of health and the extrinsic ones, attractive PA programs and offers that favor competition, fun, leisure, and social relationships influence the perception of the barrier and *lack of willpower* (Luque & del Villar, 2019).

Fear of injury is not a barrier, but it is more important in the case of men from other majors.

The category *fear of injury* is not a perceived barrier to PA in the groups of female and male students in the sample. This category comprises three items referring to the physical risk involved in practicing sports and the possible consequences or fear of illness or injury. Although there are fewer risks to the benefits obtained through the practice of PA and sports, it is important to note that the risk of suffering injuries to the locomotor system and cardiovascular problems exists to the extent that healthy levels of PA are exceeded (Ramírez-Vélez et al., 2016).

The results confirm that they do not represent an obstacle since in no group is the minimum score reached to be considered a barrier. Thus, in the case of female students of PASP and other majors, the median and mode scores for the three items are very low and do not present significant differences. In the case of men, significant differences are found in item 19 “I am afraid of getting injured or having a heart attack” with greater importance in the case of men from other majors. The study of the associations between types of university studies and the perception of fear of injury also confirms differences, with fewer PASP men students than expected perceiving the barrier and an inverse behavior of men from other majors.

Similar results got Izquierdo et al. (2017) with a sample of university students from the Latin American School of Medicine, in Cuba in which young people from more than 90 developing countries study and Prada-Rozo and Cuevas-Gómez (2022) with 2096 students from different universities, both public and private in the Dominican Republic. They used the BBQA instrument in its Spanish version and found no barriers in the category *fear of injury*. On the contrary, Ramírez-Vélez et al. (2016) found in a sample of university students from three different cities in Colombia that *fear of injury* was an important self-perceived barrier to cease PA practice in the group of women and those students with abdominal obesity.

Lack of ability is not a barrier, but it is more important in the case of female PDAF students.

Lack of ability is not a perceived barrier in the groups of women and of men in the sample, but high scores are observed in the collective of women studying PASP, with the highest values in the median and mode of the category.

This barrier refers to the mastery of physical capacity (Brown et al., 2024), to possess the skills or the level of motor training to enroll in the sports practices or PA offered in the university environment. The masculinization of the sports offer, the levels of performance demands, and the type of activities have a direct impact on the perception of the ability that women have (Luque & del Villar, 2019); on their self-concept, sense of competence and on the social physical anxiety (Niñerola i Maymí et al.; 2006; Ortega et al., 2021) that the practice can produce. Paradoxically, the results in women PASP students show the highest values in item 6 “I do not exercise enough because I have never learned any sport”, in item 13 “I do not see myself learning a new sport at my age” and in item 20 “I am not good enough in any PA/sport to entertain myself”.

These beliefs of female PASP students can only be understood if undergraduate studies continue to reproduce the hegemonic male model instead of eliminating it (Serra et al. 2016) and if the circumstances of social support, outcome expectations, and goal representations in PASP studies are not present (Serra et al. 2019). For both sexes, physical fitness education plays a pivotal role in enhancing students’ overall well-being providing the tools and the skills to be active (Rodrigues et al., 2024) and should be included in university programs.

Lack of resources is not a barrier for PASP students but it is for other majors.

The category *lack of resources* does not represent a barrier to PA practice for women and men PASP students, but it does for women and men studying other degrees. Despite this, no statistically significant differences are found between the types of university majors. Nor are significant differences found in the results for each of the items that make up this barrier, item 7 “I do not have access to jogging paths, swimming pools, bicycle paths, etc.”, item 14 “It is simply too expensive. One has to take a class, join a club, or buy the right equipment” and item 21 ‘If there was a place to exercise and showers at the university, I would be more likely to exercise’ although students in other majors have higher mode and median scores than PASP students.

Studies consulted and carried out with Latin American university samples confirm the presence of barriers associated with accessibility to PA practice about the university environment, facilities, sports materials, schedules, program costs, type of offer, monitors, safety, transportation, and financing (Ramírez-Vélez et al., 2016; Ferreira et al., 2022; Brown et al., 2024). The need to analyze barriers in the context of the safety of practice and the adaptation of the sports offer to their interests and needs (Sevil et al., 2017) and to their socioeconomic status (Niñerola i Maymí, 2006) is emphasized. Female students with lower socioeconomic profiles are more likely to perceive barriers (Griffiths et al., 2022).

Conclusions

This study is the first to identify and differentiate the barriers perceived by Ecuadorian university students to PA by comparing the types of university studies and gender. It coincides in pointing out, in order of importance, *lack of energy*, *lack of time*, *lack of will*, and *lack of resources* as the main conditioning factors for PA practice in university women studying social sciences majors. Differs from other studies in that for the first time it reports that the group of women studying PASP does not perceive barriers to PA. Although this group represents 8.9% of the total number of women studied and 30% of the PASP students in the sample it is indeed

encouraging that the external and internal factors that stand in the way of PASP women's regular exercise seemed mitigated.

Concerning university males, it reveals similarities in the perception of *lack of time* and *lack of energy* as the main impediments to PA. Unveils important differences in the effect of internal factors (*lack of will*), which affect PASP men which contrasts with the vocational nature and motor practice demands of their studies, and external factors (*lack of resources*) which are perceived as obstacles by men in other majors.

Therefore, this research provides an initial diagnosis that allows defining particular actions and strategies to eliminate perceived barriers, mainly in the group of female students of social sciences, and to favor the practice of PA in the context of the Technical University of Machala. Other strengths of the study are that the results correspond to a sample of 526 students from 12 different majors and that the instrument used is adapted to Spanish and validated for use with Latin American university students, which guarantees the credibility of the data provided. Among the limitations is the timing of data collection, which coincided with the end of the COVID-19 pandemic in Ecuador, and this may have influenced both the number of responses received and the way questions related to PA practice were addressed. Another limitation is that there are not many studies using the BBQA instrument with university students that allow comparison of results and none in which the analysis has been performed comparing both variables simultaneously, type of major studied and sex of the student.

For the future, it is desirable to carry out research that incorporates different universities in Ecuador and that analyzes the behavior of the responses to the BBQA comparing institutions, majors and sex. It would also be appropriate to carry out studies with qualitative designs that would make possible to narrate and explain the causal relationships in the perception of barriers in the different groups studied, and longitudinal research to account for the effects of measures implemented over time. For example, the effects of a PA program for women with adapted schedules, at a reduced cost and with activities in which they feel competent and skilled.

For all of the above, women studying PASP at the Technical University of Machala do not perceive barriers to the practice of PA. Women in other majors are limited by *lack of energy*, *lack of time*, *lack of will* and *lack of resources*, in order of importance. The studied men agree that *lack of time* and *lack of energy* are the main impediments to PA practice, and PASP students suffer from a *lack of will* while those in other majors suffer from a *lack of resources*.

Social influence, *fear of injury*, and *lack of ability* are not barriers, but some of their items showed differentiated impacts in the groups of university students analyzed.

The results corroborate the need to implement healthy educational and sports policies that minimize the barriers perceived as a function of majors and sex, and that favor the reconciliation of academic and physically healthy active life, especially with positive discrimination measures in the group of female students of social sciences majors at the Technical University of Machala in Ecuador.

Conflicts of interest - There are no conflicts of interest to declare.

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