ASSOCIATED FACTORS WITH INADEQUATE LIFESTYLE IN MEDICINE STUDENTS IN A PERUVIAN UNIVERSITY

FACTORES ASOCIADOS A ESTILO DE VIDA NO ADECUADO EN ESTUDIANTES DE MEDICINA DE UNA UNIVERSIDAD PERUANA

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ORIGINAL PAPER

ABSTRACT

Introduction: The inappropriate lifestyle (IL) increases the risk of non-communicable diseases; undergraduate university students are a susceptible population to present an IL. **Objectives:** To determine if age, sex, marital status, work activity, family responsibilities, study cycle and place of residence were factors associated with an inappropriate lifestyle (IL) in medical students. Secondarily, the dimensions most frequently associated with IL were identified. **Methods:** A cross-sectional, and analytical study was carried out on students from the School of Human Medicine of the Antenor Orrego Private University of Trujillo in Peru, during the first semester of 2023, using the FANTASTICO anonymous survey, an instrument that has 10 dimensions. Surveys that were not answered in their entirety were excluded. The prevalence of predetermined risk factors was compared between students with IALS and those with an adequate lifestyle (AL), using the chi-square test and the prevalence ratio; we were considered significant if p < 0.05. **Results:** Of the 258 participating students, 112 (43.4%) showed IL. No bivariate statistical association was found with respect to age (p=0.55), sex (p=0.07), marital status (p=0.29), work activity (p=0.47), having a family burden (p=0.93), the study cycle (p=0.38) and the place of residence (p=0.05) and the IL in the students. The multivariate analysis of the crude and adjusted prevalence ratio also did not find a significant association. The four prevalent dimensions in the IL were: health control, sleep and stress, introspection, and physical activity. **Conclusion:** No differences were found in the factors studied between medical students with IL and AL.

Keywords: Lifestyle; Medical students; Chronic disease; Health promotion; Cross-sectional study. (Source: MESH-NLM)

RESUMEN

Introducción: El estilo de vida no adecuado (EVNA) aumenta el riesgo de enfermedades no trasmisibles y los estudiantes universitarios de pregrado son una población susceptible para presentar un EVNA. **Objetivos:** Determinar si la edad, el sexo, el estado civil, la actividad laboral, tener carga familiar, el ciclo de estudio y el lugar de residencia fueron factores asociados a un EVNA en alumnos de medicina. Secundariamente, se identificaron las dimensiones más frecuentemente asociadas a EVNA. **Métodos:** Se realizó un estudio transversal y analítico en estudiantes de la Escuela de Medicina Humana de la Universidad Privada Antenor Orrego de Trujillo en Perú, durante el primer semestre del año 2023; se utilizó el cuestionario anónimo FANTASTICO, instrumento que cuenta con 10 dimensiones. Se excluyeron las encuestas que no fueron respondidas en su totalidad. Se compararon las prevalencias de los factores de riesgo predeterminados entre los alumnos con EVNA y los que tenían estilo de vida adecuado (EVA); se usó la prueba Chi cuadrado y la razón de prevalencias fueron consideradas significativas si p < 0,05. **Resultados:** De los 258 alumnos participantes, 112 (43,4 %) mostraron EVNA. No se encontró asociación estadística bivariada respecto a la edad (p=0,55), el sexo (p=0,07), el estado civil (p=0,29), la actividad laboral (p=0,47), tener carga familiar (p=0,93), el ciclo de estudio (p=0,38) y el lugar de residencia (p=0,05) y el EVNA en los alumnos. El análisis multivariado de la razón de prevalencias crudo y ajustado tampoco encontraron asociación significativa. Las cuatro dimensiones prevalentes en el EVNA fueron el control de la salud, sueño y estrés, introspección y la actividad física. **Conclusión:** No se encontraron diferencias en las factores estudiados entre los estudiantes de medicina con EVNA y EVA.

Palabras clave: Estilo de vida; Estudiantes de medicina; Enfermedad crónica; Promoción de la salud; Estudio transversal. (Fuente: DeCS- BIREME)

INTRODUCTION

One of the greatest challenges facing global public health is the prevention of non-communicable diseases (NCDs), also known as chronic diseases, such as diabetes, cardiovascular diseases, cancer, or chronic respiratory diseases, which can become complicated and lead to disability in daily functioning and, in the long term, death. These NCDs develop due to the presence of various metabolic, behavioral, and environmental risk factors [1,2].

NCDs account for 70% of mortality worldwide among the 30-69 age group. However, it has been observed that 80% of these deaths occur prematurely, especially in low- and middle-income countries. In Latin America, the prevalence of NCDs increased from 77.4% in the year 2000 to 80.7% in 2016, with a higher prevalence in women. Among the countries with an increase in this prevalence is Peru [3,4]. Four main factors have been evidenced in the development of NCDs: tobacco use, unhealthy diet, physical inactivity, and excessive alcohol consumption. These are part of a person's lifestyle and are modifiable behaviors, as they are influenced by economic, social, cultural, and psychological situations. The influence of an inadequate lifestyle (IAL) is present in 99% of obesity cases, followed by 91% for diabetes mellitus cases, and thirdly, 82% of heart disease cases[5,6].

The transition between adolescence and adulthood is a period of lifestyle change and personal development that can influence dietary behavior due to changes in the academic environment or economic situation. These factors show a strong association with diet in this age range [7,8]. Undergraduate university students are a population susceptible to presenting these risk factors and are in a period of their lives where they are still constantly changing their habits, which can affect their health benefits. The stress that accompanies this phase of life leads them to adopt an IAL, mainly characterized by poor nutrition, physical inactivity, and the use of legal and illegal drugs. Therefore, each behavior is voluntary and influenced by various sociodemographic factors[9-11]. Thus, concern for health promotion takes on greater interest among health science students, not

only for themselves but also for the role they play and will continue to play throughout their professional careers. They provide the necessary means to modify behaviors that endanger their health and that of their patients by managing external and internal factors to achieve an adequate or healthy lifestyle (AL)[10,12].

For this reason, this study investigated whether there are factors associated with the development of an IAL among medical students. Additionally, the most frequently altered dimensions among students with IAL were identified.

METHODS

Study Design and Area

A cross-sectional and analytical study was conducted through a survey of students enrolled in the 1st to 12th cycles of the School of Human Medicine at the Universidad Privada Antenor Orrego in the city of Trujillo, Peru, during the academic semester of the first half of 2023.

Population and Sample

The surveys of students who met the following criteria were included: aged 18 years or older, who agreed to participate by providing informed consent. Those with incomplete data or an incomplete FANTASTIC questionnaire were excluded. A non-probabilistic sampling method was used.

Variables and Instruments

It was determined whether the variables such as age, sex, marital status, employment activity, family responsibilities, study cycle, and place of residence were factors associated with an inadequate lifestyle (IAL) among medical students.

Lifestyle was determined using the FANTASTIC questionnaire, which consists of 30 items distributed across 10 dimensions: family and friends' core, physical activity and associations, nutritional habits, tobacco use, alcohol or other drug consumption, sleep condition and stress levels, type of work and

personality traits, presence of introspection, health control situation, and sexual and other behaviors. Each dimension was composed of 3 items, and each item could score between 0 and 2 points. Most items were answered according to a Likert scale. The total score from the 30 items was multiplied by 2 to obtain the final score, with a range between 0 and 120 points. This score was classified into five categories summarizing the lifestyle of the student being evaluated: 0 to 46: At risk, 47 to 72: Low, could improve, 73 to 84: Doing well, 85 to 102: Doing right, 103 to 120: Fantastic lifestyle. IAL was considered in the categories "At risk" and "Low, could improve," whereas an adequate lifestyle was considered in the categories "Doing well," "Doing right," and "Fantastic lifestyle." This questionnaire has been adapted to our Spanish language and validated in various Latin American countries, including ours, with very good reliability results in university students [13]. In our country, the FANTASTIC questionnaire has been applied to healthcare workers. Villar et al. analyzed the reliability of this instrument and obtained a reliability score using Cronbach's alpha analysis of 0.778 [14]. Secondarily, the dimensions of the FANTASTIC questionnaire that were most frequently associated with IAL were identified.

Procedures

The research was approved by the Research and Ethics Unit of the School of Human Medicine at the Universidad Privada Antenor Orrego. A survey was then sent via a Google Forms URL to students through their institutional email, which included informed consent. The survey consisted of two parts: the first part involved collecting sociodemographic variables and the factors to be investigated, and the second part was the FANTASTIC questionnaire [14], which was the instrument used to identify and assess lifestyle.

Statistical Analysis

For data analysis, SPSS V.26 software was used. Descriptive statistics were applied, with frequencies and proportions used for qualitative variables, and means and standard deviations (SD) calculated for quantitative variables. Prevalence Ratio (PR) was calculated to determine the association of the

proposed factors with IAL, considering significance at p < 0.05.

Ethical Aspects

The research was approved by the Research and Ethics Unit of the School of Human Medicine at the Universidad Privada Antenor Orrego (Resolution No. 0130-2022-FMEHU-UPAO). All participants provided informed consent and responded anonymously from a computer or electronic device with internet access.

RESULTS

A total of 258 students participated; their average age was 20.7 ± 3.5 years, 66.3% were female, 97.3% were single, 87.6% did not work while studying, 86.8% did not have any family members dependent on them, 78.7% lived in an urban area, and 18.6% were in their first study cycle (Table 1). A total of 112 students (43.4%) exhibited an inadequate lifestyle (IAL), while the remaining 146 (56.6%) had an adequate lifestyle (AL) (Table 2). In Table 2, it is observed that those with IAL had an average age of 20.7 ± 3.1 years, 72.3% were female, 98.2% were single, 89.3% did not work while studying, 86.6% did not have any family members dependent on them, 82.1% lived in an urban area, and 16.1% were in their first study cycle.

On the other hand, students with AL had an average age of 20.7 ± 3.8 years, 61.6% were female, 96.6% were single, 86.3% did not work while studying, 87.0% did not have any family members dependent on them, 76% lived in an urban area, and 20.5% were in their first study cycle. The most prevalent characteristics in participants with IAL were being female, single, not working while studying, not having a dependent family member, residing in urban areas, and being students in the 3rd to 10th study cycles. When the bivariate analysis of the studied factors and lifestyle type was performed, no significant difference was found in the factors investigated (Table 2). Additionally, multivariate analysis was performed, where the crude prevalence ratio (PRc) and adjusted prevalence ratio (PRa) were determined for all variables considered as factors associated with an inadequate lifestyle in medical students. In the results of the analysis, no significant association was found (Table 3).

Table 1. Characteristics of the School of Human Medicine students who participated.

Characteristic	Mean	Standard deviation
Age (years)	20,7	3,5
Characteristic	n	%
Gender		
Female	171	66,3
Male	87	33,7
Marital status		
Married	3	1,2
Cohabitant	2	0,8
Separated	2	0,8
Single	251	97,3
Working while studying		
No	226	87,6
Yes	32	12,4
Family member dependent on student		
No	224	86,8
Yes	34	13,2
Place of residence		
Rural	16	6,2
Semiurban	39	15,1
Urban	203	78,7
Academic cycle		
First	48	18,6
Second	35	13,6
Third	24	9,3
Fourth	17	6,6
Fifth	24	9,3
Sixth	14	5,4
Seventh	11	4,3
Eighth	12	4,7
Ninth	9	3,5
Tenth	24	9,3
Eleventh	25	9,7
Twelfth	15	5,8

n: number of participants

Table 2. Bivariate analysis of factors associated with the lifestyle of the School of Human Medicine students.

Factor	Inadequate lifestyle (n = 112)	Adequate lifestyle (n = 146)	p-value
Age ± SD (years)	20.7 ± 3.1	20.7 ± 3.8	0.55
Gender			
Female	81 (72.3%)	90 (61.6%)	0.07
Male	31 (27.7%)	56 (38.4%)	
Marital status			
Married	2 (1.8%)	1 (0.7%)	3
Cohabitant	0 (0.0%)	2 (1.4%)	
Separated	0 (0.0%)	2 (1.4%)	
Single	110 (98.2%)	141 (96.6%)	
Working while studying			
No	100 (89.3%)	126 (86.3%)	0.47
Yes	12 (10.7%)	20 (13.7%)	
Family member dependent on student			
No	97 (86.6%)	127 (87.0%)	0.93
Yes	15 (13.4%)	19 (13.0%)	
Place of residence			
Rural	7 (6.3%)	9 (6.2%)	0.38
Semiurban	13 (11.6%)	26 (17.8%)	
Urban	92 (82.1%)	111 (76.0%)	
Academic cycle			
First	18 (16.1%)	30 (20.5%)	0.05
Second	12 (10.7%)	23 (15.8%)	
Third	14 (12.5%)	10 (6.8%)	
Fourth	9 (8.0%)	8 (5.5%)	
Fifth	10 (8.9%)	14 (9.6%)	
Sixth	7 (6.3%)	7 (4.8%)	
Seventh	7 (6.3%)	4 (2.7%)	
Eighth	4 (3.6%)	8 (5.5%)	
Ninth	7 (6.3%)	2 (1.4%)	
Tenth	14 (12.5%)	10 (6.8%)	
Eleventh	7 (6.3%)	18 (12.3%)	
Twelfth	3 (2.7%)	12 (8.2%)	

n: number of participants. SD: standard deviation

Table 3. Multivariate analysis of factors associated with an inadequate lifestyle in Human Medicine students.

Factor	Multivariate analysis				Multivariate analysis			
	PRc*	95% CI** Lower	Upper	p	PRa***	95% CI** Lower	Upper	P
Age (18 to 25 years vs. 26 or older)	1,01	0,64	1,57	0,98	1,08	0,68	1,72	0,74
Gender (female vs. male)	1,22	0,99	1,51	0,06	1,23	0,99	1,52	0,06
Married/cohabitant)	1,06	0,52	2,19	0,87	1,14	0,53	2,43	0,74
Working while studying (no vs. yes)	1,12	0,84	1,50	0,44	1,15	0,80	1,65	0,46
Dependent family member (yes vs. no)	1,02	0,74	1,40	0,93	1,07	0,75	1,52	0,73
Place of residence (rural vs. semi-urban/urban)	1,01	0,64	1,57	0,98	0,99	0,63	1,54	0,95
Academic cycle (6th to 12th vs. 1st to 5th)	1,04	0,83	1,29	0,75	1,05	0,84	1,32	0,65

*Prc: Crude Prevalence Ratio. CI**: Confidence Interval. ***PRa: Adjusted Prevalence Ratio. vs.: versus.

In Table 4, the mean score with its standard deviation of the 10 dimensions that make up the FANTASTIC questionnaire is presented; the scores ranged between 2.84 and 5.04. It was found that the four dimensions with the lowest scores were physical activity (3.02 ± 1.53 points), sleep and stress (3.00 ± 1.48 points), introspection (3.01 ± 1.50 points), and health control (2.84 ± 1.55 points).

Table 4. Average scores for each dimension of the FANTASTIC questionnaire.

Dimension	Mean	Standard Deviation
Family/friends	4.28	1.35
Physical activity and associativity	3.02	1.53
Nutrition	3.30	1.31
Tobacco	4.93	1.17
Alcohol	5.04	0.95
Sleep and stress	3.00	1.48
Work	3.31	1.24
Introspection	3.01	1.50
Health control	2.84	1.55
Other behaviors	4.81	1.24

In Table 5, the frequency of students' responses to each of the items that make up the four dimensions with the lowest scores in the FANTASTIC questionnaire is shown.

Table 5. Responses to items from the dimensions with the lowest scores in the FANTASTIC questionnaire according to inadequate and adequate lifestyle.

Ítem		IAL (n = 112)	AL (n = 146)
I am an active member of health or social support groups	Almost never	75 (67.0%)	41 (28.1%)
	Sometimes	31 (27.7%)	69 (47.3%)
	Almost always	6 (5.4%)	36 (24.7%)
I perform physical activity for 30 minutes	I do nothing	61 (54.5%)	33 (22.6%)
	Once a week	36 (32.1%)	46 (31.5%)
	Three or more times a week	15 (13.4%)	67 (45.9%)
I walk for at least 30 minutes daily	Almost never	18 (16.1%)	17 (11.6%)
	Sometimes	56 (50.0%)	41 (28.1%)
	Almost always	38 (33.9%)	88 (60.3%)
I sleep well and feel rested	Almost never	50 (44.6%)	26 (17.8%)
	Sometimes	54 (48.2%)	81 (55.5%)
	Almost always	8 (7.1%)	39 (26.7%)
I feel capable of managing stress or tension in my life	Almost never	42 (37.5%)	12 (8.2%)
	Sometimes	62 (55.4%)	90 (61.6%)
	Almost always	8 (7.1%)	44 (30.1%)
I relax and enjoy my free time	Almost never	36 (32.1%)	5 (3.4%)
	Sometimes	68 (60.7%)	77 (52.7%)
	Almost always	8 (7.1%)	64 (43.8%)
I am a positive thinker	Almost never	29 (25.9%)	7 (4.8%)
	Sometimes	65 (58.0%)	55 (37.7%)
	Almost always	18 (16.1%)	84 (57.5%)
I feel tense or overwhelmed	Often	53 (47.3%)	27 (18.5%)
	Sometimes	56 (50.0%)	97 (66.4%)
	Almost never	3 (2.7%)	22 (15.1%)
I feel depressed or sad	Often	48 (42.9%)	15 (10.3%)
	Sometimes	57 (50.9%)	83 (56.8%)
	Almost never	7 (6.3%)	48 (32.9%)
I have regular health checkups	Almost never	90 (80.4%)	60 (41.1%)
	Sometimes	20 (17.9%)	51 (34.9%)
	Always	2 (1.8%)	35 (24.0%)
I talk with my partner or family about aspects of sexuality	Almost never	73 (65.2%)	39 (26.7%)
	Sometimes	31 (27.7%)	61 (41.8%)
	Always	8 (7.1%)	46 (31.5%)
In my sexual behavior, I am concerned about self-care and my partner's care	Almost never	24 (21.4%)	12 (8.2%)
	Sometimes	31 (27.7%)	25 (17.1%)
	Almost always	57 (50.9%)	109 (74.7%)

IAL: Inadequate lifestyle. AL: Adequate lifestyle. n: number of participants.

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DISCUSSION

Female students were the majority of participants in this survey to evaluate lifestyle. Although the proportion of female and male students was 66.3% and 33.7%, respectively, these findings were similar to those reported by Ramírez-Vélez et al.[15], Jiménez and Hernández [16], Canova-Barrios[17], Cáceres and Morales [18], and Silva et al.[19], where female participants predominated.

However, this differs from the findings of Pacheco et al.[20], Alzahrani et al. [21], and Montenegro and Ruíz [22], where the majority of participants were male. Female students were more prevalent in having IAL, something also described by Alzahrani et al.[21], where women showed inadequate lifestyle scores. However, this contrasts with what was reported by Cáceres and Morales [18], Montenegro and Ruíz [22], and Fang et al. [23], where females exhibited better lifestyle habits compared to males. On the other hand, gender has been cited by other authors as a determinant of lifestyle behaviors that promote health[23,24].

In fact, many social practices are gender-typed in society, and sports are often considered a male-dominated domain where male students tend to spend their free time on sports activities, while female students prefer to spend this time with family [21]. However, some unhealthy behaviors are also associated with males, such as distancing from family, tobacco, and alcohol consumption [23]. Some studies have established that socioeconomic status is associated with healthy practices [25,26]. However, within university life, this factor could present both situations; higher income may encourage students to adopt the active social life of this particular environment, but it may also provide easy access to the negative aspects of university life, such as physical inactivity [23,27]. Students aged 25 or younger had the highest prevalence of IAL, a finding similar to what was reported by Montenegro and Ruíz [22], whose study indicated that those under 26 years of age showed very poor or average lifestyles. This differs from what was reported by Fang et al. [23], who noted that, as participants' age increased, the dimensions of family/friends, tobacco, and alcohol were associated with IAL.

The marital status with the highest prevalence of IAL was found among single students (98.2% versus 96.6% of those with AL), a finding opposite to that found by Montenegro and Ruiz [22] and Shekhar et al. [27], where those who were married had a higher prevalence of AL. Students who dedicated themselves solely to studying mostly had IAL, a finding similar to what was reported by Montenegro and Ruíz[22].

Residing in an urban area had a higher frequency of IAL compared to semi-urban and rural areas, a result similar to what was reported by Shekhar et al.[27]. The academic cycles where IAL was most prevalent were those between the third and tenth cycles, similar to what was reported by Alzahrani et al. [21], where IAL was found among students in the fifth and sixth cycles, particularly concerning stress management, and by Fang et al. [23], who determined that students in the sixth, seventh, and eighth cycles had IAL due to increased tobacco use.

Our findings could be related to the fact that, during intermediate academic semesters, most students' physical activity decreases, adequate sleep hours decrease, and stress increases. However, stress management improves with age, and introspection and health control are less managed at younger ages and with less medical education. The academic cycle represents another factor that can influence lifestyle. In fact, it has been shown that stress management improves with age and experience[23].

Additionally, education and training have proven effective in raising awareness about improving lifestyle among students. Studies conducted among medical students have also shown that the more they practice healthy behaviors, the more committed they are to educating patients about health-promoting behaviors [24]. In the present study, the average scores of the dimensions in the FANTASTIC questionnaire ranged between 2.84 and 5.04, similar to what was reported by Montenegro and Ruíz [22], and different from what was found by Canova-Barrios [17], where the dimension scores did not exceed two points.

Our study found no association between the proposed sociodemographic and family factors and IAL among students from the School of Human Medicine. These findings are similar to those reported by Alzahrani et al. [21] and Montenegro and Ruíz [22], who also did not find sociodemographic factors associated with the lifestyles of medical students. Similarly, in this study, the average scores of the 10 dimensions of the FANTASTIC questionnaire were determined to identify which had the lowest scores among participants with an inadequate lifestyle (IAL) (Table 4). Additionally, the responses to the items in the 4 dimensions with the lowest scores were broken down, providing an opportunity to specifically strengthen these areas (Table 5). The identified dimensions were health control, sleep and stress, introspection, and physical activity, the latter being frequently reported in previous studies of similar populations [16,17,22,26,28,29].

Meanwhile, the dimensions least associated with IAL, because they obtained the highest scores, were those related to alcohol consumption, tobacco use, other behaviors, and family and friends. This differs from what has been reported by other researchers, where alcohol and tobacco consumption were frequently associated with IAL among students [15,16,22]. However, it is similar to what was described by Cáceres and Morales [18] and Martins et al. [19]. The COVID-19 pandemic caused university classes to be held virtually from 2020 to 2022 due to the restriction on free movement until the population was vaccinated against SARS-CoV-2.

In our country, classes were made mandatory in person starting in 2023, which meant that the participating population was exposed to additional factors related to suboptimal physical activity, inadequate nutrition, and stress. Martins et al. [19] conducted a study during the COVID-19 pandemic at a public university in Brazil, finding that 42.6% of the 61 medical students had an IAL, and the predominantly compromised domains were sleep, nutrition, stress, and physical activity. This contrasts with what was reported by Cáceres and Morales [18], who found that in 72 medical students from Adventist public and private universities in Chile, Argentina, and Bolivia, 4.2% of participants had IAL, and in these students, the predominantly compromised domains were nutrition, health control, and physical activity; it is important to mention that 61.1% of the students identified as non-omnivorous diet consumers.

The identification of factors associated with IAL and the predominantly compromised domains in university students has led to interventions focused on physical activity, establishing dietary intake guidelines for better results, and reducing the risk of developing non-communicable diseases (NCDs) in the long term. Higher education institutions are an appropriate setting to begin promoting healthy and adequate lifestyle practices among their students [30-32]. Among the limitations of this study are those inherent in a cross-sectional design, where a cause-effect relationship cannot be established, as well as the reliance on participants' memory to answer the questionnaire. The research was conducted at a single private university, which limits the generalization of our results. The sample size, the studied association factors, as well as the use of a non-probabilistic convenience sampling method may have introduced biases that could be controlled in future studies.

CONCLUSION

Age, gender, marital status, employment activity, having family responsibilities, study cycle, and place of residence were not factors associated with an inadequate lifestyle (IAL) among students of the School of Medicine at the Universidad Privada Antenor Orrego. The most prevalent dimensions in students with IAL were health control, sleep and stress, introspection, and physical activity.

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