Characterization of healthy habits and physical activity in adolescent students from Chile

Caracterización de hábitos saludables y actividad física en estudiantes adolescentes de Chile

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How to cite in APA

Ibarra Mora, J., Muñoz-Hinrichsen, F., Aguilar-Farías, N., Reyes-Amigo, T., Toledo-Vargas, M., Castelli Correia de Campos, L. F., & Román-Mella, F. (2024). Caracterización de hábitos saludables y actividad física en estudiantes adolescentes de Chile. *Retos*, *63*, 26–36. https://doi.org/10.47197/retos.v63.109885

Abstract

Introduction: Healthy lifestyle habits in school-aged children are crucial for their physical, emotional, and cognitive health and development.
Objective: to characterize physical activity levels and their association with healthy and unhealthy behaviors in adolescent students in Chile.
Methodology: It was a non-experimental, cross-sectional, and descriptive study. The non-probabilistic sample consisted of 175 high school students from public schools (n=103 females, age: 14.4±1.48 years; n=72 males, age: 14.2±1.56 years) who completed the World Health Organization's Global School-based Student Health Survey during the second semester of the year 2023.
Results: The main findings revealed a 32.5% prevalence of overweight and obesity and an 8.6% compliance with the World Health Organization's physical activity recommendation. Those who engage in at least 60 minutes of physical activity per day show higher consumption of fruits and vegetables and fewer absences from classes, while those who use active transportation also demonstrate higher consumption of fruits and vegetables.
Discussion: Adolescent students are mostly physically inactive, with a higher level of inactivity among females, and those who met the physical activity recommendations consumed more fruits and vegetables than those who did not. From a gender perspective, females exhibited higher drug and marijuana consumption, increased feelings of loneliness, worry, suicidal ideation, and higher rates of absenteeism compared to males.
Conclusions: These results highlight the necessity of developing intervention strategies targeting the adolescent school population with a gender perspective, focusing on promoting physical activity, active transportation, as well as healthy habits in both physical and mental domains.

Keywords

Adolescent; healthy habits; mental health; overweight; obesity; physical activity.

Resumen

Introducción: Los hábitos de vida saludable de niños en edad escolar son importantes para su salud y desarrollo físico, emocional y cognitivo.
Objetivo: caracterizar los niveles de actividad física y su asociación con conductas saludables y no saludables en estudiantes adolescentes de Chile.
Metodología: Fue un estudio no experimental, transversal y descriptivo. La muestra no probabilística estuvo compuesta por 175 estudiantes de secundaria de escuelas públicas (n=103 mujeres, edad: 14,4±1,48 años; n=72 hombres, edad: 14,2±1,56 años) que completaron la Encuesta mundial de salud a escolares de la OMS, durante el segundo semestre del año 2023.
Resultados: Los hallazgos revelaron una prevalencia de sobrepeso y obesidad del 32,5% y un cumplimiento de la recomendación de actividad física del 8,6%. Aquellos que realizan al menos 60 minutos de actividad física al día muestran un mayor consumo de frutas y verduras y menos ausencias a clases, mientras que aquellos que utilizan transporte activo también demuestran un mayor consumo de frutas y verduras.
Discusión: Los adolescentes son en su mayoría inactivos físicamente, con un mayor nivel de inactividad entre las mujeres, y quienes cumplían con las recomendaciones de actividad física consumían más frutas y verduras que quienes no las cumplían. Desde una perspectiva de género, las mujeres exhibieron un mayor consumo de drogas y marihuana, mayores sentimientos de soledad, preocupación, ideación suicida y mayores tasas de ausentismo en comparación con los hombres.
Conclusión: Estos resultados resaltan la necesidad de desarrollar estrategias de intervención dirigidas a escolares adolescentes con perspectiva de género, centrándose en la promoción de la actividad física, el transporte activo, así como hábitos saludables tanto en el ámbito físico como mental.

Palabras clave

Actividad física; adolescentes; hábitos saludables; salud mental; sobrepeso; obesidad.

Introduction

Promoting healthy habits in school-aged children is significant for their physical, emotional, and cognitive health and development (Inchley et al., 2020; Tapia-Serrano et al., 2022). These habits include a balanced diet, regular physical activity (PA), adequate sleep, personal hygiene, and stress management (Egger et al., 2017). Therefore, managing dietary habits, overweight and obesity, PA, sedentary behavior, screen time, and socioemotional behavior are relevant (Fruh et al., 2021). Environmental and behavioral factors contribute to the increasing prevalence of obesity in contemporary society (Llewellyn et al., 2015). These behaviors can influence individuals' energy balance, i.e., the relationship between calorie intake through diet and energy expenditure through PA and basal metabolism (Hill et al., 2012; Malik et al., 2013; Westerterp, 2017).

Prior studies have demonstrated the importance of establishing healthy eating patterns from childhood (Macias et al., 2012), as they can influence long-term food preferences and eating habits (Nascimento-Ferreira et al., 2016). Obesity is one of the leading public health problems globally, being a risk factor for numerous comorbidities, and Chile is not exempt from the consequences of this pandemic (Caballero, 2007; Upadhyay et al., 2018). However, it is the consequence of many dimensions, thus it can be explained from a bio-socioecological framework in which biological predisposition, socioeconomic, and environmental factors promote adipose tissue deposition and proliferation and resistance to efforts to control it (Jebeile et al., 2022). The Chilean Nutritional Map for the year 2022 determined an alarming prevalence of overweight and obesity of 65.8% at 10 years old and 50.3% at 14 years old, characterized mainly by a typical Western diet of frequent, abundant consumption of refined grains, red meats, unhealthy fats, and sugary beverages, as well as high levels of sedentary behavior (Rodríguez-Núñez & Valderrama-Erazo, 2021).

Children and adolescents are also affected by mental health problems. Depression in this population can be manifested in various forms and may be associated with behavioral issues, low academic performance, and suicide risk (World Health Organization, 2017). Anxiety disorders are common and can interfere with their daily functioning, including academic performance and social relationships (Paus et al., 2008). Additionally, autism spectrum disorders and behavioral and mood disorders can negatively impact children and adolescents' development (Dalrymple et al., 2020; McClellan et al., 2007; Vahia, 2013). On the other hand, regular PA in children has been associated with physical and emotional benefits. Among the physical benefits are a lower risk of obesity and improvements in cardiovascular health, including a lower risk of heart disease in adulthood (Poitras et al., 2016). It contributes to bone and muscle development, reducing the risk of osteoporosis and musculoskeletal injuries in the future (Bloomfield et al., 2004). Regular PA is also associated with better self-esteem (Poitras et al., 2016) and a reduction in stress, anxiety, and depression (Biddle et al., 2019). Regarding academic performance, there is evidence that PA can improve cognitive function and academic performance, including attention, memory, and information processing (Donnelly et al., 2016).

Adolescence, between 10 and 19 years old (World Health Organization, 2024), is crucial for laying the foundations for health trajectories in adulthood (Viner et al., 2012). As such, adolescents experience various risk behaviors that determine their health, such as problematic substance use, early pregnancy, poor diet, sexually transmitted infections, depression, suicide, and poor personal hygiene, among others (Valenzuela Mujica et al., 2013). Thus, the aim of this study was to characterize physical activity levels and their association with healthy and unhealthy behaviors in adolescent students in Chile.

Method

This study follows a quantitative, descriptive and cross-sectional design. The non-probabilistic sample consisted of students from public schools in Ñuñoa who met the inclusion criteria: 1) being in years 7 to 12, 2) having parental consent, and 3) providing their consent to participate. A total of 175 Chilean students from seven educational institutions were included (n=103 females, mean age 14.4 years ±1.48; n=72 males, mean age 14.2 years ±1.56). This study was conducted within the framework of the project "Redrawing cities with children and adolescents: development of a framework and opportunity index

for wellbeing- The REDibuja Study Protocol" (Aguilar-Farias et al., 2022) approved by the Ethics Committee of the University of La Frontera – Research Project FOLIO No. 124/21.

Procedure

The project originated from the need of the Ñuñoa Department of Education to diagnose lifestyle habits within the school community of the commune. After several meetings with communal directors and educational centers, contacts were established with the responsible individuals of each institution to communicate the objectives, specify requirements, and seek management support. Subsequently, consent and assent forms were sent to the guardians of each institution to be signed in advance and coordinate the visit to each school.

Subsequently, the evaluation team administered the Global School-based Student Health Survey (GSHS) digitally in the computer labs using REDCap (Research Electronic Data Capture) (Harris et al., 2019) under a teacher's supervision. Afterwards, weight and height were measured according to the protocol of the National Board of School Aid and Scholarships (JUNAEB acronym in Spanish). All data were collected between August and November 2023 during morning class hours. The survey administration and anthropometric variables were obtained by a team of physiotherapists and physical educators specialists in these measurements. They received training in two stages: 1) review of the GSHS, discussion, and analysis of questions led by the principal investigator; 2) analysis of the JUNAEB Anthropometric Evaluation Protocol led by a co-investigator, a qualified physiotherapist. After data collection, each institution received a report with general results.

Instruments

The World Health Organization's (WHO) GSHS was utilized for this study. The GSHS is a collaborative surveillance project designed to assist countries in measuring and evaluating behavioral risk factors and protective factors in 10 key areas in adolescents aged 13 to 17. The GSHS is relatively cost-effective as it employs a self-administered questionnaire to gather data on youth health behavior and protective factors related to the leading causes of morbidity and mortality among children and adults worldwide. It consists of 10 core modules: alcohol consumption, dietary behaviors, drug use, hygiene, mental health, physical activity, protective factors, sexual behaviors, tobacco use, violence, and unintentional injuries. The 52-question version in Spanish from 2021 (World Health Organization, 2013) was utilized in this study.

Anthropometric variables, body weight, and height were measured using a SECA 769 digital scale with a stadiometer, following the protocol developed by the Studies Unit, Planning Department JUNAEB (JUNAEB, 2022). Waist circumference was measured with an ergonomic tape measure for circumference measurements, SECA 201 (Valle-Leal et al., 2016). The results were interpreted according to the technical regulations of the Chilean Ministry of Health (MINSAL), which are based on the growth patterns from infants to adolescents set by the WHO (Rodríguez et al., 2018).

Statistical Analysis

Descriptive statistics were used to present the results of the variables and the questionnaire. The age and waist-to-height ratio data were expressed as means and standard deviations. At the same time, the variables sex, classification of body mass index, and the GSHS's results were presented as frequencies and percentages. Next, a parametric analysis of the data regarding questionnaire responses was performed using the Kolmogorov-Smirnov test for normality, with n>50 indicating normality. The Chi-Square (X2) test for proportions was applied to assess the homogeneity of data and their degrees of freedom (df) in the GSHS, sex, and body mass index classification. All responses were dichotomized into "Yes" or "No" for each question. The odds ratios (OR) were reported with a 95% confidence interval (CI) for the association between variables related to PA practice and healthy habits. The independent samples T-test (T) was used to compare means for age and waist-to-height ratio variables. A significance level of $p \leq 0.05$ was considered, and Jamovi 2.3 software was utilized for the analysis (Project, 2022).

Results

The analysis of anthropometric variables shows that 33% of the participants were overweight, while 10% were underweight. The mean number of days per week they engage in at least 60 minutes of PA was 2.9±2.2 days, with a statistically significant difference by sex (p=0.000). According to the Ministry of Sports of Chile (2021), individuals under 18 years old can be classified as Inactive if they engage in physical or sports activities less than three days a week. Those engaging three to six days a week are considered Partially Active, while those engaging daily are classified as Active. Thus, 50% of the participants declare themselves inactive, while 9% indicate engaging in PA seven days a week. Considering active transportation to or from school, participants reported a mean of 2.5±2.7 days a week. Table I displays the characterization of the study sample in terms of anthropometry and PA.

Table 1. Anthropometric and Physical Activity Characterization of the Sample

Variable	Total	Female	Male	T	*p*
Waist-to-Height Ratio (cm)	45.4±6.67	45.9±7.16	44.6±5.87	1.34	0.180
Physical Activity, days per week	2.9±2.2	2.34±2.11	3.69±2.09	0.59	<0.001**
Active Transportation, days per week	2.5±2.7	2.5±2.79	2.65±2.61	0.76	0.700
Body Mass Index Classification				χ^2	*p*
Underweight	9.7% (17)	9.7% (10)	9.7% (7)		
Normal weight	57.7% (101)	59.2% (61)	55.6% (40)	0.27	0.873
Overnutrition	32.6% (57)	31.1% (32)	34.7% (25)		
Physical Activity Classification					
Inactive	49.7% (87)	62.1% (64)	32% (23)		
Partially Active	41.7% (73)	31.1% (32)	57% (41)	22.15	0.002**
Active	8.6% (15)	6.8% (7)	11.1% (8)		

Note: p<0.05*, <0.01**. T=Student's T-test, χ^2=Chi-square. Data expressed in percentages (n), means, and standard deviation (±).

Table 2 presents the most prominent results from the GSHS regarding the sex of adolescents. It is observed that females exhibit higher drug consumption and health-related issues, with a statistically significant difference found in drug (p=0.020), marijuana consumption (p=0.030), feelings of loneliness (p=0.004), worry (p<0.001), suicidal thoughts (p<0.001) and suicide attempts (p<0.001) compared to males. Additionally, it is noted that females engage in less physical activity (p=0.029) and have higher class absenteeism rates than males (p=0.019).

Table 2. Health-related habits in adolescent school students from the Ñuñoa commune during the last 30 days

		Sex			
Questions		Female	Male	χ^2	*p*
Did you consume alcohol?	No	75.7% (78)	81.8% (59)	0.963	0.326
	Yes	24.3% (25)	18.1% (13)		
Did you get drunk?	No	84.5% (87)	87.5% (63)	0.319	0.572
	Yes	15.5% (16)	12.5% (9)		
Did you experience family problems due to alcohol?	No	93.2 % (96)	95.8 % (69)	0.544	0.461
	Yes	6.8 % (7)	4.2 % (3)		
Did you feel hungry?	No	63.1 % (65)	83.3 % (60)	8.50	0.004**
	Yes	36.9 % (38)	16.7 % (12)		
Did you consume the recommended fruits?	No	34 % (35)	20,8 % (15)	3.59	0.058
	Yes	66 % (68)	79,2 % (57)		
Did you consume the recommended vegetables?	No	48.5 % (50)	45,8 % (33)	0.125	0.724
	Yes	51,5 % (53)	54,2 % (39)		
Did you consume sodas or soft drinks?	No	4.9 % (5)	6.9 % (5)	0.344	0.558
	Yes	95.1 % (98)	93.1 % (67)		
Have you consumed drugs in general?	No	80.6 % (83)	93.1 % (67)	5.38	0.020*
	Yes	19.4 % (20)	6.9 % (5)		
Have you consumed marijuana?	No	81.6 % (84)	93.1 % (67)	4.74	0.030*
	Yes	18.4 % (19)	6.9 % (5)		
Have you felt lonely?	No	3.9 % (4)	16.7 % (12)	8.34	0.004**
	Yes	96.1 % (99)	83.3 % (60)		
Have you felt worried?	No	7.8 % (8)	26.4 % (19)	11.3	<0.001**
	Yes	92.2 % (95)	73.6 % (53)		
Have you had suicidal thoughts?	No	54.4 % (56)	87,5% (63)	21.37	<0.001**
	Yes	45.6 % (47)	12.5 % (9)		
Have you attempted suicide?	No	71.8 % (74)	94.4 % (68)	14.1	<0.001**

	Yes	28.2 % (29)	5.6 % (4)		
Have you been physically assaulted?	No	74.8 % (77)	79.2% (57)	0.459	0.498
	Yes	25.2% (26)	20.8% (15)		
Have you engaged in physical activity for more than 60 minutes daily/week?	No	22.3 % (23)	9.7 % (7)	4.74	0.029*
	Yes	77.7 % (80)	90.3 % (65)		
Do you commute to school by walking or cycling?	No	45.6% (47)	43.1% (31)	0.114	0.736
	Yes	54.4% (56)	56.9% (41)		
Do you attend Physical Education classes?	No	1.0 % (1)	0.0 % (0)	0.703	0.402
	Yes	99.0 % (102)	100.0 % (72)		
Do you sit for long periods during the day?	No	72.8% (75)	80.6% (58)	1.39	0.238
	Yes	27.2% (28)	19.4% (14)		
Have you skipped classes?	No	82.5 % (85)	94.4 % (68)	5.48	0.019*
	Yes	17.5 % (18)	5.6% (4)		
Have your peers been kind to you?	No	1.9 % (2)	4.2 % (3)	0.756	0.385
	Yes	98.1 % (101)	95.8 % (69)		
Have your parents expressed concern for you?	No	15.5 % (16)	9.7 % (7)	1.25	0.263
	Yes	84.5 % (87)	90.3 % (65)		
Have you had sexual relations?	No	74.8 % (77)	83.3 % (60)	1.83	0.176
	Yes	25.2 % (26)	16.7 % (12)		
Among those who have had sexual intercourse, did you use a condom the last time? #	No	34.6% (9)	0% (0)	5.443	0.020*
	Yes	65.4% (17)	100% (12)		
Among those who have had sexual intercourse, did you use another method of protection? #	No	38.5% (10)	25% (3)	0.061	0.416
	Yes	61.5% (16)	75% (9)		
Have you smoked cigarettes?	No	92.2 % (95)	93.1 % (67)	0.42	0.838
	Yes	7.8 % (8)	6.9 % (5)		

Note: p<0.05*, <0.01**. χ^2=Chi-square. All questions are regarding the last 30 days. Data expressed in percentages (n), #=questions only for those who had sexual intercourse.

The analysis also examined whether PA and sedentary behavior were associated with other healthy and unhealthy behaviors. Table III shows that individuals who engage in at least 60 minutes of PA per day have a higher consumption of fruits (p<0.001), vegetables (p=0.002), and fewer class absences (p<0.01). Those who use active transportation exhibit higher consumption of fruits (p=0.009) and vegetables (p=0.033).

Table 3. Physical activity habits and sedentary behavior in Chilean school students from the Ñuñoa commune, according to consumption or behavior variables during the last 30 days.

		No	Yes	OR	IC 95%	χ^2	*p*
		Did you consume alcohol?					
Have you engaged in physical activity for more than 60 minutes daily/week?	No	18.2% (25)	13.2% (5)	1.47	0.52-4.15	0.54	0.460
	Yes	81.8% (112)	86.8% (33)				
Do you commute to school by walking or cycling?	No	45.3% (62)	42.1% (16)	1.14	0.55-2.35	0.119	0.730
	Yes	54.7% (75)	57.9% (22)				
Do you sit for long periods during the day?	No	78.1% (107)	68.4% (26)	1.65	0.74-3.64	1.53	0.216
	Yes	21.9% (30)	31.6% (12)				
		Did you consume the recommended fruits?					
Have you engaged in physical activity for more than 60 minutes daily/week?	No	34% (17)	10.4 % (13)	4.43	1.95-10.0	14.0	<0.001**
	Yes	66% (33)	89.6% (112)				
Do you commute to school by walking or cycling?	No	60% (30)	38.4 % (48)	2.40	1.23-4.70	6.74	0.009**
	Yes	40% (20)	61.6 % (77)				
Do you sit for long periods during the day?	No	70 % (35)	78.4% (98)	0.64	0.30-1.34	1.38	0.240
	Yes	30 % (15)	21.6 % (27)				
		Did you consume the recommended vegetables?					
Have you engaged in physical activity for more than 60 minutes daily/week?	No	26.5 % (22)	8.7 % (8)	3.78	1.58-9.07	9.74	0.002**
	Yes	73.5 % (61)	91.3 % (84)				
Do you commute to school by walking or cycling?	No	53 % (44)	37 % (34)	1.92	1.05-3.52	4.55	0.033*
	Yes	47 % (39)	63 % (58)				
Do you sit for long periods during the day?	No	73.5 % (61)	78.3 % (72)	0.77	0.38-1.54	0.54	0.461
	Yes	26.5 % (22)	21.7 % (20)				
		Did you consume sodas or soft drinks?					
Have you engaged in physical activity for more than 60 minutes daily/week?	No	20.0% (2)	17.0% (28)	1.22	0.24-6.07	0.061	0.805
	Yes	80.0% (8)	83.0% (137)				
Do you commute to school by walking or cycling?	No	40.0% (4)	44.8% (74)	0.82	0.22-3.01	0.08	0.765
	Yes	60.0% (6)	55.2% (91)				

Do you sit for long periods during the day?	No	90.0% (9)	75.2% (124)	2.98	0.36-24.2	1.14	0.286
	Yes	10.0% (1)	24.8% (41)				
Did you consume fast food?							
Have you engaged in physical activity for more than 60 minutes daily/week?	No	21.6% (16)	13.9% (14)	1.71	0.77-3.78	1.81	0.178
	Yes	78.4% (58)	86.1% (87)				
Do you commute to school by walking or cycling?	No	44.6% (33)	44.6% (45)	1.00	0.54-1.83	<0.01	0.996
	Yes	55.4% (41)	55.4% (56)				
Do you sit for long periods during the day?	No	73.0% (54)	78.2% (79)	0.72	0.37-1.51	0.64	0.422
	Yes	27.0% (20)	21.8% (22)				
Did you consume drugs in general?							
Have you engaged in physical activity for more than 60 minutes daily/week?	No	17.3% (26)	16.0% (4)	1.10	0.34-3.48	0.02	0.870
	Yes	82.7% (124)	84.0% (21)				
Do you commute to school by walking or cycling?	No	46.0% (69)	360% (9)	1.51	0.63-3.64	0.87	0.352
	Yes	54.0% (81)	64.0% (16)				
Do you sit for long periods during the day?	No	76.7% (115)	72.0% (18)	1.28	0.49-3.31	0.25	0.613
	Yes	23.3% (35)	28.0% (25)				
Have you had suicidal thoughts?							
Have you engaged in physical activity for more than 60 minutes daily/week?	No	16.8 % (20)	17.9% (10)	1.07	0.46-2.48	0.030	0.863
	Yes	83.2 % (99)	82.1% (46)				
Do you commute to school by walking or cycling?	No	46,2% (55)	41,1% (23)	0.81	0.42-1.54	0.40	0.523
	Yes	53.8 % (64)	58,9% (33)				
Do you sit for long periods during the day?	No	76.5 % (91)	75 % (42)	0.92	0.44-1.93	0.45	0.832
	Yes	23.5% (28)	25 % (14)				
Have you attempted suicide?							
Have you engaged in physical activity for more than 60 minutes daily/week?	No	16.2% (23)	21.2% (7)	0.71	0.27-1.85	0.474	0.491
	Yes	83.8% (119)	78.8% (26)				
Do you commute to school by walking or cycling?	No	43.7% (62)	48.5% (16)	0.82	0.38-1.76	0.252	0.616
	Yes	56.3% (80)	51.5% (17)				
Do you sit for long periods during the day?	No	76.1 (108)	75.8% (25)	1.02	0.42-2.46	0.001	0.971
	Yes	23.9% (34)	24.2% (8)				
Have you had sexual relations?							
Have you engaged in physical activity for more than 60 minutes daily/week?	No	15.3% (21)	23.7% (9)	1.71	0.71-4.13	1.46	0.227
	Yes	84.7% (116)	76.3% (29)				
Do you commute to school by walking or cycling?	No	44.5% (61)	44.7% (17)	1.00	0.49-2.07	0.001	0.982
	Yes	55.5% (76)	55.3% (21)				
Do you sit for long periods during the day?	No	75.2% (103)	78.9% (30)	1.23	0.51-2.95	0.23	0.631
	Yes	24.8% (34)	21.1% (8)				
Have you smoked cigarettes?							
Have you engaged in physical activity for more than 60 minutes daily/week?	No	18.5% (30)	0% (0)	0.81	0.75-0.87	2.90	0.088
	Yes	81.5% (132)	100% (13)				
Do you commute to school by walking or cycling?	No	43.2% (70)	61.5% (8)	0.47	0.14-1.51	1.63	0.201
	Yes	56.8% (92)	38.5% (5)				
Do you sit for long periods during the day?	No	75.9% (123)	76.9% (10)	0.94	0.24-3.61	0.007	0.935
	Yes	24.1% (39)	23.1% (3)				
Have you skipped classes?							
Have you engaged in physical activity for more than 60 minutes daily/week?	No	14.4% (22)	36.4% (8)	0.29	0.11-0.78	6.54	0.01*
	Yes	85.6% (131)	63.6% (14)				
Do you commute to school by walking or cycling?	No	45.8% (70)	36.4% (8)	1.48	0.58-3.72	0.68	0.407
	Yes	54.2% (83)	63.6% (14)				
Do you sit for long periods during the day?	No	77.8% (119)	63.6% (14)	2.00	0.77-5.16	2.11	0.146
	Yes	22.2% (34)	36.4% (8)				
Were your peers kind?							
Have you engaged in physical activity for more than 60 minutes daily/week?	No	40.0% (2)	16.5% (28)	3.38	0.54-21.2	1.89	0.169
	Yes	60.0% (3)	83.5% (142)				
Do you commute to school by walking or cycling?	No	80.0% (4)	43.5% (74)	5.19	0.56-47.4	2.62	0.106
	Yes	20.0% (1)	56.5% (96)				
Do you sit for long periods during the day?	No	60.0% (3)	76.5% (130)	0.46	0.07-2.86	0.72	0.395
	Yes	40.0% (2)	23.5% (40)				
Did your parents worry about you?							
Have you engaged in physical activity for more than 60 minutes daily/week?	No	26.7% (8)	15.2% (22)	2.03	0.80-5.14	2.31	0.128
	Yes	73.3% (22)	84.8% (123)				
Do you commute to school by walking or cycling?	No	56.7% (17)	42.1% (61)	1.80	0.81-2.80	3.98	0.143
	Yes	43.3 (13)	57.9% (84)				
Do you sit for long periods during the day?	No	70% (21)	77.2% (112)	0.68	0.28-1.64	0.71	0.398
	Yes	30% (9)	22.8% (33)				

Note: p<0.05*, <0.01**. OR= Odds Ratio, CI= Confidence Interval, χ^2=Chi-square. Data expressed in percentages (n)

Results indicated that 42% of children who did not meet the minimum recommendation of consuming three servings of vegetables per day were overweight and obese, while for those who met the recommendation, this percentage decreased to 24%, showing a statistically significant difference (p=0.036). Regarding hygiene habits, 52% of students report brushing their teeth at least three times a day, 39% always wash their hands before eating, 84% always wash their hands after using the bathroom, and 67% always wash their hands with soap.

Discussion

The aim of this study was to characterize the levels of PA and its association with healthy and unhealthy behaviors in adolescent students from the Ñuñoa commune in Chile. The results indicate that only 9% of adolescent students met the PA recommendation of at least 60 minutes/day/week. These results are similar to those reported by the National Survey of Physical Activity and Sports Habits 2021 (MINDEP, 2021), where 5% of adolescents were active. Similarly, when analyzed by gender, men were more active than women (11.1% vs. 6.8%), slightly higher than the results reported by MINDEP 2021 (7.2% vs. 3.8%). These gender differences are consistent with findings from other countries with similar contexts, where men tend to engage in PA more than women (Ministry of Tourism and Sports, 2022; Tremblay et al., 2022), highlighting the need to provide greater opportunities for girls and women to engage in PA and participate in sports (Guthold et al., 2020).

The results regarding mental health also showed unfavorable outcomes for adolescent women, who reported higher perceived loneliness, worry, suicidal ideation, and suicide attempts compared to men. Various authors have highlighted this situation over the years. For example, Fink et al. (2015) found that women exhibited greater emotional problems and were at a higher risk of developing them, based on a study that considered two cohorts with a five-year difference. Blakemore (2019) identified being a teenage girl as a risk factor for depression and anxiety associated with hormonal development, which could potentially stabilize after this stage. Pedrero-Pérez et al. (2023) suggested that the perception of loneliness quadruples the chances of developing mental health problems, receiving a diagnosis of anxiety/depression, and being prescribed psychotropic drugs, advocating for a multidimensional approach to addressing loneliness during this stage.

Furthermore, concerning gender differences in substance use, a higher percentage of women reported consuming alcohol, tobacco, marijuana, and drugs, with significant differences noted in the latter two substances. These results align with the findings of the latest National Study on Drugs in School Population, conducted by the National Service for the Prevention and Rehabilitation of Drug and Alcohol Use (2023), which found that a higher proportion of adolescent girls reported daily tobacco use, alcohol use in the last month, and marijuana use in the last year compared to adolescent boys.

Regarding anthropometric measurements, our results indicate a prevalence of 33% in overweight, obesity, and severe obesity, which is lower than the national average for first-year high school students, with a proportion of 50% (JUNAEB, 2023). However, given the negative projection of an increase in the prevalence of obesity in Chilean children by 2035 (Lobstein et al., 2023), the Chilean Ministry of Health has designed its Strategy to halt the acceleration of overweight and obesity in childhood and adolescence 2023-2030 (MINSAL, 2024), within the framework of the National Food and Nutrition Policy (MINSAL, 2017).

Regarding dietary habits, our research found that 71% of students consumed fruits and 53% consumed vegetables according to recommendations. Furthermore, those who consumed more fruits and vegetables tended to engage in more active behaviors. In response, the National Food and Nutrition Policy (MINSAL, 2017) emphasizes the need to increase the availability of healthy foods, which could promote adopting healthy eating habits into adulthood. This is significant given that 38% do not consume fruits daily, and 23% do not consume vegetables (Rodríguez et al., 2023).

Diagnosing the prevalence of PA habits, nutrition, and harmful behaviors, among other factors, is significant because it provides evidence to support targeted intervention strategies and public policies

that promote and facilitate healthy habits in the population. Additionally, understanding the effects of sedentary behavior and obesity on our quality of life is crucial.

Limitations

The cross-sectional research design followed in this study precludes causal interpretations. A non-probabilistic sampling method was used due to difficulties obtaining parental informed consent and the low response rate among adolescents. Therefore, the results presented may not fully reflect the levels of PA and healthy and unhealthy behaviors in school-aged adolescents in Ñuñoa. However, the findings have guided the development of proposals for work in educational communities to improve the overall well-being of adolescents.

Conclusions

Adolescent students in Ñuñoa are mostly inactive. A higher level of inactivity and several mental health outcomes were reported among adolescent women. Those who engaged in at least 60 minutes of PA daily and used active transportation consumed more fruits and vegetables than those who did not. The results highlight the need to develop intervention strategies in the adolescent school population, with a gender perspective, focusing on promoting different types of PA and healthy habits in both physical and mental aspects.

Financing

Research project funded by the Research Directorate of the Metropolitan University of Educational Sciences, code 01-2022-IIED.
NAF was funded by FRO19101 INEs.
FRM was funded by ANID - Millennium Science Initiative Program - N° NCS2021_003.
MTV is supported by the Chilean National Scholarship Program for Graduate Studies-ANID

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