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Lifestyles, psychological well-being, and mental health: A cross-sectional study in a higher education sample

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Abstract

Background The transition to higher education represents a critical developmental stage during which lifestyle behaviours and psychosocial factors interact to influence well-being and mental health. Understanding these dynamics is essential to prevent adverse health outcomes and support academic success. This study aimed to (i) describe lifestyle patterns among Portuguese higher education students, (ii) examine their associations with well-being and mental health, and (iii) assess the influence of sociodemographic and contextual variables.

Methods A cross-sectional study was conducted with 1,159 students from the Polytechnic of Porto, Portugal. Participants completed the FANTASTICO Lifestyle Questionnaire, the Depression, Anxiety and Stress Scale (DASS-21), and the CORE-18 to assess lifestyle behaviours and mental health indicators. Descriptive analyses were performed, and one-way ANOVA and independent Student's t-tests were used to compare lifestyle and psychological variables across sociodemographic groups. Pearson's correlation coefficients were calculated to examine associations with age, body mass index (BMI), and self-rated health. A multiple linear regression model using a stepwise method identified explanatory variables of lifestyle scores.

Results The mean age of the sample was 21.51 (±2.65) years; most participants were women (69.7%) and lived with their families (71.0%). Students reported overall favourable lifestyle profiles and relatively low psychological distress. However, mild symptoms of depression, anxiety, and stress were present, approaching the threshold for moderate severity. Higher self-rated health, absence of depressive symptoms, lower stress levels, lower BMI, female gender, younger age, and enrolment in the School of Health Sciences were significantly associated with healthier lifestyle scores. Fourth-year students also reported better lifestyle and mental health indicators than those in earlier years. An unexpected positive association emerged between the CORE-18 problems/symptoms subscale and lifestyle scores, possibly reflecting compensatory health behaviours among students more aware of psychological symptoms.

Conclusions These findings highlight the complex interplay between psychological well-being, lifestyle, and sociodemographic factors in higher education students. Future research should include more diverse samples, consider additional factors such as social support, economic pressures, and physical context, and adopt longitudinal designs with objective measures to better capture the relationships between lifestyle and mental health.

Keywords Lifestyle · higher education · mental health · well-being

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Background

Higher education, while fostering personal and professional development, also presents substantial challenges to students' health and well-being. Psychological well-being and mental health are distinct yet overlapping constructs; while mental health encompasses both the presence of positive functioning and the absence of distress [1], contemporary models suggest that individuals can experience high well-being even alongside psychological symptoms [2]. Psychological well-being specifically focuses on dimensions of positive functioning like purpose and autonomy [3], whereas mental health more broadly covers both emotional distress and positive states. Distinguishing between these is vital in higher education settings, as students may simultaneously exhibit symptoms of distress and indicators of flourishing, reflecting the multidimensionality of mental functioning.

Recent evidence indicates an increasing prevalence of physical and mental health problems among higher education students, highlighting the need to examine the influence of academic demands and lifestyle factors on well-being [4]. The transition into higher education requires students to develop greater independence and adapt to new academic and institutional demands, which often coincide with profound personal and social changes [5]. Balancing academic responsibilities, social life, and other commitments can disrupt daily routines, potentially increasing stress, anxiety, and depressive symptoms, thereby compromising psychological well-being [6–8].

These transitional demands often translate into behavioural changes with important implications for lifestyle, which can be defined as the relatively stable constellation of daily habits, routines, and social practices that shape health behaviours and influence health, well-being, and quality of life [5, 6, 9, 10]. Importantly, lifestyle should not be regarded merely as the result of individual choices, since it is strongly shaped by structural factors. Socioeconomic resources, cultural values, and environmental conditions can either constrain or facilitate health-promoting behaviours, directly and indirectly influencing opportunities for healthy decision-making [11]. In this regard, lifestyle acts as a central factor associated with health, with daily behaviours either promoting physical, psychological, and social well-being or contributing to health risks [12, 13]. Whereas a healthy lifestyle promotes overall well-being and reduces the risk of chronic disease, unhealthy patterns such as prolonged sedentary behaviour, poor dietary quality, and irregular sleep are associated with adverse health outcomes [9, 14, 15]. Moreover, socioeconomic status influences access to essential health resources [16], cultural contexts shape health-related attitudes and practices, and the physical environment determines whether students can easily engage in health-promoting behaviours [11, 17].

One area particularly affected during the academic years is dietary behaviour, which constitutes a central component of lifestyle. As students transition away from family environments, they assume greater responsibility for meal planning and food preparation, often establishing autonomous health-related habits that may persist into adulthood. Financial constraints and time pressures may contribute to irregular eating patterns, including meal skipping and greater reliance on processed, energy-dense but nutritionally poor foods [18, 19]. These dietary behaviours, within the broader context of lifestyle, are associated not only with academic performance and overall well-being but also with long-term cardiovascular and metabolic risk [9, 20–24]. Conversely, healthier dietary patterns have been linked to a lower prevalence of depressive and anxiety symptoms, whereas frequent consumption of processed foods has been associated with poorer mental health outcomes [24–27].

Alongside diet, physical activity represents another cornerstone of a healthy lifestyle. Its benefits for both physical and psychosocial well-being are well documented, including reductions in stress, anxiety, and depression, as well as improvements in mood, resilience, and overall physiological functioning [9, 28, 29]. Additionally, students who are more active report feeling less stressed and experiencing fewer physical symptoms [13, 30]. However, despite these well-established benefits, many students face barriers to maintaining regular physical activity, most often due to lack of time, academic workload, and low motivation [31, 32]. These constraints frequently translate into sedentary behaviours, which in turn compromise both health and quality of life [14, 31, 33].

Another key lifestyle factor during higher education is sleep. Students often exhibit irregular sleep patterns, insufficient duration, and poor sleep quality, partly due to excessive screen exposure, digital notifications, and

late-night use of devices emitting blue light [34–37]. Sleep deprivation has been linked to increased anxiety, difficulties in self-regulation, and reduced resilience, thereby undermining overall quality of life [38]. Moreover, the relationship between sleep and mental health is bidirectional: poor sleep exacerbates vulnerability to mental health problems, while poor mental health further disrupts sleep, creating a self-reinforcing cycle that is difficult to break [39, 40].

Beyond individual behaviours, psychosocial dynamics also play an important role in student well-being. For instance, students' lifestyles may be positively shaped by protective factors such as family dynamics and social support [41]. Supportive social networks and positive relationships can buffer stress and protect against isolation, whereas poor integration and loneliness are strongly associated with depressive and anxiety symptoms [42–44]. When faced with stressors, some students adopt maladaptive coping strategies, including alcohol, tobacco, and recreational drug use. These behaviours are often reinforced by socialization and academic events, yet they contribute to negative health outcomes, exacerbating mental health difficulties and heightening the risk of dependence [45–47].

In Portugal, empirical studies examining the relationship between health-related lifestyle behaviours and well-being among higher education students remain scarce. Academic dissertations have reported that between 20% [48] and 32.2% [49] of students present inadequate lifestyle patterns. Another recent study conducted among Polytechnic of Porto students further showed that, while their overall lifestyle was generally rated as "very good," they experienced mild levels of depression, anxiety, and stress close to the threshold of the moderate category [50].

Taken together, these findings emphasize the need for a more comprehensive understanding of the interplay between lifestyle (understood here as the constellation of modifiable health behaviours, including nutrition, physical activity, sleep, and related daily practices) and psychosocial contributors of well-being among Portuguese higher education students. Therefore, the present study aims to: (i) describe lifestyle patterns in this population; (ii) examine their associations with well-being and mental health; (iii) assess the influence of sociodemographic and contextual variables and (iv) identify explanatory variables of lifestyle.

Methods

A quantitative, cross-sectional, and descriptive study was conducted from October 2024 to May 2025 using an online questionnaire available to participants on the Microsoft® Forms platform.

Participants

A non-probabilistic convenience sampling approach was adopted as it provided a feasible and cost-effective means of accessing a large student population within a specific institutional context. Given the study's objective to explore the interplay between multiple lifestyle and psychological variables rather than to establish point prevalence for the entire national population, this method allowed for the recruitment of a robust and diverse sample ($N = 1{,}159$) that exceeded the minimum requirements for statistical power [51–53]. To be eligible, participants needed to be at least eighteen years old, enrolled in one of the Polytechnic of Porto's schools, and proficient in Portuguese.

Instruments

A structured sociodemographic questionnaire was used to assess age, gender, level of education attended, educational area (health, education, engineering, marketing, and arts), academic year, student employment status (yes/no), living arrangement (living away from home: yes/no), weight, height, and self-perceived health status (rated

on a scale from 1 to 10). The FANTASTICO Lifestyle Questionnaire, which measures lifestyle choices and well-being and the DASS-21 and the CORE-18, which measure mental health, were chosen.

The FANTASTICO Lifestyle Questionnaire [54], validated in Portugal [55], is a self-administered instrument designed to assess lifestyle-related habits and behaviours. It comprises 30 closed-ended items across 10 domains represented by the acronym "FANTASTICO" in the original language which is Spanish: The distribution is as follows: Family and Friends (2 items); Physical Activity/Associativism [3]; Nutrition [3]; Tobacco, Alcohol and Other Drugs [3]; Sleep/ Stress [3]; Work/ Personality Type [3]; Introspection [3]; Health and Sexual Behaviors [3]; and Other Behaviors [2]. Each item offers three response options, scored as 2, 1, or 0 points (representing 'Almost never', 'Sometimes', and 'Almost always' or similar frequency/intensity descriptors, with higher scores indicating healthier behaviours). Domain scores are calculated by summing the respective items and multiplying by two, resulting in a global score ranging from 0 to 120 [55]. According to classification [54], scores are divided into five categories of lifestyles: Needs Improvement (0–46), Regular [47–72], Good [73–84], Very Good (85–102), and Excellent (103–120). Lower scores indicate greater need for behavioural changes, whereas higher scores reflect progressively more favourable lifestyle patterns. The Portuguese version demonstrated acceptable internal consistency (Cronbach's alpha = 0.71) [55, 56].

The Depression Anxiety Stress Scales (DASS-21) [57, 58] is a widely validated self-report instrument assessing the severity of depression, anxiety, and stress symptoms [59]. It consists of 21 items, grouped into three subscales of seven items each, rated on a 4-point Likert scale (0–3) referring to symptoms experienced in the past week. Subscale scores range from 0 to 21, with higher scores indicating greater psychological distress. The total score provides a general index of distress, which can also be converted to the full 42-item version by multiplying scores by two [60]. The Portuguese version demonstrated good reliability ($\alpha = 0.85$ for depression, 0.74 for anxiety, 0.81 for stress) [58]. It is important to note that it is not a clinical instrument and cannot provide a diagnosis. The scores from the three subscales (Depression, Anxiety, and Stress) can be categorized into severity ratings: Normal, Mild, Moderate, Severe, and Extremely Severe. These categories provide an indication of how much the symptoms might be affecting an individual's life.

The Clinical Outcomes in Routine Evaluation – Short Form (CORE-18) [61, 62] is a self-report measure derived from the original CORE-OM, designed to monitor psychological well-being and distress. It includes 18 items covering subjective well-being, problems/symptoms, life functioning, and risk/impairment, rated on a 5-point scale (0–4). Total scores range from 0 to 72, with higher values reflecting greater distress. The short form minimizes memory effects, making it suitable for repeated assessments. Reliability has been reported as high in both original and Portuguese versions ($\alpha = 0.90$; [61, 63].

Procedures

This cross-sectional study was ethically approved by the ESS Ethics Committee (No. CE0087D). The research adhered to international ethical guidelines [64], ensuring the voluntary participation and anonymity of all respondents. Prior to commencing the survey, all participants provided their informed consent. To ensure wide reach and voluntary participation, the survey was disseminated via institutional emails, social media, and physical posters in high-traffic academic areas. Data collection was intentionally conducted outside of formal class time to protect the integrity of the academic environment and to mitigate potential social desirability bias or peer pressure that might arise in a classroom setting. By allowing students to complete the survey independently, we ensured a more private and relaxed environment for reporting sensitive information regarding mental health and lifestyle habits. The estimated completion time of approximately 20 min was determined through a preliminary pilot test with a small group of students and subsequently confirmed by the platform's metadata, which tracked the average active response time.

To ensure methodological transparency, we note the relationship between this study and a prior publication by Simões de Almeida et al. (2025), which examined student lifestyles and mental well-being within the same university network. The two studies recruited samples during different academic years and through separate

institutional campaigns. While the 2025 publication evaluated a cohort of students surveyed between January and May 2024, the present study investigates a larger cohort of students recruited between October 2024 and May 2025, through a structured online survey hosted on the Microsoft® Forms platform using a convenience sampling technique.

Data analysis

The data analysis was performed using SPSS® version 29. The sample was described using summary measures, namely frequencies (N; %) for nominal or ordinal data and mean (M) and standard deviation (sd) for continuous or discrete variables. The Shapiro-Wilk test or the analysis of the data distribution utilizing threshold criteria for skewness and kurtosis, with values less than |2.0| and |9.0|, respectively, were used to determine whether the variables were normal [65]. One-way ANOVA and independent Student's t-tests were used to compare the variables and the assessment tools (total score and subscales). Pearson's correlation coefficients were used to assess the association between the instrument values and age, body mass index (BMI) and perceived health status [66]. A multiple linear regression model using a stepwise method was implemented to identify the main explanatory variables for lifestyle, according to the FANTASTICO scale. Categorical variables were added to the model as dummy variables. Given the exploratory nature of this study and the wide array of sociodemographic, contextual, and psychological factors assessed, a stepwise approach was chosen to identify the most parsimonious explanatory model. While stepwise procedures are inherently data-driven and can be prone to model instability or overfitting, these risks are substantially mitigated by our large sample size (N=1,159). This provides a participant-to-variable ratio that far exceeds the standard methodological recommendations for exploratory stepwise regression, thereby increasing the reliability of the retained variables [53, 66]. All assumptions for the analysis were rigorously tested and verified (e.g., multicollinearity via VIF, residual independence via Durbin-Watson, and outlier detection via Cook's distance) [66].

Results

Table 1 details the sociodemographic profile of the 1,159 valid participants. Rather than a fragmented distribution, the sample prominently reflects predominantly young adult women (69.70%), students enrolled in undergraduate bachelor's programs (89.50%), and primarily within the Health (41.90%) and Engineering sciences (25.50%). Most participants were in their critical first year of higher education (36.40%), did not hold employment (70.10%), and maintained a stable living arrangement with their families (71.00%). The sample presented a healthy average body mass index (BMI – M=23.00, SD=3.66) and reported a highly positive baseline perception of their overall health status (M=7.22, SD=1.43).

As detailed in Table 2, students exhibited overall favourable lifestyle profiles (FANTASTICO: M=86.63, SD=14.38) alongside mild levels of psychological distress (e.g., CORE-18: M=22.03, SD=12.18). By synthesizing the comparative analyses, three main patterns regarding sociodemographic differences were identified:

1. Gender differences: female students reported significantly healthier overall lifestyle behaviours than males (M=87.09 vs. M=86.07), yet concurrently reported higher psychological distress across all measures, including depression (M=12.01 vs. M=9.15) and anxiety (M=11.02 vs. M=6.65).
2. Academic context and maturation: students enrolled in the Health Sciences reported the highest lifestyle quality (M=88.70), outperforming students from Engineering and Arts. Additionally, fourth-year (senior) students consistently displayed better lifestyle scores (M=91.07) and lower psychological distress (e.g., CORE-18: M=18.74) compared to their peers in earlier years, such as first-year students (CORE-18: M=22.66). In terms of academic pressure, Health and Arts students reported the highest stress levels (M=17.04 and M=16.99, respectively).

Table 1 Sociodemographic characterization of the sample

Variables (N = 1159)		n (%)
Gender		
	Women	808 (69.70)
	Men	338 (29.20)
	Non-binary	13 (1.10)
Education Area		
	Health	486 (41.90)
	Education	159 (13.70)
	Engineering	296 (25.50)
	Marketing	97 (8.40)
	Arts	121 (10.0)
Education Level		
	Associate degree	29 (2.50)
	Bachelor's degree	1037 (89.50)
	Master's and PhD degrees	93 (8.00)
Curricular Year		
	First year	422 (36.40)
	Second year	293 (25.30)
	Third year	322 (27.80)
	Fourth year	122 (10.50)
Working Student		
	Yes	347 (29.90)
	No	812 (70.10)
Living away from family home	Yes	336 (29.00)
	No	823 (71.00)
Variables		**M(SD)**
Age (years)		21.51 (2.65)
BMI		23.00 (3.66)
Self-perceived health status		7.22 (1.43)

M – Mean; SD – Standard Deviation; BMI – Body Mass Index

3. Living arrangements: residing with family was associated with better lifestyle scores (M = 87.43) compared to students living away from the family home (M = 84.68). Furthermore, non-displaced students exhibited significantly lower psychological distress, including lower scores for depression (M = 10.78 vs. M = 12.26) and anxiety (M = 9.37 vs. M = 10.84).

As shown in Table 2, the large sample size (N = 1,159) resulted in high statistical power, rendering even minor differences statistically significant ($p < .05$). However, interpreting the effect sizes reveals that these sociodemographic differences have limited practical significance. The values obtained reflect predominantly small effects (Cohen's d < 0.20; Eta-squared < 0.10). This indicates that, in practical terms, sociodemographic characteristics alone (such as gender, field of study, or living arrangements) do not produce substantial or clinically meaningful shifts in students' lifestyle or mental health scores in isolation. In contrast, the multivariate model (Table 4) demonstrated a strong practical relevance, with the retained variables explaining a substantial 55% of the variance ($R^2 = 0.55$) in the FANTASTICO lifestyle scores, primarily explained by the core psychological and self-rated health measures.

Correlational analysis (Table 3) revealed a consistent inverse relationship between lifestyle quality and psychological symptomatology. Higher scores in the FANTASTICO questionnaire were significantly correlated with lower psychological distress across all measured domains. Specifically, the FANTASTICO total score was negatively associated with mental health variables, with values ranging from $r = -.362$ for the CORE-18 risk/harm subscale to a strong correlation of $r = -.649$ for the CORE-18 total score (all $p < .001$). Furthermore, perceived health status was positively associated with the FANTASTICO total score ($r = .517$, $p < .001$) and almost all its domains. The strongest negative associations with overall psychological distress (CORE-18 total) were observed

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Table 2 Lifestyle and Student's Mental Health Measures according to Sociodemographic Variables

	FANTASTICO total			CORE-18 total			DASS-21 Depression			DASS-21 Anxiety			DASS-21 Stress		
	M (*SD*)	*p*	Eta^2	**M (*SD*)**	*p*	Eta^2	**M (*SD*)**	*p*	Eta^2	**M (*SD*)**	*p*	Eta^2	**M (*SD*)**	*p*	Eta^2
Total sample	86.63 *(14.38)*			22.03 *(12.18)*			11.21 *(10.30)*			9.79 *(9.28)*			15.86 *(10.28)*		
Gender	87.09 *(13.62)*	**<0.001**	0.012	23.77 *(12.09)*	**<0.001**	0.063	12.01 *(10.60)*	**<0.001**	0.017	11.02 *(9.52)*	**<0.001**	0.051	17.79*(9.89)*	**<0.001**	0.094
Women	86.07 *(15.81)*			17.41 *(11.11)*			9.15 *(9.24)*			6.65 *(7.71)*			11.08 *(8.61)*		
Men	72.62 *(9.50)*			31.92 *(11.38)*			14.92 *(9.54)*			15.23 *(11.09)*			19.85 *(10.28)*		
Non-binary															
Education Area	88.70 (*13.24*)	**<0.001**	0.019	22.42 *(12.44)*	0.173	0.006	11.26 *(10.68)*	0.629	0.002	10.18 *(9.48)*	0.250	0.005	17.04 *(10.35)*	**<0.001**	0.017
Health	87.01 (*14.53*)			22.28 *(11.28)*			11.25 *(10.28)*			9.30 *(8.83)*			15.40 *(9.34)*		
Education	84.11 *(14.69)*			20.65 *(12.32)*			10.64 *(9.93)*			9.09 *(9.16)*			13.93 *(9.91)*		
Engineering	85.90 *(15.63)*			21.82 *(10.70)*			11.18 *(9.09)*			9.90 *(9.28)*			15.18 *(8.60)*		
Marketing	84.58 *(15.28)*			23.66 *(12.96)*			12.41 *(10.58)*			10.55 *(9.31)*			16.99 *(10.15)*		
Arts															
Education	87.03 *(18.41)*	0.062	0.005	21.41 *(14.18)*	0.115	0.004	11.52 *(10.70)*	0.469	0.001	9.38 *(11.20)*	0.404	0.002	14.18 *(10.66)*	0.058	0.005
Associate	86.92 *(14.11)*			21.82 *(12.13)*			11.09 *(10.28)*			9.69 *(9.17)*			15.71 *(9.98)*		
degree	83.29 (*15.15*)			24.55 *(12.00)*			12.45 *(10.36)*			11.10 *(9.80)*			18.09 *(10.01)*		
Bachelor's															
degree															
Master's &															
PhD															
Curricular year	86.36 *(14.76)*	**0.004**	0.012	22.66 *(12.51)*	**0.016**	0.009	11.87 *(10.10)*	**0.018**	0.009	10.32 *(9.40)*	0.195	0.004	16.05 *(10.27)*	0.089	0.006
First year	85.75 *(14.43)*			22.48 *(12.46)*			11.43 *(10.49)*			9.93 *(9.57)*			15.53 *(10.03)*		
Second year	86.11 *(13.60)*			22.03 *(11.57)*			11.16 *(10.48)*			9.60 *(8.94)*			16.61 *(9.72)*		
Third year	91.07 *(13.92)*			18.74 *(11.62)*			8.54 *(9.67)*			8.13 *(8.91)*			14.00 *(9.68)*		
Fourth year															
	M (*SD*)	***p***	Cohen's d	**M (*SD*)**	***p***	Cohen's d	**M (*SD*)**	***p***	Cohen's d	**M (*SD*)**	***p***	Cohen's d	**M (*SD*)**	***p***	Cohen's d
Working	86.30 (15.75)	0.609	−0.033	21.69 *(12.46)*	0.543	−0.039	10.91 *(9.66)*	0.516	−0.042	8.86 *(8.79)*	**0.021**	−0.148	15.86 *(9.96)*	0.994	0.000
student	86.66 (13.70)			22.17 *(12.07)*			11.34 *(10.56)*			10.19 *(9.45)*			15.85 *(10.05)*		
Yes															
No															
Living away	84.68 *(15.41)*	**0.003**	−0.192	23.66 *(12.99)*	**0.004**	0.189	12.26 *(11.14)*	**0.026**	0.144	10.84 *(10.00)*	**0.008**	0.173	16.38 *(10.61)*	0.257	0.073
from family	87.43 *(13.81)*			21.36 *(11.79)*			10.78 *(19.91)*			9.37 *(8.93)*			15.65 *(9.76)*		
home															
Yes															
No															

M – Mean; SD – Standard Deviation; FANTASTICO – FANTASTICO Lifestyle Questionnaire; CORE-18 – Clinical Outcomes in Routine Evaluation; DASS-21 – Depression, Anxiety and Stress Scales

Table 3 Association between Lifestyle and Mental Health Measures and Sociodemographic Variables

	FANTASTICO total	F	A	*N*	T	A	S	T	I	C	O
CORE-18 total	−0.649	−0.393	−0.208	−0.278	−0.132	−0.141	−0.678	−0.403	−0.773	−0.236	−0.022
	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.467
CORE-18_swe	−0.593	−0.342	−0.225	−0.263	−0.103	−0.095	−0.651	−0.355	−0.733	−0.193	0.002
	<0.001	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	0.952
CORE-18_ps	−0.565	−0.305	−0.169	−0.227	−0.089	−0.106	−0.640	−0.335	−0.743	−0.186	0.029
	<0.001	**<0.001**	**<0.001**	**<0.001**	**0.003**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	0.328
CORE-18_lfd	−0.628	−0.438	−0.211	−0.284	−0.141	−0.155	−0.591	−0.425	−0.663	−0.277	−0.078
	<0.001	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**0.008**
CORE-18_rh	−0.362	−0.260	−0.055	−0.147	−0.222	−0.250	−0.260	−0.217	−0.295	−0.142	−0.129
	<0.001	**<0.001**	0.064	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**
DASS-21 Depression	−0.612	−0.390	−0.206	−0.250	−0.130	−0.138	−0.599	−0.423	−0.703	−0.268	−0.018
	<0.001	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	0.530
DASS-21 Anxiety	−0.511	−0.256	−0.171	−0.235	−0.126	−0.129	−0.578	−0.284	−0.574	−0.190	−0.025
	<0.001	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	0.390
DASS-21 Stress	−0.532	−0.269	−0.175	−0.218	−0.099	−0.100	−0.652	−0.298	−0.662	−0.145	−0.019
	<0.001	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	0.516
PHS	0.517	0.272	0.272	0.327	0.167	0.152	0.479	0.278	0.463	0.194	0.086
	<0.001	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**0.003**
Age	−0.113	−0.001	−0.147	−0.070	−0.024	−0.043	−0.120	−0.026	−0.115	0.023	−0.047
	<0.001	0.981	**<0.001**	**0.017**	0.424	0.140	**<0.001**	0.373	**<0.001**	0.434	0.109

FANTASTICO – FANTASTICO Lifestyle Questionnaire; F - Family and Friends; A – (Physical) Activity; N – Nutrition; T – Tobacco; A - Alcohol and Other Drugs; S - Sleep/Stress; T – Work/ Type Personality; I – Introspection; C - Health/Sexual Behaviors; O - Other Behaviors; CORE-18 total – Clinical Outcomes in Routine Evaluation total; CORE-18_swe – Core subjective well-being deficits subscale; CORE-18_ps – Core problems symptoms subscale; CORE-18_lfd – Core life functioning difficulties subscale; CORE-18_rh – Core risk harm subscale; DASS-21 – Depression, Anxiety and Stress Scales; PHS - Perceived health status

Table 4 Multiple Regression Model to analyze explanatory variables of total scores of FANTASTICO

Constant	Unstandardized Coefficient (B)	SE	Standardized Coefficient (β)	t-statistic	*p*-value	95% CI
	97.05	3.81		29.54	<0.001	]83.54; 95.43[
CORE-18 Total	−0.83	0.08	−0.71	-11.02	<0.001	]-0.98; −0.68[
PHS	2.12	0.24	0.22	8.98	<0.001	]1.65; 2.58[
Women	4.03	0.75	0.13	5.38	<0.001	]2.56; 5.50[
CORE-18_ps	0.98	0.16	0.37	6.22	<0.001	]0.67; 1.28[
DASS-21 Depression	−0.23	0.05	−0.17	-4.64	<0.001	]-0.33; −0.14[
BMI	−0.33	0.08	−0.09	-4.10	<0.001	]-0.49; −0.17[
Health student	1.62	0.68	0.06	2.38	0.018	]0.28; 2.96[
DASS-21 Stress	−0.13	0.05	−0.09	-2.51	0.012	]-0.23; −0.03[
Age	−0.27	0.11	−0.05	-2.49	0.013	]-0.47; −0.06[
Engineering student	-1.80	0.80	−0.06	-2.20	0.025	]-3.38; −0.22[

PHS - Perceived health status; BMI – Body Mass Index; CORE-18 total – Clinical Outcomes in Routine Evaluation total; CORE-18_ps – Core problems symptoms subscale; DASS-21 Depression – Depression Subscale; DASS-21 Stress – Stress Subscale

in specific lifestyle domains, particularly within the FANTASTICO Introspection ($r = -.773$, $p < .001$) and Sleep/Stress ($r = -.678$, $p < .001$) subscales.

To identify and prioritize the explanatory variables of a healthy lifestyle, a multivariate stepwise regression was conducted (Table 4). The model successfully explained a substantial 55% of the variance in lifestyle scores ($R^2 = 0.55$). Synthesizing the regression weights, psychological and subjective health factors vastly overshadowed sociodemographic variables in importance. Specifically, lower overall psychological distress (CORE-18 total) and a more positive self-perception of health emerged as the most powerful explanatory variables for a healthier lifestyle. Interestingly, an isolated awareness of psychological symptoms (CORE-18 problems/symptoms subscale) positively explained lifestyle scores, suggesting that symptom recognition might trigger compensatory health-promoting behaviours. While being female, having a lower BMI, and studying health sciences were

also retained as significant explanatory variable in the final model, their standardized contributions were minor when compared to the core psychological variables.

Discussion

The present study aimed to describe lifestyle patterns among higher education students, examine their associations with psychological well-being and mental health, and assess the influence of sociodemographic and contextual variables. Overall, students from the Polytechnic of Porto reported generally positive lifestyle profiles and low levels of psychological distress. Nevertheless, mild symptoms of depression, anxiety, and stress were observed, reaching values close to the threshold for moderate severity, underscoring the need for continued monitoring and support.

A key finding was the inverse relationship between psychological well-being and lifestyle. Lower levels of depressive symptoms and stress, as measured by the DASS-21, emerged as significant explanatory variables for healthier lifestyle scores. Rather than isolated behavioural choices, this underscores a mind-body connection: psychological well-being is an important element for the adoption and maintenance of health-promoting behaviours [67, 68]. Students with fewer mental health difficulties possess the cognitive and emotional bandwidth to engage in protective habits such as regular physical activity, balanced nutrition, and adequate rest [69]. Self-rated health perception also stood out as an explanatory variable, reinforcing the established link between subjective health appraisal and behavioural engagement [70, 71]. Individuals who perceive themselves as healthy may be more proactive in preventive care, whereas those with poorer perceptions of health may lack the self-efficacy required to sustain behavioural change.

A particularly complex and counterintuitive finding was the positive association between the CORE-18 problems/symptoms subscale and healthier lifestyles within the multivariate model. While initially unexpected (given that the global CORE-18 score was negatively associated with lifestyle quality) this finding warrants deeper theoretical scrutiny. One interpretation aligns with the Health Belief Model, suggesting that heightened awareness of acute psychological symptoms may act as a "cue to action". Students experiencing psychological distress may deliberately adopt compensatory health-promoting behaviours (e.g., strict exercise or dietary regimens) as an active coping strategy to regain a sense of self-regulation and control [72, 73]. However, an alternative clinical interpretation must be critically acknowledged: this association might reflect maladaptive perfectionism or hypervigilance. In high-achieving academic environments, students might rigorously adhere to strict lifestyle routines which, while scoring high on the FANTASTICO scale, are linked to underlying anxiety, obsessive-compulsive traits, or orthorexia, rather than genuine well-being. Finally, from a methodological standpoint, this result most likely represents a statistical suppression effect within the multivariate model, where the unique variance of the symptoms subscale behaves differently when isolated from overall psychological risk. Neither the compensatory behaviour hypothesis nor the perfectionism explanation can be supported by the present cross-sectional data; thus, these interpretations remain explicitly speculative and hypothetical. Future studies should employ qualitative or clinical interviews to untangle whether these 'healthy' behaviours are genuinely adaptive or anxiety-driven.

Sociodemographic variables further shaped these outcomes, revealing a possible "Gender Paradox". Female students engaged in significantly healthier overall lifestyle behaviours than males, yet concurrently reported higher vulnerability to depression, anxiety, and stress. Moving beyond merely confirming prior literature that associates women with better preventive practices [74] and distinct lifestyle profiles [75], this paradox challenges the linear assumption that a healthy lifestyle invariably translates to psychological well-being. It suggests that women's health behaviours might hypothetically be motivated by different factors, such as potentially higher health literacy or specific societal pressures regarding body image, which do not necessarily protect against the unique psychosocial stressors. This highlights a gap in current health-promotion models, which often fail to account for the differential sources of distress between genders. Alongside gender, age also emerged as a significant demographic factor: younger students displayed healthier profiles, suggesting early developmental

differences in health behaviour. However, this trend raises concerns regarding the potential decline in health-promoting habits as students age chronologically, highlighting a critical period for early preventive interventions.

The academic context also played a structurally significant role. The superiority of Health Sciences and senior (fourth-year) students in both lifestyle and mental health outcomes could point to a process of "academic maturation" as one possible explanation, though unmeasured factors (including cohort differences or self-selection effects) may also account for these findings. Rather than assuming a definitive mechanism, students in health-related fields and advanced years could tentatively internalize a more holistic understanding of health, successfully translating theoretical knowledge into applied behavioural self-regulation [76, 77]. Conversely, the higher stress levels observed in Arts and first-year students highlight periods of heightened vulnerability, where this health literacy is yet to be consolidated and students are still navigating the transition to independent learning and living.

Living arrangements further influenced outcomes. Non-displaced students (those living with their families) reported better results across lifestyle, well-being, and mental health indicators. The presence of familiar support networks, stable environments, and reduced financial or housing-related stressors may provide a positive association that facilitate positive adjustment and engagement in health-promoting behaviours [78, 79]. Together, these results suggest that both academic trajectory and living context are factors associated with student well-being, underscoring the importance of considering contextual variables alongside individual psychological explanatory variables.

Fundamentally, the integration of effect size analysis refines our understanding of these relationships. While our univariate analyses identified several statistically significant sociodemographic differences, such as those based on gender, academic year, and living arrangements, the associated effect sizes were consistently small (Cohen's $d < 0.20$; Eta-squared < 0.10). Given the large sample size, these isolated demographic findings must be interpreted with caution regarding their practical relevance. In contrast, the multivariate regression model demonstrated robust practical significance, explaining 55% of the variance ($R^2 = 0.55$) in the FANTASTICO lifestyle scores. This substantial effect size indicates that modifiable psychological factors, specifically self-rated health and psychological distress carry the true clinical and practical weight in determining student lifestyle.

Translating these findings into practice, the multifaceted nature of lifestyle requires institutional environments that actively facilitate behavioural self-regulation [80]. While existing literature frequently highlights the vulnerability of students to lifestyle deterioration during their academic journey, including poor sleep, dietary changes, and physical inactivity related to academic stress [81–84], our data suggests that addressing these issues requires more than isolated behavioural advice. Effective university-based initiatives must adopt a holistic approach that integrates academic and social support, as previously demonstrated in Portuguese contexts [85]. Furthermore, given our finding that psychological variables overshadow demographic ones in explaining healthy behaviours, public health policies in higher education should move away from narrowly targeted demographic interventions and instead prioritize broad, transdiagnostic mental health promotion and stress management resources. Supporting healthier lifestyles in young adulthood through these comprehensive institutional strategies is not merely about improving immediate academic success but represents a critical window for enhancing quality of life, preventing chronic disease, and reducing long-term societal burdens [86, 87].

Despite its contributions, the interpretative claims of this study must be carefully aligned with its methodological constraints. First, the use of a convenience sampling design within a single institution introduces self-selection bias, as students more interested in mental health or lifestyle topics may have been more likely to respond. Consequently, our findings reflect a specific academic environment, which limits the external validity and generalizability of our conclusions. Therefore, the protective role of specific academic contexts identified in our sample should be interpreted as context-specific rather than universally applicable to the broader student population in different regions or institutions. Future research should incorporate more diverse samples and consider additional variables such as urban–rural differences, given that urban contexts offer broader access to health and sports services [88].

Second, the cross-sectional design precludes any causal inferences. While our regression model identified strong explanatory variables, we cannot determine the direction of the association between psychological distress

drives poor lifestyle choices or vice versa. Third, our reliance exclusively on self-reported measures introduces self-report bias. Shared method variance may artificially inflate the strength of the observed correlations [89]. Thus, the substantial explained variance reported in our results must be interpreted with caution, as the true magnitude of these behavioural associations might be more modest. Objective measures, such as wearable devices to track physical activity and sleep, or clinical assessments of mental health, should be incorporated in future work to enhance the robustness of the findings [90].

Fourth, while the FANTASTICO questionnaire provided a valuable and validated global index of lifestyle behaviors, its psychometric structure limits deeper, nuanced subscale analyses. The instrument divides 30 items across 10 domains, resulting in extremely brief subdimensions consisting of only two to three items each. Such brief subscales inherently lack the variance and independent internal consistency required to serve as robust dependent variables in complex multivariate models, justifying our analytical reliance on the validated global score to prevent Type I error inflation. Furthermore, the instrument does not capture the full range of quality-of-life dimensions, such as deeper social relationships or physical health metrics. Combining it with tools specifically designed to assess quality of life would yield a more comprehensive perspective.

Finally, the analytical strategy employed to identify associated factors relied on a stepwise multiple regression. While appropriate for the exploratory scope of this study, stepwise selection is inherently data-driven. Consequently, the final model prioritizes mathematical variance over theoretical importance, meaning that some variable associations might be specific to this sample. Future research should aim to confirm these findings using confirmatory, theory-driven structural equation modelling (SEM) to cross-validate the relationships identified here.

Conclusions

This study provides a comprehensive analysis of lifestyle characteristics among higher education students, examining their associations with psychological well-being and mental health as distinct yet interrelated constructs. Our results indicate that while students generally report favourable lifestyle patterns, there is a complex coexistence of psychological well-being and mild symptoms of depression, anxiety, and stress. This supports the dual-continuum model, suggesting that the presence of psychological distress does not necessarily preclude the experience of well-being, nor does a lack of symptoms guarantee flourishing. Psychological well-being and self-rated health perception emerged as key factors associated with healthier lifestyles, independent of the levels of psychological distress. These findings underscore the importance of addressing both individual and institutional factors when designing interventions to promote student well-being. Supporting healthier lifestyles during young adulthood not only fosters academic success and psychological resilience but may also reduce long-term health risks and societal costs. To achieve a deeper understanding of student lifestyle patterns, future research should expand to more diverse and representative samples and incorporate additional variables such as social support, economic pressures, and urban–rural differences. Employing longitudinal and objective measures will also be critical to capturing the dynamic interplay between lifestyle, well-being, and mental health across time.

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Data availability The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate This study was conducted in accordance with the Declaration of Helsinki and approved by the ESS Ethics Committee (No. CE0087D). Informed consent was obtained from all subjects involved in this study.

Consent for publication Not applicable.

Competing interests The authors declare no competing interests.

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