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Posted Date: 10 July 2025

doi: 10.20944/preprints202507.0863.v1

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Integrated Wellness Needs of Saudi University Students: Mental Health as a Key Determinant of Lifestyle and Quality of Life

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Abstract

The transition to university is a critical period for establishing lifelong health habits, particularly in Saudi Arabia, where non-communicable diseases linked to lifestyle are increasingly prevalent. To address this, our study sought to comprehensively assess lifestyle behaviors, mental health status, and their combined impact on health-related quality of life (HRQoL) among students at King Khalid University. We conducted a cross-sectional study between September 2024 and February 2025, recruiting 865 undergraduates via a two-stage stratified random sampling technique. Data were collected using a validated online questionnaire that included the FANTASTIC lifestyle and EuroQol 5-Dimension 3-Level (EQ-5D-3L) instruments. Our results indicated a dual health burden, with a significant proportion of students being overweight or obese (37.6%) and a high prevalence of self-reported anxiety or depression (55.9%). Although the mean lifestyle score was generally positive, regression analysis revealed that anxiety/depression was the strongest predictor of a poorer lifestyle (OR = 2.94, 95% CI: 2.02–4.28). This study concludes that a profound negative association exists between mental health, lifestyle, and overall HRQoL, highlighting the urgent need for integrated wellness policies and support systems within the university setting to address these interconnected challenges.

Keywords: healthy lifestyle; mental health; health-related quality of life; university students; FANTASTIC; EQ-5D-3L; Saudi Arabia; public health

1. Introduction

Lifestyle, defined as the composite of an individual's daily habits and behaviors, is a primary determinant of long-term health and well-being. The World Health Organization (WHO) has established that unhealthy behaviors—such as poor dietary habits, physical inactivity, and inadequate stress management—are major modifiable risk factors for the global burden of non-communicable diseases (NCDs), including cardiovascular disease, type 2 diabetes, and certain cancers [1,2]. The Global Burden of Disease (GBD) 2021 study continues to highlight these behavioral factors as leading contributors to premature mortality and morbidity worldwide [3].

The university period is a critical developmental stage where young adults, often living independently for the first time, establish autonomy and form habits that persist throughout their lives [4,5]. This transition is frequently accompanied by significant lifestyle changes as students adapt to new academic pressures, social environments, and personal responsibilities [6]. These stressors can

 doi:10.20944/preprints202507.0863.v1

negatively impact health behaviors, leading to poor dietary choices, reduced physical activity, and irregular sleep patterns [7,8].

In the Kingdom of Saudi Arabia, rapid socioeconomic development has precipitated a well-documented nutritional and lifestyle transition. This shift, characterized by increased sedentary behaviors and consumption of energy-dense foods, has contributed to a rising prevalence of obesity and related NCDs, a trend that is increasingly apparent among youth [9,10]. This challenge aligns with the goals of Saudi Vision 2030, which emphasizes improving public health and promoting preventive care [11]. University students are at the forefront of this transition, making them a crucial target population for health promotion efforts [12].

Concurrently, there is growing recognition of the mental health challenges faced by university students globally [13]. High rates of stress, anxiety, and depression are prevalent in this population, driven by factors such as academic workload, social pressures, and future uncertainty [14]. Poor mental health is not an isolated issue; it is intrinsically linked to physical health and lifestyle choices. For instance, depression is strongly associated with physical inactivity and poor diet quality [15,16], creating a vicious cycle that degrades overall health-related quality of life (HRQoL) [17].

While previous studies in Saudi Arabia have identified suboptimal dietary habits and insufficient physical activity among university students [18,19], few have comprehensively examined the tripartite relationship between lifestyle, mental health, and HRQoL within a single large cohort, particularly in the southern Asir province. Therefore, this study aims to: 1) assess healthy lifestyle patterns and BMI status; 2) evaluate the prevalence of mental health problems and overall HRQoL; and 3) identify the sociodemographic, lifestyle, and mental health factors that predict HRQoL among students at King Khalid University.

2. Materials and Methods

2.1. Study Design, Setting, and Period

A quantitative, cross-sectional study design was employed to assess the associations between lifestyle, mental health, and HRQoL at a single point in time. The study was conducted at King Khalid University (KKU), a major public university in Abha, Asir Province, Saudi Arabia. KKU serves a diverse student body of over 70,000 students from various socioeconomic and geographic backgrounds, enrolled in a wide range of scientific and literary disciplines, making it a suitable setting for this research. Data collection took place over a six-month period from September 2024 to February 2025 to capture a representative sample across a full academic semester.

2.2. Study Population and Sampling Strategy

The target population comprised all full-time undergraduate students officially registered at KKU for the 2024-2025 academic year. The sample size was calculated using Raosoft® software, setting a 5% margin of error, a 95% confidence level, and an estimated 50% prevalence of a "good" lifestyle based on regional literature. This yielded a minimum required sample of 385. To compensate for the design effect of multi-stage sampling and to ensure adequate power for subgroup analyses, the target sample was increased by over 150% to 1060 students.

A two-stage stratified random sampling technique was employed to ensure a representative sample.

- Stage 1 (Stratification): The official university registrar's list of all colleges served as the sampling frame. Colleges were stratified into two mutually exclusive groups: "Health Colleges" (e.g., Medicine, Dentistry, Pharmacy, Applied Medical Sciences) and "Non-Health Colleges" (e.g., Engineering, Science, Education, Business, Humanities).
- Stage 2 (Random Selection): A proportionate number of students were selected from each stratum using a computer-generated simple random sampling algorithm.

Inclusion criteria were: 1) being a registered full-time undergraduate student; 2) being 18 years of age or older; and 3) providing informed consent to participate. Students on an official leave of

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absence during the study period were excluded. Selected students were contacted via their official university email address, which contained a unique, non-transferable link to the online questionnaire. Up to two reminder emails were sent at two-week intervals to non-responders to maximize the response rate.

2.3. Data Collection Instrument

A structured, self-administered online questionnaire was created using Google Forms and distributed in Arabic, the native language of the participants. The questionnaire was pilot-tested on 30 students (not included in the final sample) to ensure clarity, flow, and cultural appropriateness. The instrument consisted of four sections:

- Part 1: Sociodemographic and Anthropometric Data: This section collected data on age (categorized as 18–20, 21–23, and ≥24 years), gender, college type, marital status, and monthly family income. The income cutoff of < 15,000 SAR was chosen based on national survey data to approximate the median household income [20]. Self-reported height (in cm) and weight (in kg) were used to calculate Body Mass Index (BMI), categorized according to WHO standards (Underweight <18.5; Normal 18.5–24.9; Overweight 25.0–29.9; Obese ≥30.0 kg/m²) [21].
- Part 2: Lifestyle Assessment: The FANTASTIC Lifestyle Questionnaire, developed by Wilson and Ciliska, was used [22]. The validated Arabic version of this 25-item tool assesses nine domains of lifestyle (Family/Friends, Activity, Nutrition, Tobacco/Toxins, Alcohol, Sleep/Seatbelt/Stress, Type of personality, Insight, Career). Scores range from 0 to 100 and are categorized as: Excellent (85–100), Very Good (70–84), Good (55–69), Fair (40–54), and Needs Improvement (0–39). For analytical purposes, these were collapsed into three groups: "Excellent/Very Good", "Good", and "Fair/Needs Improvement". The questionnaire demonstrated good internal consistency in this study sample, with a Cronbach's alpha of 0.78.
- Part 3: Health-Related Quality of Life (HRQoL): The EuroQol 5-Dimension 3-Level (EQ-5D-3L) instrument was used [23]. The validated Arabic version [24] measures HRQoL across five dimensions (Mobility, Self-Care, Usual Activities, Pain/Discomfort, Anxiety/Depression), with three severity levels (no problems, some problems, extreme problems). For bivariate analysis, these were dichotomized into "No problems" and "Some/Extreme problems". The instrument also includes a Visual Analogue Scale (EQ-VAS) where respondents rate their overall health from 0 (worst imaginable) to 100 (best imaginable).

2.4. Ethical Considerations

The study protocol was approved by the Institutional Review Board (IRB) of King Khalid University and was conducted in accordance with the Declaration of Helsinki. An information page preceded the questionnaire, explaining the study's purpose, the voluntary nature of participation, and assuring participants of the confidentiality and anonymity of their data. It was made clear that participants could withdraw at any time without penalty.

2.5. Statistical Analysis

Data were coded and analyzed using IBM SPSS Statistics for Windows, Version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics (means, standard deviations [SD], frequencies, percentages, and 95% confidence intervals [CI]) were used to summarize all variables. Bivariate analyses were conducted using the chi-squared (χ^2) test to assess associations between categorical variables. To correct for the risk of Type I errors from multiple comparisons in the analysis of lifestyle categories against the five EQ-5D dimensions, a Bonferroni-adjusted p-value threshold of $p < 0.01$ was considered statistically significant.

A multinomial logistic regression model was built to identify predictors of lifestyle. The "Good" lifestyle category was chosen as the reference category as it represented the modal (most frequent) group, allowing for meaningful comparisons with both superior ("Excellent/Very Good") and inferior

 doi:10.20944/preprints202507.0863.v1

("Fair/Needs Improvement") lifestyle categories. The model building was theory-driven, entering variables in a hierarchical fashion: Block 1 contained core sociodemographic variables (gender, college type, income), Block 2 added the key physical health variable (BMI category), and Block 3 added the mental health dimension (Anxiety/Depression from EQ-5D). Variables such as mother's and father's education, which were significant in the bivariate analysis, were tested in the initial model but were found to be non-significant after controlling for other covariates and were therefore removed from the final parsimonious model. Assumption checking was performed; multicollinearity was assessed using the Variance Inflation Factor (VIF), with all variables having a VIF < 2.0, indicating no issues. The Hosmer-Lemeshow test indicated good model fit ($p > 0.05$). Potential interaction effects (e.g., gender × anxiety) were tested but were not significant and thus excluded from the final parsimonious model. A p-value of < 0.05 was considered statistically significant for the regression analysis.

3. Results

3.1. Participant Characteristics

Of the 1060 students invited, 865 completed the questionnaire, yielding a response rate of 81.6%. The demographic, socioeconomic, and anthropometric characteristics of the participants are detailed in Table 1. The mean age of participants was 21.8 (±2.9) years, with the largest group (46.2%) being 18–20 years old, followed by the 21–23 age group (42.2%). The sample was fairly balanced by gender, with slightly more females (52.5%) than males (47.5%). The majority of students were enrolled in non-health colleges (64.3%) and were single (88.1%). A significant majority (68.4%) reported a monthly family income of less than 15,000 SAR, with 22.1% earning between 15,000-25,000 SAR and 9.5% earning over 25,000 SAR. With regard to weight status, just over half of the students (54.8%) were of normal weight. However, a combined 37.6% (95% CI: 35.3%–41.9%) were classified as overweight (26.2%) or obese (11.3%), indicating a substantial prevalence of excess weight in this population.

Table 1. Sociodemographic and BMI Characteristics of Study Participants (n=865).

Characteristic	Category	n (%)
Age (years)	18–20	400 (46.2)
	21–23	365 (42.2)
	≥24	100 (11.6)
Gender	Male	411 (47.5)
	Female	454 (52.5)
College Type	Health Colleges	309 (35.7)
	Non-Health Colleges	556 (64.3)
Mother's Education	Illiterate/Primary	181 (20.9)
	Intermediate/Secondary	344 (39.8)
	Bachelor's or Higher	340 (39.3)
Father's Education	Illiterate/Primary	133 (15.4)
	Intermediate/Secondary	371 (42.9)
	Bachelor's or Higher	361 (41.7)
Monthly Family Income (SAR)	< 15,000	592 (68.4)
	15,000 – 25,000	191 (22.1)
	> 25,000	82 (9.5)
BMI Category (kg/m²)	Underweight (<18.5)	66 (7.6)
	Normal weight (18.5–24.9)	474 (54.8)
	Overweight (25.0–29.9)	227 (26.2)
	Obese (≥30.0)	98 (11.3)

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3.2. Lifestyle and HRQoL Assessment

The overall mean FANTASTIC lifestyle score for the cohort was 68.9 (SD=12.5), falling into the "Good" category. The distribution of lifestyle categories was as follows: Excellent (8.7%), Very Good (24.8%), Good (41.3%), Fair (22.1%), and Needs Improvement (3.1%). The mean self-rated health score on the EQ-VAS was 81.4 (SD = 16.2), indicating a generally positive perception of health. A significant positive correlation was observed between the total FANTASTIC score and the EQ-VAS score (Spearman's $r = 0.53$, $p < 0.001$), suggesting that better lifestyle habits are strongly linked with higher self-rated health.

Table 2 presents the distribution of responses on the EQ-5D-3L dimensions. While the majority of students reported no problems with Mobility (91.1%), Self-Care (96.5%), and Usual Activities (89.6%), a substantial proportion reported experiencing health issues in other domains. Over one-third of the students (36.1%) reported having some or extreme problems with Pain/Discomfort. Most notably, a majority of the students (55.9%; 95% CI: 52.5%–59.3%) reported experiencing problems with Anxiety/Depression, highlighting a significant mental health burden in this population.

Table 2. Distribution of Responses to EQ-5D-3L Dimensions (n=865).

Dimension	Level	n (%)	95% Confidence Interval
Mobility	No problems	788 (91.1)	89.1% – 92.8%
	Some / Extreme problems	77 (8.9)	7.2% – 10.9%
Self-Care	No problems	835 (96.5)	95.1% – 97.6%
	Some / Extreme problems	30 (3.5)	2.4% – 4.9%
Usual Activities	No problems	775 (89.6)	87.4% – 91.5%
	Some / Extreme problems	90 (10.4)	8.5% – 12.6%
Pain/Discomfort	No problems	553 (63.9)	60.6% – 67.1%
	Some / Extreme problems	312 (36.1)	32.9% – 39.4%
Anxiety/Depression	No problems	382 (44.1)	40.7% – 47.5%
	Some / Extreme problems	483 (55.9)	52.5% – 59.3%

3.3. Association Between Variables and Lifestyle

The results of the chi-squared analysis investigating the association between participant characteristics and the three lifestyle categories are presented in Table 3. A statistically significant association was found between lifestyle category and college type ($p < 0.001$). Specifically, a higher proportion of students from health colleges (38.8%) were in the 'Excellent/Very Good' category compared to students from non-health colleges (30.6%). Significant associations were also found with both the Pain/Discomfort ($p < 0.001$) and Anxiety/Depression ($p < 0.001$) dimensions of the EQ-5D-3L. For anxiety/depression, nearly half (47.4%) of the students with no problems were in the 'Excellent/Very Good' lifestyle category, whereas only 22.6% of those with problems fell into this top tier. Conversely, a third (33.5%) of students with anxiety/depression problems were in the poorest lifestyle category, compared to just 14.7% of those without such problems. No statistically significant associations were found between lifestyle category and gender, age, family income, or BMI category in the bivariate analysis.

Table 3. Association between Participant Characteristics and Lifestyle Categories (n=865).

Variable	Lifestyle: Excellent/Very Good (n=290)	Lifestyle: Good (n=357)	Lifestyle: Fair/Needs Improvement (n=218)	*p*-value
Mother's Education				**0.028**
Illiterate/Primary	51 (28.2)	71 (39.2)	59 (32.6)	
Intermediate/Secondary	109 (31.7)	149 (43.3)	86 (25.0)	

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Bachelor's or Higher	130 (38.2)	137 (40.3)	73 (21.5)	
Father's Education				0.155
Illiterate/Primary	39 (29.3)	58 (43.6)	36 (27.1)	
Intermediate/Secondary	115 (31.0)	159 (42.9)	97 (26.1)	
Bachelor's or Higher	136 (37.7)	140 (38.8)	85 (23.5)	
College Type				**<0.001**
Health	120 (38.8)	135 (43.7)	54 (17.5)	
Non-Health	170 (30.6)	222 (39.9)	164 (29.5)	
Anxiety/Depression				**<0.001**
No problems	181 (47.4)	145 (38.0)	56 (14.7)	
Problems	109 (22.6)	212 (43.9)	162 (33.5)	

Significance based on χ^2 test. Bold indicates $p < 0.05$.

3.4. Predictors of Lifestyle

The results of the final multinomial logistic regression model predicting lifestyle category are presented in Table 4. When comparing the 'Excellent/Very Good' category to the reference 'Good' category, being male (OR=1.58, 95% CI: 1.11–2.25) and being enrolled in a health college (OR=1.65, 95% CI: 1.14–2.39) were significant predictors of a better lifestyle. Reporting problems with anxiety/depression significantly reduced the odds of being in the top lifestyle category (OR=0.46, 95% CI: 0.31–0.67). When comparing the 'Fair/Needs Improvement' category to the 'Good' category, anxiety/depression was the only significant predictor. Students reporting problems with anxiety/depression had nearly three times the odds of being in the poorest lifestyle category compared to those with no such problems (OR=2.94, 95% CI: 2.02–4.28).

Table 4. Multinomial Logistic Regression Predicting Lifestyle Category.

Predictor	Comparison	Odds Ratio (OR)	95% C.I.	*p*-value
Gender (Male vs. Female)	Excellent/Very Good vs. Good	1.58	1.11 – 2.25	**0.012**
College (Health vs. Non-Health)		1.65	1.14 – 2.39	**0.008**
BMI (Overweight/Obese vs. Normal)		0.91	0.65 – 1.27	0.580
Anxiety/Depression (Problems vs. No Problems)		0.46	0.31 – 0.67	**<0.001**
Gender (Male vs. Female)	Fair/Needs Improvement vs. Good	0.91	0.64 – 1.29	0.589
College (Health vs. Non-Health)		0.85	0.60 – 1.21	0.368
BMI (Overweight/Obese vs. Normal)		1.03	0.75 – 1.43	0.852
Anxiety/Depression (Problems vs. No Problems)		2.94	2.02 – 4.28	**<0.001**

Reference categories: Good Lifestyle; Female; Non-Health College; Normal BMI; No Problems with Anxiety/Depression. Bold indicates $p < 0.05$.

4. Discussion

This study provides a comprehensive assessment of the intricate relationships between lifestyle, mental health, and quality of life among university students in Saudi Arabia. The principal finding is the identification of a dual health burden: a high prevalence of overweight/obesity co-existing with an alarmingly high rate of self-reported anxiety and depression. While students' overall lifestyle

 doi:10.20944/preprints202507.0863.v1

scores were generally “Good”, the profound negative influence of poor mental health on both lifestyle behaviors and HRQoL emerged as the most critical public health challenge in this population.

The prevalence of overweight and obesity (37.6%) among our student sample is a major concern that aligns with, and slightly exceeds, figures reported in other regional studies among similar populations [10,25]. This underscores that the epidemic of excess weight is well-established in the younger generation, posing a significant future risk for NCDs. However, the most salient finding is the prevalence of self-reported problems with anxiety or depression, affecting a majority (55.9%) of students. This rate is substantially higher than that reported in some earlier Saudi studies and is consistent with the escalating mental health crisis documented among university students globally in the post-COVID-19 era [13,26]. It represents a significant barrier to both academic success and the development of a healthy, resilient future workforce, demanding urgent attention from university administrators and public health policymakers.

Our regression model unequivocally identified poor mental health as the strongest predictor of an unhealthy lifestyle. This supports the concept of a vicious cycle, where psychological distress may lead to unhealthy coping behaviors (e.g., poor diet, physical inactivity), which in turn exacerbate mental health problems and degrade quality of life [15,17]. The odds of having a poor lifestyle were nearly three times higher for students with anxiety/depression, while the odds of having an excellent lifestyle were halved. This powerful statistical link highlights the futility of addressing physical health behaviors like diet and exercise in isolation, without concurrently providing robust mental health support.

The finding that students in health colleges had significantly better lifestyles is logical and consistent with other research [19,27], suggesting that health literacy is a key protective factor. This presents a clear opportunity for intervention: implementing mandatory, practical health education courses for all students, regardless of their field of study, could be a highly effective, university-wide strategy to improve health awareness and behaviors. Similarly, the finding that male students reported better lifestyles aligns with some regional studies, which may reflect socio-cultural factors influencing higher rates of participation in sports and physical activity among males [18]. This points to a need for universities to actively promote and ensure equitable access to culturally appropriate recreational facilities and programs for female students.

While such health literacy and gender-specific initiatives are valuable, addressing the primary challenge the profound impact of mental health on lifestyle necessitates a move towards a more structured and comprehensive model of integrated care. One such framework is the Stepped Care Model (SCM), a patient-centered approach that organizes services in hierarchical steps from the least to the most intensive based on an individual's needs. A comprehensive scoping review recently concluded that the SCM is a viable and effective model for delivering primary mental health care. The model's emphasis on initiating care with low-intensity interventions, such as guided self-help or digital wellness tools, before "stepping up" to more intensive, face-to-face therapies makes it particularly suitable for the university context. This structure could provide broad, accessible support to the large proportion of students reporting psychological distress, while efficiently reserving specialized resources for those with more severe needs [28].

However, several limitations must be acknowledged. First, the cross-sectional design precludes causal inference; we can identify strong associations but not prove that poor mental health causes a poor lifestyle. Second, all data, including height and weight for BMI calculation, were self-reported and subject to recall and social desirability bias. Third, while KKU is a major university, the findings from a single institution may not be generalizable to all Saudi universities. Finally, the EQ-5D-3L provides a broad measure of anxiety/depression but is not a clinical diagnostic tool; it indicates self-perceived problems rather than a formal diagnosis.

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5. Conclusions

The health and well-being of university students represent a critical investment in the future of a nation. This study reveals that while students at King Khalid University have some lifestyle strengths, these are severely undermined by significant challenges in nutrition, physical activity, and, most critically, mental health. The powerful negative influence of poor mental health on both lifestyle and quality of life demands a paradigm shift in university health policy, moving from a reactive to a proactive and integrated model model by implementing a tailored SCM for student wellness. Such a framework would establish an integrated system of support, beginning with universal, low-intensity services and providing clear pathways to 'step up' to individualized therapy for students who require it.

Author Contributions: Conceptualization, F.A. (Faris Alzahrani) and M.A.; Methodology, F.A. (Faris Alzahrani) and A.Z.; Formal Analysis, A.Z.; Investigation, A.A. (Abdullah Asiri), A.A. (Ashwag Asiri), S.A., A.A. (Aram Alqathradi), H.K., and A.A. (Ali Alshahrani); Data Curation, H.K. and A.A. (Ali Alshahrani); Writing—Original Draft Preparation, F.A. (Faris Alzahrani); Writing—Review and Editing, A.Z., A.A. (Abdullah Asiri), and M.A.; Supervision, M.A.; Project Administration, F.A. (Faris Alzahrani). All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study protocol was approved by the Institutional Review Board (IRB) of King Khalid University and was conducted in accordance with the Declaration of Helsinki. An information page preceded the questionnaire, explaining the study's purpose, the voluntary nature of participation, and assuring participants of the confidentiality and anonymity of their data. It was made clear that participants could withdraw at any time without penalty.

Informed Consent Statement: Electronic informed consent was obtained from all participants before they could proceed to the questionnaire. Data were stored on a password-protected server, and all identifying information was removed prior to analysis.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

BMI	Body Mass Index
EQ-5D-3L	EuroQol 5-Dimension 3-Level
FANTASTIC	FANTASTIC Lifestyle Questionnaire
GBD	Global Burden of Disease
HRQoL	Health-Related Quality of Life
IRB	Institutional Review Board
KKU	King Khalid University
NCDs	Non-Communicable Diseases
SCM	Stepped Care Model
WHO	World Health Organization

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