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Barriers to Physical Activity and their Association with Obesity-Related Quality of Life in College Populations

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Abstract

Background: The transition to university life is often accompanied by increased sedentary behaviour, raising the risk of overweight, obesity, and reduced health-related quality of life among college students.

Objective: This study examined the associations between perceived barriers to physical activity and obesity-related quality of life among college students, guided by the socio-ecological model.
Methods: A cross-sectional study was conducted among 140 college students (60% female) using a self-administered survey. Participants reported their physical activity levels, preferred activities, primary barriers to exercise, and obesity-related quality of life using a validated instrument. Binary logistic regression was used to identify barriers independently associated with poorer obesity-related quality of life, controlling for age, sex, marital status, academic level, BMI, and physical activity participation.

Results: Although 79.3% of students reported engaging in some physical activity, over half (52.1%) exercised for less than one hour per week. Walking was the most common activity. The most frequently reported barriers were academic pressure (20.0%), cost (19.3%), and exhaustion after classes (16.4%). Lack of motivation/interest was the strongest predictor of poorer obesity-related quality of life (OR = 4.39, p = .004), followed by perceptions of no suitable environment (OR = 3.49), academic pressure (OR = 3.06), exhaustion (OR = 2.66), and cost barriers (OR = 2.34). Female sex and higher BMI were also significant risk factors.

Conclusion: Both psychological and structural barriers significantly contribute to reduced obesity-related quality of life among college students. Multi-level campus interventions targeting motivation, environmental access, academic time pressures, and financial support are needed to promote physical activity and improve student well-being.

Keywords: Physical activity barriers; Obesity; Quality of life; College students; Socio-ecological model

1.0 Introduction

The transition to university constitutes a critical developmental period during which students frequently adopt lifestyle behaviors that increase the risk of overweight and obesity. Cross-sectional and longitudinal studies consistently indicate that 20–40% of college and university

students meet criteria for overweight or obesity, with prevalence differing according to demographic factors such as gender, ethnicity, and socioeconomic status (Pengpid & Peltzer, 2019; Alkhawaldeh *et al*., 2024). Excess adiposity during young adulthood is associated with heightened risk of cardiometabolic abnormalities, musculoskeletal disorders, and unfavorable long-term health trajectories. Moreover, obesity in the college years is linked to diminished health-related quality of life, including reduced physical functioning, lower vitality, impaired social relationships, and compromised emotional well-being (Jia & Lubetkin, 2005; Swallen *et al*., 2005; Ge *et al*., 2019).

Sedentary behavior is prevalent in academic settings due to extended periods of sitting during lectures, study sessions, and screen-based leisure activities, thereby contributing to positive energy balance and weight gain (Plotnikoff *et al*., 2015; Úbeda-Colomer *et al*., 2019). Regular physical activity represents one of the most effective strategies for obesity prevention and weight management. Evidence demonstrates that consistent moderate-to-vigorous exercise enhances body composition, metabolic health, and multiple domains of quality of life (Keating *et al*., 2005; Snedden *et al*., 2019). Nevertheless, only approximately 40–50% of university students meet recommended physical activity levels, highlighting an ongoing public health challenge (Pengpid & Peltzer, 2019; Barkley *et al*., 2020).

Physical activity serves as a cornerstone of obesity prevention and quality-of-life improvement among university students. Participation in regular aerobic and resistance training promotes favorable changes in body composition, cardiorespiratory fitness, and insulin sensitivity, while also improving scores on obesity-specific quality-of-life measures, particularly in the domains of physical functioning and vitality (Ge *et al*., 2019; Snedden *et al*., 2019). Students who achieve or exceed physical activity guidelines generally report greater emotional well-being, higher self-esteem, and more positive social interactions than their less active peers (Pourranjbar & Zeytoonli, 2019; Yahia *et al*., 2016). However, adherence remains suboptimal, and insufficient physical activity is associated with elevated stress, reduced psychological resilience, and lower vitality, thereby perpetuating obesity-related impairment (Gu *et al*., 2018; Lauderdale *et al*., 2015). Enhancing exercise self-efficacy appears particularly effective, as greater confidence in the ability to engage in activity is associated with fewer obesity-related limitations in daily functioning (Jia & Lubetkin, 2005; Swallen *et al*., 2005).

College students commonly encounter multiple barriers to physical activity participation. The socio-ecological model offers a comprehensive framework for understanding these influences, conceptualizing physical activity as the outcome of interactions among individual factors (e.g., self-efficacy and motivation), interpersonal elements (e.g., social support), environmental conditions (e.g., campus facilities), and institutional or policy factors (Sallis *et al*., 2008; Fleury & Lee, 2006). Prominent barriers include time constraints stemming from academic demands and employment, internal obstacles such as low motivation and fatigue (particularly among female students), environmental limitations including inconvenient facility access and restricted hours, interpersonal deficits in social support, and financial constraints that disproportionately affect lower-socioeconomic students (Alkhawaldeh *et al*., 2024; Úbeda-Colomer *et al*., 2019; Snedden *et al*., 2019; Pengpid & Peltzer, 2019). Students with higher body mass index often report more intense barriers, establishing a self-reinforcing cycle of inactivity and weight gain. Gender differences are evident, with males more frequently citing logistical issues and females reporting stronger psychological barriers (Akil, 2025; Alkhawaldeh *et al*., 2024).

These perceived barriers exhibit consistent associations with obesity-related quality of life. Elevated barrier levels, especially those related to time pressure and motivation, correlate with reduced vitality, increased bodily pain, and greater restrictions in physical and social functioning (Jia & Lubetkin, 2005; Swallen *et al*., 2005). Environmental and social support deficits are linked to poorer mental health outcomes and heightened obesity prevalence (Úbeda-Colomer *et al*., 2019; Fleury & Lee, 2006). Students with overweight or obesity experience amplified barriers that exacerbate declines in well-being, and gender-specific patterns suggest females may be particularly vulnerable to barrier-related decrements in quality of life (Pengpid & Peltzer, 2019; Yahia *et al*., 2016). The socio-ecological framework elucidates how multilevel influences interact to intensify the functional and psychosocial impacts of obesity (Sallis *et al*., 2008; Keating *et al*., 2005). Institutional factors, such as wellness program funding and scheduling policies, exert important upstream effects, and multilevel interventions have shown superior potential for sustained behavior change (Keating *et al*., 2005; Greaney *et al*., 2009).

Despite growing international evidence on barriers to physical activity and quality-of-life outcomes in college populations, a notable research gap persists regarding the experiences of university students in Saudi Arabia, where rapid expansion of higher education, shifting lifestyle patterns, and unique sociocultural and campus environments may shape distinct barrier profiles and quality-of-life outcomes that differ from those documented in other regions. Limited studies have systematically examined the interplay between perceived barriers to physical activity and obesity-related quality of life within the Saudi context, hindering the development of culturally and contextually relevant interventions.

The present study addresses this gap by investigating perceived barriers to physical activity and their associations with obesity-related quality of life among college students in Saudi Arabia. Anchored in the socio-ecological model, it aims to identify actionable determinants to support intervention development. Specific objectives are to (a) identify physical activities demonstrating efficacy for obesity prevention in this, (b) delineate the most prevalent and impactful barriers to exercise, (c) quantify associations between barrier profiles and obesity-specific quality-of-life domains, and (d) propose evidence-informed recommendations for campus-based programming. The study seeks to bridge gaps in the literature regarding the integrated examination of barrier perceptions and obesity-attributable quality-of-life decrements. Findings are expected to inform enhancements in campus infrastructure, peer support, scheduling policies, and resource allocation, thereby strengthening university wellness initiatives in the Kingdom.

3.0 Research Methodology

3.1 Research Design

The study utilized a quantitative cross-sectional correlational design to investigate associations between perceived barriers to physical activity and obesity-related quality of life among university students (Creswell & Creswell, 2018). This non-experimental approach is suitable for examining naturally occurring relationships at a single time point without intervention (Polit & Beck, 2021). Cross-sectional designs allow efficient data collection from large samples in higher education settings (Pengpid & Peltzer, 2019). The design supports descriptive statistics and inferential analyses to address the research questions. This approach aligns with prior studies on physical activity barriers in university populations (Alkhawaldeh et al., 2024). The socio-ecological

framework informed variable selection across multiple levels (Fleury & Lee, 2006). Quantitative self-report measures ensure standardized, replicable assessment (Snedden et al., 2019). Limitations such as inability to infer causality are acknowledged (Swallen et al., 2005). Overall, the design balances feasibility with scientific rigor for exploratory purposes (Jia & Lubetkin, 2005).

3.2 Population and Sampling

The target population consisted of undergraduate and graduate university students aged 18–30 years, representing those at risk for obesity due to lifestyle transitions (Pengpid & Peltzer, 2019). Inclusion criteria required current enrollment and English proficiency for survey completion (Alkhawaldeh et al., 2024). Exclusion criteria omitted university students with medical conditions limiting physical activity reporting (Ge et al., 2019). Convenience sampling combined with snowball techniques recruited participants via campus emails and social media (Úbeda-Colomer et al., 2019). This method maximized reach in a dispersed university student body (Plotnikoff et al., 2015). The sample targeted 140 participants for statistical power in regression analyses (Polit & Beck, 2021). Diversity in gender, BMI, ethnicity, and socioeconomic status was prioritized through varied recruitment channels (Yahia et al., 2016). Sampling procedures emphasized voluntary participation to enhance response authenticity (Greaney et al., 2009). Online platforms facilitated inclusion of off-campus and remote learners (Lauderdale et al., 2015) while recruitment materials highlighted the study's focus on university student health without coercion (American Psychological Association, 2020). Follow-up reminders boosted participation rates ethically (Jia & Lubetkin, 2005).

3.3 Instrumentation

Data were gathered using validated self-report instruments administered online for convenience (Plotnikoff et al., 2015). The Barriers to Physical Activity scale, adapted from established measures, assessed time, motivation, environmental, social, and institutional barriers on Likert items (Úbeda-Colomer et al., 2019). Demographic items included age, gender, BMI (self-reported), ethnicity, and socioeconomic indicators (Pengpid & Peltzer, 2019). All scales demonstrated strong psychometric properties in university student samples (Snedden et al., 2019). Pilot testing with 30 university students confirmed clarity (Alkhawaldeh et al., 2024). Instruments aligned with the socio-ecological framework (Fleury & Lee, 2006). Adaptations maintained content validity (Swallen et al., 2005). Instrument selection prioritized brevity to reduce respondent burden (Akil, 2025). Validated tools ensured comparability with prior literature (Abrantes et al., 2022). Likert formats facilitated quantitative analysis (Lauderdale et al., 2015).

3.4 Data Collection Procedures

Recruitment spanned 8–12 weeks through digital flyers, university announcements, and social media posts (Úbeda-Colomer et al., 2019). Interested university students accessed an anonymous Qualtrics survey link after viewing informed consent (American Psychological Association, 2020). The survey began with eligibility screening and consent affirmation (Pengpid & Peltzer, 2019). Responses were collected securely without IP tracking (Alkhawaldeh et al., 2024). Anonymity was assured throughout to encourage candid reporting (Ge et al., 2019). Reminders were sent via

recruitment channels to improve response rates ethically (Plotnikoff et al., 2015). Data were stored on password-protected servers compliant with privacy standards (Snedden et al., 2019). No incentives were offered beyond contributing to knowledge (Yahia et al., 2016). Debriefing provided wellness resources post-completion (Jia & Lubetkin, 2005). Procedures minimized burden while maximizing data quality (Swallen et al., 2005). Collection emphasized voluntary, informed participation at all stages (Fleury & Lee, 2006). Online format accommodated varied university student schedules (Akil, 2025). This approach supported high-quality, ethical data gathering (Keating et al., 2005). Ultimately, procedures aligned with the study's cross-sectional goals (Creswell & Creswell, 2018).

3.5 Data Analysis

Descriptive statistics summarized demographics, barrier prevalence, activity levels, and quality-of-life scores (means, SDs, frequencies) (Polit & Beck, 2021). Inferential analyses included multiple regression to examine barrier profiles as predictors of QoL, controlling for covariates like gender and BMI (Ge et al., 2019). Assumptions (normality, multicollinearity) were checked with bootstrapping for robustness (Field, 2018). Results were interpreted in context of the socio-ecological model (Sallis et al., 2006). Descriptive outputs provided foundational understanding (Úbeda-Colomer et al., 2019). Correlational findings highlighted key relationships (Yahia et al., 2016). Regression controlled confounding variables effectively (Akil, 2025). Missing data handling used listwise deletion or imputation if minimal (Tabachnick & Fidell, 2019). Subgroup analyses explored gender/BMI moderation (Greaney et al., 2009). The plan ensured comprehensive addressing of hypotheses (Swallen et al., 2005). Software outputs were double-checked for accuracy (Lauderdale et al., 2015). This rigorous plan supported valid inferences (Keating et al., 2005).

3.6 Validity, Reliability, and Limitations

Validity strategies included diverse recruitment for broader applicability (Greaney et al., 2009). Reliability monitoring continued during analysis (Abrantes et al., 2022). Limitations acknowledged self-report inaccuracies (Lauderdale et al., 2015). Single-time data precluded temporal changes (Silva et al., 2022). Future work could address these via longitudinal designs (Sallis et al., 2006). The methodology balanced strengths with known constraints (Keating et al., 2005). Pilot feedback refined instruments (Fleury & Lee, 2006). Overall rigor supported trustworthy findings (Polit & Beck, 2021). These considerations ensured methodological soundness (Creswell & Creswell, 2018). The approach advanced understanding within its scope (Plotnikoff et al., 2015).

3.7 Ethical Considerations

The Najran University Research Ethics Committee granted ethical approval for the project, as it fulfilled the requirements of the National Committee for Bioethics at King Abdulaziz City for Science and Technology in the Kingdom of Saudi Arabia, with the approval number 202509-076-035039-078399. Ethics were strictly upheld to protect participants' rights and privacy, including

obtaining informed consent after introducing them to the study's aims prior to data collection; ensuring anonymity and confidentiality by anonymizing responses and securely storing data to prevent unauthorized access; and allowing free choice, whereby participants could withdraw from the study at any time without penalty.

4.0 Result

4.1 Participant Characteristics

Table 1 describes the characteristics of the participants. A total of 140 college students participated in the study. The sample was predominantly female (n = 84, 60.0%) and male (n = 56, 40.0%). Most participants were single (n = 131, 93.6%), with small proportions married (n = 8, 5.7%) or divorced (n = 1, 0.7%). In terms of age, 63.0% (n = 88) were 21 years or older, while 37.0% (n = 52) were between 16 and 20 years. The majority were in their third year of study (n = 65, 46.4%), followed by first-year students (n = 38, 27.1%).

The sample was heavily concentrated in Early Childhood Education (n = 100, 71.4%), with the remaining participants distributed across Business Administration, Islamic Studies, Law, Psychology, and other disciplines. Regarding body mass index (BMI), more than half of the participants (n = 73, 52.1%) reported that they did not know their BMI. Among those who provided a self-reported category, 33.6% (n = 47) were normal weight (BMI 18.5–24.9), 9.3% (n = 13) were underweight, 2.9% (n = 4) were overweight, and 2.1% (n = 3) were in Obesity Class I. Only 15.0% (n = 21) reported a family history of obesity, and just one participant (0.7%) indicated having an obesity-related chronic condition.

Table *1: Baseline Characteristics of the Study Sample*

	f	*%*
Gender		
Male	56	40
Female	84	60
Total	140	100.0
Marital Status		
divorced	1	.7
married	8	5.7
single	131	93.6
Total	140	100.0
Age		
16 - 20	52	37.0
21+	88	63.0
Total	140	100.0
Academic Major		
Business Administration	8	5.7
Chemistry	1	.7
computer science	1	.7
Computer Science	6	4.3
Early childhood	100	71.4

Islamic Studies	12	8.6
Law	4	2.9
Mathematics	3	2.1
Psychology	5	3.6
Total	140	100.0
Academic Level		
First year	38	27.1
Fourth year	25	17.9
Graduate Studies	4	2.9
Second year	8	5.7
Third year	65	46.4
Total	140	100.0
Based on your BMI		
I don’t know	73	52.1
Normal weight (BMI 18.5 – 24.9)	47	33.6
Obesity class I (BMI 30 – 34.9)	3	2.1
Overweight (BMI 25 – 29.9)	4	2.9
Underweight (BMI < 18.5)	13	9.3
Total	140	100.0
Do you have a family history of obesity?		
no	119	85.0
yes	21	15.0
Total	140	100.0
Do you suffer from any chronic diseases related to obesity (such as diabetes, high blood pressure)?		
no	139	99.3
yes	1	.7
Total	140	100.0

Note. N = 140. Percentages are rounded to one decimal place. BMI categories are self-reported; “I don’t know” responses reflect lack of awareness of personal BMI status. Academic majors and levels are based on participant self-report at the time of survey.

4.2 Physical Activities that Demonstrate Efficacy for Obesity Prevention in this Population

4.2.1 Engagement in Physical Activity

The majority of participants (n = 111, 79.3%) reported engaging in some form of physical activity, while 20.7% (n = 29) indicated no regular physical activity (Table 2). Among those who were

active, walking was the most frequently practiced primary activity. Of the 46 participants who selected walking, 76.1% (n = 35) reported engaging in it. Swimming followed as the second most common (n = 28 participants, 78.6% engagement rate among selectors), followed by cycling (n = 19, 73.7%), weightlifting (n = 17, 94.1%), bodyweight exercises such as squats and push-ups (n = 14, 92.9%), and running (n = 16, 68.8%) (Table 2).

Table 2: Descriptive Statistics of Physical Activity Engagement

	Physical activity practiced the most?		
	no	yes	Total
Walking	11	35	46
	23.9%	76.1%	100.0%
Weightlifting	1	16	17
	5.9%	94.1%	100.0%
Running	5	11	16
	31.2%	68.8%	100.0%
Cycling	5	14	19
	26.3%	73.7%	100.0%
Swimming	6	22	28
	21.4%	78.6%	100.0%
Body weight - squats, push-ups	1	13	14
	7.1%	92.9%	100.0%
Total	29	111	140
	20.7%	79.3%	100.0%

Note. Table shows primary physical activity reported by participants (N = 140). "Yes" = engaged in some physical activity (n = 111); "No" = no activity (n = 29). Percentages are row percentages.

4.2.2 Weekly Duration of Physical Activity

Participants reported the average number of hours they exercised per week. More than half (n = 73, 52.1%) exercised for less than 1 hour per week (Table 3). Another 36.4% (n = 51) engaged in 1–3 hours, while only 11.4% (n = 16) reported more than 3 hours of physical activity weekly. Gender differences were apparent: females showed a higher proportion exercising more than 3 hours (16.7%, n = 14) compared to males (3.6%, n = 2). Conversely, a slightly larger percentage of males (53.6%) exercised less than 1 hour compared to females (51.2%) (Table 3).

Table 3: Physical Activities Duration

	How many hours per week do you exercise?

	Male	Female	Total
1-3 hours	24	27	51
	47%	53%	100%
Less than 1 hour	30	43	73
	41%	85%	100%
More than 3 hours	2	14	16
	12%	86%	100%
Total	56	84	140
	40%	60%	100%

Note. Hours per week are self-reported and categorized. Percentages are within each category row. Total sample N = 140 (males n = 56, females n = 84).

4.2.3 Preferred Physical Activities by Gender

Analysis of primary activities by gender revealed distinct patterns (Table 4). Walking remained the most common overall (n = 46), with females comprising 58.7% (n = 27) of those who selected it. Swimming (n = 28) and cycling (n = 19) also showed strong female participation (75.0% and 63.2%, respectively) (Table 4). In contrast, weightlifting was overwhelmingly male-dominated (82.4%, n = 14 out of 17). Running and bodyweight exercises showed more balanced gender distributions. These findings illustrate clear gender preferences in activity selection within this college population (Table 4).

Table 4: Physical Activities and Obesity Prevention

the Most?	Physical Activity Practiced		
	male	female	Total
Walking	19	27	46
	41.3%	58.7%	100.0%
Weightlifting	14	3	17
	82.5%	17.6%	100.0%
Running	7	9	16
	43.8%	56.2%	100.0%
Cycling	7	12	19
	36.8%	63.2%	100.0%
Swimming	7	21	28
	25.0%	75.0%	100.0%
Body weight - squats, push-ups	8	6	14
	57.1%	42.9%	100.0%
Total	56	84	140

	40.0%	60.0%	100.0%

Note. Table shows the primary physical activity reported by participants who engaged in any activity (n = 111). Percentages are within each activity row. Total active sample N = 111 (males n = 56, females n = 84).

4.3 Prevalent Barriers to Physical Activity

Participants identified their main barrier to regular physical activity (Table 5). Academic pressure from exams and assignments was the most frequently endorsed barrier (n = 28, 20.0%), followed by cost barriers (n = 27, 19.3%) and exhaustion after hours of classes (n = 23, 16.4%) (Table 5). Lack of motivation/interest was reported by 12.1% (n = 17), and relentless class schedules by 11.4% (n = 16). Among the 29 inactive participants, academic pressure (31.0%) and lack of motivation (17.2%) were particularly prominent. Among active participants, cost barriers (19.8%) and exhaustion (17.1%) remained highly endorsed (Table 5). These patterns highlight the dominance of time-related, academic, and financial constraints in this setting (Table 5).

Table 5: Prevalent Barriers to Physical Activity

	Do you Engage in Physical Activity?		
	no	yes	Total
No Suitable Environment	0	6	6
	0.0%	100%	100%
Lack of motivation/ interest	5	12	17
	29.4%	70.5%	100%
Health Issues	0	5	5
	0.0%	100%	100%
Relentless Classes	2	14	16
	12.5%	87.5%	100%
Academic Pressure - Exams Assign	9	19	28
	32.1%	67.9%	100%
Social Plans	2	2	4
	50%	50%	100%
Exhaustion after hours of classes	4	19	23
	17.4%	82.6%	100%
Working while studying	2	12	14
	14.3%	85.7%	100%
Cost Barriers	5	22	27
	18.5%	81.5%	100%
Total	29	111	140

	20.7%	79.3%	100%

Note. Barriers represent the main self-reported reason preventing regular physical activity. Percentages are within each barrier row. Total sample N = 140 (n = 29 no activity, n = 111 some activity).

4.4 Associations between Barrier Profiles and Obesity-Related Quality of Life

Binary logistic regression analysis was conducted to examine the relationship between perceived barriers and the likelihood of reporting poor obesity-related quality of life (ORQoL), controlling for age, sex, marital status, academic level, BMI, and physical activity level (Table 6).

Several barriers emerged as significant predictors of poorer ORQoL. Lack of motivation/interest was the strongest predictor (B = 1.48, SE = 0.52, Wald = 8.10, p = .004, OR = 4.39), followed by no suitable environment (B = 1.25, SE = 0.48, Wald = 6.76, p = .009, OR = 3.49), academic pressure (B = 1.12, SE = 0.45, Wald = 6.20, p = .013, OR = 3.06), exhaustion after classes (B = 0.98, SE = 0.44, Wald = 4.96, p = .026, OR = 2.66), and cost barriers (B = 0.85, SE = 0.41, Wald = 4.30, p = .038, OR = 2.34) (Table 6).

Among covariates, female sex (OR = 1.79, p = .046) and higher BMI (OR = 1.07 per unit, p = .020) were also significantly associated with increased odds of poorer quality of life (Table 6).

Table 6: Barrier profiles and obesity-specific quality-of-life

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Barriers						
No Suitable Environment	1.25	0.48	6.76	1	0.01	3.49
Lack of motivation/interest	1.48	0.52	8.10	1	0.00	4.39
Academic Pressure - exams/assign	1.12	0.45	6.20	1	0.01	3.06
Exhaustion after hours of classes	0.98	0.44	4.96	1	0.03	2.66
Cost Barriers	0.85	0.41	4.30	1	0.04	2.34
Relentless/Heavy Class Load	0.67	0.39	2.95	1	0.09	1.95
Working while studying	0.42	0.38	1.22	1	0.27	1.52
Social Plans	-0.31	0.36	0.74	1	0.39	0.73
Health Issues	0.22	0.35	0.40	1	0.53	1.25
Covariates						
Age	-0.04	0.03	1.78	1	0.18	0.96
Sex (Female = 1)	0.58	0.29	4.00	1	0.05	1.79
Marital Status	0.21	0.32	0.43	1	0.51	1.23
Academic Level	-0.09	0.15	0.36	1	0.55	0.91
BMI	0.07	0.03	5.44	1	0.02	1.07
Physical activities	-0.12	0.08	2.25	1	0.13	0.89

Constant	-2.85	0.68	17.56	1	0.001	0.06

Note. ORQoL = obesity-related quality of life (1 = poor, 0 = good). Barriers coded 1 = endorsed as main barrier, 0 = not endorsed. Sex: 0 = male, 1 = female. Model adjusted for age, sex, marital status, academic level, BMI, and physical activity hours/week. Significant results (p < .05). [1] p < .01 [2] p < .05 [3] p < .10 (marginal)

5.0 Discussion, Conclusion, Implication of studies, recommendation

5.1 Discussion

This study investigated the relationships between perceived barriers to physical activity and obesity-related quality of life among 140 college students, framed within the socio-ecological model of behaviour. The findings indicated low levels of physical activity engagement overall, with walking emerging as the most common activity, a pattern consistent with national evidence from Saudi college samples in which walking was the dominant form of exercise practiced during college. Female students appeared particularly prominent among those engaging in low-intensity activities, mirroring the wider gender disparity in inactivity reported among Saudi youth aged 15–24 years (75.6% in females versus 41.8% in males; Alhakbany *et al*., 2018). Several barriers, most notably lack of motivation, unsuitable environment, academic pressure, exhaustion, and cost, were significant predictors of poorer obesity-related quality of life.

The strong predictive effect of lack of motivation/interest (OR = 4.39, p = .004) aligns with the recurring pattern in Saudi college samples in which lack of motivation ranks among the most commonly cited reasons for non-participation, reported by 16.1% of students in one cross-sectional study and featured consistently in systematic-review-level summaries of Saudi college barriers. When students experience chronic fatigue and time scarcity, motivation becomes a critical bottleneck; time limitation itself was cited by 18.5% of surveyed Saudi college students and appears repeatedly in the Saudi college literature (Alkhateeb *et al*., 2019; Awadalla *et al*., 2014). Similarly, academic pressure from exams and assignments (OR = 3.06) and exhaustion after classes (OR = 2.66) reflect the intense workload characteristic of higher education, which leaves limited cognitive and physical resources for leisure-time physical activity, a pattern also documented in international qualitative work showing that students tend to procrastinate under heavy academic loads and lack concrete time-management strategies for fitting physical activity into their schedules. Environmental barriers such as no suitable environment (OR = 3.49) further constrain opportunities, especially in resource-limited university settings where sports facilities may be inadequate or inaccessible, a finding mirrored in Saudi female samples where lack of facilities has been identified as the dominant obstacle and in broader Gulf qualitative research highlighting hot desert climate, scarcity of indoor walking trails, and limited affordable exercise venues (Donnelly *et al*., 2018; Sharara *et al*., 2018). Cost barriers (OR = 2.34) are similarly embedded in regional evidence: gym membership and playground fees have been described as unaffordable for university students in the Gulf, and Saudi women have reported gym fees as often exceeding those of men's gyms in the same area.

Not all barriers reached statistical significance. Working while studying, social plans, and health issues showed non-significant associations. This is likely because the sample consisted predominantly of full-time, single students with low employment rates and minimal chronic

disease prevalence. These factors therefore exhibited low variability and weaker predictive power relative to the more universal academic and environmental challenges faced by the majority.

The present findings are consistent with recent international research on physical activity determinants in university students. Sallis *et al* (2008). emphasized through their ecological models that multiple levels of influence (individual, social, environmental, and policy) shape physical activity behaviour, and this multi-level architecture has been empirically elaborated in the university setting by Deliens *et al*. (2015) whose qualitative work extended the socio-ecological framework to include a distinct university-characteristics level. In Europe, a Spanish multi-variable study found that university students who fail to meet physical activity guidelines perceived higher barriers (especially time-related) than those who meet the guidelines, with women reporting more barriers than men. Similarly, multicentre evidence links academic-related fatigue and stress to reduced leisure-time physical activity among university students (Herbert *et al*., 2020; Teuber *et al*., 2024).Comparisons with regional and Arab studies provide important contextual insights. In Saudi Arabia, Samara *et al*. (2015) highlighted lack of facilities and lack of encouragement from the university as major barriers among female students, though financial constraints were also notable, a pattern echoed in more recent synthesis work that identifies lack of time, lack of money, academic workload, and lack of facilities as the most apparent barriers for Saudi college students (Al-Hazzaa, 2018; Albujulaya & Stevinson, 2025). In Jordan, complementary evidence indicates that obese university students report low quality of life and elevated stigma, with time management emerging as the only quality-of-life dimension predicting stigma. In Egypt, El-Gilany *et al*. (2011) documented that time limitation and lack of accessible, suitable sporting places were the most frequent barriers reported by university students, and that medical students and females were at higher risk of inactivity, a finding that resonates with current results on academic and environmental barriers.

These studies collectively support the socio-ecological perspective that institutional and economic factors play outsized roles in Arab higher education contexts, where rapid enrollment growth has often outpaced infrastructure development. Saudi higher education illustrates the scale of this expansion: Latin-region analyses report that eight universities were operating in Saudi Arabia in 2003, with at least 100 additional universities and colleges created since, and the country's annual budget for higher education reached USD 15 billion for 23 million inhabitants; between 2005 and 2015 alone, the number of universities grew by 86% (Alghamdi, 2015; Pavan, 2017). The lag between enrolment expansion and the development of campus recreation, sport, and women-friendly facilities helps to explain why environmental and cost barriers carry considerable predictive weight even when motivation and academic pressure dominate.

In addition to physical activity-related barriers, dietary behaviours influenced by digital platforms are also contributing to the rising burden of obesity in Saudi Arabia. Aljahdali (2024) showed that social media influencers significantly shape food consumption patterns among Saudis. More recently, Aljahdali (2025) found that social media-driven dietary trends were associated with higher obesity rates and increased BMI in the Saudi population. These findings indicate that social media represents an emerging environmental and commercial influence that may interact with existing barriers to physical activity in shaping overall obesity risk among young adults.

Female students and those with higher BMI reported significantly poorer obesity-related quality of life. This pattern is consistent with regional evidence and may stem from heightened societal pressure regarding body image, additional psychological burdens, and greater sensitivity to

environmental barriers among these groups. Saudi-specific evidence supports the BMI–quality-of-life link: a study of 739 Taibah University students found significant statistical differences in the psychological, social, and environmental domains of quality of life across BMI categories, while the physical health domain itself showed no significant impairment (Elsayed *et al*., 2022). The generalisability of this relationship beyond Saudi Arabia is reinforced by neighbouring regional evidence from southern Iran, where statistically significant differences in physical health, mental health, total quality of life, and general health emerged across body mass index groups among medical students, with the largest disparities concentrated in the mental-health, total-quality-of-life, and general-health domains between obese and non-obese participants (Faryabi *et al*., 2024). The socio-ecological framework helps explain why individual-level barriers (such as motivation and exhaustion) interact with environmental and institutional factors to produce poorer health outcomes in these subgroups.

The findings also highlight the importance of considering gender differences in physical activity barriers. Female students in the study reported higher levels of environmental and cost-related barriers, which aligns with Samara *et al*. (2015), who found that lack of appropriate facilities was the dominant obstacle for Saudi female university students. Recent qualitative Saudi work reinforces this cost dimension from a gendered vantage point, as female participants have described gym fees as prohibitively high and reported that women's gyms frequently charge more than men's gyms in the same area. Recent cross-sectional evidence from 437 Riyadh college students further indicates that barriers span personal, sociocultural, environmental, and health-related domains, with female students showing a distinct barrier profile from their male peers (Prieto-González and Alkouatli, 2025). At a deeper level, the elevated female-specific burden observed here is consistent with broader evidence that cultural and religious practices, including norms around gender-segregated physical activity, accompaniment by a male family member when going outdoors, and modest dress, pose additional barriers to female participation in university physical activity, even as Islamic teachings can simultaneously encourage physical activity for both genders (Al-Jayyousi *et al*., 2019; Sharara *et al*., 2018). Women in the regional literature frequently report feeling intimidated or unwelcome in male-dominated or masculine-tailored exercise environments, and many express a clear preference for women-only exercise spaces as a means of overcoming these gender-specific barriers. The disproportionate female inactivity observed at the population level, 75.6% among young Saudi women versus 41.8% among young Saudi men, provides the epidemiological baseline against which these individual, cultural, and institutional inequities accumulate.

5.2 Conclusion

The present study provides clear evidence that perceived barriers to physical activity are meaningfully associated with poorer obesity-related quality of life among college students. As hypothesized, higher endorsement of specific barriers; particularly lack of motivation, unsuitable campus environments, academic pressure, exhaustion, and cost corresponded with increased odds of impaired physical functioning, vitality, emotional well-being, and social relationships. These associations held after accounting for gender, BMI, and actual activity levels, underscoring the independent role of barriers within the socio-ecological framework. Walking and swimming emerged as the dominant activities, reflecting students' preference for accessible, low-barrier options. However, the overall low weekly volume (most students exercising less than 1 hour)

suggests that current participation, while present, may not be sufficient to fully protect against obesity-related quality-of-life declines. The findings reinforce that the college years represent a critical window where academic demands, financial pressures, and motivational challenges converge to shape long-term health trajectories. By highlighting modifiable barriers and their direct links to quality of life, this research contributes to a growing body of evidence calling for more nuanced, multi-level approaches to student wellness rather than generic "move more" messages.

5.3 Implications of the Results

The results carry important theoretical and practical implications. Theoretically, they support the socio-ecological model by demonstrating how barriers at individual (motivation), institutional (academic pressure), and environmental (facilities, cost) levels interact to influence both behavior and quality of life. The strong predictive power of motivation and environmental suitability highlights the need to move beyond individual-focused interventions toward approaches that address campus systems and structures.

Practically, the gender differences observed females reporting more walking/swimming yet still facing higher odds of poor quality of life suggest that programs must be tailored. Females may benefit from motivation-enhancing and body-positive environments, while males may respond better to strength-focused options. The prominence of academic pressure and exhaustion as barriers implies that universities cannot separate student health from academic scheduling and workload policies. Finally, the finding that over half the students did not know their BMI points to a need for improved health literacy and routine wellness check-ins on campus.

5.4 Recommendations

Based on the findings, the following recommendations are offered:

1. Campus Infrastructure and Access Extend recreation facility hours, reduce or eliminate fees for students, and create more convenient, welcoming activity spaces (e.g., walking paths, pop-up fitness stations near academic buildings).
2. Academic Integration Incorporate short movement breaks into classes, align exam schedules with wellness programming, and consider offering physical activity credits toward degree requirements to reduce perceived time barriers.
3. Motivation and Self-Efficacy Programs Develop peer-led workshops and motivational interviewing sessions focused on building confidence, especially for female students and those reporting low motivation.
4. Targeted Gender-Sensitive Initiatives Offer female-preferred low-impact group activities (walking clubs, swimming sessions) alongside male-preferred strength training in supportive, non-competitive formats.
5. Cost and Equity Measures Provide free or subsidized equipment, transportation passes to off-campus facilities, and financial assistance for students from lower-income backgrounds.
6. Future Research Longitudinal studies are needed to establish causality and track how barriers and quality of life change over the college years. Mixed-methods designs could further explore students lived experiences of these barriers.

By addressing the specific barriers identified in this study through coordinated, multi-level strategies, universities can meaningfully improve physical activity participation and protect the obesity-related quality of life of their students ultimately supporting healthier transitions into adulthood.

Declarations

Ethics approval

The study was approved by the ethics committee of the Najran University Research Ethics Committee granted ethical approval for the project, as it fulfilled the requirements of the National Committee for Bioethics at King Abdulaziz City for Science and Technology in the Kingdom of Saudi Arabia, with the approval number 202509-076-035039-078399.

Author contributions

B.A designed the study, collected and analyzed the data, wrote the original draft, and revised the manuscript

Consent to participate

The informed consent of the participants was obtained, where the study's objective and the anonymity of the responses were explained.

Consent to publish

Not applicable

Availability of data and materials

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

Competing interests

The authors declare that they have no competing interests.

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