

Knowledge, Attitudes, and Practices towards Junk Food Consumption among Health Science Undergraduates with Different BMI Classifications

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Abstract: Junk food consumption is notably higher among younger populations, particularly university students in developing countries, where it increasingly constitutes a significant part of their diet. The demanding nature of university life often limits time for meal preparation, leading students to opt for the convenience of readily available junk food. These foods, typically high in fat, sugar, salt, calories, and artificial additives but low in nutritional value, pose considerable health risks. This study aimed to assess the knowledge, attitudes, and practices (KAP) related to junk food consumption among health science students with normal and overweight/obese body mass index (BMI) classifications. Additionally, the study examined the association between KAP scores and sociodemographic characteristics. A cross-sectional design was employed, involving 107 health science undergraduates. Participants' anthropometric measurements were recorded, followed by the completion of a structured online questionnaire accessed via QR code. Findings revealed that 50.5% of respondents had a normal BMI, while 49.5% were classified as overweight or obese. Overall, participants demonstrated high knowledge regarding the health risks of junk food and negative attitudes towards its consumption; however, actual consumption practices remained high. Comparative analysis showed no significant differences in knowledge and attitude scores between normal and overweight/obese students. Nonetheless, a significant difference was observed in practice scores, with normal BMI students exhibiting healthier dietary behaviors compared to their overweight/obese counterparts. Furthermore, no significant correlations were found between knowledge, attitude, and practice scores in either group. The findings suggest that while health science students possess adequate knowledge of the adverse health effects of junk food, this knowledge does not necessarily translate into healthier eating behaviors, particularly among overweight or obese individuals. Targeted interventions should therefore focus not only on enhancing knowledge but also on addressing attitudes and behavioral change to effectively reduce junk food consumption and promote healthier dietary practices among university students.

Introduction:

Optimal nutrition involves the precise utilisation of energy and nutrients essential for human growth, development, and the maintenance of physiological functions, while preserving their nutritional integrity (Onurlubaş & Yilmaz, 2013). Food serves as a fundamental medium for delivering these nutrients, providing energy for metabolic processes, contributing to structural components, and supporting overall health and well-being (Rojekar et al., 2019).

The relationship between diet and health has long been recognized, epitomized by Ludwig Feuerbach's assertion in 1848, "*You are what you eat.*" Since the 1970s, global dietary patterns have shifted significantly, with a marked transition from traditional home-cooked meals to the widespread consumption of fast food and ultra-processed products. This shift has coincided with increased use of refined edible oils and sugar-sweetened beverages, particularly within the modern Western dietary pattern (Popkin, Adair, & Ng, 2012; Singhal, 2017). These changes, coupled with declining physical activity levels and more sedentary lifestyles, have contributed to a positive energy balance, fostering weight gain, overweight (Body Mass Index [BMI] > 25), and obesity (BMI > 30) (Bodden, Hannan, & Reichelt, 2021).

The global obesity rate has tripled since 1975, evolving into a major public health concern. The health implications of this epidemic became more apparent as obesity, diabetes, metabolic syndrome, and cardiovascular diseases emerged as leading causes of morbidity and mortality worldwide (Bodden, Hannan, & Reichelt, 2021). The modern Western diet, characterized by excessive intake of saturated fats, refined carbohydrates, and sugars such as sucrose and fructose, is now recognized as a critical contributor to this global health crisis (Bodden, Hannan, & Reichelt, 2021). The World Health Organization (WHO) has consistently highlighted the risks associated with unhealthy dietary patterns, identifying them as key contributors to non-communicable diseases (NCDs). Frequent consumption of junk food, sugar-sweetened beverages, and alcohol is strongly linked to the development of metabolic syndrome, with long-term consequences including chronic illness and premature mortality (Singh et al., 2021).

Junk food, defined as energy-dense food items with minimal nutritional value, is typically high in fat, sugar, salt, and calories. Regular consumption of such foods adversely affects physical and mental well-being, leading to reduced intake of essential nutrients from sources like milk, fruits, and vegetables (Liu et al., 2021). Common examples include processed snacks, candies, and sweet desserts, which are palatable but nutritionally inadequate (Rojekar et al., 2019).

Several factors contribute to the rising consumption of junk food, including rapid urbanization, higher disposable incomes, aggressive marketing strategies, and the proliferation of food delivery services (Subedi et al., 2020). Socioeconomic, cultural,

environmental, and psychological factors also shape food choices and dietary habits. Personal lifestyle preferences, particularly decisions concerning time, energy, and financial resources, significantly influence individual consumption behavior (Onurlubaş & Yilmaz, 2013).

A growing trend is the consumption of snack or meal replacement bars, such as cereal and nutrition bars. Despite their classification as processed or junk food, these products are often perceived as healthy due to strategic marketing, particularly when labeled with health-related terms such as "protein" (Jensen & Schwartz, 2021). Such misleading promotion highlights the tactics used by manufacturers to create a "health halo" effect around nutritionally poor products.

Given these challenges, there is a growing need for effective educational interventions targeting young adults, particularly university students, to enhance their awareness and understanding of healthy dietary practices. Strengthening nutritional literacy in this population is crucial to mitigating the adverse health outcomes associated with excessive junk food consumption (Singh et al., 2020).

This study aimed to assess students' knowledge, attitudes, and practices (KAP) regarding junk food consumption and highlight its potential health implications, particularly in relation to overweight and obesity. The findings are intended to inform public health strategies to reduce junk food intake among university students and promote healthier campus environments. By comparing KAP between normal-weight and overweight/obese students, this study provides insights into behavioral patterns that may contribute to weight-related issues, offering valuable evidence to guide future interventions and educational programs promoting healthier dietary habits.

Method:

Study Design

A cross-sectional study was conducted using a self-administered online questionnaire distributed via Google Forms. The questionnaire, adapted from validated previous studies (Azman et al., 2020; Subedi et al., 2020), assessed knowledge, attitudes, and practices (KAP) related to junk food consumption among undergraduate health science students. Cross-sectional designs are frequently employed to evaluate health-related outcomes, determinants, and demographic characteristics at a single point in time (Kesmodel, 2018). Participants were selected based on specific inclusion and exclusion criteria. All study procedures adhered to ethical standards.

Study Setting

The study was carried out in East Coast, Malaysia, targeting undergraduate students from health science field. Anthropometric measurements, including weight and height,

were conducted at the students' hostel on the campus. The area offers numerous fast-food outlets and eateries, making it a strategic location to study junk food consumption patterns influenced by environmental factors such as food availability and affordability.

Study Population

The study population comprised health science undergraduates from various programs, including Dietetics, Nutrition, Forensic Science, Exercise and Sport Science, Biomedicine, Medical Radiation, Audiology, Nursing, and Speech Pathology, from Year 1 to Year 4.

Inclusion Criteria

Undergraduate students aged 18 years and above
Enrolled in the Health Campus
BMI classified as normal or overweight/obese

Exclusion Criteria

Underweight individuals (BMI <18.5 kg/m²)
Students with known chronic conditions (diabetes, hypertension, hyperlipidemia)

Sample Size Estimation

The sample size was calculated using the Raosoft calculator based on a population of 1,165 students. With a 95% confidence interval and 10% margin of error, the minimum required sample was 89 participants. Accounting for a 20% dropout rate, the final sample size was set at 107.

Sampling Method and Recruitment

Convenience sampling was employed. Eligible students were invited through batch representatives, WhatsApp groups, and posters. Interested participants attended physical measurement sessions where their weight and height were recorded. Subsequently, they completed the online consent form and questionnaire. Recruitment continued until 107 valid responses were obtained.

Research Instrument

The structured questionnaire consisted of five sections:

Section A: Demographic information (gender, age, race, financial aid)

Section B: BMI calculation based on physical measurements

Section C: Knowledge (8 items) regarding junk food and health risks

Section D: Attitudes (6 items) towards junk food consumption

Section E: Practices (7 items) related to junk food intake

Scoring systems were adapted from previous studies. Knowledge and practice scores were categorized as 'high' or 'low', while attitude was classified as 'positive' or 'negative'.

Pilot Testing

A pilot test was conducted with 30 health science students to evaluate reliability and internal consistency. The Cronbach's Alpha coefficient was 0.723, indicating acceptable reliability.

Data Collection Procedure

Ethical approval was obtained from the USM Human Research Ethics Committee (HREC). Data collection occurred over three months. Physical measurements were conducted using a TANITA body composition analyzer and stadiometer. BMI was calculated accordingly. Participants then completed the online questionnaire. Sampling was monitored to balance the BMI groups. Recruitment for each group ceased once the target sample was reached. Participation was incentivized by providing body composition results.

Data Analysis

Data were exported to Microsoft Excel and analyzed using SPSS version 27.0. Descriptive statistics summarized socio-demographic variables and KAP scores. The Mann-Whitney U test compared KAP scores between normal and overweight/obese groups. Spearman's rho correlation assessed relationships between knowledge, attitudes, and practices. A significance level of $p < 0.05$ was set for all analyses.

Results:

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 27. Descriptive statistics, including frequencies and percentages, were used to summarize socio-demographic characteristics. As the data were not normally distributed, non-parametric tests were applied. The Mann-Whitney U test was used to compare differences in knowledge, attitudes, and practices (KAP) of junk food consumption between normal BMI and overweight/obese students. Additionally, Spearman's rank correlation was conducted to examine the relationships between knowledge and attitude, as well as knowledge and practice.

Socio-Demographic Characteristics

Table 1 summarizes the demographic profile of respondents, aged between 20 and 27 years. The majority were 22 years old (39.3%). Female students comprised 77.6% of the sample, while males accounted for 22.2%. Ethnic distribution showed most respondents were Malay (68.2%), followed by Chinese (21.5%), Indian (6.5%), and other ethnicities (3.7%). In terms of academic level, 43.9% were third-year students, while the smallest proportion (3.7%) were in their fourth year. Regarding financial aid, 39.3% received study loans and 38.3% were supported by scholarships. This reflects the common reliance of Malaysian students on financial assistance, particularly loans, during their studies, as reported by Alhazmi and Aziz (2020). BMI classification revealed that 50.5%

of participants had a normal BMI, whereas 49.5% were categorized as overweight/obese.

Table 1: Distribution of demographic characteristics of the respondents (N=107)

Demographic		Total, N (%)
Gender	Male	24 (22.4%)
	Female	83 (77.6%)
Age	20	12 (11.2%)
	21	23 (21.5%)
	22	42 (39.3)
	23	20 (18.7%)
	24	7 (6.5%)
	25	0 (0.0%)
	26	2 (1.9%)
	27	1 (0.9%)
Race	Malay	73 (68.2)
	Chinese	23 (21.5%)
	Indian	7 (6.5%)
	Other	4 (3.7%)
Year	Year 1	20 (18.7%)
	Year 2	36 (33.6%)
	Year 3	47 (43.9%)
	Year 4	4 (3.7%)
Financial Aid	Parents	24 (22.4%)
	Scholarship	41 (38.3%)
	Loan	42 (39.3%)
BMI	Normal	54 (50.5%)
	Overweight/Obese	53 (49.5%)

Knowledge of Junk Food Consumption

Table 2 summarizes the participants' knowledge regarding junk food consumption. The majority of respondents (95.3%) acknowledged that junk food consumption contributes to obesity, while 4.7% remained neutral and none disagreed. Additionally, 85% of participants recognized the potential of junk food to cause heart attacks, with 13.1% reporting a neutral response and only 1.9% disagreeing. More than half of the respondents (66.4%) believed that consuming junk food could help relieve stress, whereas 19.6% were neutral and 14% disagreed. In contrast, 72.9% disagreed with the statement that junk food has no adverse health effects, indicating strong awareness of its negative health implications; 14% agreed with the statement, while 13.1% were neutral. A significant majority (91.6%) correctly identified junk food as high in calories

and salt but low in nutritional value, with 7.5% neutral and only 0.9% disagreeing. Furthermore, 93.5% of participants demonstrated overall awareness of the harmful health effects associated with junk food consumption, with 6.5% remaining neutral and no participants disagreeing.

Table 2: Knowledge Level About Junk Food

Topic	Agree N(%)	Disagree N(%)	Neutral N(%)
1. Junk food consumption results in obesity (gaining weight).	102(95.3)	0(0.0)	5(4.7)
2. Consumption of junk food cause heart attack.	91(85)	2(1.9)	14(13.1)
3. Consumption of junk food relieves stress.	71(66.4)	15(14)	21(19.6)
4. Junk food is not necessarily unhealthy.	48(44.9)	38(35.5)	21(19.6)
5. Junk food has no adverse effects on the overall health of an individual.	15(14)	78(72.9)	14(13.1)
6. Junk food is high in calories, salt & low in nutritive value.	98(91.6)	1(0.9)	8(7.5)
7. You know the harmful effects of junk food.	100(93.5)	0(0.0)	7(6.5)
8. Having junk food on a daily basis makes you eat more?	59(55.1)	19(17.8)	29(27.1)

Tables 2.1: Summary of Knowledge Score

Items	Median(IQR)	N(%)	
		High (≥50%)	Low (<50%)
Knowledge score	75 (12.50)	95(88.8)	12(11.2)

Attitudes towards Junk Food Consumption

Table 3 presents the attitudes of participants toward junk food consumption. The majority of respondents reported consuming junk food primarily due to its palatability, with 43.9% strongly agreeing and 40.2% agreeing that they eat junk food because they enjoy the taste. Convenience was also a significant factor, as 42.1% strongly agreed and 30.8% agreed that the ease of access and preparation influenced their consumption. Regarding eating habits when experiencing hunger, 18.7% of respondents strongly agreed and 31.8% agreed that they consume junk food to satisfy hunger. Boredom emerged as another contributing factor, with 37.4% strongly agreeing and 40.2% agreeing that they eat junk food when bored. Similarly, 33.6% strongly agreed and 28% agreed that they consume junk food while completing assignments. A busy lifestyle also appeared to promote junk food consumption, as 24.3% strongly agreed and 20.6% agreed that their demanding schedules contributed to their eating behaviors. Additionally, 32.7% strongly agreed and another 32.7% agreed that they preferred consuming junk food either at home or at a friend's residence.

When asked about the primary reason for continuing junk food consumption, 58.9% of participants cited their strong liking for it, while 21.5% attributed it to their busy schedules, emphasizing the role of convenience. Furthermore, 16.8% acknowledged addictive tendencies as a factor influencing their consumption patterns. Regarding intentions to reduce junk food intake, 56.1% of respondents reported uncertainty (maybe) about stopping consumption despite being aware of the health risks. Meanwhile, 36.4% expressed willingness to stop, and 7.5% indicated they would not stop. Among those willing to reduce consumption, health concerns were the most cited reason (61.5%). Similarly, among respondents uncertain about quitting, 53.3% identified health concerns as their primary consideration, while 16.7% mentioned convenience and 10% noted portion control as influencing factors in their indecision.

Table 3: Attitudes Toward Junk Food Consumption (N=107)

Topics	Strongly agree N(%)	Agree N(%)	Undecided N(%)	Disagree N(%)	Strongly disagree N(%)
1. Why do you eat junk food?					
I like the taste	47(43.9)	43(40.2)	14(13.1)	2(1.9)	1(0.9)
Because of varieties	33(30.8)	32(29.9)	29(27.1)	7(6.5)	6(5.6)
I am too busy to cook	22(20.6)	24(22.4)	35(32.7)	19(17.8)	7(6.5)
It is convenient	45(42.1)	33(30.8)	23(21.5)	3(2.8)	3(2.8)
To be socialize with friends	21(19.6)	24(22.4)	29(27.1)	20(18.7)	13(12.1)

2. When do you prefer to take junk food ?						
When I am hungry	20(18.7)	34(31.8)	29(27.1)	18(16.8)	6(5.6)	
When I am bored	40(37.4)	43(40.2)	13(12.1)	4(3.7)	7(6.5)	
When I'm working with assignments	36(33.6)	30(28)	21(19.6)	14(13.1)	6(5.6)	
When I am busy	26(24.3)	22(20.6)	25(23.4)	18(16.8)	16(15)	
3. Which place do you prefer for consuming junk food?						
At home/Friend's house	35(32.7)	35(32.7)	18(16.8)	12(11.2)	7(6.5)	
Café/Restaurant	9(8.4)	30(28)	32(29.9)	21(19.6)	15(14)	
University/College	40(37.4)	42(39.3)	20(18.7)	3(2.8)	2(1.9)	
Work Place	14(13.1)	23(21.5)	28(26.2)	26(24.3)	16(15)	
Public place	14(13.1)	20(18.7)	37(34.6)	18(16.8)	18(16.8)	
4. What makes you to consume junk food even if you are aware of the health risks of junk food?						
I like it a lot	63(58.9)					
I am addicted	18(16.8)					
I think there are more benefits compare to the risks	3(2.8)					
I am immunable to stop because of busy schedule	23(21.5)					
5. Will you stop consuming junk food, once you know the health risks associated with junk food?						
Yes	39(36.4)					
No	8(7.5)					
Maybe	60(56.1)					
6. Reason for your answer for question (5) :						
	Yes	No	Maybe			
	N(%)	N(%)	N(%)			
	(n=39)	(n=20)	(n=60)			
Health reason	24(61.5)	4(20.0)	32(53.3)			
Take ocasionaly	0(0)	8(40.0)	6(10)			
Emotional eating	0(0)	2(10.0)	3(5)			
Convenient	0(0)	1(5.0)	10(16.7)			

Preferences	0(0)	5(25)	5(8.3)
Not Sure	3(7.7)	0(0.0)	4(6.7)

Table 3.1 Summary of Attitude Score

Items	Median(IQR)	N(%)	
		Positive (≥50%)	Negative (<50%)
Attitude score	42.9 (35.7)	46(43)	61(57)

Table 4 presents the practices associated with junk food consumption among the respondents. A majority of students (59.8%) reported that their family members regularly consume junk food, while 40.2% indicated occasional consumption within their households. Notably, no respondents denied family exposure to junk food. Dining out was also common among participants, with 36.4% frequently going out for dinner, 49.5% reporting occasional dining out, and 14% indicating that they rarely or never dine out. Nutritional information influenced purchasing decisions for nearly half of the students, with 47.7% consistently considering it when buying junk food, 32.7% doing so occasionally, and 19.6% not considering it at all. Food safety practices were evident, as 76.6% of students consistently checked the expiry date when purchasing junk food, 15.9% checked occasionally, and only 7.5% did not check expiry dates. Similarly, 49.5% of respondents routinely inspected product packaging, while 35.5% did so occasionally and 15% did not check packaging integrity. However, fewer students reported paying attention to nutrient content. Only 31.8% regularly reviewed the nutritional levels of junk food, 45.8% did so occasionally, and 22.4% did not check nutrient information at all.

Table 4: Practices toward Junk Food Consumption (N=107)

	Yes N (%)	No N(%)	Sometimes N(%)
Topics			
1. Family members consume junk food.	64(59.8)	0(0.0)	43(40.2)
2. Going outside from home for dinner	39(36.4)	15(14)	53(49.5)
3. Nutritional information influence decision to buy	51(47.7)	21(19.6)	35(32.7)

junk food			
4. Checking expiry date while purchasing junk food	82(76.6)	8(7.5)	17(15.9)
5. Checking proper packing while purchasing junk food	53(49.5)	16(15)	38(35.5)
6. Checking the nutrient levels in the junk food	34(31.8)	24(22.4)	49(45.8)

Table 4.1: Summary of Practice Score

Items	Median(IQR)	N(%)	
		Good (≥50%)	Poor (<50%)
Practice score	58.33 (25)	78(72.9)	29(27.1)

Differences in Knowledge, Attitudes, and Practices of Junk Food Consumption between Normal and Overweight/Obese Students

The analysis in Table 5 showed no statistically significant difference in knowledge scores related to junk food consumption between students with normal BMI and those classified as overweight or obese ($p = 0.056$), indicating a comparable level of knowledge across both groups. Similarly, attitudes toward junk food consumption did not differ significantly between the two groups ($p = 0.724$), suggesting alignment in their perceptions and beliefs. However, a significant difference was identified in the practice scores between normal BMI and overweight/obese students ($p = 0.028$), indicating that actual consumption behaviors varied significantly, with overweight/obese students demonstrating less favorable dietary practices.

Table 5: Differences in knowledge, attitude and practice on junk food consumption between normal and overweight/obese students (N=107).

Variables	Median (IQR)		Z statistic	P value ^a
	Normal (n=54)	Overweight/Obese (n=53)		
Knowledge score	75(12.50)	75(25)	1.908	0.056
Attitude score	42.9(30.3)	42.9(35.7)	0.35	0.724
Practice score	58.33(16.67)	50(29.17)	2.193	0.028

Table 5.1 presents the distribution of knowledge levels regarding junk food consumption by BMI status. Among students with normal BMI, 85.2% demonstrated a high level of knowledge, while 14.8% exhibited low knowledge. Similarly, 92.5% of students in the overweight/obese group demonstrated high knowledge, with only 7.5% showing low knowledge. Overall, both groups exhibited a high level of knowledge concerning junk food consumption.

Table 5.1: Difference in knowledge between normal and overweight/obese participants

	BMI Status n (%)	
	Normal	Overweight/Obese
Knowledge		
Low	8 (14.8%)	4 (7.5%)
High	46 (85.2%)	49 (92.5%)
Total	54 (100.0%)	53 (100.0%)

Table 5.2 displays the distribution of attitudes toward junk food consumption across BMI categories. In the normal BMI group, 48.1% of respondents demonstrated a positive attitude, while 51.9% exhibited a negative attitude. Similarly, among overweight/obese students, 37.7% showed a positive attitude, whereas 62.3% reported a negative attitude. Overall, negative attitudes toward junk food consumption were more prevalent in both groups, with a higher proportion observed among overweight/obese students.

Table 5.2: Difference in attitude between normal and overweight/obese participants

	BMI Status n (%)	
	Normal	Overweight/Obese
Attitude		
Positive	26 (48.1%)	20 (37.7%)
Negative	28 (51.9%)	33 (62.3%)
Total	54 (100.0%)	53 (100.0%)

Table 5.3 presents the distribution of junk food consumption practices among students with normal and overweight/obese BMI. Among students with normal BMI, 81.5% demonstrated good practice levels, while 18.5% exhibited poor practices. In comparison, 64.2% of overweight/obese students reported good practices, whereas 35.8% demonstrated poor practice levels. These findings indicate that students with normal BMI were more likely to engage in healthier consumption practices compared to their overweight/obese counterparts. Notably, the proportion of poor practice was higher among overweight/obese students, suggesting a potential association between

unhealthy dietary behaviors and increased BMI. Nevertheless, the majority of respondents in both groups reported good levels of practice regarding junk food consumption.

Table 5.3 Difference of practice between normal and overweight/obese participants

	BMI Status n (%)	
	Normal	Overweight/Obese
Practice		
Good	44 (81.5%)	34 (64.2%)
Poor	10 (18.5%)	19 (35.8%)
Total	54 (100.0%)	53 (100.0%)

Table 5.4 presents the correlation analysis between knowledge and attitude toward junk food consumption. The p-value obtained was 0.378, exceeding the significance threshold of 0.05. As a result, the null hypothesis is retained, indicating no significant relationship between knowledge and attitude regarding junk food consumption among the respondents.

Table 5.4: Correlation between knowledge and attitude

Variable	Knowledge	p-value
Attitude	$r_s = 0.086$	0.378

Table 5.5 presents the correlation test between knowledge and practice of junk food consumption for both groups of respondents. The p-value is 0.653 which is more than the significant level 0.05. Hence, we fail to reject the null hypothesis indicating that there is no significant relationship between knowledge and practice on junk food consumption.

Table 5.5: Correlation between knowledge and practice

Variable	Knowledge	p-value
Practice	$r_s = 0.044$	0.653

Discussion

The present study comprised predominantly female participants (77.6%), reflecting the gender distribution within the university's health science programs. Similar trends were reported by Almansour et al. (2020), who noted a female predominance in health-related disciplines, often attributed to the overall gender ratio favoring women. Lower male participation may also relate to reduced interest or compliance in completing the questionnaire. Participants ranged in age from 20 to 27 years, with the majority aged 22. This aligns with Almansour et al. (2020), who emphasized that individuals within this

age range are in a critical life stage, often marked by unhealthy lifestyle choices and poor dietary habits. Ethnically, the sample reflected Malaysia's demographic distribution in health sciences, with Malay students comprising the majority (68.2%), followed by Chinese (21.5%), Indian (6.5%), and other ethnic groups (3.7%). Financially, over 90% of participants relied on loans or scholarships, consistent with findings by Alhazmi and Aziz (2020), reflecting the economic challenges faced by students pursuing higher education in Malaysia. Regarding BMI status, 50.5% of respondents fell within the normal range, while 49.5% were classified as overweight or obese, highlighting an almost equal distribution and aligning with national trends in student populations.

The study revealed a high level of knowledge regarding the health risks of junk food consumption among both normal weight and overweight/obese students. This is likely influenced by their health science education, which enhances awareness of nutrition and diet-related health impacts (Kokilaa et al., 2023; Zafar et al., 2023). Similar findings by Sümen et al. (2022) and Bozbulut et al. (2020) reported high obesity awareness among health science students. However, contrasting results were observed in Kumar Singh et al. (2020), where nearly half the respondents demonstrated inadequate knowledge, emphasizing the role of academic background in shaping nutrition knowledge. Despite high knowledge levels, both groups displayed negative attitudes toward junk food consumption. This differs from studies reporting moderate to positive attitudes toward healthy eating (Ayran & Karaca, 2023; Arı & Çakır, 2021). Taste and convenience were the most cited reasons for consumption, consistent with Subedi et al. (2020), who identified these as key motivators driving junk food intake. Practices indicated a high prevalence of junk food consumption across both groups, reflecting patterns observed in prior studies (Mittal, 2012). Frequent dining out was reported by a considerable proportion of respondents, which is associated with higher caloric intake and increased risk of overweight and obesity (Zang et al., 2018; Kant et al., 2015; Allman-Farinelli et al., 2019). Although some students checked nutritional labels, only a minority consistently reviewed nutritional content, reinforcing the need for stronger emphasis on label literacy (Adesina et al., 2022).

Statistical analysis revealed no significant difference in knowledge levels between normal and overweight/obese students ($p = 0.056$), with both groups demonstrating a high understanding of junk food's health risks. This aligns with Azman et al. (2020), who attributed this finding to the students' health science background. Similarly, attitudes toward junk food consumption did not significantly differ between BMI groups ($p = 0.724$). Both groups held predominantly negative attitudes, differing from Azman et al. (2020), who reported more positive attitudes. This variation may reflect contextual or cultural differences influencing students' perceptions of junk food. In contrast, a significant difference in practice was observed ($p = 0.028$), with normal-

weight students reporting healthier dietary practices than their overweight/obese counterparts. These findings differ from Abraham et al. (2018), who observed higher practice levels in overweight/obese students, but align with studies highlighting complex relationships between weight status, dietary habits, and physical activity (D'Addesa et al., 2010). The university environment, academic demands, financial constraints, and easy access to fast food likely contribute to these behavioral differences (Jiménez-Díez & Ojeda-Lopez, 2017).

No significant correlation was found between knowledge and attitude toward junk food consumption, contrasting with Kokilaa et al. (2023) and Elsafi et al. (2024), who reported positive associations. Despite adequate knowledge, students' attitudes may remain unchanged due to marketing influences that foster emotional connections with junk food (Bryan et al., 2019). Similarly, no significant association was observed between knowledge and practice. Students continued to consume junk food despite understanding its adverse effects, reflecting findings by Subedi et al. (2020) and Madan et al. (2021). The persistence of unhealthy consumption despite awareness highlights the complex interplay of behavioral, environmental, and psychological factors. According to WHO (2016), such behaviors contribute to non-communicable diseases and metabolic syndrome, driven by the high-calorie, low-nutrient profile of junk food (Zhu et al., 2019; Singh et al., 2021; Rouhani et al., 2012; Musaiger, 2014).

Conclusion

This study demonstrated that health science students, regardless of BMI, possess a high level of knowledge concerning the health risks associated with junk food consumption. Despite this, both groups exhibited negative attitudes toward junk food, highlighting a potential gap between knowledge and behavior. Normal weight students reported significantly healthier dietary practices compared to their overweight/obese peers, emphasizing the complexity of factors influencing food choices in university settings. No significant relationships were found between knowledge and attitude or knowledge and practice, indicating that awareness alone may be insufficient to influence attitudes or behaviors. These findings underscore the need for targeted interventions within university environments that go beyond knowledge dissemination. Strategies should aim to reshape attitudes and support healthy dietary practices, considering the unique challenges faced by students, including academic pressures, financial constraints, and the pervasive availability of unhealthy food options. Future research should further investigate the behavioral, environmental, and psychosocial determinants of junk food consumption to inform more effective health promotion initiatives among university populations.

A major strength of this study is its focus on undergraduate health science students, allowing assessment of whether academic knowledge translates into healthier dietary

behaviors. Given their educational background, disparities between knowledge and practice are particularly meaningful. However, reliance on self-reported data introduces the potential for response bias, as participants may underreport unhealthy behaviors or overestimate knowledge to align with social desirability. Additionally, the study did not account for psychological stress or peer influence, both of which may significantly impact dietary habits. Environmental factors, such as the availability of healthy food alternatives on campus, were also not examined, limiting a comprehensive understanding of the determinants of junk food consumption.

References:

1. Abraham, S., Martinez, M., Salas, G., & Smith, J. (2018). College student's perception of risk factors related to fast food consumption and their eating habits. *Journal of Nutrition and Human Health*, 2(1).
2. Adesina, E., Ajayi, B., Amoo, E. O., Adeyeye, B., Ajayi, M. P., Olawande, T., Olawole-Isaac, A. & Udume, M. E. (2022) Consumers' Knowledge and Use of Nutritional Labelling Information in Lagos, Nigeria. *Sustainability (Switzerland)*, 14(1).
3. Aguirre Sánchez, L., Roa-Díaz, Z. M., Gamba, M., Grisotto, G., Moreno Londoño, A. M., Mantilla-Urbe, B. P., Rincón Méndez, A. Y., Ballesteros, M., Kopp-Heim, D., Minder, B., Suggs, L. S. & Franco, O. H. (2021) What Influences the Sustainable Food Consumption Behaviours of University Students? A Systematic Review. *International Journal of Public Health*.
4. Alhazmi, A. & Aziz, F. (2020) Dietary assessment and its awareness in female students from different health departments: Unhealthy diet with normal BMI. *Journal of Public Health Research*, 9(3).
5. Allman-Farinelli, M., Rahman, H., Nour, M., Wellard-Cole, L. & Watson, W. L. (2019) The role of supportive food environments to enable healthier choices when eating meals prepared outside the home: Findings from focus groups of 18 to 30-year-olds. *Nutrients*, 11(9).
6. Alzahrani, S. H., Saeedi, A. A., Baamer, M. K., Shalabi, A. F., & Alzahrani, A. M. (2020). Eating Habits Among Medical Students at King Abdulaziz University, Jeddah, Saudi Arabia. *International Journal of General Medicine*, 13, 77–88.
7. Arı, Y. & Çakır, E. (2021) Correlation between participation in physical activity and healthy nutrition: An example of a sports science faculty. *Baltic Journal of Health and Physical Activity*, 13(3).
8. Ayran, G. & Karaca, O. (2023) Relationship Between Obesity Awareness and Nutrition Attitude: A Sectional Study Among Secondary School Students. *Galician Medical Journal*, 30(4).
9. Azman, S. A. M., Ibrahim, M. A. & Azahari, N. (2020) Knowledge, attitude, and practice on fast food consumption among normal and overweight/ obese International Islamic University Malaysia Kuantan students.

10. Barrington, W. E. & Beresford, S. A. A. (2019) Eating occasions, obesity and related behaviors in working adults: Does it matter when you snack?. *Nutrients*, 11(10).
11. Begum, R. F., Singh S, A. & Mohan, S. (2023) Impact of junk food on obesity and polycystic ovarian syndrome: Mechanisms and management strategies. *Obesity Medicine*.
12. Blüher, M. (2019). Obesity: Global Epidemiology and Pathogenesis. *Nature Reviews Endocrinology*, 15(5), 288–298.
13. Bodden, C., Hannan, A. J., & Reichelt, A. C. (2021). Of “junk food” and “brain food”: how parental diet influences offspring neurobiology and behaviour. *Trends in Endocrinology & Metabolism*, 32(8), 566–578.
14. Bozbulut, R., Ertaş-Öztürk, Y., Döğër, E., Bideci, A. & Köksal, E. (2020) Increased Obesity Awareness and Adherence to Healthy Lifestyle-Diet Reduce Metabolic Syndrome Risk in Overweight Children. *Journal of the American College of Nutrition*, 39(5).
15. Bryan, C. J., Yeager, D. S. & Hinojosa, C. P. (2019) A values-alignment intervention protects adolescents from the effects of food marketing. *Nature Human Behaviour*.
16. Chandra Sarker, R. (2018) Knowledge attitude and behaviours towards dietary salt in a selected slum population in Bangladesh. *International Journal of Perceptions in Public Health*, 2(4).
17. Chen, H. W. J., Marzo, R. R., Anton, H., Abdalqader, M. A., Rajasekharan, V., Baobaid, M. F., Hamzah, H., Tang, H. C., & Ads, H. O. (2022). Dietary habits, shopping behavior and weight gain during COVID-19 pandemic lockdown among students in a private university in Selangor, Malaysia. *Journal of Public Health Research*, 10(s2).
18. Chen, H. W. J., Marzo, R. R., Anton, H., Abdalqader, M. A., Rajasekharan, V., Baobaid, M. F., Hamzah, H., Tang, H. C., & Ads, H. O. (2022). Dietary habits, shopping behavior and weight gain during COVID-19 pandemic lockdown among students in a private university in Selangor, Malaysia. *Journal of Public Health Research*, 10(s2).
19. Chooi, Y. C., Ding, C. & Magkos, F. (2019) The epidemiology of obesity. *Metabolism: Clinical and Experimental*, 92.
20. D'Addesa, D., D'Addezio, L., Martone, D., Censi, L., Scanu, A., Cairella, G., Spagnolo, A., & Menghetti, E. (2010). Dietary Intake and Physical Activity of Normal Weight and Overweight/Obese Adolescents. *International Journal of Pediatrics*, 2010, 9. Article ID 785649.
21. Elsafi, S. H., Al-Dossari, R. H., Al-Shaqi, R. A., Fakirah, W. E., Al-Dossari, R. F., Al-Sharif, O. J., Maawadh, R. M., Musallam, L. D. A., Alaohali, A., Hassan, A. M. A., Alfahad, O. A., Naam, Y. A. A. & Zahrani, E. M. A. (2024) Obesity-Related

- Knowledge and Practice Among the Healthcare Professions Students in Saudi Arabia. *Diabetes, Metabolic Syndrome and Obesity*, 17.
22. Gesteiro, E., García-Carro, A., Aparicio-Ugarriza, R. & González-Gross, M. (2022) Eating out of Home: Influence on Nutrition, Health, and Policies: A Scoping Review. *Nutrients*.
 23. Gupta, A., Kapil, U., & Singh, G. (2018). Consumption of junk foods by school-aged children in rural Himachal Pradesh, India. *Indian Journal of Public Health*, 62(1), 65.
 24. Hassanzadeh, J., Mohammadbeigi, A., Eshrati, B. & Moemenbellah-Fard, M. (2012) Estimation of the regional burden of non-communicable diseases due to obesity and overweight in Markazi province, Iran, 2006-2007. *Journal of Cardiovascular Disease Research*, 3(1).
 25. Hegde, A. M., Shah, T., George, S. S. & K., P. K. (2016) Assessment of Knowledge, Attitude and Dietary Practices Among Rural School Children Around Mangalore - An Epidemiological Survey. *Journal of Health and Allied Sciences NU*, 06(03).
 26. Hoffmann, R., Lutz, S.U. (2019). The health knowledge mechanism: evidence on the link between education and health lifestyle in the Philippines. *Eur J Health Econ*. 20(27-43).
 27. Janssen, H. G., Davies, I. G., Richardson, L. D., & Stevenson, L. (2017). Determinants of takeaway and fast food consumption: a narrative review. *Nutrition Research Reviews*, 31(1), 16-34.
 28. Jensen, M. L., & Schwartz, M. B. (2021). Junk food consumption trends point to the need for retail policies. *The American Journal of Clinical Nutrition*, 114(3), 837-838.
 29. Jia, S. S., Wardak, S., Raeside, R. & Partridge, S. R. (2022) The Impacts of Junk Food on Health. *Frontiers for Young Minds*, 10. Kabir, A., Miah, S. & Islam, A. (2018) Factors influencing eating behavior and dietary intake among resident students in a public university in Bangladesh: A qualitative study. *PLoS ONE*, 13(6).
 30. Kant, A. K., Whitley, M. I., & Graubard, B. I. (2014). Away from home meals: associations with biomarkers of chronic disease and dietary intake in American adults, NHANES 2005-2010. *International Journal of Obesity*, 39(5), 820-827.
 31. Karimy, M., Armoon, B., Fayazi, N., & Koohestani, H. R. (2019). A Study on the Knowledge, Attitude, and Practices of Iranian Mothers towards Childhood Obesity. *Obesity Facts*, 12(6), 669-677.
 32. Kesmodel, U. S. (2018). Cross-sectional Studies - What Are They Good for? *Acta Obstetricia et Gynecologica Scandinavica*, 97(4), 388-393.
 33. Kokilaa, G. L., Gowthamkarthic, R., Wali, A. & Agadi, S. (2023) Perception and practice of junk food consumption among undergraduate students in a medical university in Chengalpattu District". *World Nutrition*, 14(3).

34. Kumar Singh, P. S., Tanveer, T., Singh, A., Saeed, S. & Janardhanan, R. (2020) Knowledge, Attitude And Practice Of Junk Food Consumption Among University Students Of Delhi/Ncr, India. *International Journal Of Scientific Research*, 9(11), 47–51.
35. Lee, M. (2019). Research trends in obesity & obesogenic environments in Korea. *Nutrition Research and Practice*, 13(6), 461.
36. Liu, J., Lee, Y., Micha, R., Li, Y. & Mozaffarian, D. (2021) Trends in junk food consumption among US children and adults, 2001-2018. *American Journal of Clinical Nutrition*, 114(3).
37. Madan, S., Verma, R. & Mathur, G. (2021) Junk food Consumption Pattern by Undergraduate Students of Dayalbagh Educational Institute, Agra *Indian Journal of Public Health Research & Development* 12(3).
38. Marty, L., Chambaron, S., Bournez, M., Nicklaus, S., & Monnery-Patris, S. (2017). Comparison of implicit and explicit attitudes towards food between normal- and overweight French children. *Food Quality and Preference*, 60, 145–153.
39. Milani, G. P., Silano, M., Pietrobelli, A., & Agostoni, C. (2017). Junk food concept: seconds out. *International Journal of Obesity*, 41(5), 669–671.