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Prevalence and Perceptions of Energy Drink Consumption and Risks Among Young Adults Aged 18-30 in Riyadh, Saudi Arabia

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Abstract

Background: Energy drink (ED) consumption has become a growing public health concern, particularly among young adults. Despite regulatory efforts in Saudi Arabia, limited research has explored the prevalence, perceptions, and factors influencing ED consumption in Riyadh.

Objective: This study aimed to assess the prevalence of ED consumption among young adults in Riyadh, examine associated sociodemographic factors, and evaluate awareness of health risks.

Method: A cross-sectional study was conducted using a convenience sampling method with an online questionnaire distributed via social media. A total of 1,368 valid responses from participants aged 18–30 years were analyzed. The questionnaire covered sociodemographic characteristics, ED consumption patterns, influencing factors, and awareness of health risks. Descriptive statistics were used to summarize the data, and chi-square tests assessed associations between sociodemographic characteristics and ED consumption.

Results: Among participants, 37% consumed EDs, with the highest prevalence among males (47.63%) and individuals aged 18–22 years (76.09%). Fatigue (38.98%) and academic pressures (33.65%) were the triggers. 80.63% recognized health risks, 61.46% reported insufficient public health education. ED consumption was significantly associated with smoking ($p < 0.0001$) and higher income levels ($p = 0.0464$).

Recommendation: This study recommends targeted health education campaigns for high-risk groups, including students (38.9%) and smokers (17.59%), to reduce energy drink consumption. Public awareness should emphasize ingredient label checking (55.5%) and stricter marketing regulations, as energy drinks are frequently consumed at home (30.34%). Promoting healthier alternatives in schools and workplaces can help mitigate health risks and decrease reliance on energy drinks.

Conclusion: Despite widespread awareness of potential health risks, ED consumption remains high among young adults in Riyadh. These findings highlight the need for targeted public health campaigns, stricter regulations, and improved education efforts to mitigate excessive ED consumption.

Keywords: Energy drink, consumption, young adults, health awareness, Saudi Arabia.

1. Introduction

Originally, energy drinks (EDs) were first introduced in Japan in the 1960s when Taisho Pharmaceuticals introduced Lipovitan-D, a drink designed to combat fatigue and boost stamina; it contains B vitamins, taurine, and ginseng, which are all ingredients of energy drinks, Eds also in the 1960s started in Asia (Heckman et al., 2010). The early 2000s marked the entry of energy drinks into the Saudi market, leading to a massive growth in their consumption (Elsoadaa et al., 2016). They are widely consumed for various effects, including increased wakefulness, reduced fatigue, enhanced alertness, improved memory, and their enjoyable taste (Subaiea et al., 2019). EDs commonly contain high amounts of caffeine, added sugars, and other additives, such as taurine, guarana, and L-carnitine, which are legal stimulants (Centers for Disease Control and Prevention, 2022). These legal stimulants can enhance alertness, focus, and energy, but they may also lead to increased blood pressure, heart rate, and breathing, potentially causing harmful effects (Centers for Disease Control and Prevention, 2022) which

can lead to health issues like increased heart rate, blood pressure, and heart rhythm disturbances such as arrhythmia and atrial fibrillation (Alsunni, 2015). Caffeine also has neurological and psychological effects; excessive consumption can result in symptoms like anxiety, tension, and mood disorders (Alsunni, 2015). Furthermore, the high sugar content in these drinks may contribute, in the long run, to obesity, metabolic syndrome, and digestive issues and can also cause tooth erosion (Alsunni, 2015). Despite the potential side effects, energy drinks are noted to increase endurance and alertness, making them attractive to young people or students working or studying (Rahamathulla, 2017). However, excessive caffeine in energy drinks can be addictive and sometimes lead to intoxication (Rahamathulla, 2017). Numerous brands, such as Red Bull, Power Horse, Bison, and other Eds, are available in the Saudi market and are easily accessible in stores (Alafif et al., 2021). Code Red, for instance, was identified as the most popular energy drink brand among 546 university students in Riyadh, it was favoured by 50% of participants, comparably taste being the primary reason for consumption by 53.6% (Alafif et al., 2021).

Aonso-Diego's 2023 review found global energy drink consumption at 54.7%, analyzing nearly 200 studies. Adolescents and young adults showed the highest prevalence, raising concerns (Aonso-Diego et al., 2023). Moreover, according to the Global Energy Drinks Report 2012, Saudi Arabia was highlighted as one of the top ten countries in terms of energy drink consumption (Faris, 2014). Many studies have been conducted on the prevalence of energy drink consumption in Saudi Arabia. For example, a 2023 national survey in Saudi Arabia (SDHNS) analyzed by Aljaadi et al. examined consumption habits of soft and energy drinks. Among nearly 4,000 adults, the study mentioned that over two-thirds (67%) reported weekly consumption of soft drinks, while 30% drank energy drinks weekly (Aljaadi et al., 2023). Interestingly, Aljaadi found that men, younger adults, those with lower income, and those with lower physical activity levels were more likely to consume both beverages. Additionally, overweight or obese individuals were less likely to consume energy drinks compared to those with a healthy weight (Aljaadi et al., 2023).

To our knowledge, no research has specifically examined the prevalence and perception of energy drink consumption among young adults aged 18-30 in Riyadh, Saudi Arabia. Therefore, this study seeks to answer the following question: What is the prevalence and perception of energy drink consumption among young adults in Riyadh. To address this, we aim to (i) assessing this demographic's knowledge, perception, prevalence, and consumption patterns of energy drinks. Additionally, we seek to (ii) understand the underlying factors and triggers influencing energy drink consumption and provide valuable insights into the perceptions held by this population.

2. Methodology

2.1 Study Design, Study Population and Sampling

This cross-sectional study used convenience sampling with a validated, self-developed online questionnaire targeting Riyadh residents aged 18-30. A total of 1,441 participants were surveyed, representing a population of 2,224,055 in this age group (General Authority for Statistics, 2023).

2.2 Inclusion and Exclusion Criteria

The study included participants aged 18-30 residing in Riyadh. Individuals who did not consent to participate and those involved in the pilot study due to subsequent modifications to the survey instrument were excluded. Participants who did not consume energy drinks were not required to complete the section addressing energy drink consumption patterns and related perceptions.

2.3 Data Collection Method and Survey Instrument

A self-administered questionnaire was used to collect the data between August and October 2024. The questionnaire was composed of three main sections. The first section focused on demographic information, including gender, age, education level, employment status, income level, and region of residence within Riyadh (east, west, north, south, or central). It also captured information on chronic disease history and habits such as smoking. The second section measured the prevalence of energy drink consumption and explored how family members and/or friends influenced consumption patterns. The third section of the questionnaire focused on assessing various factors related to perceptions of energy drinks among consumers. Including frequency and preferred times/locations of consumption, situational triggers for consumption, knowledge of energy drinks, preferred brands and satisfaction with prices, and the availability of information and education regarding these products. Additionally, it explored participants' awareness of both positive and negative experiences related to energy drinks.

A pilot sample of 30 people was used to develop and revise the questionnaire and to validate its reliability. Validate/Reliability of the questionnaire was assessed using Cronbach's alpha test and was found to be 0.7827.

2.4 Statistical Analysis

Descriptive statistics were used to summarize categorical data, and they were presented in frequency tables, pie charts, and bar charts to highlight key findings. A Chi-Square test of independence was used to assess the relationship between sociodemographic characteristics and energy drink consumption. All statistical analyses and data visualization were performed using JMP (JMP, 2024) and Microsoft Excel (Microsoft Excel, 2024). A p-value of <0.05 was considered statistically significant.

2.5 Response Rate and Handling of Missing Data

Out of 1441 responses received, 1,368 valid responses were utilized for all participants, and 506 for the energy drink consumers, resulting in a response rate of 94.93% and 35.1%, respectively. No missing data were found.

2.6 Ethical Considerations

Ethical approval for this study was obtained from the Institutional Review Board (IRB) at King Saud University (Approval Number: 25-470). Moreover, informed consent was obtained from participants through the online questionnaire, which outlined the study's purpose and objectives. Participation was voluntary; no names, emails, phone numbers, or personal questions were asked. Participants were informed of their right to withdraw. A means of communication with the researchers was provided. Participant information was kept confidential, and responses were anonymized and numerically encoded to ensure privacy.

3. Results

Figure 1 illustrates the proportion of energy drink consumers (37%) compared to non-consumers (63%) among young adults in Riyadh, Saudi Arabia.

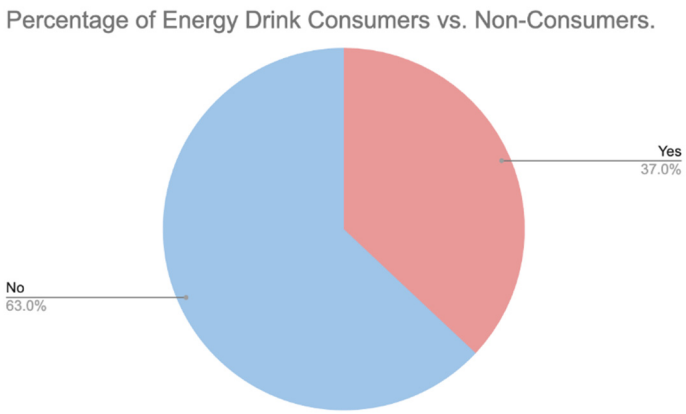

Figure 1. Percentage of Energy Drink Consumers vs. Non-Consumers

Among energy drink consumers, the majority (25.7%) reported consuming energy drinks one to two times per month, followed by 22.9% of participants who consumed energy drinks more than once per week (Figure 2).

This figure presents the frequency of energy drink consumption among consumers. The majority (25.7%) reported consuming energy drinks **one to two times per month**, while **22.9%** consumed them **more than once per week**.

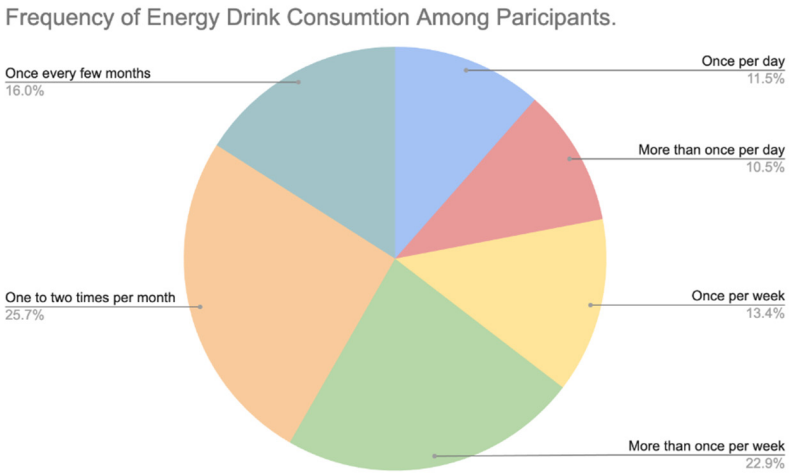

Figure 2. Frequency of Energy Drink Consumption Among Participants

A large majority (70%) of participants believed energy drinks were expensive, while only 2% believed they were cheap (Figure 3).

This figure displays participants' perceptions of energy drink prices. The majority (**70%**) perceived energy drinks as **expensive**, while **only 2%** believed they were **affordable**.

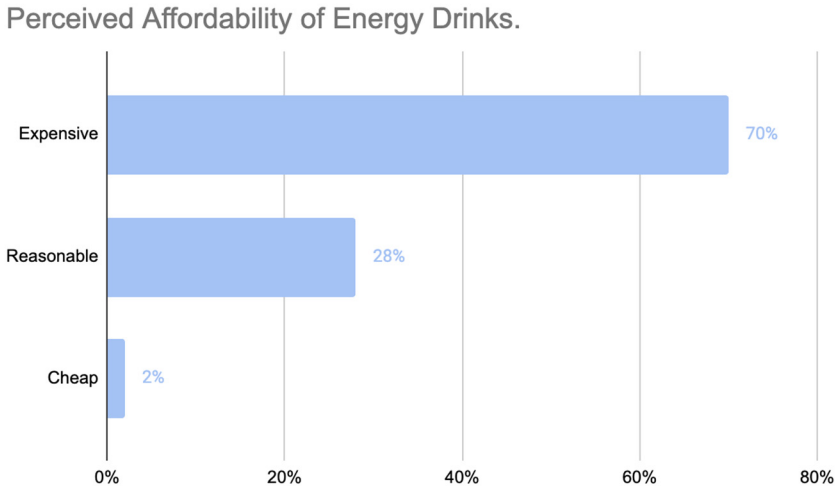

Figure 3. Perceived Affordability of Energy Drinks

Participants were more likely to have heard of negative experiences related to energy drink consumption (76%) than positive experiences (24%) (Figure 4).

This figure represents participants' awareness of positive and negative experiences related to energy drink consumption. **76%** of participants reported being aware of negative experiences, compared to **24%** for positive experiences.

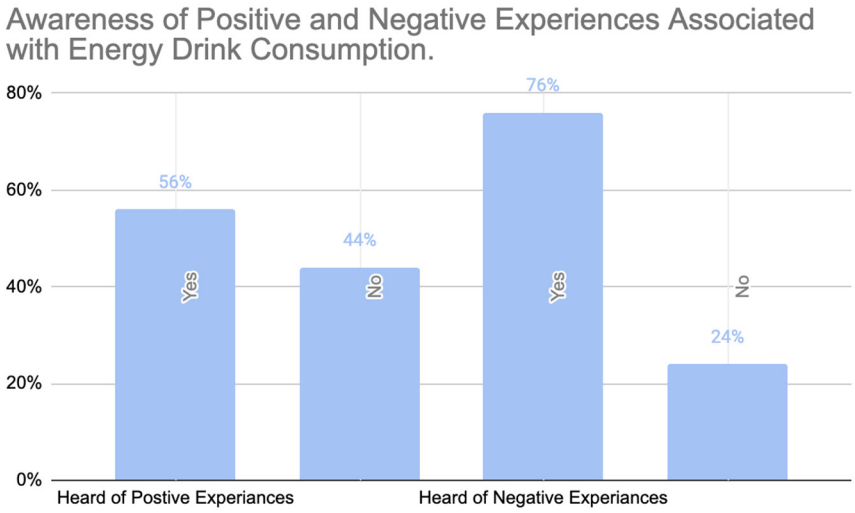

Figure 4. Awareness of Positive and Negative Experiences Associated with Energy Drink Consumption

A majority of participants (55.5%) reported not checking the ingredient labels of energy drinks (Figure 5).

This figure highlights the percentage of participants who check ingredient labels before consuming energy drinks. A **majority (55.5%)** reported **not checking labels**, indicating a potential gap in consumer awareness.

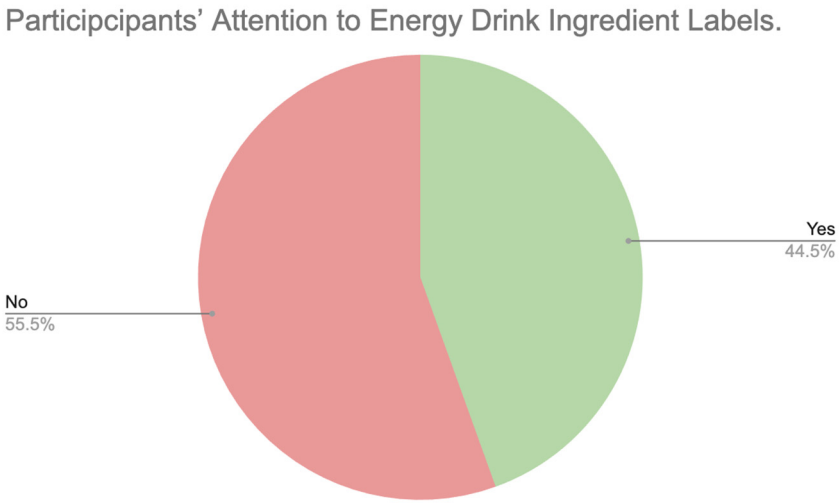

Figure 5. Participants' Attention to Energy Drink Ingredient Labels

Most participants were female (58.26%) and aged 18-22 (69.3%). A bachelor's degree was the most common education level (61.48%), and students made up 75.3%. The majority earned <10,000 SAR (38.01%), while 20.25% earned >25,000 SAR. Most lived in eastern (30.7%) and northern (29.97%) Riyadh. Smokers comprised 10.38%, and 9.5% had a chronic disease.

Table 1. Sociodemographic Characteristics of All Participants

Variable	N	% of Total
Gender		
Female	797	58.26%
Male	571	41.74%
Age		
18-22 years old	948	69.30%
23-25 years old	179	13.08%
26-30 years old	241	17.62%
Educational level		
Secondary school or less	308	22.51%
Diploma degree	113	8.26%
Bachelor's degree	841	61.48%
Advanced degree	106	7.75%
Occupational status		
Student	1018	74.42%
Employed	175	12.79%
Employed and a student	110	8.04%
Unemployed	65	4.75%
Monthly income/family income		
Less than 10,000 SAR	520	38.01%
10,000-15,000 SAR	264	19.30%
15,000-20,000 SAR	207	15.13%
20,000-25,000 SAR	100	7.31%
More than 25,000 SAR	277	20.25%
Area of Residence in Riyadh		
Eastern region	420	30.70%
Middle region	114	8.33%
Northern region	410	29.97%
Southern region	178	13.01%
Western region	246	17.98%
Smoking Status		
Yes	142	10.38%
No	1226	89.62%
Chronic Disease Status		
Yes	130	9.50%
No	1238	90.50%

Energy drink non-consumers were mostly female (61.72%), while consumers were primarily aged 18-22 (76.09%). Non-consumers were highest in the 26-30 age group (75.93%). Educational level, residence, and chronic disease status were similar between groups. Most were students (≈78%). Both groups had similar income distributions, with most earning <10,000 SAR. Smokers were more likely to be consumers (17.59%) than non-consumers (6.15%).

Table 2. Sociodemographic Characteristics of Energy Drink Consumers and Non-Consumers.

Variable	Energy Drink Consumers		Energy Drink Non-Consumers	
	N	% of Total	N	% of Total
Gender				
Female	265	52.37%	532	61.72%
Male	241	47.63%	330	38.28%
Age				
18-22 years old	385	76.09%	563	65.31%
23-25 years old	63	12.45%	116	13.46%
26-30 years old	58	11.46%	183	21.23%
Educational level				
Secondary school or less	117	23.12%	191	22.16%
Diploma degree	40	7.91%	73	8.47%
Bachelor's degree	321	63.44%	520	60.32%
Advanced degree	28	5.53%	78	9.05%
Occupational status				
Student	396	78.26%	622	72.16%
Employed	51	10.08%	124	14.39%
Employed and a student	34	6.72%	76	8.82%
Unemployed	25	4.94%	40	4.64%
Monthly income/family income				
Less than 10,000 SAR	180	35.57%	340	39.44%
10,000-15,000 SAR	104	20.55%	160	18.56%
15,000-20,000 SAR	70	13.83%	137	15.89%
20,000-25,000 SAR	31	6.13%	69	8.00%
More than 25,000 SAR	121	23.91%	156	18.10%
Area of Residence in Riyadh				
Eastern Region	153	30.24%	267	30.97%
Middle region	41	8.10%	73	8.47%
Northern region	153	30.24%	257	29.81%
Southern region	66	13.04%	112	12.99%
Western Region	93	18.38%	153	17.75%
Smoking Status				
Yes	89	17.59%	53	6.15%
No	417	82.41%	809	93.85%
Chronic Disease Status				
Yes	45	8.89%	85	9.86%
No	461	91.11%	777	90.14%

Most participants in the study were non-consumers of energy drinks (63%), while 37% were classified as energy drink consumers (Figure 1).

Participants' perceptions of energy drink consumption among family members revealed that 47.66% perceived their family members never to consume energy drinks. In contrast, the perception of energy drink consumption among friends was higher, with 40.86% of participants perceiving their friends mainly to consume energy drinks (Table 3).

Table 3. Participants' Perception of Energy Drink Consumption Among Friends and Family

	Always		Mostly		Rarely		Never	
	%	n	%	n	%	n	%	n
Do your friends consume energy drinks?	10.67%	146	40.86%	559	37.21%	509	11.26%	154
Does your family consume energy drinks?	2.49%	34	13.23%	181	36.62%	501	47.66%	652

Energy drink consumption was more common at home (30.34%) than social gatherings (6.69%). Participants also consumed energy drinks in the evenings (36.97%). Redbull was the most popular brand among participants (31.35%), followed by Code Red (23.27%) (Table 4).

Table 4. Patterns and Preferences in Energy Drink Consumption

	%	N
Where do you most often consume energy drinks?		
At home	30.34%	304
At work/school	24.55%	246
While exercising	12.97%	130
On the go (in the car, on the road, etc.)	25.45%	255
At social gatherings	6.69%	67
total	100%	1002
When do you most often consume energy drinks?		
Morning	16.84%	148
Midday	26.39%	232
Evening	36.97%	325
Midnight	19.80%	174
total	100%	879
What are your favorite brands of energy drinks?		
Redbull	31.35%	326
Monster	10.48%	109
Rockstar	3.94%	41
5 hour energy	0.87%	9
Power horse	6.44%	67
Code red	23.27%	242
Bison	8.08%	84
Other	15.58%	162
total	100%	1040

Participants reported that fatigue or sleepiness (38.98%) and working or studying (33.65%) were the most common factors influencing their decision to consume energy drinks. The primary motivations for consumption were flavor (20.01%) and refreshment (18.12%) (Table 5).

Table 5. Factors Influencing Energy Drink Consumption and Motivations.

	%	N
What conditions make you more likely to consume energy drinks?		
When I'm feeling anxious or stressed	12.20	103
While working/studying	33.65	284
When I feel tired or sleepy	38.98	329
Before/during exercise	15.17	128
total	100	844
Why do you consume energy drinks?		
To improve focus and attention	16.36	251
To improve performance (while exercising)	9.06	139
For refreshment	18.12	278
When you lack sleep or are tired	12.06	185
Out of habit	7.43	114
To cope with stress and anxiety	6.78	104
For the flavor	20.01	307
To substitute it for coffee and tea	10.17	156
total	100	1534

Most participants (80.63%) were aware of energy drink health risks, with many linking them to kidney (68.38%) and heart disease (73.12%). About 54.35% associated them with anxiety. Nearly 87.75% knew they contained caffeine, and 76.09% recognized their difference from soft drinks. Over half (61.46%) reported insufficient health education on their risks.

Table 6. Participants' Awareness and Opinions on Energy Drink Health Risks

	Yes		No		I don't know	
	%	N	%	N	%	N
Are you aware of the potential health risks of energy drinks?	80.63%	408	4.74%	24	14.62%	74
Do you think energy drinks increase the risk of kidney disease?	68.38%	346	11.66%	59	19.96%	101
Do you think energy drinks increase the risk of heart disease?	73.12%	370	14.03%	71	12.85%	65
Do you think there is a link between energy drink consumption and anxiety?	54.35%	275	22.53%	114	23.12%	117
Do you think energy drinks contain caffeine?	87.75%	444	6.72%	34	5.53%	28
Do you think energy drinks are the same as soft drinks?	17.19%	87	76.09%	385	6.72%	34
Do you think there is sufficient health education and information available to the public about the potential health risks of consuming energy drinks?	38.54%	195	61.46%	311		

Inferential Analysis

1) Gender and Energy Drink Consumption (Table 7)

A chi-square test revealed a significant association between gender and energy drink consumption ($\chi^2 = 11.451$, $p < 0.05$). Among females, 66.75% were non-consumers of energy drinks.

Table 7. Gender vs. Energy Drink Consumption

Count Row %	Yes	No	Total	ChiSqaure
Female	265 33.25	532 66.75	797	X=11.451
Male	241 42.21	330 57.79	571	P-value
Total	506	862	1368	P=0.0007*

Note. * P<0.05.

2) Age and Energy Drink Consumption (Table 8)

A chi-square test showed a significant association between age and energy drink consumption ($\chi^2 = 22.853$, $p < 0.0001$). Energy drink consumption was most common among participants aged 18-22 years (40.61%).

Table 8. Age vs. Energy Drink Consumption

Count Row %	Yes	No	Total	ChiSqaure
18-22 years old	385 40.61	563 59.39	948	X=22.853
23-25 years old	63 35.20	116 64.80	179	P-value
26-30 years old	58 24.07	183 75.93	241	P<.0001*
Total	506	862	1368	

Note. * P<.0001.

3) Occupational Status and Energy Drink Consumption (Table 9)

A chi-square test revealed a significant relationship between occupational status and energy drink consumption ($\chi^2 = 8.022$, $p < 0.05$). Students (38.9%) and unemployed individuals (38.46%) were more likely to consume energy drinks.

Table 9. Occupational Status vs. Energy Drink Consumption

Count Row %	Yes	No	Total	ChiSqaure
Student	396 38.90	622 61.10	1018	X=8.022
Employed	51 29.14	124 70.86	175	P-value
Employed and a student	34 30.91	76 69.09	110	P=0.0456*
Unemployed	25 38.46	40 61.54	65	
Total	506	862	1368	

Note. * P<0.05.

4) Monthly Income and Energy Drink Consumption (Table 10)

The chi-square test showed a significant relationship between monthly income and energy drink consumption (χ^2 = 9.669, $p < 0.05$). Energy drink consumers were more likely to have a monthly income greater than 25,000 SAR (43.68%).

Table 10. Monthly Income vs. Energy Drink Consumption

Count Row %	Yes	No	Total	ChiSqaure
Less than 10,000 SAR	180 34.62	340 65.38	520	X=9.669
10,000-15,000 SAR	104 39.39	160 60.61	264	p-value
15,000-20,000 SAR	70 33.82	137 66.18	207	P=0.0464*
20,000-25,000 SAR	31 31.00	69 69.00	100	
More than 25,000 SAR	121 43.68	156 56.32	277	
Total	506	862	1368	

Note. * P<0.05.

5) Smoking Status and Energy Drink Consumption (Table 11)

A chi-square test revealed a significant association between smoking status and energy drink consumption (χ^2 = 44.859, $p < 0.0001$). Smokers were more likely to consume energy drinks (62.68%) than non-smokers (34.01%).

Table 11. Smoking Status vs. Energy Drink Consumption

Count Row %	Yes	No	Total	ChiSquare
Yes	89 62.68	53 37.32	142	X=44.859
No	417 34.01	809 65.99	1226	P-value
Total	506	862	1368	P<.0001*

Note. * P<.0001.

4. Discussion

This study aimed to assess the prevalence of energy drink (ED) consumption among young adults in Riyadh, examine associated sociodemographic factors, and evaluate awareness of health risks. Our findings revealed that 37% of participants consumed energy drinks, with the majority being younger adults aged 18–22 years 76.09% and males 47.63%. These results are consistent with prior studies conducted in Jeddah where Musaiger & Zagzoog (2013) reported that 71.3% of males and 35.9% of females consumed energy drinks, while in Hail, Faris (2014) found that 46% of participants were energy drink consumers. These consistent findings across various regions in Saudi Arabia highlight a national trend of high-energy drink consumption among young adults. Moreover, our study highlighted significant associations between energy drink consumption and certain demographic variables.

Smokers were more likely to consume energy drinks 62.68% compared to non-smokers 34.01%, similar to findings from Elsoadaa et al. (2016) in Makkah. Furthermore, participants with higher monthly incomes (43.68% earning over 25,000 SAR) were more likely to consume energy drinks, suggesting affordability influences consumption patterns.

Specific behavioral and situational factors influenced energy drink use. Fatigue or sleep deprivation was the most common trigger by 38.98% of consumers, followed by the need to focus during work or study sessions 33.65%. These findings align with research in Riyadh, where 28.4% of participants consumed energy drinks to prepare for exams (Aljaloud, 2016). Similarly, Makkah Elsoadaa et al. (2016) noted that 18.14% of males and 14% of females reported consuming energy drinks during exams. They often drink energy drinks during exams to enhance energy levels, improve focus, and combat fatigue, as these beverages typically contain caffeine and sugar that quickly boost alertness. A study by Smith and Richards in 2018 indicates that energy drink consumption is also associated with an unhealthy lifestyle, including skipping some meals and consuming junk food, which may negatively affect academic performance (Smith & Richards, 2018).

Taste emerged as the most significant factor driving energy drink consumption among our participants 20.01%. This finding aligns with Alafif et al. (2021) who reported that 53.6% of university students in Riyadh consumed energy drinks primarily due to their taste. Similarly, Musaiger & Zagzoog (2013) in Jeddah found that 58% of respondents favour taste, underscoring the importance of flavor in shaping consumer preferences across different regions. In terms of brand preferences, RedBull (31.35%) and Code Red (23.27%) were the most popular choices in our study. Interestingly, regional variations in brand preference were observed in other research. For instance, Elsoadaa et al. (2016) in Makkah identified Code Red as the leading brand among participants. By contrast, Faris (2014) in Hail reported that 28.82% of energy drink consumers preferred Bison. On pricing, our findings revealed that 70% of participants in Riyadh perceived energy drinks as overpriced, while 28% found the pricing reasonable. This contrasts with Alrasheedi (2016) in Jeddah, where 70.3% of participants considered energy drink prices fair, and 25% deemed them too expensive. The perception of energy drink prices as expensive among our participants (70%) could also be influenced by economic factors and regulatory policies. In Saudi Arabia, a 100% excise tax was imposed on energy drinks as part of a broader public health initiative to reduce the consumption of products deemed harmful, including tobacco and sugary beverages (General Authority of Zakat & Tax, 2017).

Social influence also emerged as a key factor in energy drink consumption. Nearly 41% of participants perceived their friends as frequent energy drink consumers, suggesting that peer behavior significantly influences individual choices. This observation is consistent with (Rahamathulla, 2017) who reported that 59.4% of participants in Al-Kharj consumed energy drinks in the company of friends. The findings of this study indicate a relatively high level of awareness about energy drinks among participants. A notable 87.75% were aware that energy drinks contain caffeine, compared to Musaiger & Zagzoog (2013), which reported that nearly half of respondents were unaware of these drinks' caffeine content and ingredients. Similarly, 80.63% of participants in our study recognized the potential health risks of energy drinks, with 68.38% identifying an increased risk of kidney disease and 73.12% linking them to heart disease, suggesting a significant improvement in public knowledge over time. However, participants' understanding of specific risks appeared limited. Only 54.35% recognized a connection between energy drink consumption and anxiety, and 55.5% admitted to not checking ingredient labels before consumption. Furthermore, more than half 61.46% believed that public health education on energy drink risks was insufficient. This finding mirrors Musaiger & Zagzoog (2013) conclusion that Saudi youth require greater awareness of the ingredients and risks of energy drinks. Yet, we have noticed an increased consumption of Eds among young adults in Saudi Arabia. This trend suggests an immediate public health intervention. The rising consumption of energy drinks among young adults in Saudi Arabia poses serious public health risks, including increased heart rate, anxiety, and sleep disturbances. Studies indicate that this trend is significantly influenced by aggressive marketing strategies that promote these beverages as performance enhancers, leading to higher consumption rates among youth (Aljaadi et al., 2023).

4.1 Limitations and Strengths

This study provides valuable insights into energy drink consumption among young adults in Riyadh, but several limitations must be acknowledged. The use of convenience sampling limits the generalizability of the findings to the broader population since we were solely focusing on Riyadh's residents. Additionally, reliance on self-reported data may have introduced recall or/and misunderstanding bias, particularly regarding consumption patterns and motivations. Moreover, the study sample was predominantly from the age group of 18-22, which may limit the representativeness of the results for other age groups. However, the study also offers notable strengths. The large sample size of 1368 participants increase the accuracy of results. Moreover, we collected data from actual energy

drink users and non-users, allowing for a better comparison of their behaviors. The focus on a specific demographic provides in-depth insights into energy drink consumption within this group. This detailed understanding can contribute to developing targeted interventions for young adults in Riyadh.

5. Research implications & Recommendations

Future research should utilize different sampling methods to ensure a more diverse and generalizable sample. Longitudinal designs would be beneficial to explore the long-term health impacts of energy drink consumption among young adults and assess the effectiveness of targeted public health interventions. Additionally, future studies should include both consumers and non-consumers in different ages and cities to allow for comparative analysis of their consumption, perceptions and knowledge. Comprehensive data should be collected through qualitative approaches such as interviews and focus groups to gain more insight and understanding. The health implications of excessive energy drink consumption necessitate immediate public health interventions.

Based on our results, we recommend enhancing health education campaigns, particularly targeting high-risk groups such as students (38.9%) and smokers (17.59%) who consume energy drinks at higher rates. Public awareness initiatives should emphasize the importance of checking ingredient labels, as 55.5% of participants reported not doing so, to help consumers regulate their intake of caffeine and sugar. Additionally, stricter regulations on marketing and availability should be enforced, especially as energy drinks are frequently consumed at home (30.34%). As 80.63% of participants were aware of health risks, but many still consumed energy drinks, mandatory health education sessions should be considered. Finally, educational institutions and workplaces should promote healthier alternatives, such as proper hydration, balanced diets, and better sleep habits, to reduce reliance on energy drinks for fatigue and focus. Implementing these measures can help reduce excessive consumption and mitigate potential health risks associated with energy drinks.

6. Conclusion

This study highlights the high prevalence of energy drink (ED) consumption among young adults in Riyadh, with males and individuals aged 18–22 years being the most frequent consumers. Despite widespread awareness of health risks, many participants continue to consume EDs, influenced by fatigue, academic pressures, and social factors. Significant associations were found between ED consumption and smoking status, higher income levels, and gender, indicating potential behavioral and lifestyle influences.

The findings emphasize the urgent need for targeted public health interventions, including educational campaigns on ED risks, stricter marketing regulations, and policies addressing youth consumption patterns. Future research should explore long-term health impacts and behavioral motivators, incorporating qualitative methods to gain deeper insights. Efforts to increase public awareness and promote healthier alternatives are essential to mitigating excessive ED consumption among young adults in Saudi Arabia.

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Institutional Review Board Statement

Ethical approval was obtained from the Institutional Review Board IRB: (Approval Number: 25-470) at King Saud University.

Informed Consent Statement

Informed consent was obtained from participants through the online questionnaire, which outlined the study's purpose and objectives. Participation was voluntary, no names, emails, phone numbers or personal questions were asked. Participants were informed of their right to withdraw. A means of communication with the researchers was provided. Participant information was kept confidential, and questionnaires were anonymized and numerically encoded to ensure privacy.

Data Availability Statement

Data is unavailable due to privacy and ethical restrictions.

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Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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