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RESEARCH ARTICLE

THE PREVALENCE OF ENERGY DRINKS AND ADVERSE EFFECT AMONG MALE STUDENTS IN TECHNICAL AND VOCATIONAL TRAINING CORPORATION (SAUDI ARABIA) IN AL-MADINAH AL-MUNAWARA REGION IN 2021

Dr. Husain Eid Alraddadi, Dr. Abdulelah Tali Alshairi, Fayrouz Hazzaa Hamadallah and Dr. ahmad eid Alraddadi
Family Medicine Resident.
Family medicine consultant, postgraduate family medicine center, Al-Madinah.

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Abstract

Background: There are so many adverse effects of consuming energy drinks, because of high amount of caffeine like increasing heart rate and b[illegible] no ro[illegible] drink[illegible] aims to estimate the Prevalence of energy drinks and adverse effect among Male students in Technical and Vocational Training Corporation (Saudi Arabia) in Al-Madinah Al-Munawara Region in 2021. The study also aims to determine the Prevalence of energy drinks and adverse effect among Male students, to assess the association of energy drinks consumption and harmful effects (headache, insomnia and palpitation) among male students, and to find out the reason of Energy Drinks consumption among male students at Taibah university in Al-Madinah Al-Munawara in 2021.

Methodology: This is a cross-sectional study conducted at Technical and Vocational Training Corporation (Saudi Arabia) in Al-Madinah Al-Munawara Region in 2021 to see the prevalence and adverse effects of energy drinks among male college students between March 2021 and august 2021.Analyses were conducted using Statistics SPSS 23.0 for windows (SPSS Inc., Chicago, IL, USA). Quantitative data were presented as the mean ± SD & (range), and qualitative data were expressed as absolute frequencies (number) & relative frequencies (percentage).

Results:Out of the invited 377 students, only 373 students filled and returned the questionnaire with a response rate of 99%. Fifty-nine-point two percent (59.2%) aged between 20- 25 years old, 31.9% were less than 20 years old and 5.6% were 26- 30 years old. 36.5% were specialized in network system management.

More than two -third of the studied student(71%) drink one to three energy drink packs per week, while the other one-third is distributed between other categories(11.6% drink 4- 6 packs, 6% 7- 9 packs 3.6% 10- 12 packs, 1.5% 13- 15 packs and 3% more than 15 packs per week).

Corresponding Author:- Dr. Husain Eid Alraddadi
Address**:-** Family Medicine Resident.

Favourite type of energy drink was reported as 71.9% Code red, 21.3% Red bull, 21% Bison, and 11.7% power horse. Reasons for consuming energy drinks was because of its delicious taste in 80.5%, feeling of activism in 29.9%, to reduce fatigue and compensate for lost energy in 14.7%, to drive better in 9.6%, because of effect of advertising and commercials in 2.4%, and to imitate friends in 3.9%.

Conclusion: Energy drink consumption is high among male students in Technical and Vocational Training Corporation (Saudi Arabia) in Al-Madinah Al-Munawara, Saudi Arabia. The rate of consumption is significantly associated with academic year.

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Introduction:-

Energy drinks start in Asia long in 1962. It was designed to help employees work hard well into the night. The very first energy drink Introduced to the United States was in 1980s and wasn't really an energy drink at all it called Jolt Cola. it was a lot of added sugar and caffeine [1]

In 1997 Red Bull began distributing its drink in the United States and reached more than $1 billion in 2000(1). Between 2006 and 2014, consumption of energy drinks in the UK increased by 155%, from 235 to 600 million.[2]

In Saudi Arabia at al-Madinah for example energy drinks are consumed by 41.4% among female secondary school [3]. About 60% of the students in Jeddah consumed at least one can of an energy drink per week, and 63.3% drank two to four cans per week [4]. And 71.6 % of university students in Riyadh, Saudi Arabia consumed energy drink .[5]

In 2011, the European Food Safety Authority (EFSA) commissioned a study to gather consumption data for energy drinks in 16 countries of the European Union [2]. They found that young people aged 10–18 years had the highest reported consumption prevalence (68%), compared with 30% and 18% among adult over 18 years and children under 10 years respectively .[2]

The top 10 brands in Saudi Arabia are (Red Bull, Power Horse, Bison, Bugzy, Code Red, Boom Boom, Shark, AMP, Double Horse, Blu Day) and there are other different brands very popular worldwide .[5]

Energy drinks and Sports drinks are significantly different products. Sports drinks are flavored beverages that often contain carbohydrates, minerals, electrolytes (e.g., Sodium, potassium, calcium, magnesium), and sometimes vitamins or other nutrients.[6]

While energy drinks are a non-alcoholic beverage that contains 24 to 33g of sugar (glucose) per unit although some types are sugar free [4], and caffeine which range from 40-250 mg per 8 fluid ounces (240 ml) and it contain other ingredients like vitamins, taurine, ginseng.[7]

Caffeine is a stimulant that increase alertness, improving memory, and enhancing a person's mood [9]. There are so many adverse effects of consuming energy drinks, because of high amount of caffeine like increasing heart rate and blood pressure. Also, it can cause insomnia, headache, gastric upset, dehydration and increase urination .[9]

In addition, high caffeine can be toxic to adolescents and other age groups. It happens when someone rapidly consume 1200 mg(milligrams)of caffeine or 0.15 tablespoons of pure caffeine [7]. According to the Drug Abuse Warning Network (DAWN), in 2011, about 11% of energy drink consumers 12years and older whom visits emergency department need hospitalization .[10]

Patients who reach a toxic dose of energy drink usually present to medical services with seizure or ventricular tachycardia [7]. Pure and highly concentrated caffeine products have contributed to at least two deaths in the United States in the last few years. "Just one teaspoon of pure powdered caffeine can contain the same amount of caffeine as 28 cups of coffee" [7].

The researcher interested in this topic Because it's common between young age group and athletes. And energy drink sales are rarely regulated by age and no roles in selling it unlike tobacco. Also, the prevalence of energy drinks consumption progressively increases in Saudi Arabia. And they are commonly selling it in coffee shop as a cocktail without warning the customers.

Study Objectives:-

The study aims to estimate the Prevalence of energy drinks and adverse effect among Male students in Technical and Vocational Training Corporation (Saudi Arabia) in Al-Madinah Al-Munawara Region in 2021. The study also aims to determine the Prevalence of energy drinks and adverse effect among Male students, to assess the association of energy drinks consumption and harmful effects (headache, insomnia and palpitation) among male students, and to find out the reason of Energy Drinks consumption among male students at Taibah university in Al-Madinah Al-Munawara in 2021.

Literature Review:-

Local studies:

There are so many studies that carried out about energy drinks consumption worldwide. But it's not that much in Saudi Arabia. Thirty-five studies conducted on Saudi Arabia.

One of these studies was done at Al-Madinah in 2015, it focused on female governmental secondary school. It was conducted over 372 students with mean age 17.2 ± 1.04 years. Objectives of this study are to find out the prevalence of energy drinks among female governmental secondary school and it was 41.4% [(3)]

Also, to know the reason why they are consuming this type of drinks, the main reason was because it's delicious and help them study. 56.3% of students who join this study had adverse effects mainly palpitation, headache, insomnia and other side effects [(3).]

Study was done by Alrasheedin et al [(4)]. in Jeddah in 2014. to in investigate how frequently male and female school and university students consumed energy drinks, their reasons for drinking them, and their knowledge about the beverages. Number students involved in this study was around 4355 between 12-26 years [(4)].60% of the students had one can per week and 63.3% drink 2 to 4 cans per week [(4)].

Where was significant difference in daily consumption of energy drinks between male was more than female (35.2% and 24.0%, respectively; $P<0.05$). The most common types of drinks they consumed was Code Red. Regard less to the time of day that students used energy drinks more at afternoon [(4)].

Twenty two percent of the students mixed energy drinks with painkillers, such as paracetamol (acetaminophen) products that contain caffeine, or non-alcoholic cocktails drinks that can buy it from coffee shop. More than 70.3% of the students think that price of the energy drinks was fair [(4)].

The most common reasons for consuming energy drinks were insufficient sleep or the need for concentration. More than half of the students (57.7% of males, 51.1% of females) that did not know that energy drinks contain caffeine ($P<0.05$), but majority aware it contain sugar because most students did not read the food label. Most female students (87%) but less than half of the male students (42.2%) knew that energy drinks may cause health side effects [(4)].

Another survey; was conducted in Jeddah by Musaiger et al [(11)]. to measure Knowledge, Attitudes and Practices toward Energy Drinks among Adolescents in Saudi Arabia and the total sample size was 1061 male and female. current study showed that a high proportion of Saudi adolescents consumed a high amount of energy drinks and there was a significant difference between male and female in consuming energy drinks with 31.9% of male had energy drinks one to two days per week and only 24.7% in female [(11)].

They mentioned that Advertisements were the main source of information. About half of students that involved in this study knew that these drinks contain caffeine. Sixty seven percent of participants confused energy drinks with soft drinks. Furthermore, they were unaware of the side-effects on their health. Knowledge and practices regarding energy drinks need improvement so that they will understand the drinks' contents and their impacts on health We should educate the public about energy drinks either in social media or in schools about its side effects on health [(11)].

In study carried out among college students of three major universities in Riyadh (king Saud university, princess Nora Bint Abdul Rahman university and Imam Muhammad Ibn Saud Islamic university) in 2015 that involved 472 students from both genders. Around 71.6%. of students use energy drinks as daily habits. Most common kind was Red Bull, Power Horse, Bison, Bugzy, Code Red, Boom Boom, and others. They were using it without knowing its benefits and risks [5].

Most of students they believed that energy drinks are safe in general. A majority of students felt that energy drinks enhance academic performance and improve concentration, strength and endurance. And 38.8% indicated that energy drinks were taken as a pain reliever. On other hand, 54.4% felt that energy drinks were a healthy choice [5].

Most students 54.7% reported a family member or friend as being their main source of information on energy drinks. Fewer than 10% of college students reported their sources of information as being online, coach or physician, and nutritionist or dietician resources [5].

One research was done regarding energy drinks consumption, prevalence, side effects and awareness among female students in Prince Sattam bin Abdulaziz University in Saudi Arabia in 2016. The response rate generated for 337 students was 94.1%. The results highlighted that 81.3% were a regular consumer. And large portion of students that involved in this study started to consume energy drinks at age of 16 and above [12].

furthermore, the top reasons for consuming it was accompanying friends, better performance in exams, concentration during studies and its flavour. According to this study 163 students out from 274 who consume energy drink does not recommend for other. Also, in measuring the knowledge about energy drinks more than half of students didn't know its effects on health [12].

International studies:

A meta-analysis study done by Visram et al [2]. to review consumption of energy drinks by children and young people. Only 46 out of 410 studies meet the inclusion criteria. And a majority of studies were cross-sectional. the involved participants aged 11–18 years and were conducted in North America or Europe [2].

Consumption of energy drinks by children and young people was found to be a gender related which more in boys than girls, and the highest consumption observed most in sedentary individuals who stayed more on TV and video games and high physical active persons [2].

Also, Advertising was the major influences on young people's use of energy drinks, with participants reporting seeing them on TV, the internet, through games promotions, via sports sponsorship and in shops. The primary reason to purchase and consumption of energy drinks are Taste and flavour and to enhance sports performance [2].

There is growing evidence that consumption of energy drinks is associated with a range of adverse outcomes and risk behaviours in terms of children's health and well-being. Several studies identified a strong and positive association between the use of energy drinks and higher health-damaging such as headaches, stomach aches, hyperactivity and insomnia. The greater energy drinks use the higher chance to express these symptoms and awareness of possible negative effects was low [2].

Another meta-analysis study done by A. Shah et al to evaluate the effect of acute energy drinks consumption on blood pressure parameters and heart rate. From total 361 studies only 15 studies meet the inclusion criteria. The patient population that included was healthy patients with age between 15 to 40 years [13].

All these 15 studies that included in this meta-analysis study was a prospective clinical study that asses the effects of an energy drinks of blood pressure parameter and heart rate after specific duration which range between 30 minutes to 6 hours [13].

The results of this meta-analysis found that energy drinks significantly increase systolic and diastolic blood pressure post-consumption. There also appears to be a dose effect because when caffeine consumed was <200 mg the SBP elevation was under 4 mm Hg and more than 6 mm Hg when caffeine consumption was ≥200 mg [13].

In another study of healthy volunteers, 400 mg of caffeine increased SBP from 118 ± 5 mm Hg to 128 ± 8 mm Hg ($P < 0.01$) and DBP from 75 ± 6 mm Hg to 77 ± 7 mm Hg ($P < 0.05$) over 3 hours. Heart Rate did not change significantly in the overall analysis [13].

Methodology:-

Study type and Settings:

This is a cross-sectional study conducted at Technical and Vocational Training Corporation (Saudi Arabia) in Al-Madinah Al-Munawara Region in 2021 to see the prevalence and adverse effects of energy drinks among male college students between March 2021 and august 2021.

Study population:

According to Technical and Vocational Training Corporation (Saudi Arabia) in Al-Madinah Al-Munawara Region in 2021 and estimated number is 20000 male students.

Inclusion criteria:

1. Male students
2. Attending Madinah College of Technology
3. Welling to participate

Exclusion criteria:

1. Female students
2. Faculty student outside Al-Madinah Exclusion criteria
3. Not welling to participate

Sampling technique:

A total of Three hundred seventy-seven (373) college students out of 6000 college students from Madinah College of Technology -MCT of Al-Madinah. City, Saudi Arabia in 2021 will be selected randomly to minimize selection bias and to increase the statistical power of the study as much as possible. The students at the college will ask to volunteer for the study through their college E-mails**.**

Sample size:

It was calculated by epi info app from CDC version7.2.3.1. Which is a statistical software used for sample size calculation. The programmed developed by CDC**.**

The calculated sample was as the following**:**
Population size: 6000 students**.**
Acceptable margin of error: 5%
Excepted frequency: 50%
Confidence interval:95%
Sample size: 377 male students

Study tool:

The included students were asked to fill a predesigned structured questionnaire. The questionnaire was developed for previous study and has been validated (internal validity Cronbach alpha: 0.86) (4). The questionnaire included questions about identification characteristics including age, sex, educational level and department. The questionnaires also included data about Consumption of energy drinks such as reasons, number of cans, types of energy drinks, time of consumption and any adverse effects from energy drinks. The questionnaire will be distributed by e-mail to Madinah College of Technology -MCT students

Statistical analysis:

Analyses were conducted using Statistics SPSS 23.0 for windows (SPSS Inc., Chicago, IL, USA). Quantitative data were presented as the mean ± SD & (range), and qualitative data were expressed as absolute frequencies (number) & relative frequencies (percentage). Percent of categorical variables were compared using the Chi-square test or Fisher exact test when appropriate. P-value < 0.05 was considered statistically significant.

Results:-

Out of the invited 377 students, only 373 students filled and returned the questionnaire with a response rate of 99%.the table 1presents the **Sociodemographic characteristics of participants.**
Fifty-nine- point two percent (59.2%) aged between 20- 25 years old, 31.9% were less than 20 years old and 5.6% were 26- 30 years old. Thirty-six-point five (36.5%) were specialized in network system management, 24.7% technical support, 18% programming, 4.8% cyber security and 3.8% electronics.

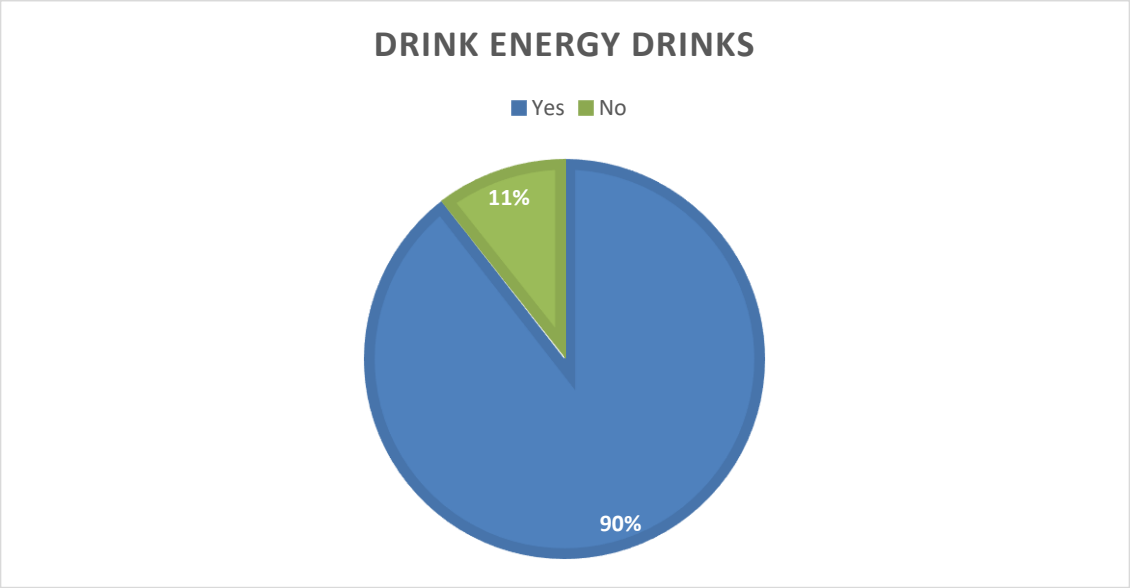
Thirty-one-point six percent (31.6%) were in the first academic year, 24.1% the second, 39.9% the third, and 2.4% in the fourth academic year. 94.4% were single. Seventy-six-point one (76.1%) had generally good health condition, 21.4% medium and 2.4% had bad health condition. Regarding comorbidities, 92.5% of participants had no comorbidities, 3.2% had asthma, 1.6% diabetes, and 0.5% hypertension.

Table (1):- Sociodemographic characteristics of participants (n=***373***).

Parameter		No.	%
Age	**Less than 20**	119	31.9
	20 - 25 years old	221	59.2
	26 - 30 years old	21	5.6
	31 - 35 years old	6	1.6
	36 more than	6	1.6
Specialization	**Programming**	67	18.0
	Network systems management	136	36.5
	General Administration	3	.8
	electronics	14	3.8
	cyber security	18	4.8
	computer	5	1.3
	sustainable energy	1	.3
	marketing	1	.3
	computer technology	11	2.9
	Technical Support	110	29.5
	Electric Power	7	1.9
Academic year	**first**	118	31.6
	the second	90	24.1
	the third	149	39.9
	the fourth	9	2.4
	the fifth	5	1.3
	the sixth	2	.5
Social status	**Single**	354	94.9
	Married	19	5.1
Health condition	**Good**	284	76.1
	Bad	9	2.4
	Medium	80	21.4
Co-morbidities	**Asthma**	13	3.2
	Hypertension	2	0.5
	Herniated disc and amputation of the left hand below the elbow	1	0.3
	Anaemia	1	0.3
	Hypersensitivity	1	0.3
	Kidney stone	1	0.3
	rheumatism	1	0.3
	Diabetes	6	1.6
	I don't have any disease	347	92.5

The prevalence of students who reported consuming energy drinks was 89.5% and only 10.5% never consumed energy drinks.

Figure (1):- Percentage of participants who use energy drinks.



A high proportion (42.4%) of participants reported that they drank energy drinks at the age 16- 20 years old, 39.1% at 12- 15 years old and 6.7% at 21- 25 years old.

Seventy one percent (71%) of respondents drank one to three energy drink packs per week, 11.6% drink 4- 6 packs, 6% 7- 9 packs 3.6% 10- 12 packs, 1.5% 13- 15 packs and 3% more than 15 packs per week.

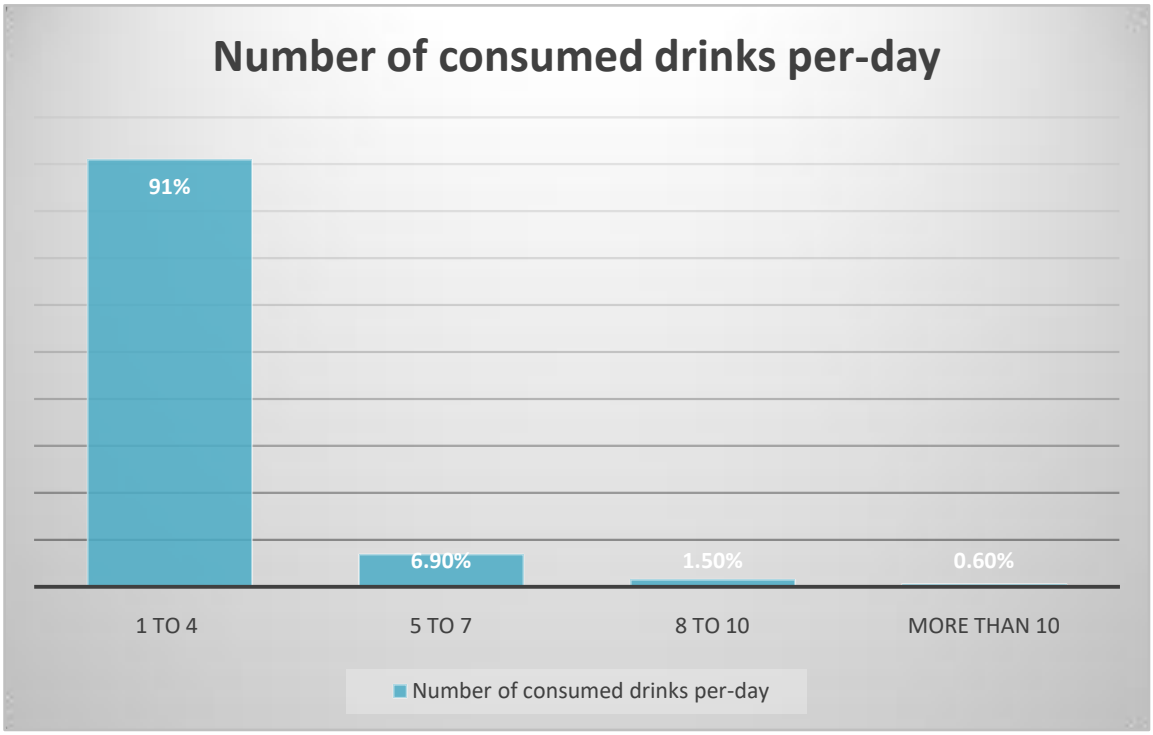
Favourite type of energy drink was reported as 71.9% Code red. The other brands of energy drinks that students consumed included 21.3% Red bull, 21% Bison**,** and 11.7% power horse.

Regard to the time of day that students used energy drinks, most students (69.3%) at evening time. Other was reported to be during the day by 20.6%, wake-up time to start of work by 6%, and 4.2% at night and before bed.

Table (2):- Determinants of energy drinks use among study participants (n=***373***).

Parameter		No.	%
Drink Energy drinks	**Yes**	334	89.5
	No	39	10.5
Age when started drinking energy drinks	**12- 15**	146	39.1
	16- 20	158	42.4
	21- 25	25	6.7
	26- 30	5	1.3
	Do not drink	39	10.5
Number of cans of energy drinks per week	**refill a month**	11	3.3
	1-2-3 pack	238	71.0
	4-5-6 packs	39	11.6
	7-8-9 packs	20	6.0
	10-11-12 pack	12	3.6
	13-14-15 packs	5	1.5
	More than 15 packages	10	3.0
Largest number of bottles of energy drinks had in one day	**1-4**	305	91.0
	5- 7	23	6.9
	8- 10	5	1.5

	More than 10	2	6.
Favourite type of energy drink	**Code red**	240	71.9
	Burn	19	5.7
	Red bull	71	21.3
	Bison,	70	21.0
	power horse	39	11.7
	Black and Nirav	7	2.1
	Boom boom Bom bom	14	4.2
	duet	13	3.9
	citrus	14	4.2
	Rockstar	5	1.5
	Monster	10	3.0
Energy drink time	**Wake-up time to start of work**	20	6.0
	during the day	69	20.6
	evening time	232	69.3
	At night and before bed	14	4.2
The energy drink time corresponds to:	**Without a specific time**	177	52.8
	While driving long distances	71	21.2
	Nights at parties and events	61	18.2
	Before and during exercise	9	2.7
	study time	6	1.8
	Wake up time to help focus	11	3.3



Reasons for consuming energy drinks was because of its delicious taste in 80.5%, feeling of activism in 29.9%, to reduce fatigue and compensate for lost energy in 14.7%, to drive better in 9.6%, because of effect of advertising and commercials in 2.4%, and to imitate friends in 3.9%.

Twenty- two-point seven percent (22.7%) of participants mix energy drinks with other drinks (3.6% with other energy drinks,3 % with soft drinks and 16.2% with flavours).

Twenty-eight-pint four percent (28.4%) of participants felt the harmful effects of energy drinks on physical health (6.9% of participants reported fast heart rate, 3% reported headache and loss of balance, 1.5% reported teeth problems and 2.1% osteoporosis).

Table (3):- Participant'sconsumption of energy drinks(n=***373***).

Parameter	No.	%	
Reasons for consuming energy drinks: (Bias occur)	**It tastes delicious**	269	80.5
	Giving you a feeling of activism	100	29.9
	Reduce fatigue and compensate for lost energy	49	14.7
	To drive better	32	9.6
	The effect of advertising and commercials	8	2.4
	Imitate friends	13	3.9
	To perform better in the exam	7	2.1
	Before exercise to increase the proportion of glucose and caffeine in the blood	5	1.5
Mix energy drink with other products	**Yes**	76	22.7
	No	259	77.3
If yes, mention	**Other energy drinks**	12	3.6
	Soft drinks	10	3.0
	Flavours	54	16.2
Felt the harmful effects of energy drinks on physical health	**Yes**	95	28.4
	No	240	71.6
If yes, mention	**Kidney pain**	4	1.2
	the teeth	5	1.5
	Stomach ache	4	1.2
	knee pain	4	1.2
	lethargy	5	1.5
	fast heart rate	23	6.9
	ghee	3	0.9
	Headache, loss of balance in walking	10	3.0
	Anorexia	30	9
	Osteoporosis	7	2.1
Price of energy drink	**The price is right**	106	31.6
	higher than the expected price.	217	64.8
	Less than expected price	12	3.6
Support selling drinks in the markets and commercial centres	**Yes**	202	60.3
	No	133	39.7
Number of relatives and friends use energy drinks	**3-1**	106	31.6
	6-4	70	20.9
	7 or more	131	39.1
	Don't know anyone who takes it	28	8.4

Figure (3):-

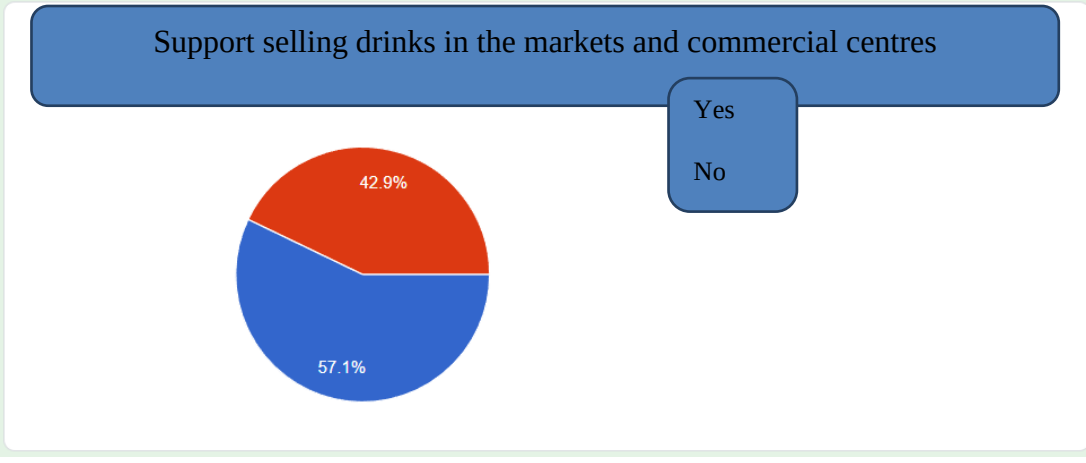
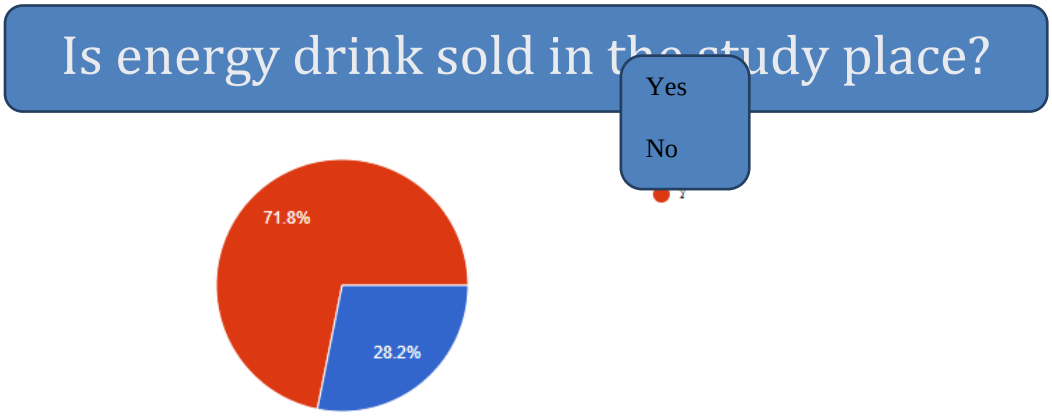


Figure (4):-



Thirty-eight-point five percent (38.5%) of participants Read the energy drink nutrition label. 42.1% know that the main ingredient in energy drinks is caffeine, 82.4% know that energy drinks contain sugar, 37% reported that energy drinks provide the body with activity during exercise, 37.3% reported that energy drinks help focus while driving, and 27.5% think that energy drinks such as soft drinks.13.7% of participants thought that energy drinks are no different from sport drinks. Eighty percent (80%) of participants knew that energy drinks are not suitable for children. Fifteen-point two percent(15.2%) of participants think that energy drinks are not harmful.

Table (4):- Participants Knowledge of Energy Drinks (n=373).

	Yes	No	Don't know
Read the energy drink nutrition label	129 38.5%	160 47.8%	46 13.7%
The main ingredient in energy drinks is caffeine	141 42.1%	78 23.3%	116 34.6%
Energy drinks contain herbs	44 13.1%	167 49.9%	124 37.0%
Energy drinks contain sugar	276 82.4%	28 8.4%	31 9.3%
Energy drinks are no different from sport drinks	76 22.7%	156 46.6%	103 30.7%
Energy drinks can be consumed while waking up without health damage	46 13.7%	221 66.0%	68 20.3%
Energy drinks provide the body with activity during exercise	124 37.0%	135 40.3%	76 22.7%
Energy drinks are suitable for children	32 9.6%	268 80.0%	35 10.4%
Energy drinks do not cause anxiety and stress	76 22.7%	167 49.9%	92 27.5%
Drinking energy drinks at night does not cause sleeplessness	86 25.7%	178 53.1%	71 21.2%
Drinking energy drinks in the morning helps you stay active and focus	77 23.0%	168 50.1%	90 26.9%
Energy drinks help focus while driving	125 37.3%	133 39.7%	77 23.0%
I can drink any amount of energy drinks	64 19.1%	220 65.7%	51 15.2%
Energy drinks are not harmful	51 15.2%	236 70.4%	48 14.3%

Energy drinks such as soft drinks	92 27.5%	198 59.1%	45 13.4%

		Number of Energy drinks consumed per week							Total (N=152)	P value
		Refill a month	**1-3 pack**	**4-6 packs**	**7-9 packs**	**10-12 pack**	**13-15 packs**	**>15**		
Speciality	**Programming**	2	34	12	3	2	2	0	55	**0.237**
		18.2%	14.3%	30.8%	15.0%	16.7%	40.0%	0.0%	16.4%	
	Network systems management	2	95	10	6	5	0	4	122	
		18.2%	39.9%	25.6%	30.0%	41.7%	0.0%	40.0%	36.4%	
	General Administration	1	1	0	0	0	0	0	2	
		9.1%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	
	electronics	1	6	4	1	1	0	1	14	
		9.1%	2.5%	10.3%	5.0%	8.3%	0.0%	10.0%	4.2%	
	cyber security	0	17	0	0	0	0	1	18	
		0.0%	7.1%	0.0%	0.0%	0.0%	0.0%	10.0%	5.4%	
	computer	0	2	1	2	0	0	0	5	
		0.0%	0.8%	2.6%	10.0%	0.0%	0.0%	0.0%	1.5%	
	Technical support	0	8	1	2	0	0	1	12	
		0.0%	3.4%	2.6%	10.0%	0.0%	0.0%	10.0%	3.6%	
	sustainable energy	0	1	0	0	0	0	0	1	
		0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	
	marketing	0	1	0	0	0	0	0	1	
		0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	
	computer technology	1	6	0	1	1	1	0	10	
		9.1%	2.5%	0.0%	5.0%	8.3%	20.0%	0.0%	3.0%	
	Electric Power	0	4	2	1	0	0	0	7	
		0.0%	1.7%	5.1%	5.0%	0.0%	0.0%	0.0%	2.1%	

Chi-square test was used.

academic year	**first**	2	67	16	9	4	1	6	105	**0.008**
		18.2%	28.4%	41.0%	45.0%	33.3%	20.0%	60.0%	31.5%	
	the second	3	57	11	5	3	2	3	84	
		27.3%	24.2%	28.2%	25.0%	25.0%	40.0%	30.0%	25.2%	
	the third	4	104	10	6	3	2	1	130	
		36.4%	44.1%	25.6%	30.0%	25.0%	40.0%	10.0%	39.0%	
	the fourth	0	3	2	0	2	0	0	7	
		0.0%	1.3%	5.1%	0.0%	16.7%	0.0%	0.0%	2.1%	
	the fifth	2	3	0	0	0	0	0	5	
		18.2%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	
	the sixth	0	2	0	0	0	0	0	2	
		0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	

Chi-square test was used.

	Number of Energy drinks consumed per week							Total (N=152)	P value
	Refill a month	**1-3 pack**	**4-6 packs**	**7-9 packs**	**10-12 pack**	**13-15 packs**	**>15**		

Age	**Less than 20**	1	68	14	9	3	2	3	100	**0.972**
		9.1%	28.6%	35.9%	45.0%	25.0%	40.0%	30.0%	29.9%	
	20 - 25 years old	9	144	22	11	9	3	7	205	
		81.8%	60.5%	56.4%	55.0%	75.0%	60.0%	70.0%	61.2%	
	26 - 30 years old	1	16	2	0	0	0	0	19	
		9.1%	6.7%	5.1%	0.0%	0.0%	0.0%	0.0%	5.7%	
	31 - 35 years old	0	6	0	0	0	0	0	6	
		0.0%	2.5%	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%	
	36 more than	0	4	1	0	0	0	0	5	
		0.0%	1.7%	2.6%	0.0%	0.0%	0.0%	0.0%	1.5%	
Social status	**Single**	11	222	38	20	12	5	10	318	**0.550**
		100.0%	93.3%	97.4%	100.0%	100.0%	100.0%	100.0%	94.9%	
	married	0	16	1	0	0	0	0	17	
		0.0%	6.7%	2.6%	0.0%	0.0%	0.0%	0.0%	5.1%	
Health condition	**good**	8	187	26	15	8	3	6	253	**0.117**
		72.7%	78.6%	66.7%	75.0%	66.7%	60.0%	60.0%	75.5%	
	not good	0	3	2	1	2	0	1	9	
		0.0%	1.3%	5.1%	5.0%	16.7%	0.0%	10.0%	2.7%	
	medium	3	48	11	4	2	2	3	73	
		27.3%	20.2%	28.2%	20.0%	16.7%	40.0%	30.0%	21.8%	

Chi-square test was used.

Discussion:-

Seeing as college students are often under a lot of pressure to perform well both academically and athletically, some are always in need of energy drinks to help them perform better academically and/or athletically[12]. Thus, this study aims to estimate the Prevalence of energy drinks and adverse effect among Male students in Technical and Vocational Training Corporation (Saudi Arabia) in Al-Madinah Al-Munawara Region in 2021.

In our study, 89.5% of participants consume energy drinks which was higher than mostly reported in previous literature. A Saudi study in Qassim reported that about 37.8% of the study participants were energy drink consumers[16] which was lower than what have been reported in Hail (46%).36% of the daily consumers drink more than two cans every day, representing about 11% of the total study participants, while about one third of them consume two cans every day[17].

This also was less than those reported among students at Dammam university in 2010[18]. When comparing with other results from Saudi Arabia, the current result was less than that reported in Western districts (52.2%)[19] but higher than that reported in the Middle (34%)[20]. Unfortunately, the rate of consumers among male students of Qassim University was higher than what have been seen in Umm Al-Qura (27.2%)[21].

About those result published outside KSA, the rate of energy drink consumer among American college students came to be 46%[22], which is similar to those reported in Hail[17] and Dammam[18] but higher than the rate in Qassim[16]which was less than that of another report published on Saudi college students found that 71.6% currently consume energy drinks[5]. Turkish college students (48.3%) [23], and much less than that for college students in the United States (51%)[24],and in Ghana (62.2%)[25].

As for rate of consumption, in our study 71% of participants drink one to three energy drink packs per week, 11.6% drink 4- 6 packs, 6% 7- 9 packs 3.6% 10- 12 packs, 1.5% 13- 15 packs and 3% more than 15 packs per week. A Saudi study reported that 21.4 % of the students consume energy drinks every day. Among those who consume energy drinks daily, about half of them drink one can daily, while 21.7 % use three cans daily [16]In another Saudi study, the results showed that a high percentage of college students (71.6%) use different energy drinks per week.

A majority of students (39.3%) consumed only one can of energy drink, and 92 students (27.2%) consumed two cans of energy drinks[5], which is similar to the study conducted by Trunzo et al. [26]. Mean energy drink usage among college students was two to five days per week. Similarly, results showed that 40% of students drink energy drinks at least once a week yet sometimes increase frequency of consumption to twice a week (34%). On the other

hand, professionals reported drinking energy drinks at least once a week (36%) with a tendency to increase intake to more than three times a week [27].

In another study, it was shown that 18.8% of college students consumed energy drinks at least weekly [28]. In another study, the average amount of energy drink consumption among nursing students when studying for their most recent midterm exam was 1.63 ± 2.64 cans per week, and the number of cans of energy drink consumed during that time spanned 1–30 per week [29].

Regarding reasons for consuming energy drinks, our study found that participants drink it for its delicious taste 80.5%, feeling of activism in 29.9%, to reduce fatigue and compensate for lost energy in 14.7%, to drive better in 9.6%, because of effect of advertising and commercials in 2.4%, and to imitate friends in 3.9%. Other study reported that about 53% of consumers continue to keep on these drinks because of habitation, while 23.1% justify them continue just to imitate their friends[16].

A study done on university students in United States reported that the majority of users consumed energy drinks for insufficient sleep (67%), to increase energy (65%) or to drink with alcohol while partying (54%)[24].A study on Turkish students reported that reasons for using energy drinks included getting energy, staying awake, boosting performance in sports, or mixing with alcoholic beverages[23].

Another study results showed that a high percentage of students 71.6% used energy drinks for a variety of reasons. For example, 28.4%believed that studying for exams or finishing a project was a reason for using energy drinks, (26%) reported using energy drinks for gaining energy (speed, strength, power), whereas 23.4% reported enhanced academic performance as their reason for using energy drinks[5].

In another recent study, energy drinks were most commonly used to increase energy (50%), combat sleepiness (45%) enhance academic performance (40%) and enhance performance during sports (23%) [30]. In an additional study, it was found that the main reason for energy drink consumption among college students was to support studying for exams or completing a project (31.4%) [31].

These results correlate with another study, which showed that the majority of college students consumed energy drinks because the drinks were perceived to be safe (48.2%) and the students wanted to: improve health (54.4%), improve endurance (64.5%), gain more energy (66, 7%), increase training (54.7%), increase strength (43.2%), and improve concentration (42.0%). In a previous study, the reason for using energy drinks was to gain energy in general (32.8%), whereas other reasons given included: lack of sleep (12.8%), just to be like friends (11.4%), or driving (8.5%) [31].

In another study, it was found that the main reason for energy drink consumption among college students was to provide energy while work overtime to finish a course project or working overtime at the office [27]. Moreover, a recent study showed that, taste-driven consumers (31%) endorsedpleasurable taste, energy-seeking consumers (24%) endorsed function and taste motives, and hedonistic consumers (33%) endorsed pleasure and sensation-seeking motives [32].

Additional reasons for energy drink consumption were for enhanced fatigue recovery (79.9%) concentration enhancement (29.3%) and curiosity (22.0%) [33]. Favourite type of energy drink in this study was reported as 71.9% Code red, 21.3% Red bull, 21% Bison, and 11.7% power horse. Another study showed that Red Bull (31.7%) and Code Red (25.7%) were the most popular energy drinks, followed by Bison (18.3%), Bugzy (7.1%), Power Horse (5.3%), and Double Horse (5.1%)[5].

Similarly, among brands of energy drinks most consumed, Cobra, Red Bull, and Monster Energy were the most popular products used by students. Among the popular brands of energy drinks, Cobra was significantly more popular among professionals (58%), while Red Bull and Monster Energy were significantly more popular among students at 29% and 7%, respectively[27].

Regarding the relationship between timing of energy drink consumption and regular meals, our study participants reported taking energy drinks atwake-up time to start of work by 6%, during the day by 20.6%, 69.3% at evening time and 4.2% at night and before bed. A study inQassim reportedthat 17% consume the drinks after meals, 56.1% consume them before of the regular meals time, and 26.5% consume them with meals[16].

In contrast, 43% of hail students reported that they consume the drinks after meals, 35% consume them before the regular meals time, and 14% consume these drinks with meal[17].

Energy drinks use is characterized by a high prevalence of negative effects and can occur in hazardous situations, such as when combined with alcohol or during sporting activities. This emphasizes the importance of ED risk education, the correction of inaccurate and dangerous perceptions about the usefulness of EDs during exercise and sporting activities, and awareness of the dangers of "rum and Red Bull" drinking behaviour. There is also a need to engage students in more healthy ways of coping with academic demands and improving performance.

Conclusion:-

Energy drink consumption is high among male students in Technical and Vocational Training Corporation (Saudi Arabia) in Al-Madinah Al-Munawara, Saudi Arabia.The rate of consumption is significantly associated with academic year. Energy drinks consumption is associated with a high rate of adverse effects. There is a need to educate students about the potential dangers of energy drinks and promote health and wellness regarding the use on campuses.

Recommendation:-

Health care providers must inform the public of the potential health hazards related to excessive intake of energy drink.

Should have some restriction role in selling energy drink her in Saudi Arabia especially in study place.

Food labels should mention the total amount of caffeine and provide clear information to consumers aboutappropriate limits and the risks of excessive consumption.

Consent:
All the participants will be required to sign a consent section that is included in the questionnaire. The participation of this study is voluntary, and they can withdraw from the study at any time.

Confidentiality:
Privacy and confidentiality of all participants will be assured.

Budget:
self-funded

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استمارة استبيان

Prevalence of energy drinks and adverse effect among Male students in Technical and Vocational Training Corporation (Saudi Arabia) in Al-Madinah Al-Munawara Region in 2021.

قياس مدى انتشار مشروبات الطاقة و تاثيرها الضار بين الطلاب كلية التقنية بمنطقه المدينة المنورة خلال عام 2021

يهدف هذا البحث إلى معرفة استهلاك مشروبات الطاقة بين طلاب كلية التقنية بمنطقه المدينة المنورة وأسباب تناول هذه المشروبات والإلمام بتأثراتها الجانبية على الصحة. وذلك لغرض تصميم برنامج توعية غذائية وصحية لهذه الفئة من المجتمع. نرجو منكم التكرم بالإجابة على اسئلة الاستبيان بدقة وعدم ترك أسئلة بدون إجابة وذلك بالاختيار من الإجابات المتعددة أو ذكر الإجابة المناسبة . علما بأن جميع المعلومات سرية وتستخدم في أغراض البحث العلمي فقط.

أولاً : البيانات العامة والشخصية :

1 - **التخصص :**

2 - **السنة الدراسية :**

3 - العمر:

4 - الحالة الاجتماعية : O أعزب O متزوج

5 - بشكل عام كيف ترى صحتك؟

جيدة متوسطة غير جيدة

6 - هل تعاني من احد الامراض التالية ؟

سكرالضغط تكسرخلايا الدم الربو الشعبي

لا أعاني من أي مرضأخرى.....

ثانيا : التعرف علي استهلاك مشروبات الطاقة بين طلاب كلية التقنية

1 - هل تتناول مشروبات الطاقة : نعم لا

2 - في حالة الإجابة بلا في السؤال السابق . ما هو سبب عدم تناولك لمشروبات الطاقة :

طعمها غير جيد تأثيراتها الصحية الضارة
لم أجربها من قبل توفر اختيارات صحية أخرى
أخرى . أرجو ذكرها .....

3 - كم كان عمرك عند بداية تناول مشروبات الطاقة؟اكتب عمرك

4 - كم عدد العبوات من مشروبات الطاقة التي تتناولها في الأسبوع :

1-2-3 عبوات 4-5-6 عبوات 7-8-9 عبوات
10-11-12 عبوة 13-14-15 عبوة أكثر من 15 عبوة
الرجاء تحديد عدد العبوات .....

ما هو أكبر عدد من قوارير مشروبات الطاقة تناولته في يوم واحد ؟ " اعط رقماً " .....

5 - نوع مشروب الطاقة المفضل :

ريد بول Red **بور هورس** power horse **بايسون** Bison **كود ريد** Code
red **بوم بوم** Bom bom **بغزي**
مونستر Monster **روكستار** Rockstar **بيرن** Burn
غيرها ، حدد .....

6 - وقت تناول مشروب الطاقة :

وقت الاستيقاظوحتى بداية الدوام
خلال النهار
فترة المساء
في الليل وقبل النوم

7 - يتوالى وقت تناول مشروب الطاقة مع :

وقت الاستيقاظ للمساعدة في التركيز

قبل وأثناء ممارسة الرياضة
أثناء القيادة لمسافات طويلة
وقت الاستذكار
السهر في الحفلات والمناسبات
أتناولها بدون وقت محدد

ثالثا : التعرف علي أسباب تناول هذه المشروبات و الإلمام بتأثراتها الجانبية على الصحة.

أسباب تناول مشروبات الطاقة : (يمكن اختيار اكثر من إجابة)
طعمها اللذيذتقليد الأصدقاء
تأثير الدعاية والإعلانات التجاريةإعطاء الشعور بالنشاط
تقليل الشعور بالتعب وتعويض الطاقة المفقودة.

8 - هل تخلط مشروب الطاقة بمنتجات أخرى

نعم لا

في حالة الإجابة بنعم ، أرجو ذكرها .....

10-هل شعرت بتأثيرات ضارة لمشروبات الطاقة على صحتك الجسدية ؟

نعم لا

في حالة الإجابة بنعم ، أرجو ذكرها .....

11-هل تعتقد أن سعر (ثمن) مشروب الطاقة مناسب ؟

أقل من السعر المتوقع سعرها مناسب
أعلى من السعر المتوقع .

12-هل يتم بيع مشروب الطاقة في مكان الدراسة ؟

نعم لا

رابعا :الوعي الغذائي (أو المعارف) بمشروبات الطاقة :

العبارة	نعم	لا	لا أعرف
1 - أقرأالملصقالغذائيلمشروبالطاقة			
1 - المكون الأساسي لمشروبات الطاقة هو الكافيين			
2 - تحتوي مشروبات الطاقة على الأعشاب			
3 - تحتوي مشروبات الطاقة على السكر			
4 - لا تختلف مشروبات الطاقة عن المشروبات الرياضية			
5 - يمكن تناول مشروبات الطاقة وقت الاستيقاظ بدون أضرار صحية			
6 - مشروبات الطاقة تمد الجسم بالنشاط أثناء ممارسة التمارين الرياضية			
7 - يتواجد الكافيين في مشروبات الطاقة والقهوة والشاي			
8 - مشروبات الطاقة مناسبة للأطفال			
9 - مشروبات الطاقة لا تسبب القلق والتوتر			
10 - تناول مشروبات الطاقة في الليل لا يسبب السهر			
11 - يساعد تناول مشروبات الطاقة في الصباح على النشاط والتركيز			
12 - تساعد مشروبات الطاقة على التركيز أثناء قيادة السيارة			
13 - ممكن اشرب اي كمية من مشروبات الطاقة			
14 - مشروبات الطاقة ليس لها اضرار علي الجسم			
15 - مشروبات الطاقة مثل المشروبات الغازية			

شكرا على تعاونكم في الإجابة على الاستبيان ...

أهداف البحث

1. التعرف علي استهلاك مشروبات الطاقة.
2. التعرف علي أسباب تناول هذه المشروبات و الإلمام بتأثراتها الجانبية على الصحة.
3. التعرف علي درجة الوعي الغذائي للمراهقين والشباب بمشروبات الطاقة .
4. اقتراح برنامج توعية غذائية وصحية للمراهقين والشباب الخاص بمشروبات الطاقة.