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Evaluating The Use of Energy Drinks, Food Supplements and Nutrition Habits among Adolescents in terms of Ecological Approach: Antalya Sample

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ABSTRACT

This study was conducted to determine adolescents' habits of consumption of energy drinks and supplementary foods and to evaluate the results using an ecological approach.

This study was conducted with 1084 adolescents between December 2016 and June 2017 in a city center to determine adolescents' habits of consumption of energy drinks and supplementary foods and to evaluate the results using an ecological approach. Data were collected using a self-questionaired form prepared by the researchers.

Male adolescents consumed more sports drinks, energy drinks and protein powders than girls ($p < .001$). Female students were more unable to stop themselves while they were eating compared to male students. Parental continuous dieting was associated with adolescent energy consumption (OR = 0.64, $p = .038$) and adverse drug use (OR = 6.28, $p = .002$) (OR = 2.85, $p = .008$). To criticise continually due to past mistakesrelated to energy consumption (OR = 0.43, $p < .05$), parental desire to know their adolescent's friends was found to be related to drug use (OR = 0.11, $p < .001$) to lose weight. Additionally, we found that depression was related to smoking (OR = 4.05, $p < .001$).

The unconscious use of energy drinks and supplements is increasing rapidly and the effect on the body is unknown.

Key Words: Adolescent, energy drink, food supplement, ecological approach

Introduction

In recent years, the energy drink sector has been growing rapidly. Energy drinks comprised 42.4% of beverage sales in the markets in late 2008 and reached sales of US$164 million by the end of 2013 (1). Recent studies have revealed that these products originally used by athletes, sportsmen and sportswomen for their energy needs are also often used by adolescents (2,3). There was 26.3 million liters of energy drink consumed in 2011 in Turkey, and this increased to approximately 30 million liters in 2012 (4). As is the case for medicines, there is an obligation to declare the contents and quality of these products, whose licenses are approved by the Ministry of Food, Agriculture and Livestock; however, there is no obligation to report their side effects. According to the Turkish Food Codex the term 'energy drink' refers to a flavored non-alcoholic drink containing caffeine, taurine, glucuronolactone, inositol, carbohydrates, amino acids, vitamins, minerals and other food and components (5). The main ingredient of the energy drink is caffeine and this has a stimulating effect. There is no associated health risk with caffeine when less than 400 mg daily is consumed (2). Symptoms such as anxiety, headache, aggressive behaviors, nausea, vomiting and cardiovascular symptoms may occur in individuals who have exceeded a daily consumption of 500–600 mg (6,7). These products can also cause undesirable effects on the skin as well as on gastrointestinal, cardiovascular, endocrine, urinary, and neurological systems. The sweetening of energy drinks and their different flavours encourage their use by adolescents (1). Some parents allow children to use energy drinks,

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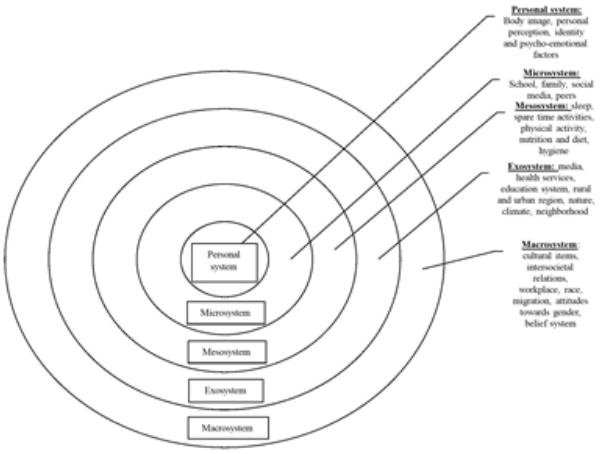

Fig. 1. Ecological Approach Scheme (Created by researchers)

thinking that their children need to stay awake and be energetic.

Adolescents have also been encouraged to use protein powder in some sports centers by emphasizing its muscle-building features, but this can be a health risk. Young people see these products as harmless because they are a part of popular culture and because these products are sold in the market, or by herbalists and on the internet; but there is no age limit for the buyers, and there is a lack of information about the products present in the media. The main target for these products is young people (8). In addition, some sporting activities receive sponsorship from energy drink companies thereby suggesting to young people interested in sports that these products are harmless and their consumption is encouraged (1). It has been shown in many studies that the rate of energy drink use among young people is high (3,9,10). At the same time, the use of energy drinks in boys is more than in girls (3,9). As a result of culturally determined gender roles since infancy and childhood, consumption of these products may be higher in young men.

From childhood, the image of the body begins to form in young people due to their development and the influence of many environmental factors. In this process, girls can easily gain access to the products available on the market to help them lose weight and stay weak while male adolescents develop muscle. The fact that the prefrontal cortex is not fully developed in adolescence and that the feelings of firmness and invincibility are more dominant in male adolescents (11) makes the use of products such as energy drink and protein powder in favor of men.

With the onset of adolescence, female adolescents develop faster physically and gain weight faster than males. Behavior such as social pressure and related to weakness may cause eating problems (12,13) and may affect the use of dietary medicines to stay at a certain weight. In the literature, it has been reported that smoking and alcohol use is increasing in adolescents (14,15) and smoking is associated with depression (11). During this period, depression and smoking were interacting. Excessive smoking can cause depression by increasing stress, and smoking is also used as a negative coping method for depression caused by different reasons. In addition, studies have also shown that consumption of energy drinks increases smoking and alcohol consumption (16-18).

The ecological approach, an important component of the new and modern public health understanding, focuses on the interaction of people with each other and their environments (19). Although this approach has been suggested by sociologists and social service specialists, it has also been widely used, especially in the field of public health. According to the ecological approach, people try to adapt to the environment they are in and are constantly interacting and communicating with this environment (20). For this reason, in situations of breakdown of balance and risky behaviors, the individual should be treated within the environment they live in, the ecological system they are in, and all living areas of the individual should be targeted to determine the source of the problem. The ecological approach can be examined in four subgroups:

a) "Personal system" includes elements that individual characteristics (age, gender, body image, personal perception, identity, psychological and emotional factors)

b) "Microsystem" includes elements that affect primarily the role and responsibilities of a person and his/her relationships with his/her environment (school, work, family, etc.)

c) "Mesosystem" is a system consisting of two or more microsystems that are actively involved in one's life.

d) The "Exosystem" includes the elements that the person is not directly in, but affect the development of that person.

e) "Macrosystem" is a system that includes the belief, culture and ideological system, including the other three systems and it is the outer most component of the environment of the person.

When the figure below is examined, the use of energy drinks and food supplements in adolescents (dietary drugs, protein powder, etc) is actually seen to be affected by all their environmental systems. The data in the literature also show that the environment is an effective element in directing youth people to risky behaviors (21,22). These uses may be due to the personal system of the adolescent (such as body

image), but may also be affected by school/peers/social media (microsystems), nutrition and diet, physical activity habits (mesosystem), or the effect of media, living in urban areas (exosystem) and attitudes about migration, gender (macrosystem) (Figure). In this study, the ecological approach was examined as a conceptual framework and within the scope of the research, the personal system, micro and meso system variables were examined.

The aim of this study is to determine adolescents' habits of consumption of energy drinks and supplementary foods and to evaluate the results using an ecological approach.

Materials and Methods

Location and Time: This cross-sectional study was conducted between December 2016 and May 2017 in city center of Antalya.

Population and Sample: There are 54 high schools providing secondary education in the city center of Antalya. and these schools constitute the population of the study (N: 15506). A systematic sampling method was applied in the sample selection. The high schools located in the city center were ranked according to the percentage of their academic achievement, starting with the first one, then every nineth school was selected to achieve a total of six schools (Antalya Anatolian High School, Antalya High School, 75. Yıl Cumhuriyet Anatolian High School, Hacı Ekrem-Şerife Yazaroğlu Anadolu Imamhatip High School, Prof. Dr. Tuğgeneral Cevdet Demirkol-Ayhan Demirkol Vocational-Technical Anatolian High School and Antalya Ticaret Borsası Vocational-Technical Anatolian High School) so that 1084 students were included in the study. The sample size provides 90% power with a 95% confidence interval at 0.1 effect size (G*Power 3.1.9.4). Since the total number of students in these schools differed, in order to avoid bias two classrooms (A and B classroom) from the 1st, 2nd, 3rd and 4th grade levels in the schools were studied.

Prosedure: Since there was no standardized measurement tool suitable for the purpose and scope of this study, a socio-demographic information form and a questionnaire prepared by the researchers, based on the literature, that also included questions about young people's consumption habits of these products were used to collect the data.

Questionnaire: A data collection form was prepared by the researchers, based on the literature (23-26) and containing a total of 46 multiple-choice questions with two sections. Opinions were obtained from five experts working in the field of child development and adolescent health for the content validity of the questions. In analyzing expert opinion using Davis technique; A) is appropriate, B) is slightly glanced, C) the item is seriously audited, and D) the item is not appropriate. The number of experts who mark the choice of A and B is divided by the total number of experts to obtain the content validity index of the item. 0.80 is considered as the criterion (27). Prior to the study, 37 students were applied pre-test in a high school which was not included in the scope of the research in terms of the suitability and comprehensibility of the research questions. The questionnaire was finalized in line with the feedback of the students.

The first section contained questions about the age, gender, the class level of the adolescents, parents' educational level and profession; in the second section there were questions about the students' heights, body weights, daily sleeping hours, eating habits, the status of doing sports and playing in a team, use of diet products, status of consuming energy and sports drinks, use of protein powder, use of caffeine and questions investigating the parent–adolescent relations. Parent-adolescent relationships are examined in six questions "Does your parents diet to lose weight?, Does your parents warn you to keep your weight?, How do you feel when communicating with your family?, Does your parents criticize you for your past mistakes?, Does your parents want to know who your friends are?, Does your parents want to know where you are after school?". The data collection tool was distributed to the students and it was completed under supervision in the classroom, taking 15–20 minutes.

Statistical Analysis: While the SPSS 20.0 program was used in the coding and evaluation of the data, percentage, frequency, chi-square and logistic regression analysis were applied during the data analysis.

Measures

Dependent Variables: Four dependent variables were examined in the model (energy drink consumption, drug use for weight loss, cigarette use for weight loss, depression). The first variable was examined with the question "Do you consume energy drink?" and three options were categorized in response (I do not consume, sometimes drink, drink every day). The second dependent variable relates to the use of drugs for weight loss. The question "Have you used diet medications to lose weight in the last 30 days?" and the answers were categorized as " Yes, No". The third dependent variable is smoking for weight loss and the question "Have you smoked to lose weight in the last 30 days?" The answers are categorized as "Yes, No". The last dependent variable

is the diagnosis of depression. The question "Have you received any of the following diagnoses?" was asked and a table was prepared to answer "Yes, No" for Anorexia nevrosa, Bulimia neurosa, depression, Type 1 and Type 2 DM, other diagnoses.

Independent Variables: Personal-level factors; Eight variables are included in this group (age, gender, defining their own weight, defining eating behavior, inability to control themselves during eating, satisfaction with body weight, satisfaction with body shape, defining health). The age question was asked as open-ended. The gender question is categorized as "Female, Male". Defining eating behavior "When I feel saturated, I stop eating, I finish everything on my plate even if I am not hungry". The inability to stop himself during eating was questioned with the question "Did you feel that you could not stop or control yourself while eating?" and the answers were categorized as "Yes, No". Body weight and body shape satisfaction status "Are you satisfied with body weight? Are you satisfied with your body shape?" and categorized as "Yes, No". With the question "How do you define your health in general?" the state of health perception was questioned and examined in four categories (Very Good, Good, Medium, Bad).

Micro-level factors; There are six variables in this group (class level, parents' education level, parents' occupation, parents' dieting status, parents' continuous encouragement of young people to diet, parents' criticism of young people for past mistakes). The level of education was examined in four categories as 9th, 10th, 11th and 12th grade. The educational status of the parents was examined in six categories as "Not literate, Literate, Primary, Secondary, High school, University and above ". The profession of the parents was categorized into five groups as "Not working, Civil servants, Workers, Self-employed, Retired". Parents' dietary status and the constant encouragement of young people to diet were categorized into four groups as "Never, A little, Quite, Too much". Parents' criticism of the youth for their past mistakes has been categorized into four groups as "Never, Rarely, Often, Always".

Meso-level factors; This group includes eight variables (smoking, alcohol consumption, vegetable consumption, fruit consumption, carbonated beverage consumption, sports drink consumption, sports team playing, daily sleep time). Smoking and alcohol use "No, I never did; Yes, I started before I was 10; Yes, I started after the age of 11". Vegetable-fruit consumption, carbonated beverage and sportsman's consumption were questioned with the words "I never consume, sometimes I consume, I consume regularly every day". Playing in sports team; "Have you played any sports team in the last 12 months?" and the answers were categorized as "I haven't played any sports team, 1 team, 2 teams, 3 and more teams". "Daily sleep time" was asked as open ended.

Research Hypotheses:

H_1: There is a difference between adolescents using energy drink, sports drink, protein powder according to gender.

H_2: There is a difference between eating behaviors of adolescents according to gender.

H_3: Parent-adolescent communication affects the consumption habits of adolescents.

Ethical Principles: Before the study commenced, the participants were informed individually about the purpose of the study, the time required for completing the questionnaire, that their participation was on a voluntary basis, they could terminate their participation at any point, the information they provided would not be used anywhere other than the study, and there was no need to write names on the questionnaire. After answering their questions, if there were any, their verbal and written consents and parental written consents were obtained. Ethical permission was obtained from Akdeniz University Medical Faculty Clinical Trials Ethics Board (70904504/531) and Antalya Provincial Directorate of National Education (98057890-20-E.14024597) to conduct the study.

Results

There were 1084 adolescents included in this study. When the socio-demographic characteristics of the adolescents were examined, we found that more than half 53.7% were female and had mothers 28.6% and fathers 37.4%, most of whom had a primary school education degree. In addition, among the mothers more than half 65.4% were unemployed, and the fathers of the majority worked in income-generating work 81.6%.

When the adolescents' characteristics regarding eating habits were examined, almost half of them reported having a regular breakfast 45.3% and some consumed fruits 36.6% and vegetables 23.2% regularly. Some 24.5% of the adolescents stated that they consumed coffee regularly every day, 13.7% consumed convenience foods every day and some reported finishing their plate even if they were not hungry 29.1%. When the physical activity habits of the adolescents were examined, we found that most 67.8% went to school via a vehicle and did not play in any sports team 65.3%. In addition, more than half of the adolescents expressed that they were satisfied with their body weight 56.0% and their body shape 59.3%.

Table 1. Characteristics of the Adolescents Concerning Nutrition and Physical Activity Habits (n = 1084)

Characteristics	n	%
Having breakfast		
Never	76	7.0
Sometimes	517	47.7
Every day, regularly	491	45.3
Fruit consumption		
Never	34	3.1
Sometimes	654	60.3
Every day, regularly	396	36.6
Vegetable consumption		
Never	64	5.9
Sometimes	769	70.9
Every day, regularly	251	23.2
Coffee consumption		
Never	114	10.5
Sometimes	705	65.0
Everyday	265	24.5
Convenience food consumption		
Never	118	10.9
Sometimes	818	75.5
Everyday	148	13.7
Eating behavior		
I stop eating when I'm full	769	70.9
Even if I'm not hungry, I finished my plate	315	29.1
Playing in a sports team		
I have not played in any sports team	708	65.3
1	265	24.4
2	84	7.7
3 and more	27	2.5
School transportation		
No biking or walking	735	67.8
Biking or walking a few days a week	96	8.9
Biking or walking every day	253	23.3
Being satisfied with body weight		
Yes	607	56.0
No	477	44.0
Being satisfied with the body shape		
Yes	643	59.3
No	441	40.7
BMI		
Female	20.33±3.24	
Male	21.83±3.17	
Age	16.09±1.22	
Sleep	7.93±1.75	

The adolescents slept an average of 7–8 hours per night. Their average age was 16.09±1.22 years and their mean body mass index (BMI) was within normal limits (Female, 20.33±3.24; Male, 21.83±3.17) (Table 1).

When the characteristics of the adolescents regarding their medical histories and habits were examined, we found that 0.6% had anorexia nervosa, 0.7% had bulimia nervosa, 6.4% had depression, and 2.2% had diabetes. Among these adolescents 12.6% stated that

Table 2. The Characteristics of the Adolescents Concerning their Medical Histories and Habits (n = 1084)

Characteristics	n	%
Being diagnosed with Anorexia Nervosa		
Yes	7	0.6
No	1077	99.4
Being diagnosed with Bulimia Nervosa		
Yes	8	0.7
No	1076	99.3
Being diagnosed with Depression		
Yes	69	6.4
No	1015	93.6
Being diagnosed with diabetes Type 1- Type 2		
Yes	24	2.2
No	1060	97.8
Starting to smoke		
I've never used	932	86.0
10 years and under	15	1.4
11 years and over	137	12.6
Starting to drink alcohol		
I've never used	893	82.4
10 years and under	32	3.0
11 years and over	159	14.7
Consumption of energy drink		
I never consume	511	47.1
I sometimes drink	523	48.2
I drink everyday	50	4.4
The use of protein powder		
Never	977	90.1
Sometimes	64	5.9
Usually	24	2.2
Always	19	1.8
The use of emetic-laxative drug		
Yes	23	2.1
No	1061	97.9
Eating food excessively		
Yes	753	69.5
No	331	30.5
Not being able to stop while eating		
Yes	380	35.1
No	704	64.9
Being criticized by parents		
Never	321	29.6
Rarely	531	49.0
Often	152	14.0
Always	80	7.4

they had started to smoke and 14.7% started to drink alcohol after the age of 11. While the rate of those who consumed energy drinks was 52.9% and the rate of those who used protein powder was 9.9%, only 2.1% stated that they used emetic-laxative drugs. In addition, more than half of the cohort stated that they were eating excessively (69.5%), some could not stop themselves from eating (35.1%), and 21.4% were often criticized by their parents (Table 2).

Table 3. Comparison of Some Consumption Habits of Adolescents in terms of Gender

	Diet carbonated beverage (n %)		Sports drink (n %)		Energy drink (n %)		Protein powder (n %)		Excessive eating (n %)		Unable to stop eating (n %)	
	I never consume	I consume	I never consume	I consume	I never consume	I consume	I never use	I use	Yes	No	Yes	No
Gender												
Female	432 (74.2)	150 (25.8)	426 (73.2)	156 (26.8)	339 (58.2)	243 (41.8)	560 (96.2)	22 (3.8)	419 (72.0)	163 (28.0)	240 (41.2)	342 (58.8)
Male	350 (69.7)	152 (30.3)	207 (41.2)	295 (58.8)	172 (34.4)	328 (65.6)	417 (83.1)	85(16.9)	334 (66.5)	168 (33.5)	140 (27.9)	362 (72.1)
Test and Significance*	x^2=2.722 p=.099		x^2=113.321 p=.000		x^2=46.180 p=.000		x^2=52.405 p=.000		x^2=3.787 p=.052		x^2=21.095 p=.000	

When some consumption habits of the adolescents in terms of gender were compared (Table 3), we found that more males consumed sports drinks (x2 = 113.321, p =.000), energy drinks (x2 = 46.180, p = .000) and protein powders (x2 = 52.405, p = .000) than did females. However, while more female students stated they were unable to stop themselves eating food, compared to male students (x2 = 21.095, p = .000), no statistically significant difference was found between the consumption of diet carbonated beverages and the consumption of excessive food in terms of gender (p > 0.05).

In the multivariate analysis and by using logistic regression, it was found that continuous dieting of parents affected the energy drink consumption among adolescents (OR = 0.64, p = .038) as well as their parents' drug use to lose weight (OR = 6.28, p = .002), and their parents' continuous stimulation to diet affected the adolescents' smoking to lose weight (OR = 2.85, p = .008). We found that criticism continuously due to past mistakes affected energy drink consumption (OR = 0.43, p = .000) and parents' desire to know their friends also affected drug use to lose weight (OR = 0.11, p = .001). In addition, we determined that the consumption of friends/peers was highly effective in increasing the consumption of these products (OR = 0.55, p = .000). However, the diagnosis of depression was associated with smoking (OR = 4.05, p = .000) (Table 4).

Discussion

Results obtained from the present study are very important for encoraging adolescents to adopt healthy lifestyle behaviors. Health is, above all, closely related to the development level of countries as a social phenomenon. Since today's young people are the future of our country, it is crucial for them to have a healthy adolescence to encourage the formation of a healthy society and to live a healthy life in the later stages of their lives.

The ecological assessment of the results of this study is useful for understanding the reasons that drive young people to use these products. Study results suggest the importance of determining the level of adolescents' use of these products to develop adolescent health.

According to the Turkish Food Codex, energy drinks cannot be regarded within the scope of special nutritional foods. It has been determined that these products cannot be sold in sports facilities, school canteens, hospitals or to the group aged under 18 years and these drinks cannot be advertised (5). Nevertheless, advertisements showing them as a beverage necessary for the body, the fact that they can be reached easily and give energy, and their consumption by peers have all triggered the increased consumption among adolescents in particular.

The rate of those saying that they consumed energy drinks was 52.9%; whereas, the rate of those who used protein powder was only 9.9%. By comparison, the rate of those who used energy drinks was 38% in Miller's study, 48.3% in the study conducted by Atila and Çakır, and 55% in Kayapınar and Özdemir's study (3,9,10). The trend shown in the literature is that consumption rates of energy drink have increased over time. This is supported by the results of the present study. As noted in the ecological approach, this increased use may be due to the effect of popular culture and peers, as well as the products being easily accessible and that adolescents feel the need to prove themselves as one of the effects of this development period.

When the correlation between adolescents' energy drink consumption and environmental factors was examined, we found that energy drink consumption by friends/peers increased the consumption of these

Table 4. Logistic Regression Analysis on Some Consumption Habits and Family Relationships of the Adolescents

Variables	Odds Ratio (95% GA)				p*
	Energy drink consumption	Drug use to lose weight	Smoking to lose weight	Depression	
Continuous dieting of parents	0.64 (0.42-0.97)[a]	6.28 (1.98-19.94)[b]			0.038[a] 0.002[b]
Stimulation for diet			2.85 (1.32-6.15)		0.008
Consumption of energy drinks in the environment	0.55 (0.42-0.71)				0.000
Being continuously criticized due to the mistakes in the past	0.43 (0.31-0.58)				0.000
Desire to know their friends		0.11 (0.03-0.43)			0.001
Smoking				4.05 (2.33-7.03)	0.000

products. Adolescents are more affected by their peers and friends during this stage of development (21, 28-30). Adolescents are influenced by characteristics such as occupation, respect, popularity, and belonging among their peer groups in the microsystem of the ecological model (Figure). The thought that it is not harmful to consume the same energy drinks as their friends or that it will be easier for them to be accepted in a friend's environment may be dominating. As stated in one study among university students, environmental factors affect young people's consumption of energy drinks and non-alcoholic beverages (31).

In a multivariate analysis conducted to investigate the effect of adolescents' family relationships on some consumption habits in the present study, we found that parents' continuous dieting increased the energy drink consumption and drug use to lose weight among adolescents. It was determined that adolescents who were persistently stimulated by their parents to diet also showed increased use of cigarettes to lose weight. We also found that continuous criticism about past mistakes increased energy drink consumption in adolescents, and their parents' desire to know their friends also influenced adolescents' use of drugs to lose weight. In addition, those adolescents diagnosed with depression smoked more. Parent-adolescent relationships are very important in terms of making healthy decisions and showing the right behaviors during adolescence. The continuous criticism of the teenager by his parents may have triggered smoking and energy drink consumption due to his depressive symptoms. Saçan and Adıbelli supports this finding (11). Positive parental control is an effective practice that protects young people from risky behavior as a structure combining parents and young people (32).

Parents can be effective role models throughout their child's entire life cycle. According to the microsystem, the observation of parents as continuously dieting may affect adolescents through social learning and trigger them to adopt the same behavior. This may have increased the use of energy drinks by adolescents to meet his/her energy needs. Constantly criticized adolescents may want to consume energy drinks just to upset and punish their parents and they may also use it as a reaction to the communication problems they have with their family. Risky behaviors have been reported significantly less in young people who have a healthy and safe relationship with their parents (3,21). In a meta-analysis, Assink et al. found that the role model of the father was more effective in the formation of negative behaviors in young people (33).

We noted in our study that some adolescents were diagnosed with depression and diabetes and some had started smoking and drinking alcohol after the age of 11. In addition, more than half of the adolescents expressed that they ate excessively. Energy drinks may be preferred because they are reported as improving physical and mental performance and reducing mental fatigue (34). However, studies have also shown that consumption of energy drinks increases smoking and alcohol consumption (16-18). It has been determined that the age of energy drink users varied between 19 and 28 from four cases that presented to an emergency department associated with energy drinks, two of four cases drank on an empty stomach, one consumed more than two bottles, and the other

consumed energy drinks with diet pills both cases had seizures after this consumption (34). The factors affecting the medical histories, nutrition and dietary habits of adolescents may be associated with the mesosystem group of the ecological approach (Figure). This mesosystem includes habits and lifestyle behaviors, we found that smoking and alcohol use affects the use of energy drinks. In one study conducted in the United States, it was determined that high school students' cigarette and alcohol use, and the use of prescription medicines, increased energy drink consumption (3). Similarly, in a cohort study in England and Netherlands, Treur et al. determined that the use of caffeinated beverages and energy drinks was higher among smokers (22).

In the present study, we determined that males consumed more energy drinks and protein powder than females, but there was no statistically significant difference between consumption of dietary carbonated beverages and excessive consumption of food according to gender. This was similar in the studies by Miller, Atila and Çakır, who found that males consumed more energy drinks (3,9). In another study, it was determined that characteristics such as income level of the family, living in the city, the family's educational status were influential on the consumption of these products (35). Unlike the results of the present study, one qualitative study conducted to determine the use of caffeinated energy drinks in adolescents and young adults showed there was consumption of energy drinks in both genders (1). Cultural differences may have been effective in the differentiation of these results as associated with the macrosystem group of the ecological approach.

Conclusion

The ecological system has an predictable effect on adolescents. Adolescents are affected by some subgroups of the ecological approach, especially issues related to parent-adolescent communication and relationship. Sports drinks, energy drinks, protein powder use and eating behaviors in adolescents vary according to gender. Adolescents' consumption of energy drinks, drug use for weight loss, parent-adolescent communication and relationship is affected. It was found that adolescents were diagnosed with depression and cigarette smoking.

What can be done to reduce the consumption of these products?

- Advertisements related to energy drinks should be removed from mass and general media sources.
- Training about energy drinks and food supplements should be organized by community health workers for students, teachers and parents at the schools. Training should include consideration of the easy access to these products and their inadequate control and increased awareness about the product.
- School education should educate about the harms of energy drinks, as they do about tobacco, alcohol, and addictive substances.
- Since one of the main problems with the use of these products is adolescent–parent communication, educational programs for parents whose children have not yet entered adolescence age should be organized for early intervention.
- Physicians and health professionals, especially those working in emergency department services, should receive special training to recognize symptoms related to energy drinks.
- These products should have warning tags about their harmful effects as in tobacco products.

Limitations: Results obtained from the study are limited to the sample of the study.

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