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Research Article

The Environmental practices and dietary behaviors of adolescents in Kirkuk

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Abstract

Adolescence is a critical period of development during which adolescents acquire the specific skills and knowledge necessary to enter the labor force and contribute to economic efficiency. Diet has an extensive and profound effect on human health, mainly on children and adolescents, as the major age groups with high nutritional needs for growth and development. A cross-sectional study was performed in Kirkuk City. Three hundred forty-two adolescents participated in our research. A specially designed questionnaire form has been utilized to collect data online. Females (183; 53.5%), aged 14 – 17 years (204; 59.6%), with mother's educational level ranging from primary-secondary school (203; 59.4%), high father's educational level (174; 50.9%), lived in an urban area (310; 90.6%) with both parents (311; 90.9%) were the main participants. The mean BMI was 23.075 ± 5.5. BMI was significantly correlated with age, parental marital status, and father's job (P = 0.001, 0.012, and 0.003, respectively). Only milk was heavily correlated with weight (P is 0.02). Common food eaten for breakfast was bread (206; 68.7%) and tea (196, 65.3%). Sweets were the preferable snacks (57.9%). More than half of them were concerned about their weight (228, 66.7%) practising sports daily in less than 30 mins. Adolescents spent more than four hours on social media (166; 48.5%) using a laptop or mobile (248; 72.5%). The study noticed neglect of safety food behavior (reading the instructions on packaged food 54.1%, checking expiry date 44.2%, hand washing before meals 63.8%, and washing fruits and vegetables before eating 88.3%). The nutritional habits of adolescents have changed recently. Unfortunately, snacks have become a meal in adolescents' daily lives. Adolescents neglected

food safety and hygiene practices are still below recommended. Social media has become part of the adolescent's life.
Keywords: Dietary behaviour, adolescent, BMI, Hygiene practices, Social Media

Introduction

Food refers to any material or substance that is ingested to provide nourishment for an individual. It is typically derived from plants, animals, or fungi and comprises vital nutrients, including minerals, vitamins, proteins, fats, or carbohydrates. A human consumes and undergoes processing of the substance to stimulate growth, sustain life, and obtain energy (Hanna, 2002; Services, 2005; Toews & Parton, 2001). Adolescent matter of controversy. The WHO and the UNCRC both define adolescents as individuals between the ages of 10 and 19, while the former defines them as "persons under the age of 18" (Kuruvilla et al., 2016).

Maintaining a healthy diet during adolescence is crucial due to the physiological changes in the body, which can impact an individual's dietary needs. Adolescents are making an increasing number of dietary choices autonomously as they mature.

The intergenerational cycle of undernutrition is reinforced by mounting evidence that the dietary status of adolescent mothers has a significant impact on fetal health and growth (Black et al., 2013; Varela-Silva et al., 2009). Adolescents become more active and require nutritious diets to satisfy their increased appetite and growth spurt. It helps them to participate better in school and athletic activities. Several surveys indicate that a minimum of 16% of adolescents between the ages of 12 and 19 are overweight, and an additional 11% are currently classified as obese (Black et al., 2013; Moreno et al., 2017).

In 2000, more than sixteen percent of those under the age of eighteen lived in economic deprivation, frequently suffering from malnutrition (Moreno et al., 2017). Between 1980 and 1999, the percentage of overweight children and adolescents nearly doubled, and the prevalence of overweight among adolescents aged 12 to 19 rose from 5% to 14% (Evans et al., 1996; Moreno et al., 2017; Twig et al., 2016; Weight, n.d.). Nutritional aspects in teens might revealed in nutritional terms (e.g., obesity and risk of chronic diseases) (Indicator & Survey, 2018; Saydah et al., 2013). Obesity and overweight are significant issues that manifest in children and adolescents and can develop into chronic diseases in adults (Semlitsch et al., 2019). There are several important differences between childhood obesity and adult obesity:

In the beginning, BMI should not be employed in isolation; rather, it should be expressed as a BMI centile about a population that is matched in terms of age and gender. A BMI below the 5th percentile indicates underweight, a BMI between the 85th and 95th percentile signifies normal weight, and a BMI greater than the 95th percentile signifies obesity (Semlitsch et al., 2019). Furthermore, concerning preventing and managing childhood obesity and nutritional and energy deficiency, it is important to note that reducing sedentary behavior and increasing physical activity do not necessarily impede healthy development and growth (Semlitsch et al., 2019).

In some instances, when the degree of obesity is more severe, consistent, manageable weight loss might be an appropriate objective. Extremely obese postpubescent adolescents might benefit from more ambitious weight loss objectives (Lau et al., 2007). Obesity can lead to emotional and social issues as well as an increased risk of numerous health complications, which have a significant impact on the patient's life. There is a significant correlation between childhood obesity and adult obesity, which raises the risk of developing critical health conditions like heart disease and stroke throughout one's life (Lau et al., 2007).

Youth surveys in Iraq (Lobstein et al., 2015) show that obesity is a characteristic of adolescent males and females. Availability of food and low prices, changes in attitude toward body images (Aurino, 2017). Publishing on practices of eating food, e.g., fast foods (fatty and speedy), beverages, coffee, high sugar, sweaty pieces (nestle), snacks, attending restaurants, leaving behinds traditions, e.g., eating alone, sedentary lifestyle, e.g., sitting along on media (social media, videogames, etc.) (Das et al., 2017; KEATS et al., 2018).

Therefore, this work was carried out to establish baseline data on the nutrition of adolescents. Our study objectives are to explore the nutritional habits of adolescents in Kirkuk 2021 and explore adolescents' attention to nutrition in their world, such as body image (beauty), attractiveness, and practicing sports.

Material and methods

Study population

The population of interest comprised male and female adolescents in the seventh through twelfth grades enrolled in private or public schools in Kirkuk in 2021. The study was conducted from the 1st of February 2021 to the end of November 2021. We only received 342 responses over four months. The data were collected in the electronic form of the prepared questionnaire because of the quarantine and online education of the students last year (2021). An interview was conducted

with eight Kirkuk secondary school leaders who permitted their students to participate in this research. Then, the supervisor teachers added us to their online groups with students. Then, after explaining the study's aim and purpose to them in the presence of their parents, they sent the questionnaire in Arabic and asked them to answer the questions in their free time. The chi-square test was used. P value ≤ 0.05 was considered statistically significant.A well-structured questionnaire was prepared and consisted of five sections:

Section A: Demographic data.

Section B: Food frequency consumption.

Section C: Food habits.

Section D: Physical activity and lifestyle.

Section E: Food safety and behavior in hygiene practices.

Results

Table (1) shows the characteristics of the studied sample. More than half of the participants were female (183; 53.5%), aged 14 – 17 years (204; 59.6%), lived within a family size 6 – 9 (172; 50.3%), their mother's educational level ranged from primary-secondary school (203; 59.4%), and father's educational level was high (174; 50.9%). The majority were unmarried (322; 94.2%), lived in urban areas (310; 90.6%), and their parental marital status was married (311; 90.9%). More than half of their mothers were housewives (222; 64.9%), and their fathers were employees (183; 53.5%).

Table 1. Characteristics of the studied sample.

Variable		Frequency	%
Age	≤ 13 years	51	15
	14 – 17 years	204	59.6
	≥ 18 years	87	25.4
Gender	Male	159	46.5
	Female	183	53.5
Residence	Urban	310	90.6
	Rural	32	9.4
Marital status	Single	322	94.2
	Married	20	5.8
Parental marital status	Married	311	90.9

	Divorced	12	3.5
	Widow	19	5.6
Mother's educational level	Uneducated	26	7.6
	Primary-secondary	203	59.4
	High	113	33.0
Father's educational level	Uneducated	14	4.1
	Primary-secondary	154	45
	High	174	50.9
Mother's job	Housewife	222	64.9
	Employee	95	27.8
	Free	25	7.3
Father's job	Without	22	6.4
	Employee	183	53.5
	Free	137	40.1
Family size	2 – 5	159	46.5
	6 – 9	172	50.3
	≥ 10	11	3.2
Total		342	100

Table (2) shows the mean and SD of the studied participants' anthropometric measures. Mean weight, height, and BMI were 59.83, 161.92, and 23.075, respectively.

Table 2. Mean and SD of anthropometric measures of the studied sample.

Anthropometric measure	Mean	± SD
Weight	59.83	17.11
Height	161.92	10.91
BMI	23.07	5.54

Table (3) shows the interpretation of BMI for age-percentile. Male students (13,15, and 18) years old are overweight, with mean BMIs (22.5, 24, and 26.3), respectively, while ten years old male students are obese, with a mean BMI (of 26.75). Female students of (10,13) years old are overweight, with mean BMI (21.56,23) respectively.

Table 3. Interpretation of BMI for age-percentile.

Age	Gender	Frequency	Mean BMI	Category
10 years	Male	2	26.75	Obese
	Female	3	21.56	Overweight
11 years	Male	2	19.16	Normal
	Female	2	15.9	Normal
12 years	Male	8	19.4	Normal
	Female	13	23	Overweight
13 years	Male	8	22.5	Overweight
	Female	11	22	Normal
14 years	male	22	20.45	Normal
	female	11	20	Normal
15 years	male	11	24	Overweight
	female	24	22.7	Normal
16 years	male	16	22	Normal
	female	48	23	Normal
17 years	male	36	23.5	Normal
	female	38	24.34	Normal
18 years	male	27	26.3	Overweight
	female	25	23.4	Normal
19 years	male	25	24	Normal
	female	10	25.6	Normal

Food consumption frequency is shown in Table (4). Most studied samples ate rice, pasta, bread, fruits and vegetables (267, 221; 78.1%, 64.6%, respectively). Unfortunately, over two-thirds of the sample do not drink milk (238; 69.6%).

Table 4. Food consumption frequency.

Food consumption	**Yes**		**No**		**Total**	
	Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**
Drinking milk	104	30.4	238	69.6	342	100
Rice, pasta, bread	267	78.1	75	21.9	342	100
Fruits and vegetables	221	64.6	121	35.4	342	100

Table (5) shows daily food items consumption. Most participants who drank milk had 1-2 glasses daily (80; 76.9%). Over four glasses of water were drunk daily (160, 46.8%). Pasta/rice/bread/ potatoes or pizza lovers had this food in 1-2 portions (238; 89.1%), while fruit and vegetable consumers usually had it in 1 -2 portions /day (175; 79%).

Table 5. Daily food items consumption.

Food item	Frequency					
	(1–2)		(3–4)		> 4	
	No.	%	No.	%	No.	%
Milk	80	76.9	17	16.3	7	6.7
Water	42	12.3	140	40.9	160	46.8
Rice, pasta, bread	238	89.1	25	9.3	4	1.5
Fruits and Vegetables	175	79	38	17	8	4

Table (6) shows the correlation between daily food consumption and the participants' anthropometric measures. Only milk was significantly correlated with weight (P = 0.02).

Table 6. Correlation of anthropometric measures with daily food items.

Food item		Weight	Height	BMI
Milk	Pearson correlation	0.21	0.15	0.14
	P value	0.02	0.09	0.1
Water	Pearson correlation	0.07	0.04	0.05
	P value	0.20	0.42	0.33
Pasta/rice/bread/ potatoes or pizza	Pearson correlation	- 0.02	0.018	- 0.03
	P value	0.72	0.77	0.63
Fruits and Vegetables	Pearson correlation	0.04	0.005	0.05
	P value	0.51	0.94	0.48

Table (7) shows the frequency distribution of food habits and physical activity. More than half of the studied sample never had breakfast daily, had three meals/day and were physically active (220, 212, 284; 64.3%, 62%, and 83%, respectively).

Table 7. Frequency distribution of food habits and physical activity.

Food habits	Always		Never	
	No.	%	No.	%
Having breakfast daily	122	35.7	220	64.3
Having 3 meals daily	130	38	212	62
Physical activity	58	17	284	83

Table (8) shows the frequency distribution of physical activity and lifestyle habits. More than half of them were concerned about their weight (228, 66.7%). Most were not on diet (224, 65.5%), and they do not take diet pills or laxatives, induce vomiting, or not eating (266, 77.8%)

Table 8. Frequency distribution of physical activity and lifestyle.

Physical activity and Lifestyle	Yes		No		Total	
	Freq.	%	Freq.	%	Freq.	%
Concerning about weight	228	66.7	11	33.3	342	100
On diet	118	34.5	224	65.5	342	100
Taking diet pills or laxatives, induce vomiting, or not eating	76	22.2	266	77.8	342	100

Fig. (4) shows the daily sports time for the studied sample. Over half of the sample spend less than 30 mins on sport daily (166, 48.5%). Only (18, 6.7%) of them spend more than two hours on sports.

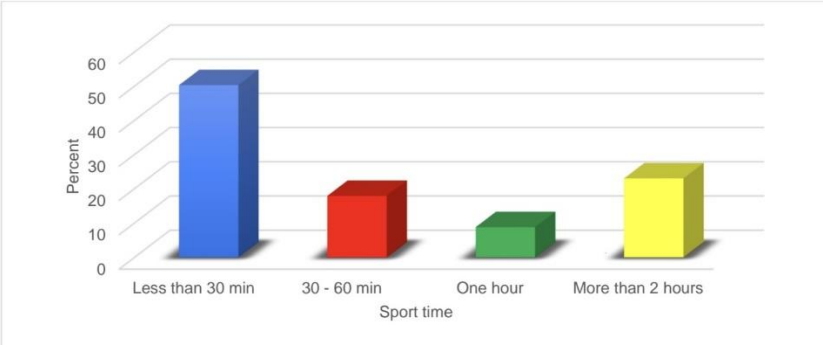

Figure 4. Daily sport time.

Fig. (5) shows daily social media time. More than half of them spent more than four hours on social media (166, 48.5%), and only 76 of them (22.2%) used social media for 1–2 hours.

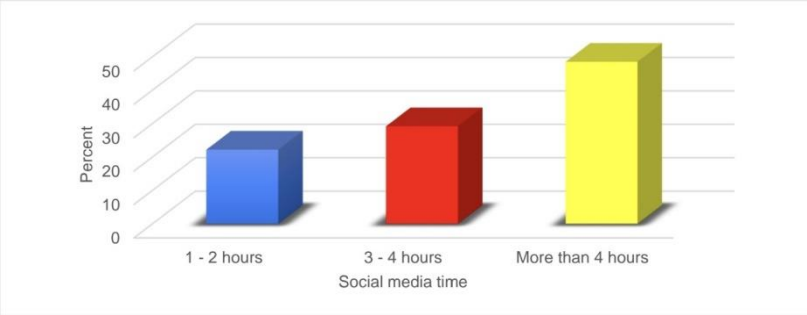

Figure 5. Daily social media time.

Fig. (6) shows the preferences of free time spent by the participants. Mobile phones or laptops were the preferred items for the studied sample in their free time (248; 72.5%). Sports was the least favorable one (44, 12.9%).

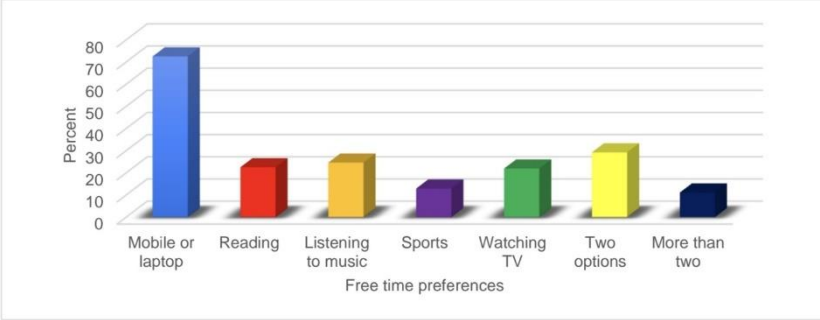

Figure 6. Preferences of the free time

Table (12) lists the frequency of food safety and behavior in hygiene practices. The majority of the studied sample washed fruits and vegetables before eating (302, 88.3%). More than half of them read the instructions on packaged food and wash their hands before eating (185, 218; 54.1%, 63.8%, respectively). Unfortunately, about half of the participants (151, 44.2%) did not check the expiration date.

Food safety and behavior	**Always**		**Sometimes**		**Never**		**Total**	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Checking expiry date	86	25.1	105	30.7	151	44.2	342	100
Reading the instruction on packaged food	85	24.9	185	54.1	72	21	342	100
Hand washing beforeeating	218	63.8	117	34.2	7	2	342	100
Fruits and vegetables washing before eating	302	88.3	36	10.5	4	1.2	342	100

Discussion

Adolescence is the developmental period that begins at puberty and ends at adulthood (KEATS et al., 2018). It is a period of gaining specific expertise and skills to enter the standard workforce and contribute to economic productivity. Major changes in health and health-related behaviors such as smoking and substance abuse, unsafe sexual practices, poor eating, and lack of exercise took place that may impact health outcomes in later life (Das et al., 2017).

Diet has an extensive and profound effect on human health (Salam et al., 2016). Nutrient inadequacy or special dietary patterns during childhood may be associated with adverse health outcomes during childhood, adolescence, and adulthood. Adolescents had more control than children over their eating habits and access to outside food, experimenting more with food choices and diverging more from three meal\day eating patterns (Basch, 2011).

The study showed that the average BMI of the participants was 23.7. Adolescents are concerned about their general appearance and body image. Their thoughts and behaviors are greatly affected by social media and peers. This phenomenon might be explained by the activity of MOH in school health activities and the promotion of sports races. This finding is similar to that in the literature (T DWYER et al., 2001). The study showed that Male students (13,15,18) years old are overweight, with a mean BMI (22.5, 24, and 26.3), respectively, while ten years old male students are obese, with a mean BMI (26.75). Female students of (10,13) years old are overweight, with mean BMI (21.56,23) respectively.

The study revealed that age, sex, parental marital status, and the father's job positively impacted anthropometric measures ($p = 0.00, 0.00, 0.001, 0.01$, respectively). Adolescence is characterized by rapid growth that is second to infancy. The conception of body image might explain the positive significant effect of sex on BMI being different between sexes. In females, it is for beauty; in males, the concept is about physical fitness. These findings are similar to those in literature (Boutelle et al., 2002; Cohen et al., 2003; Wolfe et al., 1994), in contrast to a study conducted in Baghdad in 2020 (Berkey et al., 2003). The study showed that about two-thirds of the study sample ate rice, pasta, bread, fruits and vegetables and did not drink milk (78.1%, 64.6%, and 69.6%, respectively). Most drank milk and ate pasta, rice, bread, fruits and vegetables once to twice daily (94.2%, 89.5%, and 62.9%, respectively). Weekly eaten dairy products, meat, legumes, fruits and vegetables, eggs, fish, sweets, fries, and fast food were once to twice only (44.4%, 42.4%, 54.7%, 43.9%, 40.6%, 52.3%, 40.3%, 45.9% and 46.2%,

respectively). Half of the studied teenagers did not eat sausages (50.9%). This might be because feeding habits are greatly affected by peers, cost, personal and cultural beliefs, food availability and preferences, and mass media. This finding reflects a change in society and the preference of sweets over fruits and vegetables. This figure is similar to that in Baghdad (Berkey et al., 2003) and inconsistent with that in Spain, Croatia and Canada (Amin, 2019; Aranceta et al., 2001; Barić & Šatalić, 2003).

The study revealed that weak food habits had no impact on anthropometry. This finding might be explained by confounders, e.g., physical activity. This study was a limited design. Many studies showed the effect of confounding factors (physical activities) on individual anthropometry (Cohen et al., 2003; T DWYER et al., 2001). It was shown that 35.7% of the adolescents had their breakfast daily. Other studies reported higher figures (88% to 66%) (Barić & Šatalić, 2003; Keski-Rahkonen et al., 2003). This might reflect the change in society, i.e., having snacks is a sign of wealthiness and identifying with westernization. It might be attributed to dieting or concerns about body weight. Going to school without breakfast is also a matter of maternal carelessness. The study showed that the common food eaten for breakfast was bread, and the common beverage drunk was tea (68.7%, and 65.3%, respectively). Sweets were the most common snack among teenagers (57.9%). This finding reflects the eating patterns of their families. The types of foods consumed at breakfast were similar across different population groups. Various kinds of bread are commonly consumed (Nicklas et al., 2000). Snack food is a new tradition in Iraqi society after 2003. This finding reflects a change in society and the preference of sweets over fruits and vegetables. Breakfast consumers had better diet quality (Vermorel et al., 2003). Breakfast skipping has been associated with increased snacking (Basiotis et al., 1999) or higher intakes of high-fat snacks (Sjöberg et al., 2003). This finding is observed in the United States (Resnicow, 1991).

Two-thirds of the participants were concerned about their weight (66.7%), but without diet (65.5%). Surprisingly, some of the teenagers took diet pills or laxatives, induced vomiting or even ate nothing (22.2%). This finding showed a lack of parental supervision and awareness about the proper health of adolescents. These practices (induced vomiting or laxatives) will definitely affect nutrients and essential elements in the body, affecting their intellectual and physical development (Kleinman et al., 1998; Siega-Riz et al., 1998).

The study revealed that 61.7% practiced sports daily in less than 30 minutes. It is a bad figure in Iraq. The conflicts and virtual communications during the COVID-19 pandemic affect sports practice. Neglecting sports sessions in schools is a prominent cause for this finding. This figure is similar to that in Baghdad (Berkey et al., 2003). Unfortunately, most common time spent on social media was more than four hours per day, and laptop or smart phone were the most preferable for spending free time with (72.5%) and sports was the least favorable (12.9%). Adolescents spend a long time using the internet. This phenomenon is general in Iraq. This finding definitely affects their anthropometry. Spending time on social media was enhanced by families to keep them away from outside home danger and widespread violence. This is similar to that in literature (Alaimo et al., 2001; Barry et al., 2017; Griffiths & Kuss, 2017; Turconi et al., 2003).

The study documented the neglect of safety food behavior (reading the instructions on packaged food 54.1%, checking expiry date 44.2%, hand washing before meals 63.8%, and fruits and vegetables washing before eating 88.3%). It is a matter of carelessness, proceeded by parental negligence.

Conclusions

Nutritional habits of adolescents were changed recently. Unfortunately, snacks have become a meal in adolescents' daily life. Breakfast is the best and the essential meal of the day is very neglected by most adolescents, unsafe weight reduction methods spread widely among adolescents, e.g. taking diet pills, laxatives, or by induce self-vomiting, food safety and hygiene practices were neglected by adolescents are still below recommended, & social media affects become part of the adolescent's life. The following recommendations can be followed up:

- Encourage sports sessions in schools.
- Increase advertisement of physical activities through social media.
- Food safety and hygiene practices should be taught in schools.
- Have breakfast because it is an essential meal to reduce snacks.
- Guiding schools to provide healthy food in the school bar.
- Creating educational posters in the schools to raise students' awareness about healthy foods and their benefits.

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