

Eating Behaviors Motives Underlying Food Selection and Perceived Barriers to Healthy Eating among Adolescents in Alexandria-Egypt

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Abstract: Background: Adolescents may have an enormous appetite at times. Generally, if they are eating a healthy, balanced diet they will have an appropriate weight, while eating too much or too much of unhealthy food can lead to overweight. Similarly, not eating enough can also lead to issues of being underweight which can affect energy levels, growth and development. It may also mean missing important nutrients such as iron and calcium. **Aim:** The study aimed to assess eating behaviors motives underlying food selection and perceived barriers to healthy eating among adolescents in Alexandria Egypt. **Study design:** Descriptive design was used to carry out this study. **Study setting:** The study was conducted at 8 youth centers in Alexandria governorate. **Study tools:** three tools were used for data collection from the adolescents namely: Tool I: Motive underlying the selection of food: The Food Choice Questionnaire (FCQ), Tool II: Alarming Eating Behaviors Assessment Questionnaire, and Tool III: Perceived barriers to healthy eating assessment questionnaire in addition to Socio-demographic Characteristics of the studied adolescents. **Study subjects:** The study subjects consisted of 227 adolescents from the above-mentioned settings. **Results:** The findings of the present study revealed that sensory appeal comes as the first priority motive followed by mood, health, and weight control, whereas familiarity followed by convenience, natural content, ethical concern, and the price comes at the last ranking of the healthy eating motives from the studied adolescent perspectives. Additionally, the higher mean percent score was belonging to the social barriers with a mean of 63.2 ± 25.5 , compared to personal and environmental barriers with a mean of 46.0 ± 22.0 . Regarding the alarming eating behaviors among the studied adolescents around one third only of the studied adolescents always committed to daily breakfast intake, more than half of the studied adolescents reported that they always eat outside their home and eating in front the television or while using computer or cellular phone, drinking tea after meal. Less than a quarter only of the studied adolescents received low salty foods. More than one fifth of the studied adolescents declared that they sometimes or always eat a heavy meal at dinner. Only 30.0% of the studied adolescents didn't sleep after dinner by less than two hours. More than two fifths of the studied adolescents reported that they always received three sugary drinks per day. **Conclusion:** There are nine motives affecting the studied adolescent decision to select healthy food and there are two main barriers against healthy eating practices. **Recommendation:** A well planned session must be conducted to orient the adolescents about healthy eating barriers and motives as one of the basic roles of the community health nurses.

Keywords: Motives, Food choice, Barriers, Alarming, Adolescent, Eating behaviors.

INTRODUCTION

The 2030 Agenda for Sustainable Development Goals (SDGs) helps us to imagine a better world, one where there is peace, partnership and prosperity for everybody and for the planet. The

goal of health and well-being for all at all ages (Goal 3) cannot be reached without addressing the major health determinants of adolescents and youth health as the future generation (**WHO, 2019a**). Adolescent health is starting to attract the attention it deserves and is increasingly prominent in global health initiatives (**WHO, 2019b**). Adolescence is known as the period of development that begins at puberty and ends in early adulthood (**Das et al, 2017**). The world now has more young people than ever before of the 7.2 billion people worldwide, over 3 billion are younger than 25 years, making up 42% of the world population. Around 1.2 billion of these young people are adolescents aged between 10 and 19 years (**WHO, 2019b**). Egypt's young population is rapidly growing. The adolescents are around 17 million, representing approximately 19 percent of the total population. Together with youth in the age group 20-24 years, an additional 9 million, adolescents and youth represent almost one third of the Egyptian population (**UNICEF, 2019**).

Nutrition and the adolescent transition are closely interlinked, since eating patterns and behaviors are influenced by many factors, including peer influences, parental modeling, food availability, food preferences, cost, convenience, personal and cultural beliefs, mass media, and body image (**Das et al, 2017**). Meal consumption and diet quality are important for healthy development during adolescence (**MeloRodrigues et al, 2017**). Adolescents who engaged in unhealthy strategies were found to be at a higher risk of eating disorders, since these behaviors were accompanied by higher levels of drive for thinness and body dissatisfaction, as well as by beliefs associated with the importance of weight and body shape as a means of personal and social acceptance (**Cruz-Sáez et al, 2015**).

The literature documents that, nutritional deficits and poor eating behaviors established during adolescence have long-term health, growth, and developmental consequences (**United Nations Department of Economic and Social Affairs, 2018, MeloRodrigues et al, 2017, Slining et al, 2013**). Investments in adolescent health and wellbeing bring a triple dividend of benefits now, into future adult life, and for the next generation of children, assessment of their nutrition and its motivating factors and barriers against better eating behavior are highly important (**Patton et al, 2016**). According to **CDC (2019)** healthy eating plan is defined as eating fruits, vegetables, whole grains, and fat-free or low-fat milk and milk products, lean meats, poultry, fish, beans, eggs, and nuts, low in saturated fats, trans-fats, cholesterol, salt, and low added sugars. Healthy food plan helps to maintain body weight.

There are many factors specifically influence an adolescent's food choices within the community context. Cultural norms, school environment, and neighborhood attributes are examples of factors that may vary across different communities, and accounting for this variation can be quite challenging, unless community perspectives are acknowledged (**Fitzgerald, 2010**). Understanding motives underlying selection of healthy food are important parameters to transform eating practices of the adolescent into healthy practices. These motives include sensory properties of the foods as taste, smell, and texture, convenience with respect to time, hunger or food cravings, emotions and mood states related to food. (**Kumar, 2014**) Moreover, food price, natural content, familiarity, ethical concern, health related issues and weight control are motives affecting adolescent food selection decision (**Pollard et al, 1998, Prescott et al, 2002, Lobera and Ríos 2011**).

Changing food consumption is not an easy task even for those who have actual personal health reasons for doing so, because people have difficulties relating health with their own lifestyles or personal behaviors. Studying alarming eating behaviors are mandatory, these alarming behaviors include omitting breakfast, eating fast or salty food, eating outside home, eating while

watching television, sleeping immediately after eating as well as eating unhealthy fatty meals (**Abd El-Shaheed et al, 2019**).

The most powerful influencers on eating behaviors in adolescence are family, friends and media. Thus, good parental support and understanding have a major imprint on reforming such harmful conduct (**Reicks et al, 2015**). Also, scholastic healthy eating programs are extremely important as a source of easy access to widespread information. The college's canteen must be an ideal exemplar of how healthy eating should be. Penalty for unhealthy food advertisements should be under strict supervision. Further research studies are needed to explore more about eating behaviors on a larger number of adolescents and in different countries (**Kim et al , 2016, Abd El-Shaheed et al, 2019**).

Perception of barriers toward healthy eating behaviors among adolescent are highly important. The perceived barriers to healthy eating may be divided into two main parts; which are personal and environmental barriers, and social barriers. Firstly, personal and environmental barriers involve healthy diet related knowledge and skills, motivation, enjoy eating, buy healthy and cheap meals. Secondly, social barriers toward healthy eating which include parents and media support, and time constrain (**Stevenson et al,2007**).

A primary role of the community health nurse is to work in partnership with different community agencies and population groups to reduce healthy eating barriers and enhancing its facilitators. They act to identify the facilitators and barriers to achieving a healthy diet in the school environment as well as outside the school. Moreover, perceived school-based facilitators included mandatory physical education classes, nutrition education, healthy meals facilities, and optional team sports that are available during recess. A mandatory part of the curriculum must discuss food selection motives underlying, alarming eating behaviors and barriers to healthy eating (**Madrigal et al, 2017**). So, the current study aims to assess eating behaviors motives underlying food selection and perceived barriers to healthy eating among adolescents in Alexandria Egypt.

Aims of the study

The study aimed to

- Assess eating behaviors motives underlying food selection among adolescents in Alexandria Egypt.
- Describe the perceived barriers to healthy eating among adolescents in Alexandria Egypt.
- Assess the alarming eating behaviors among adolescents in Alexandria Egypt.

Research questions:

- What are eating behaviors motives underlying food selection among adolescents in Alexandria Egypt?
- What are the perceived barriers to healthy eating among adolescents in Alexandria Egypt?
- What are the alarming eating behaviors among adolescents in Alexandria Egypt?

MATERIALS AND METHOD

Materials

Research design:

A descriptive research design was used to carry out the study.

Study settings:

The study was conducted in 8 youth centers in Alexandria, according to the Sport & Youth Directorate data 2018; the total number of Youth Centers in Alexandria are **47** presented in **8** zones namely; El-Montazah, East, West, Middle, El-Ajmi, El-Ameriya, El-Gomrok and Borg Elarab. By

using the equal allocation method, one youth center from each zone will be selected randomly to be included in the study. The selected youth centers are the following;

- El-Amrawi youth center affiliated to El-Montazah zone.
- Smouha youth center affiliated to East zone.
- El-Qabari youth center affiliated to West zone.
- El-Shlalat youth center affiliated to Middle zone.
- El-Dkhila youth center affiliated to El-Ajmi zone
- El-Ameriya youth center affiliated to EL-Ameriya zone.
- El-Anfushi youth center affiliated to El-Gomrok zone.
- Borg Elarab youth center affiliated to Borg Elarab zone.

Study subjects:

The target population for this research was adolescents who selected randomly. The total subjects were 227 adolescents who are attending the previously selected Youth Centers. Epi Info7 sample size estimation program was used to estimate the study subjects where, the following information was used to calculate the sample size.

1. Population size: 2940 adolescents
2. Expected frequency: 20%
3. Acceptable error:3%
4. Confidence coefficient: 97% = 2.58
5. Minimum sample size: 227 adolescents

Inclusion criteria:

- Adolescents aged 10-19 years
- Both sex
- Free from chronic diseases

Tools of data collection:

In order to collect the necessary data for the study, three tools were used.

Tool I: Motive underling the selection of food: The Food Choice Questionnaire (FCQ): It is a 36-item instrument that uses a 4-point Likert scale. The tool was developed by **Stephoe et al, 1995** in order to assess the motives that influence food choice. The nine motives labeled health, sensory appeal, price, convenience, mood, natural content, weight control, familiarity and ethical concern. For more accurateness, this questionnaire contains repeated statements with the same meaning but with different language structure to accurately discriminate between truthful and deceptive adolescents' responses.

Tool II: Alarming Eating Behaviors Assessment Questionnaire: This questionnaire was used to assess alarming eating behaviors among the studied adolescents. This questionnaire was developed by the researchers after thorough review of recent literatures. It included eight questions describe the following; daily commitment to breakfast intake, eating outside home, intake of salty foods, eating in front of the television/ mobile/computer, eating a heavy meal at dinner, sleeping after dinner by less than two hours, drinking tea after meals, and intake of three sugary drinks per day.

Tool III: Perceived Barriers to Healthy Eating Assessment Questionnaire: The higher mean indicates high perceived barriers: This tool was developed by the researchers to assess adolescents' healthy eating behaviors barriers. It includes two main parts;

Part I:Personal and environmental barriers to healthy eating which used to assess if adolescents have enough information about a healthy diet, motivated to eat a healthy diet, enjoyed

to eating healthy foods, have skills to plan and shop for preparing or cooking healthy foods, have access to healthy foods, not able to buy healthy foods that are expensive.

Part II: Social barriers to healthy eating which used to assess if the adolescent has no parents' support to eat a healthy diet, no friends' support to eat a healthy diet and not having time to prepare or eat healthy foods. In addition this part including data related to socio-demographic and personal characteristics of the studied adolescents as age, sex, level of education, body mass index, mother's age, mother's education, mother's work, income and social leveling which was assessed using Modified Fahmy et al Scale 2015

Method

Administrative process:

- An official letter from the Faculty of Nursing was directed to the Sport & Youth Directorate in Alexandria to inform them about the study objectives and to take their permission to conduct the study in the selected settings.

Content validity:

- After reviewing the recent literature, tool II and III were developed by the researchers. The tools were validated by juries of five experts in the field of community health nursing. Their suggestions and recommendations were taken into consideration.
- Cronbach's alpha test was used to estimate the reliability of **Tool I** "Motive underling the selection of food: The Food Choice Questionnaire (FCQ)" which revealed that it was $r (> 0.70)$ suggesting that the scale is acceptable since it is more than 70% reliable. Cronbach alpha score for each subdomain is as follows: *health*= 0.81, *mood*=0.83, *convenience*=0.84, *sensory appeal*=0.72, *natural content*=0.86, *price*=0.83, *weight control*=0.85, *familiarity*=0.72, *ethical concern*=0.74. Additionally, the Cronbach's alpha test indicate that **Tool II** "Alarming Eating Behaviors Assessment Questionnaire" is 82% reliable with $r (0.82)$.

Pilot study:

- A pilot study was carried out on 24 adolescents who didn't include in the study, in order to ascertain the relevance, clarity, and applicability of the tools, test wording of the questions and estimate the time required for filling the questionnaire. Based on the obtained results, the necessary modifications were done.

Fieldwork:

- Data were collected by the researchers over four months from the start of March 2019 to end of June 2019.

Statistical analysis:

- The collected data were coded and analyzed using PC with the International Business Machine- Statistical Package for Social Sciences (IBM-SPSS version 25) and tabulated frequency and percentages were calculated.
- The level of significance selected for this study was p-value equal to or less than 0.05.

Scoring System:

Tool I: Motive underling the selection of food: The Food Choice Questionnaire (FCQ) scoring system:

- Each adolescent asked to respond to 36 statements by using a 4- point Likert self-rating scale which ranged from (1) not important at all to (4) very important.
- The total score ranged from 36 to 144 points.
- The higher mean indicates higher motives underling food selection.

Tool II: Alarming Eating Behaviors Assessment Questionnaire scoring system:

- Each adolescent asked to respond to the eight questions that describe their alarming eating behavior. By using a 3- point Likert self-rating scale which ranged from a score of (zero) was given for not present, a score of (one) was given for sometimes present and a score of (two) was given for always present.
- The higher means indicate higher alarming behaviors that need concern.

Tool III: Perceived Barriers to Healthy Eating Assessment Questionnaire:

- Each adolescent asked to respond to the nine questions that describe their perception of barriers to healthy eating.
- A score of (zero) was given for not present and a score of (one) was given for present.
- The higher mean indicates high perceived barriers to healthy eating.
- Body Mass index (BMI) (To determine the nutritional status of the adolescents, the following steps were done:
- Calculate the Body Mass Index (BMI) through measuring the adolescents’ weight and height according the following metric formula $BMI = \text{weight in kilograms} \div (\text{height in meters})^2$.

Ethical considerations

- Informed written consent was obtained from all adolescent after providing an appropriate explanation about the purpose of the study and the nature of the research.
- The confidentiality and anonymity of adolescent’s responses, volunteer participation and the right to refuse to participate in the study were emphasized to them.

RESULTS

Table (1) shows that slightly more than half (52.4%) of the studied adolescents were female. Around three quarters (70.5%) of the studied adolescents were in late adolescence stage (Aged 17 to 19 years) with a mean age of 17.4 ± 1.9 years. Regarding to level of education, the minority (0.9%) of the studied adolescents were read and write compared to 52% who at the secondary level of education. Only 5.3% of the studied adolescents were married. More than half (56.4%) of them reported that they have inadequate income. Regarding social leveling, around two fifths of the studied adolescents were having high to moderate social leveling (37.9%, 41.4% respectively). Regarding their mother age, the mean age of the studied adolescent’s mother was 39.2 ± 4.3 years. Slightly less than half (48.0%) of the studied adolescent’s mothers had just finished secondary level of education. Only 29.5% of them were working mothers. Finally, Body Mass Index (BMI) of the studied adolescents revealed that, around one tenth of them were underweight or obese (10.6%, 12.8% respectively).

Table (1) Distribution of the studied adolescents according to their Sociodemographic and Personal Characteristics (n.227)

Sociodemographic and personal characteristics	no.	%
Sex		
Male	108	47.6
Female	119	52.4
Age (Years)		
Early adolescent (10-13)	22	9.7
Middle adolescent (14-16)	45	19.8
Late adolescent (17-19)	160	70.5

Sociodemographic and personal characteristics	no.	%
Mean \pm SD	17.4 \pm 1.9	
Level of education		
Read and write	2	0.9
Primary level	11	4.8
Preparatory level	61	26.9
Secondary level	118	52.0
Above average	35	15.4
Marital status		
Single	215	94.7
Married	12	5.3
Per capita income / month		
Adequate	99	43.6
Inadequate	128	56.4
Social leveling		
High social level	86	37.9
Moderate social level	94	41.4
Low social level	45	19.8
Very low social level	2	0.9
Mother's age (Years)		
30 to less than 35	23	10.1
35 to less than 40	113	49.8
40 and more	91	40.1
Mean \pm SD	39.2 \pm 4.3	
Mother's education		
Read and write	3	1.3
Primary education	6	2.6
Preparatory education	21	9.3
Secondary education/ intermediate education	109	48.0
University education or higher	88	38.8
Mother's work		
Not working/ housewife	160	70.5
Working	67	29.5
BMI of the adolescent		
Underweight (Less than 18.5 kg/m ²)	24	10.6
Average weight (18.5-24.9 kg/m ²)	174	76.7
Overweight (25-29.9 kg/m ²)	29	12.8

Motives underlying selection of food are divided into nine motives. **Table (2)** elaborates the studied adolescents' opinion regarding it. Regarding convenience as a food selection motive, slightly more than half of the studied adolescents thought that it is very important that they can be bought food in shops close to where they live or work, followed by easily prepared food (56.4%, 53.3% respectively). Furthermore, more than two fifths (44.1%) of them reported that it is very

important that the food is cooked very simply. As regard natural content of food as a selection motives, it was annoyed to found that more than two fifths of the studied adolescents revealed that it is not important at all to select food which contain no additives or contain natural ingredients (44.1%, 43.6% respectively), while 41.0% of them reported that it is moderately important to select food which contain no artificial ingredients.

Regarding Sensory Appeal motive of food selection, the majority of the studied adolescents mentioned that it is very important to select food which taste good, smells nice (86.3%, 81.5% respectively), whereas, around half of them stated that it is very important to select food which has pleasant texture and looks nice (50.7% and 41.0% respectively). In relation to food price as a selection motive ,the table revealed that, the studied adolescents believed that it is not important at all to select food which cheap, have good value for money or not expensive (63.4%, 48.5% and 33.9% respectively).Furthermore, in relation to weight control as a selection motive, less than two thirds of the studied adolescents stated that it is very important to select food which helps to control weight and contain no fat (60.8%, 59.0% respectively).

Regarding familiarity of food as a motive for selection, it was found that 55.5% of the studied adolescents reported that it is very important to them to select food which they usually eat. As regard health as a selection motive, it worthy to found that the majority (87.2%) of the studied adolescents believed that it is very important to select food that keeps them healthy, where 55.5% mentioned that it is very important to select food that good for their skin, teeth, hair, and nails. There are around two fifths of the studied adolescents considered it is very important to select food which are high in fiber and roughage, contains lots of vitamins and minerals, and nutritious. (41.9%, 41.4%, 39.6% respectively). The adolescents revealed that regarding mood as a selection motive. It is very important to them to select food which cheers them up, helps them to cope with stress, keeps them awake and alert, and makes them feel good (81.5%, 78.9%,63.9%, and 59.0% respectively). Finally, regarding food selection ethical concern motive it surprising to found that around half of the studied adolescents stated that it is very important to select food which comes from countries that they approve of politically of it, compared to those who stated that it is not important at all to select food which has the country of origin clearly marked (47.6% with the same percentages for both).

Table (2) Distribution of The Studied Adolescents According to Motives Underlying Their Selection of Food (n.227)

Motives underlying the selection of food	Adolescent's opinion							
	Not important at all (1)		A little important (2)		Moderately important (3)		Very important (4)	
	no.	%	no.	%	no.	%	no.	%
Convenience								
1.Is easy to prepare.	23	10.1	26	11.5	57	25.1	121	53.3
2.Is easily available in shops and supermarkets.	110	48.5	81	35.7	11	4.8	25	11.0
3.Can be cooked very simply.	46	20.3	32	14.1	49	21.6	100	44.1
4.Takes no time to prepare.	146	64.3	25	11.0	36	15.9	20	8.8
5.Can be bought in shops close to where I live or work.	0	0.0	39	17.2	60	26.4	128	56.4
Natural Content								
6.Contains no additives.	100	44.1	28	12.3	50	22.0	49	21.6
7.Contains natural ingredients.	99	43.6	29	12.8	33	14.5	66	29.1

Motives underlying the selection of food	Adolescent's opinion							
	Not important at all (1)		A little important (2)		Moderately important (3)		Very important (4)	
	no.	%	no.	%	no.	%	no.	%
8. Contains no artificial ingredients.	28	12.3	34	15.0	93	41.0	72	31.7
Sensory Appeal								
9. Tastes good. (delicious)	0	0.0	0	0.0	31	13.7	196	86.3
10. Smells nice.	0	0.0	0	0.0	42	18.5	185	81.5
11. Looks nice.	8	3.5	34	15.0	92	40.5	93	41.0
12. Has a pleasant texture.	0	0.0	0	0.0	112	49.3	115	50.7
Price								
13. Is not expensive.	77	33.9	56	24.7	20	8.8	74	32.6
14. Is good value for money.	110	48.5	75	33.0	17	7.5	25	11.0
15. Is cheap.	144	63.4	75	33.0	8	3.5	0	0.0
Weight Control								
16. Is low in calories.	73	32.2	103	45.4	39	17.2	12	5.3
17. Is low in fat.	42	18.5	16	7.0	35	15.4	134	59.0
18. Helps me control my weight.	0	0.0	0	0.0	89	39.2	138	60.8
Familiarity								
19. Is familiar to me.	76	33.5	27	11.9	53	23.3	71	31.3
20. Is like the food I ate when I was a child.	36	15.9	27	11.9	88	38.8	76	33.5
21. Is what I usually eat.	46	20.3	18	7.9	37	16.3	126	55.5
Health								
22. Is high in fiber and roughage.	0	0.0	14	6.2	118	52.0	95	41.9
23. Is nutritious.	7	3.1	27	11.9	103	45.4	90	39.6
24. Contains lots of vitamins and minerals.	17	7.5	23	10.1	93	41.0	94	41.4
25. Is high in protein.	62	27.3	122	53.7	40	17.6	3	1.3
26. Keeps me healthy.	0	0.0	0	0.0	29	12.8	198	87.2
27. Is good for my skin/teeth/hair/nails etc.	22	9.7	25	11.0	54	23.8	126	55.5
Mood								
28. Cheers me up.	0	0.0	0	0.0	42	18.5	185	81.5
29. Helps me cope with stress.	0	0.0	0	0.0	48	21.1	179	78.9
30. Keeps me awake and alert.	0	0.0	0	0.0	82	36.1	145	63.9
31. Helps me relax.	72	31.7	64	28.2	19	8.4	72	31.7
32. Makes me feel good.	0	0.0	0	0.0	93	41.0	134	59.0
33. Helps me to cope with life.	0	0.0	0	0.0	132	58.1	95	41.9
Ethical concern								
34. Is packaged in an environmentally friendly way.	67	29.5	79	34.8	57	25.1	24	10.6
35. Comes from countries I approve of politically.	14	6.2	55	24.2	50	22.0	108	47.6
36. Has the country of origin clearly marked.	108	47.6	55	24.2	51	22.5	13	5.7

Table (3) and figure (1) shed the light on the ranking of the food selection motives among the studied adolescents according to its mean percent score \pm SD. Sensory appeal comes as the

first priority motive followed by mood, health, and weight control, whereas familiarity followed by convenience, natural content, ethical concern, and the price comes at the last ranking of the healthy eating motives from the studied adolescent perspectives(89.8±6.8, 86.0±6.2, 78.2±7.9, 72.6±12.5, 70.7±17.1, 64.8±13.9, 61.8±15.0, 59.5±16.3, and 46.7±13.8 respectively).

Table (3) Distribution of Adolescents’ Food Selection Motives Ranking according to its Mean± SD and Mean%± SD Scores

Motives underlying the selection of food	Maximum allowed score	Mean ± SD	Mean % ± SD
Sensory appeal	16	14.3±1.0	89.8±6.8
Mood	24	20.6±1.5	86.0±6.2
Health	24	18.7±1.9	78.2±7.9
Weight control	12	8.7±1.5	72.6±12.5
Familiarity	12	8.4±2.0	70.7±17.1
Convenience	20	12.9±2.7	64.8±13.9
Natural content	12	7.4±1.8	61.8±15.0
Ethical concern	12	7.1±1.9	59.5±16.3
Price	12	5.6±1.6	46.7±13.8
Total food choice motives	144	104.1±4.9	72.3±3.4

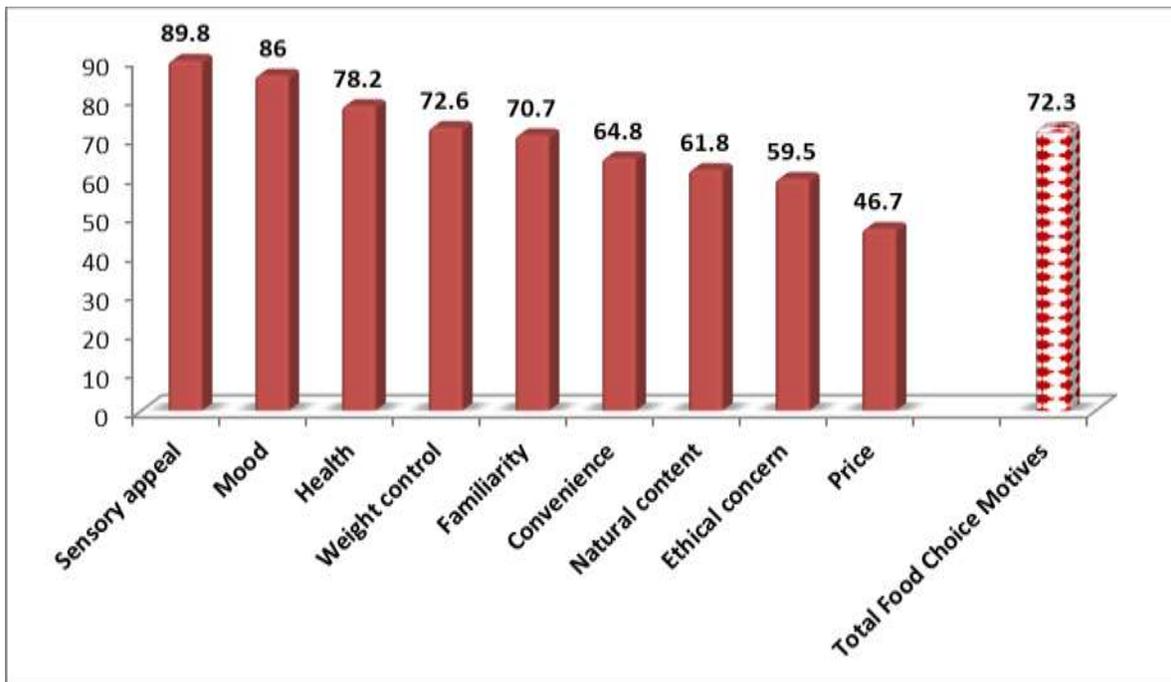


Figure (1) Ranking of food choice motives as perceived by the studied adolescents

Table (4) represents the alarming eating behaviors among the studied adolescents. Only around one third (34.4%) of the studied adolescents always committed to daily breakfast intake, more than half of the studied adolescents reported that they always eat outside their home and eating in front the television or while using computer or cellular phone, drinking tea after meal

(54.2%, 52.9%, 51.5% respectively). Only less than a quarter (23.8%) of the studied adolescents received low salty foods. More than one fifth of the studied adolescents declared that they sometimes or always eat a heavy meal at dinner (24.2%, 21.6% respectively). Only 30.0% of the studied adolescents didn't sleep after dinner by less than two hours. More than two fifths (46.3%) of the studied adolescents reported that they always received three sugary drinks per day.

Table (4) Distribution of The Studied Adolescents According to Alarming Eating Behaviors (n.227)

Alarming Eating Behaviors	no.	%
Daily commitment to breakfast intake		
No	56	24.7
Sometimes	93	41.0
Always	78	34.4
Eating outside home		
No	78	34.4
Sometimes	26	11.5
Always	123	54.2
Intake of salty foods		
No	54	23.8
Sometimes	86	37.9
Always	87	38.3
Eating in front of the television/ cellular phone/computer		
No	25	11.0
Sometimes	82	36.1
Always	120	52.9
Eat a heavy meal at dinner		
No	123	54.2
Sometimes	55	24.2
Always	49	21.6
Sleep after dinner by less than two hours		
No	68	30.0
Sometimes	104	45.8
Always	55	24.2
Drinking tea after meal		
No	88	38.8
Sometimes	22	9.7
Always	117	51.5
Received three sugary drinks per day (soft drink/juices reserved / warm drinks + 3 teaspoonful extra sugar per cup)		
No	34	15.0
Sometimes	88	38.8
Always	105	46.3
Mean ± SD of the total alarm eating behaviors (maximum allowed score=16 points)		7.9±2.51
Mean% ± SD of the total alarm eating behaviors (maximum allowed score =100 points) #		49.3±15.8

Higher mean indicates higher alarm

Table (5) presents the perceived barriers to healthy eating among the studied adolescents. Regarding personal and environmental barriers, around half of the studied adolescents reported that they do not enjoy eating healthy foods, do not have skills to plan and shop for preparing or cooking healthy foods, do not have enough information about a healthy diet, and they do not be motivated to eat a healthy diet (52.4%, 48.5%, 48.0%, and 46.3% respectively). Around two fifths of them reported that they not able to buy healthy foods that are expensive, do not have access to healthy foods (41.4%, 39.6% respectively).

As regard social barriers to healthy eating, the table also portrayed that, the majority (87.7%) of the studied adolescents stated that they not having time to prepare or eat healthy foods. In relation to adolescent's received support to eat a healthy food, more than one third (38.3%) of the studied adolescents proclaimed that they have no parents' support to eat a healthy diet, compared to 63.9% of those who reported that they have no friends' support to eat a healthy diet.

Table (5) Distribution of The Studied Adolescents According to Their Perceived Barriers to Healthy Eating (n.227)

Perceived barriers to healthy eating among studied adolescents	no.	%
A- Personal and environmental barriers to healthy eating		
Do not have enough information about a healthy diet		
No	118	52.0
Yes	109	48.0
Do not be motivated to eat a healthy diet		
No	122	53.7
Yes	105	46.3
Do not enjoy eating healthy foods		
No	108	47.6
Yes	119	52.4
Do not have skills to plan and shop for preparing or cooking healthy foods		
No	117	51.5
Yes	110	48.5
Do not have access to healthy foods		
No	137	60.4
Yes	90	39.6
Not able to buy healthy foods that are expensive		
No	133	58.6
Yes	94	41.4
B- Social barriers to healthy eating		
No parents' support to eat a healthy diet		
No	140	61.7
Yes	87	38.3
No friends' support to eat a healthy diet		
No	82	36.1
Yes	145	63.9
Not having time to prepare or eat healthy foods		
No	28	12.3
Yes	199	87.7

Table (6) and Figure (2) revealed that the higher mean percent score was belonging to the social barriers with a mean of 63.2 ± 25.5 , compared to personal and environmental barriers with a mean of 46.0 ± 22.0 .

Table (6) Distribution of the studied adolescents according to Mean± SD and Mean%± SD of The Total Scores of The Perceived Barriers to Healthy Eating

Healthy eating perceived barriers #	Mean ±SD	Mean % ±SD
Personal and environmental barriers (Maximum points=6)	2.7±1.3	46.0±22.0
Social barriers (Maximum points = 3)	1.8±0.7	63.2±25.5
Total perceived barriers to healthy eating (maximum points=9)	4.6±1.7	51.7±19.5

Higher mean indicates high perceived barriers

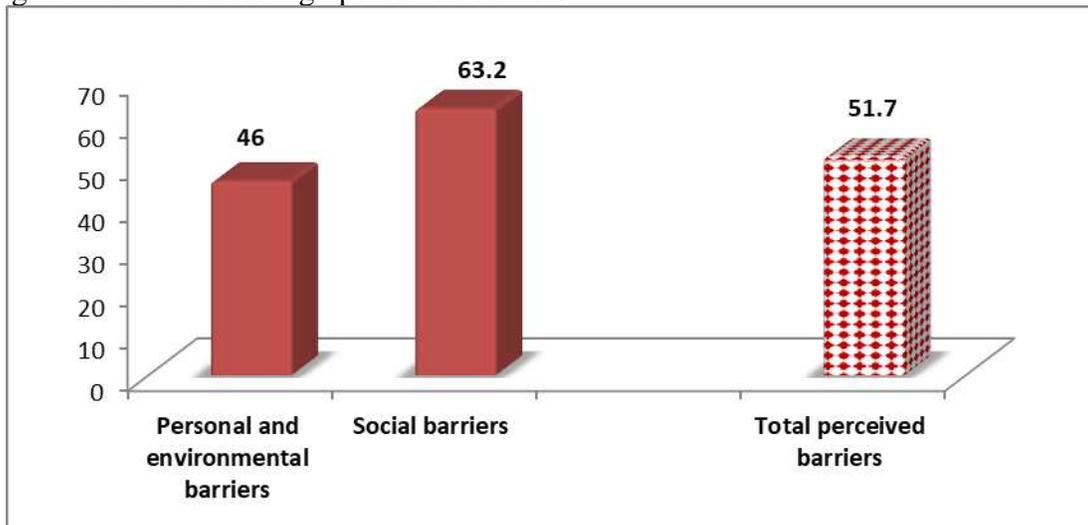


Figure (2) Healthy eating barriers as perceived by the studied adolescents

DISCUSSION

Several reports have documented that the dietary habits of Arab children and adolescents have become saturated with foods low in fiber and high in fat, salt and sugar. Recent studies of the dietary habits of Arab adolescents are characterized by skipping breakfast, inadequate intake of fruit, vegetables and milk, and high intake of fast foods and sugar-sweetened drinks (**Al-Hazzaa et al, 2011a, Al-Hazzaa et al, 2011b, Musaiger et al, 2011**). Understanding motives underlying food choices provides useful insights for development of interventions and communication campaigns for promoting healthier diets (**Machín et al, 2014**).

Food Selection Motives

In the current study 227 adolescents of both sexes were asked to join into the research in order to understand their motives, barriers and alarming behaviors affecting their selection of food. **The current study** shed the light on the ranking of the food selection motives among the studied adolescents according to its mean percent score, where sensory appeal comes as the first priority motive followed by mood, health, and weight control, whereas familiarity followed by convenience, natural content, ethical concern, and the price comes at the last ranking of the healthy eating motives from the studied adolescent perspectives. Nearly the same finding was reported by **Machín et al (2014)** who reported that, the elicited motives were grouped into 10 dimensions:

price, health/nutrition, perceived quality, freshness, sensory characteristics, hedonics, convenience, situational factors, variety and satiety. Additionally, **Sushma et al (2014)** also reported that the 10 motives regarding food selection were include health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity, ethical concern and oral health. Whereas, **Rankin et al (2018)** highlights that, weight control, mood and price are the highest-ranking motivators in food selection

In relation to convenience as a food selection motive, slightly more than half of the studied adolescents in the current study reported that it is very important that they could buy food from shops close to where they live or work, followed by easily prepared food. Furthermore, more than two fifths of them reported that it is very important that the food is cooked very simply. **Pula et al (2014)** study entitled “Regulatory Focus and Food Choice Motives: Prevention Orientation Associated with mood, convenience, and familiarity” findings agreed with the current study findings.

Foods that contain only natural content are free of additives and artificial ingredients. Concern for natural content is strongly associated with concern for health which means that a higher score for the factor ‘natural content’ will result in a higher score on the healthy diet index (**Maarsman, 2016**). In this regard natural content of food as a selection motives was discussed by the studied adolescents in the current study, it was annoyed to found that more than two fifths of them revealed that it is not important at all to select food which contain no additives or contain natural ingredients, while 41.0% of them reported that it is moderately important to select food which contain no artificial ingredients.

Regarding Sensory Appeal motive of food selection, the majority of the studied adolescents stated that it is very important to select food which tastes good, smells nice, whereas, around half of them stated that it is very important to select food which has pleasant texture and looks nice. This finding goes in line with **Hein et al (2012)** who documented that, one of the motives of food selection among the consumers is linked to how that product is liked. Whereas, **Vabø (2014)** declared that, sensory preferences alone do not determine our food choice, there are a lot of factors affecting this choice such as food price. Price has been claimed to strongly influence consumer purchase intention in two different ways: it can lower purchase intention because of a greater monetary sacrifice or have a positive impact by increasing perceived quality (**Jaeger, 2006**). In contrast, In relation to food price as a selection motive the current study revealed that, the studied adolescents believed that it is not important at all to select food which cheap, have good value for money or not.

From another standpoint, **American Psychological Association (2019)**, exploring unhealthy weight control behaviors such as fasting, skipping meals, eating very little food, vomiting and using diet pills, laxatives or diuretics and found that it has also been found to co-occur with obesity. Many adolescents, particularly teenage girls, have body image concerns and engage in unhealthy weight control behaviors which affect their food desire or preference. The same concern was discussed by the studied adolescents in the current study, where less than two thirds of them stated that it is very important to select food which helps to control weight and contains no fat.

Moreover, one of the driving forces behind consumers’ behavioral responses towards food selection is food neophobia which means their selection based on their previous experience of food “familiarity” since some customer refused to buy new or unfamiliar food (**Verneau et al, 2014**).Regarding familiarity of food as a motive for selection, it was found that 55.5% of the

studied adolescents in the current study reported that it is very important to them to select food which they usually eat.

A healthy diet is essential for good health and nutrition. It protects person against many chronic noncommunicable diseases, such as heart disease, diabetes and cancer. Eating a variety of foods and consuming less salt, sugars and saturated and industrially produced trans-fats, are essential for healthy diet (WHO, 2019c). As regard health as a selection motive, it worthy to found that the majority of the studied adolescents believed that it is very important to select food that keeps them healthy, where 55.5% believed that it is very important to select food that good for their skin, teeth, hair, and nails. There are around two fifths of the studied adolescents considered it is very important to select food which are high in fiber and roughage, contains lots of vitamins and minerals, and nutritious. These findings support Tobler et al (2011) who studied “Eating Green. Consumers’ Willingness to Adopt Ecological Food Consumption Behaviors” and found that, healthiness tends to be the most important factors that influence food choice. Moreover, Kaya (2016) added that the major motivation for food selection is health related motive either sufficient or balanced nutrition.

It is well known that unhealthy eating patterns can cause mood swings. Blood sugar fluctuations and nutritional imbalances are often to blame. Without a steady source of fuel from the foods we eat, our mind and bodies don’t function well. Here’s how some unhealthy eating habits can alter mood and emotional well-being (Magill, 2018). With respect to this fact, the studied adolescents in the current study revealed that, it is very important to them to select food which cheers them up, helps them to cope with stress, keeps them awake and alert, and makes them feel good. This finding goes in line with Piqueras-Fizman and Jaeger (2014) who studied the impact of the means of context evocation on consumers’ emotion associations towards eating occasions and found that, emotion and mood enjoyment are linked to food selection

For many people, it can be quite overwhelming to realize the ethical concern in relation to food selection motivation. Regarding food selection ethical concern motive it surprising to found that around half of the studied adolescents in the current study stated that it is very important to select food which comes from countries that they approve of politically of it, compared to those who stated that it is not important at all to select food which has the country of origin clearly marked. This finding goes in line with Insch and Jackson (2014) who studied “Consumer understanding and use of country-of-origin in food choice” and reported that, only 3.5 percent of respondents mentioned Country of Origin (CoO) as one of the factors influencing their decision.

Alarming Eating Behaviors

The current study researchers are also taking a closer look at the alarming eating behaviors among the studied adolescents as one of the important parameters that guide proper planning for healthy messages regarding healthy diet. Unfortunately, wrong dietary choices lead to unsatisfactory nutritional status.

One of the important eating behaviors affecting health is eating breakfast, although the huge benefits of the sustainable commitment to breakfast, only around one third of the studied adolescents in the current study always committed to daily breakfast intake. In this regard, the Arab Teen Life Study (ATLS) was carried out in seven Arab countries, supervised by King Saud University, Saudi Arabia. It was designed to determine the dietary, physical, sedentary and lifestyle habits among adolescents aged 14 to 19 years old. Findings revealed that 52% to 82% of Arab adolescents do not have breakfast every day (Al-Hazzaa et al, 2011a). Moreno et al (2014) who studied “Nutrition and Lifestyle in European Adolescents” also reported that, only half of the

adolescents were breakfast consumers. **Al-Haifi et al (2016)** added that studied subjects who rarely ate breakfast have less sleep duration.

Different studies confirmed that adolescents prefer eating outside their homes for different reasons, may be due to the intense desire to share their meals with peers, or due to time constrain or due to other reasons. In this regard, **Watts et al (2017)** study entitled “Eating Away from Home: Influences on the Dietary Quality of Adolescents with Overweight or Obesity” revealed that, adolescents reported eating approximately 3 lunch or dinner meals prepared away from home and half purchased snacks from vending machines or stores per week. Moreover, the current study reported that, more than half of the studied adolescents reported that they always eat outside their home. That may put them at risk for unhealthy eating behaviors.

Furthermore, adolescent prefer to eat in front of screen (Television/computer screen). More than half of the studied adolescents in the current study reported that they always eat meals in front of the television or while using computer or cellular phone. In this concern, a study done in KSA by **Al-Hazzaa et al (2011b)** for “Physical activity, sedentary behaviors and dietary habits among Saudi adolescents relative to age, gender and region” concluded that higher screen time was significantly associated with a higher consumption of sugar-sweetened drinks, fast foods, cake/doughnuts and energy drinks. Additionally, a study done in Kuwaiti by **Allafi et al (2014)** revealed that the majority of the Kuwaiti adolescents, especially girls, do not perform adequate physical activity, spend more time on sedentary activities and have unhealthy dietary practices especially in front T.V.

Tea is used as a popular beverage worldwide and its ingredients are now finding medicinal benefits. Various studies suggest that polyphenolic compounds present in green and black tea are associated with beneficial effects in prevention of cardiovascular diseases, particularly of atherosclerosis and coronary heart disease, act as anti-aging, antidiabetic and many other health beneficial effects are associated with tea consumption(Khan and Mukhtar,2014). But we have to remember that, drinking tea immediately after a meal can inhibit iron absorption from vegetable sources. In this regard, more than half of the studied adolescents in the current study reported that they always drinking tea after meal. Less than a quarter only of the studied adolescents received low salty foods. More than one fifth of the studied adolescents declared that they sometimes or always eat a heavy meal at dinner. Only 30.0% of the studied adolescents didn't sleep after dinner by less than two hours. More than two fifths of the studied adolescents reported that they always received three sugary drinks per day.

All these alarming behaviors have its dangerous and numerous effects on health. **Musaiger et al (2011)** in their strategy to combat obesity and to promote physical activity in Arab countries declared that part of the solution to the obesity and weight related problems involves changing dietary habits and another part involves changing lifestyle habits such as the amount of time spent watching television, using the internet and playing computer games.

Perceived Barriers to Healthy Eating

Decisions about what food to buy, eat and serve for one's family and friends and influenced by many factors, which act as barriers against their healthy choice (**Jaeger, 2006**).**The current study** presents the perceived barriers to healthy eating among the studied adolescents, where the higher mean percent score was belonging to the social barriers, compared to personal and environmental barriers. Nearly the same findings were reported by **Seguin et al (2014)** who found that social norms and stigma are determinant of food selection barriers. The majority of the studied adolescents stated that they not having time to prepare or eat healthy foods. The amount of time spent on food preparation and cooking may have implications for diet quality and health. Time

might be an essential ingredient in the production of healthier eating habits among adults (**Monsivais et al, 2014**). Prior studies have demonstrated that social norms or cues of others' eating behaviors serve as powerful guides for one's own eating behaviors (**Kim et al, 2019**). But eating behavior barriers exceed social norms, since personal and environmental barriers also affecting healthy eating practices.

Regarding personal and environmental barriers, around half of the studied adolescents in the current study reported that they do not enjoy eating healthy foods, do not have skills to plan and shop for preparing or cooking healthy foods, do not have enough information about a healthy diet, and they do not be motivated to eat a healthy diet. Around two fifths of them reported that they could not be able to buy healthy foods that are expensive do not have access to healthy foods. It is worth mentioning that, however, health motive was considered the third ranking category for adolescents' food selection motives, adolescents as a part of the Egyptian community may have false thoughts regarding healthy food they may think that healthy food has a bad taste or smell or it is very expensive and for high class only or just select this food for making dieting or for only patients not as a part of healthy life style. **Thus, healthy food awareness campaigns targeting both adolescents and their families** at different settings as schools, malls, youth centers, health care settings are recommended. Moreover, these campaigns should introduce a clear message emphasizing on how to make a healthy diet dish with lowest price and how to decorate it. Food decoration is important step for making a healthy food dish looking better to attract all adolescents' senses especially that Sensory appeal comes as their first priority motive for their food selection.

Peer influence is not necessarily a bad thing. We are all influenced by our peers, both negatively and positively, at any age. Sometime peer influence plays a positive role in healthy eating practice, this only occurred if they well prepared and equipped to support each other. That's why community health nurse must put their healthy eating plan with more concern given to peer pressure phenomenon. In relation to adolescent's received support to eat a healthy food, more than one third of the studied adolescents in the current study proclaimed that they have no parents' support to eat a healthy diet, compared to 63.9% of those who reported that they have no friends' support to eat a healthy diet.

To sum up, community health nurses must be oriented by all form of motives, barriers and eating alarm behaviors in order to prepare a proper plan to protect the next generation and shape the healthy future of the adolescent who will be father and mother of tomorrow. Health education which tailored to the adolescents helps to achieve the goal of healthy eating sustainability.

CONCLUSION

Based on the findings of the current study, it can be concluded that:

The sensory appeal comes as the first priority motive followed by mood, health, and weight control, whereas Familiarity followed by convenience, natural content, ethical concern, and the price comes at the last ranking of the healthy eating motives from the studied adolescent perspectives. In relation to healthy food selection barriers, the higher mean percent score was belonging to the social barriers, compared to personal and environmental barriers.

Regarding the alarming eating behaviors among the studied adolescents, only around one third of the studied adolescents always committed to daily breakfast intake, more than half of the studied adolescents reported that they always eat outside their home and eating in front the television or while using computer or cellular phone, drinking tea after meal. Less than a quarter only of the studied adolescents received low salty foods. More than one fifth of the studied adolescents declared that they sometimes or always eat a heavy meal at dinner. Only 30.0% of the

studied adolescents didn't sleep after dinner by less than two hours. More than two fifths of the studied adolescents reported that they always received three sugary drinks per day.

RECOMMENDATIONS

Based on the previous findings, the following recommendations are suggested:

- Emphasize on the importance of rising public awareness regarding food selection motives and its related consequences through educational sessions or educational campaigns and distribute healthy messages about the appropriate food planning and how to overcome its barriers and deals with alarming eating behaviors among adolescents.
- Concerning food selection, parents as well as the adolescents need to be educated and counseled to select healthy meals and provide the needed support and encourage each other to select high nutrient value food and avoid unhealthy one. Moreover, there is a need for the cooperation between Ministry of Health and Population (MOHP) representing with health care providers and the different health care settings and Ministry of Social Solidarity (MOSS) representing with Nongovernmental Organizations (NGOs), Sport and youth directorate, and Ministry of Education (MOE) representing by school teachers, adolescents and their parents to enhance the knowledge of the parents and peer regarding the danger effect of un healthy meals.
- Media directed recommendations including (1) Establishing adult educational programs using all media means about; the food selection motives and emphasizing clear description of healthy and unhealthy food and its consequences, (2) Controlling channels of obtaining unhealthy meals by implementing strict regulations especially at schools and youth centers.
- Enforcement of healthy meals regulations in Egypt that raise inappropriate food consumption. Health authorities have to implement their regulations to enhance the selling of healthy meals only for the younger generation and prohibit selling unhealthy one. Emphasizing peers and parents' role and responsibility in stopping sale these forms of unhealthy meals.
- Further study is needed to investigate the Egyptian parents' perception regarding appropriate food selection and its barriers.
- Further study is needed to assess body weight and socioeconomic with motives and healthy eating barriers.

Acknowledgement

The authors would like to express their appreciation to the studied adolescents who devote their time to participate in this research.

Conflict of interest

The authors declared that they have no conflict of interest.

Author contribution

All three authors were part of the initial design of the research. They shared in collected and analyzed the data, wrote and edited the final version of the text of the manuscript and formatted it and submitted it for publication.

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