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Nutritional Awareness Campaign Combating Egyptian Food Myths: Empowering Adolescents' Healthy Food Consumption in Alexandria Youth Centers

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Abstract: **Background: Not only Adolescence is a golden chance for preventing the harms caused by unhealthy behavior, but also it is a time for empowering adolescents to practicing healthy lifestyle including healthy eating habits with adequate food consumption pattern. Aim: the study aimed to assess the current nutritional status of the studied adolescents attending Alexandria youth centers, explore the Egyptian food myths from the studied adolescents, their parents and staff members of youth centers point of views, and evaluate the adolescents' nutritional knowledge, and practices pre and post the nutritional awareness campaign implementation. Study design: Two study designs were used (triangulated and quasi-experimental design). Study settings: The study was conducted at two youth centers in Alexandria governorate, Egypt. Study tools: four tools were used for data collection from the adolescents and their parents namely: Tool 1: Adolescents' Nutritional Awareness and Practices Assessment Questionnaire, Tool II: Twenty Four Hours Dietary Recall Assessment Tool, Tool III: The Current Nutritional Status of Adolescent Assessment Tool, and Tool IV: Egyptian Food Myths Focus Group Discussion Guide. Study subjects: The study subjects consisted of80 adolescents for quantitative data and 20 adolescents and 20 parents in addition to 4 staff members of youth centers for qualitative data. Results: The findings of the present study revealed that according to the assessment of the nutritional status a of the studied adolescents based on their body mass index (BMI) classifications, slightly more than three quarters of them have average body weight, slightly around tenth of them have overweight, and exactly one tenth of them were underweight, the adolescent food intake according to Food Dome Dietary Guideline for Arab Countries pre and post the nutritional awareness campaign application revealed a significant improvement regarding all food elements in addition to practicing of sports. Food myths as mentioned by the adolescents and their parents were divided into three main categories; firstly "weight control related myths", "Healthy food related myths", and "Pregnancy and lactation related myths". The nutritional awareness and practice level of the adolescent's pre and post the campaign revealed a significant improvement post the campaign than pre. Conclusion: Nutritional awareness campaign affecting adolescents' awareness and practice positively and empowering them regarding their healthy food consumption. Recommendations: Public awareness campaigns are needed to raise adolescents' awareness regarding the negative health impacts of high salt and sugar-sweetened beverage consumption. Food safety awareness campaigns are also needed at different adolescents' existing facilities including schools, clubs, and youth friendly clinics. Arabic scientific nutrition web sites and resources that covering nutrition healthy messages should be directed to empower the adolescents to combat unhealthy nutrition related myths, finally, further study must be directed to study the effect of empowered adolescents on their peers in the area of nutrition awareness.**

Keywords: **Myths, eating behaviors, behavior change communication, adolescent empowerment.**

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1. INTRODUCTION

Adolescence is a period of significant physiological change that includes marked skeletal growth, increased bone mass and fundamental neurological development (**Soliman et al., 2014**).Proper nutrition during adolescence is crucial for optimal growth and development and helps to prepare adolescents for adulthood. However, many adolescents face challenges in achieving optimal dietary intake, especially in low and middle income countries (LMICs) where the majority of adolescents reside (**WHO, 2019**). In fact, poor nutrition is a global pandemic with social, economic, and environmental causes and consequences. Out of the 17 Sustainable Development Goals (SDGs), only SDG2 explicitly mentions nutrition (**Baye, 2017**), while the other SDGs are related to nutrition in some extent and may be affect on and affected by nutritional awareness, so education and advocacy must be directed to fulfilling the educational needs of the public regarding public health nutrition (**Binns, 2017)**.

Healthy eating habits could be developed during adolescence. However external pressure can influence the adolescents' food choice that does not promote growth and/or help them maintain a healthy body weight (Scaglioni, et al, 2018). According to the evidence, healthy eating and regular physical activity play a substantial role in preventing chronic diseases, including heart disease, cancer, and stroke, the three leading causes of death among adults. Poor diet and physical inactivity among younger persons can lead to an increased risk for these diseases in later life. Eating behaviors established during childhood track into adulthood and contribute to long-term health and chronic disease risk. Engaging children and adolescents in healthy eating and regular physical activity can lower their risk for obesity and related chronic diseases **(CDC, 2011)**. So, many health-related organizations are focusing on the most deprived and vulnerable populations including mothers, children and adolescents in conducting nutritional awareness activities and nutritional counseling to deal with such marketing issues and its consequences **(UNICEF, 2013)**.

Certainly, everyone has a role in helping to create and support healthy eating patterns in multiple settings nationwide, from home to school to work to communities through the implementation of nutritional awareness campaign**.** Awareness campaigns are an organized communication activity with the aim of creating awareness and changing behavior among the general population. Nutrition awareness campaign known as combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food- and nutrition-related behaviors conducive to health and wellbeing (**McNulty,2013**).

Generally, nutritional awareness campaign targeting adolescents, promotes links between healthy eating and physical activity, positive self-esteem, healthy relationships with food, healthy attitudes towards body shape, and also promotes the using critical thinking skills when interpreting healthy messages. It is therefore reasonable to believe that, these campaigns could serve as inspiration for future interventions in empowerment-based health promotion areas. In evidence, acquiring scientific knowledge, using active adolescents' involvements activities and using different visual aids might enable the adolescents to view their health behaviors differently, and providing them with greater empowerment in decision-making processes related to their health and their peers' as well **(Holmberg et al, 2018; Reicks et al, 2015; Zhang and McIntosh, 2011).**

Community health nurses (CHNs) as a member of the largest group of health team can play an important role in promoting adolescents' health, as they communicate regularly with them during their transitions to adulthood. They meet them at various settings in the community (**Allender et al, 2014**). Community health nurse can dispel myths for clients and give sound nutritional advices by focusing on actual foods and broader dietary patterns. After reviewing most of literature, there is scarce scientific sources talking about the community food myths as only one study has comprehensively examined the food myths (**Lesser etal,2015**). Respectively, food myths should be discussed with the adolescents and their parents in order to separate fact or science from fiction or silliness.

So, the aim of the present study was to assess the adolescents' nutritional status and identify their nutritional knowledge, and practices and its relation with community food myths. After assessment (situational analysis) there was a need to conducting nutritional awareness campaign combating food myths, hypothesized that, adolescent's nutritional knowledge and practices will be improved after the campaign than before. Adolescents who were acquired nutritional related knowledge will be empowered and well prepared to be peer educators regarding different nutritional issues.

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The study framework:

This study has two frameworks that guide the researchers in conduction this work. The first framework is based on reliable dietary guideline that suits the Egyptian culture. Dietary guidelines are important tools for selecting a healthy diet. Since 2012, there was no special dietary guideline for Arab people and the health Institutes are mainly using the Western dietary guidelines, such as American Food Pyramid. At 2012 Musaiger and the Arab Centers for Nutrition take action to establish "Food Dome", the dietary guidelines for the Arab countries **(Figure1)**. The dome illustration used for the dietary guidelines reflect the culture and religious background of Arab people, as the dome is part of most mosques and churches and is widely used in many buildings in the Eastern Mediterranean Region. The Food Dome is divided into different sections, each representing a food group, proportional to the recommended amounts. A wide variety of foods commonly consumed by Arab people are represented, including traditional foods. The graphical format is characterized only by fresh foods; milk is represented by a bottle. In general, the Food Dome reflects the recommendations of promoting a healthy diet for the WHO EMRO: User-Friendly Guide (**WHO, 2012**). While adhering to regional and cultural food practices and access, specific recommendations for vulnerable groups included school children and adolescents. The dome recommendations for adolescents focusing on eating sufficient quantities of fruit and vegetables daily reduce the intake of food and drink rich in sugar especially between meals, consume a sufficient quantity of whole cereals daily and of those fortified with micronutrients. Reduce intake of food rich in fat such as some western and local fast foods, drink a sufficient quantity of water and other liquids dairy products daily. Maintain proper weight for height and participate in moderate physical activity for 60 minutes on most days (**Musaiger and the Arab Centers for Nutrition, 2012; Montagnese et al, 2019**)

Figure (1) Food DOME Dietary Guidelines for Arab Countries

While, the second framework that guide conducting this study is the Social-Ecological Model which works **to** recognize the complex factors and contexts influencing adolescents' dietary patterns (**Herforth and Ahmed, 2015**). According to U.S. Department of Health and Human Services and U.S. Department of Agriculture 2015-2020 Dietary Guidelines, the Social-Ecological Model (SEM) for food and physical activity decisions can help health professionals including community health nurses to understand how layers of influence intersect to shape a person's food and physical activity choices and ultimately health outcomes. This model includes four major layers of factors; the first layer is sectors factors which include systems (e.g., governments, education, health care, and transportation), organizations (e.g., public health, community, and advocacy), and businesses and industries (e.g., entertainment, marketing, and media). The second layer is settings factors since the individuals make choices in a variety of settings, both at home (family members and parents) and away from home (e.g., schools, youth centers, worksites, community centers, and food retail and food service establishments). The third layer is social and cultural value and norms factors which denote rules that govern thoughts, beliefs, and behaviors include preferences for certain types of foods, attitudes about acceptable ranges of body weight, and values placed on physical activity and health. Finally, the fourth layer is the individual factors such as age, sex, socioeconomic status, race/ethnicity, the presence of a disability, as well as other influences, such as physical health, psychosocial condition, knowledge and skills, and personal preferences (**U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015; Saquib, 2018)**. Adequate understanding of this framework will facilitate the nutritional awareness campaign implementation process.

AIMS OF THE STUDY:

The study aimed to:

- Assess the current nutritional status of the studied adolescents attending Alexandria youth centers.
- Explore the Egyptian food myths from the studied adolescents, their parents' and staff member of the youth centers point of view
- Evaluate the adolescents' nutritional knowledge, and practices pre and post the nutritional awareness campaign implementation in Alexandria youth centers.

Research hypothesis:

- Adolescents' nutritional knowledge and practices will be improved after the implementation of the nutritional awareness campaign than before.

2. MATERIALS AND METHOD

Materials:

Study design:

Two study designs were adopted in the current study (Triangulated study design followed by quasi experimental design).

- **The Triangulated Study Design** (involved qualitative and quantitative data) was conducted at the first phase to assess the adolescents' nutritional knowledge and practices as well as the Egyptian food myths that affecting their food consumption pattern.
- **Quasi Experimental Study Design** was carried out at the second phase to assess the impact of the nutritional awareness campaign on the adolescents' knowledge and practices combating the Egyptian food myths and empowering them to healthy food consumption.

Study settings:

This study was conducted at two youth centers (harvesting the highest adolescent attendees) out of 47 youth centers at Alexandria governorate, Egypt. The selected youth centers namely "Smouha youth center affiliated to East zone and El-Anfushi youth center affiliated to El-Gomrok zone".

Subjects:

A- Subjects for the Qualitative data: twenty adolescents and twenty of their parents &four staff members from the previous mentioned study settings were selected to be involved in four focus group discussions. For each center two focus groups were held. One focus group for adolescents including ten adolescents and one for both parents & staff members from youth center (including ten parents and two staff members).

B- Subjects for the Quantitative data: Eighty male and female adolescents aged 10-19 years who had the willing to participate in the study were selected randomly.

Data collection Tools:

Four tools were used for data collection including;

Tool I: Adolescents' Nutritional Awareness and Practices Assessment Questionnaire:

This tool was developed after reviewing the related literatures to assess adolescents' nutritional awareness and practices (**Musaiger and the Arab Centers for Nutrition, 2012; Montagnese et al, 2019**). This questionnaire including three parts:

Part I: Adolescents' Personal Data:

Socio-demographic characteristics of the adolescents including their sex, age, residence, family income, mothers' education, their reasons for visiting youth centers and their youth center membership.

Part II: Adolescents' Nutritional Awareness:

This part was including 50 questions covering the important aspects of nutrition in order to assess the adolescents' nutritional awareness. All the questions (50) asking about knowledge related to sources of macronutrients and its functions, sources of vitamins and consequences of its deficiency, sources of minerals and consequences of its deficiency and dietary choices and healthy dietary practices.

Part III: Adolescents' Nutritional Practices:

This part including 10 questions assessing adolescents' healthy nutritional practices such as number of meals intake, the way of cooking, food safety, water intake, salt and sweets intake, fast food intake and practicing of exercises.

Tool II: Twenty-Four Hours Dietary Recall Assessment Tool:

This tool used to assess the adolescents food consumption pattern according to the Food Dome (Dietary guidelines for the Arab countries) and the local food composition tables of the Egyptian National institute of nutrition (**Montagnese et al, 2019; Wark et al, 2018; Musaiger and the Arab Centers for Nutrition, 2012**). The adolescents' daily intake from protein, carbohydrate, vegetables and fruits was calculated and scored and classified into three categories (adequate-inadequate- abundant or not consuming) this tool also asking about adolescents' physical activity pattern.

Tool III: **The Current Nutritional Status of Adolescent Assessment Tool:**

This tool was used to determine the current adolescents' nutritional status. This tool was also used to assess the adolescents' Body Mass Index (BMI) through the following steps; measuring the adolescents' weight and height and using the standardized metric formula (weight in kilograms÷ height in meters square),then each adolescent's BMI was compared to the CDC standardized clinical growth chart (**CDC, 2017**). Furthermore, the current adolescents eating habits such as the number of daily meals, escaped meal, eating outside home and the adolescents' dieting was assessed to evaluate the current nutritional status of the studied adolescents.

Tool IV- Egyptian Food Myths Focus Group Discussion Guide:

This focus group guide including open ending questions that was developed by the researchers after literature review to explore the Egyptian food myths and its effect on adolescents' food consumption and eating pattern. This tool helped to identify the priority needs in nutrition education contents with collaboration with both adolescents' family members and adolescents themselves. It includes several parts; **Introduction** part: in this part the researchers introduce themselves

(name, occupation) and explain the study purpose and confirm the confidentiality of data as well as getting their permission for recording. **Engagement question** (ice breaking): the researchers asked the subjects can you express yourself in two words. **Exploration questions:** this including open ended questions that covered the main topic such as questions related to weight control, healthy food myths, vegetables and protein related myths..etc, and **Exist questioning / ending**(closing question): the researchers asking if the respondents had anything else they want to add.

Method:

ADMISTRATIVE PROCESS:

1- **Ethical approval**: The protocol of the study was approved by the "Ethical Committee" affiliated to the Faculty of Nursing Alexandria University.

2- **Administrative approva**l: 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.

DEVELOMENT OF STUDY TOOLS:

After reviewing the recent and related literature, the study tools were developed and used by the researchers in order to collect the study necessary data. These tools were validated after reviewing from 5 experts in the field of community nursing (1), community medicine (1), clinical nutrition (1), pediatric nutrition (1) and curriculum development & nursing education (1).

PILOT STUDY:

The pilot study was carried out for both qualitative and quantitative data to ascertain the relevance, clarity and applicability of the tools. Test wording and estimate the time for filling the questionnaire. Based on the obtained results modification were done.

A- The Pilot study for quantitative data including tool I, tool II, and tool III were carried out on 8 adolescents. Testing the tools was held on one youth center that did not involve the study.

B- MOCK (pilot study) for qualitative data (tool IV) was done on 3 parents & one staff members from the youth center and for 5 adolescents who did not included in the study.

NUTRITIONAL AWARENESS CAMPAIGN DEVELOPMENT PROCESS:

The nutritional awareness campaign development process was including three phases (**Figure 2**).

PHASE 1: Situational analysis for campaign intervention assessment /planning phase: this phase exactly means (**What we've got about**) as it described the type and magnitude of nutrition issues and identifies possible causes of the nutritional problems observed. Moreover, it determined adolescents' existing knowledge, attitudes and practices relating to nutrition, moreover, this phase also identified the nutrition education priorities. Thus, the findings of a situation analysis will help in planning a nutrition intervention, this step including the following;

- Announcement poster at each youth center declared that there will be a day for free measuring adolescents' BMI (for assessing the adolescents' current nutritional status through using Tool III (weight and height were measured for all adolescents who attended that day) and assess their BMI.
- Each adolescent's BMI was compared to the CDC growth chart; accordingly, percentiles position held were identified. Then the following references weight values were used (**CDC, 2017)**.

BMI	References weight values
BMI-for-age < 5^{th} percentile	Underweight
BMI-for-age ≥ 5^{th} - <85^{th} percentile	Normal weight
BMI-for-age ≥ 85^{th} -<95^{th} percentile	At risk of overweight
BMI-for-age ≥ 95^{th} percentile	Obese

- During that day an interview was held with the adolescents, written consent was obtained from adolescents who willing to be involved in the study after telling them the study objectives.
- Pre-test was done by using tool I and tool II.
- Appointments was taken to conducting focus group discussion by using tool IV, this was followed by environmental preparation for focus group conduction.
- Conducting focus groups discussion in each center (to get more in-depth data about the Egyptian food myths and explore to how extent it affects adolescents' food consumption pattern (four focus group discussions were done. For each center two focus groups were held. One focus group for adolescents and one for both parents & staff members from the youth center).
- Based on the situational analysis data, identified gaps in adolescents' knowledge, attitudes and dietary practices were recognized. "**What we need",** the researchers identified the priority needs in nutrition education contents with collaboration with both adolescents' family members and adolescents themselves. The title of the nutritional awareness campaign and the study expectation were identified. A list of the participant's phones or way of contact was needed to reach them easily in case of their selection for including in the campaign.
- The suitable time for campaign were established with both adolescents and administrative personal at the youth centers.
- Another announcement poster was declared with the campaign schedule (4 days including sessions).
- A number of 80 adolescents were selected randomly from the name list and informed about the campaign time.
- Adolescents who did not include in this study informed that they will be involved in another campaign later by their educated peers (peer to peer).
- Preparation of nutrition awareness campaign sessions' contents. The session's contents were prepared by the researchers based on review of the related literature, results of the assessment of the adolescents' needs.
- Selecting the suitable educational strategies as brain storming, group discussion/activities, demonstrations and role play. Educational materials (educational aids) were used to facilitate and illustrate teaching contents such as posters, handouts, food models and real natural food stuffs, food dome, my plate example, food pyramid, art educational drawing. These educational materials helped in the success of the awareness campaign. Moreover, my food plate educational booklets were distributed to the participants to enhance the retention of knowledge.

PHASE II: Implementation of the campaign awareness sessions phase: This phase included the implementation of the planned nutritional awareness campaign sessions. The adolescents (80 adolescents) were divided into small groups (4 groups) based on their availability and according to the time schedule at the center. Therefore, nutritional awareness sessions were implemented through 5 sessions one session per week for each group. Each session lasted approximately 60 minutes. Firstly, the researchers were introducing themselves to the adolescents and ask them to share one little known fact about themselves (Ice breaking process). Discussion of the session objectives and content were dedicated, then, providing available time for adolescents' participation and interaction. Different methods of instructions and teaching aids mentioned before were used. The sessions entitled;

Session (1): Essential of nutrients and food groups.

Session (2): How to empower the adolescents to build a healthy eating pattern.

Session (3): Combating food myths and making healthy eating a part of our lifestyle.

Session (4): My Plate 10 tips to build a healthy meal.

Session (5): Physical activity and health.

PHASE III: Evaluation phase: Immediate feedback was obtained after completion of each educational session. The awareness campaign evaluation was done after three months of its completion for the purpose to identify changes in

adolescent's practices and identify who can be recognized to become facilitators to other adolescents. This Medium-term outcome (after a more extended period 3 months) is commonly resulting in changes in behavior (i.e. practices), The Post campaign evaluation was done by using Tool I and tool II.

- Data were collected by the researchers over a period of four months from May 2019 to August 2019.

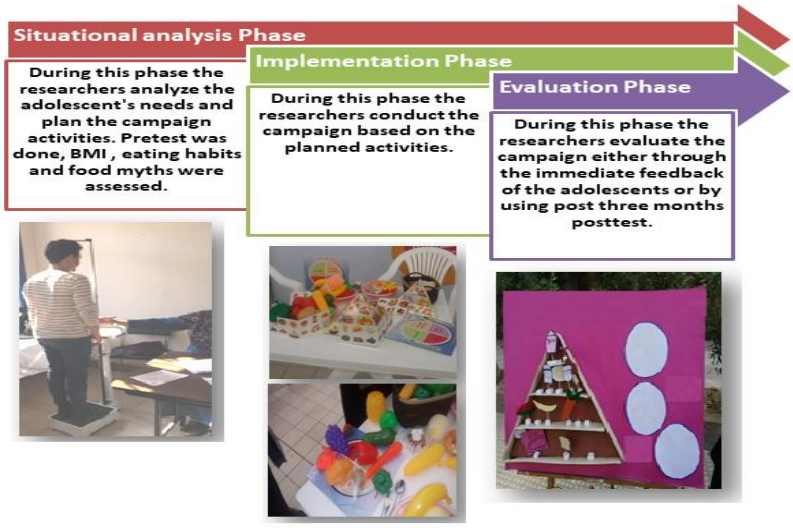

Figure (2) Nutritional Awareness Campaign Phases including Documentary Photos

ETHICAL CONSIDERATIONS:

- Informed written consent was obtained from all adolescents and their guardian after providing an appropriate explanation about the purpose of the study and nature of the research. Volunteer participation and right to refuse participating in the study were emphasized to the adolescents.
- The confidentiality and anonymity of individual responses was maintained.

DATA PROCESSING (STATISTICAL ANALYSIS):

A- For quantitative data:

- The collected data were coded and analyzed using PC with the IBM Statistical Package for Social Sciences (IBM SPSS version 25) and tabulated frequency and percentages were calculated.
- Count and percentage: Used for describing and summarizing quantitative data.
- Minimum, Maximum, Arithmetic mean ($\bar{x}$), Standard deviation (SD), Median were used as measures of central tendency and dispersion respectively for normally distributed quantitative data. Median was used for ranked or scored data as it is not affected by outliers or extreme values.
- Chi square: (χ^2) was used to determine whether there is a significant difference between the expected frequencies and the observed frequencies in one or more categories.
- Fisher exact and Monte Carlo test were used whenever the expected frequency of any cells of 2×2 table falls below 5.
- Analysis of variance (ANOVA) was used to check if the means of two or more groups are significantly different from each other. ANOVA checks the impact of one or more factors by comparing the means of different samples.
- The level of significance selected for this study was p value equal to or less than 0.05.

B- For qualitative data:

- After completion of all FGDs sessions, the data was organized for analysis by collecting all transcripts from the tapes.

- Each focus group session was transcribed verbatim (word for word) in order to capture the exact words, phrases voiced by the participants.
- Proofread (read through for errors) in order to check the accuracy of all transcripts against the audiotape were done.
- Sensitive information as accidental use of individuals name during the discussions was replaced by appropriate participant ID.
- Findings together with pertinent quotations were then organized according to the discussed topics.
- The main categories covering the objective behind the research were formulated. Examination for each category was carried out in order to search for subtopics and to select the most useful for various ideas; this was followed by clustering the categories into themes. These themes provided the major heading for the results.
- Trustworthiness and quality of the qualitative data were ensured by adopting triangulation, member checking, peer debriefing, inquiry audit and thick description strategies.

SCORING SYSTEM:

A- Adolescent's nutritional awareness scoring system:

In relation to the adolescent's nutritional awareness, a score of two was given to complete correct response, while a score of one was given to incomplete response and a score of zero was given to incorrect or don't know response. The total nutritional awareness score was calculated and transferred to percentage and classified into:

- Poor nutritional awareness scores are less than 50 % of scores.
- Fair nutritional awareness scores are ranged from 50 to less than 75% of scores.
- Good nutritional awareness scores are equal to or greater than 75% of scores.

B- Adolescent's nutritional practice scoring system:

In relation to the adolescent's nutritional practice, a score of one was given to the correct practice, while a score of zero was given to incorrect practice. The total nutritional practice score was calculated and transferred to percentage and classified into:

- Wrong nutritional practice scores are less than 50 % of scores.
- Fair nutritional practice scores are ranged from 50 to less than 75% of scores.
- Good nutritional practice scores are equal to or greater than 75% of scores.

3. RESULTS

Table (1) presented socio-demographic and personal data of the studied adolescents and their parents, the results revealed that, fifty percent of the studied adolescents were male, and the rest were females. It was observed that seventy percent of them aged 17 to 19 years old "late adolescent" with a mean of 17.4 ±1.9. Less than half (48.8%) of the adolescents have secondary level of education, followed by around one quarter (26.3%) who completed preparatory stage. The majority (91.3%) of the studied adolescents were single, where 8.8% of them were married. Slightly less than two third (60%) of them stated that their per capita income per month was inadequate, around one third of them (35%) have high social leveling and the rest have moderate to low one.

In relation to adolescent's mothers (parents who mainly attend with their adolescents at the campaign sessions), the mean age of the adolescent's mothers was 39.1±4.6 years, more than two fifths of the mothers completed either secondary or university level of education (43.8% and 42.5% respectively). It was noticed that seventy percent of the mothers were nonworking. Finally, the table also presented that, vast majority (80%) of the adolescents visiting youth center for recreational related reason as compared to only 20% who visiting it for sports related reasons and only 40% of them have membership at the youth center.

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Table (1) Distribution of The Studied Adolescents and Their Parents According to Their Socio-demographic and Personal Data

Socio-demographic and personal data	No. (n.80)	%
Sex		
Male	40	50.0
Female	40	50.0
Age (Years)		
Early adolescent (10-13)	8	10.0
Middle adolescent (14-16)	16	20.0
Late adolescent (17-19)	56	70.0
Mean ± SD	17.4±1.9	
Level of education		
Primary stage	5	6.3
Preparatory stage	21	26.3
Secondary stage	39	48.8
Above average	15	18.8
Marital status		
Single	73	91.3
Married	7	8.8
Per capita income / month		
Adequate	32	40.0
Inadequate	48	60.0
Social leveling		
High social level	28	35.0
Moderate social level	33	41.3
Low social level	19	23.8
Mother's age (Years)		
30 to less than 35	10	12.5
35 to less than 40	36	45.0
40 and more	34	42.5
Mean ± SD	39.1±4.6	
Mother's education		
Primary education	3	3.8
Preparatory education	8	10.0
Secondary education/ intermediate education	35	43.8
University education or higher	34	42.5
Mother's work		
Not working/ housewife	56	70.0
Working	24	30.0
Reasons of visiting youth center		
Sport related reasons	16	20.0
Recreational reasons	64	80.0
Membership in youth center		
Yes	32	40.0
No	48	60.0

Table (2) showed the adolescents eating pattern, the results reveled that, more than two thirds (67.5%) of the adolescents reported that they eat three meals per day, compared to 8.8% of them who eat only one meal per day. Regarding the skipped meals, it was observed that 18 (22.5%) of the adolescents skip one or two meals per day, where slightly less than

two thirds (61.1%) of them skip breakfast, followed by more than one quarter (27.7%) who skip dinner meal. There are slightly less than one quarter (23.8%) of the adolescents prefers fast food, Indomie or Noodles was the preferred snack by vast majority (82.5%) of them. Sixty percent of the adolescents eat in front screen (Television or computer screen), more than half (55%) of them drinks tea immediately after meals especially after lunch. Finally, vast majority (82.5%) of the adolescents preferred soft drinks at meal.

Table (2) Distribution of the Studied Adolescents According to Their Eating Pattern

Adolescent eating pattern	No. (n.80)	%
Number of meals		
- Only one meal/day	7	8.8
- Two meals/day	11	13.8
- Three meals/day	54	67.5
- More than three/day	8	10.0
Skipped meals	**(n.18)**	
- Breakfast	11	61.1
- Lunch	2	11.1
- Dinner	5	27.7
Fast food	**(n.80)**	
- Preferred	19	23.8
- Not preferred	61	76.3
Snacks (Indomie or Noodles)		
- Preferred	66	82.5
- Not preferred	14	17.5
Eating in front screen		
- Always	48	60.0
- Sometimes	12	15.0
- Rarely	20	25.0
Drinking tea after meals		
- Preferred	44	55.0
- Not preferred	36	45.0
Soft drinks		
- Preferred	66	82.5
- Not preferred	14	17.5

In order to separate fact or science from fiction or silliness the Egyptian food myths main themes derived from the focus group dissections with the adolescents and their parents and youth center staff members were elaborating in Table (3). It was observed that food myths as mentioned by the respondents were divided into three main categories; firstly "weight control related myths", "Healthy food related myths", and "Pregnancy and lactation related myths".

As regard weight control myths, the respondents elucidated four main myths related to weight control which include; A- eating time myths such as ("Don't eat after 7pm.", "Eating at late night leads to weight gain", "Skipping breakfast is a good way to cut calories and lose weight faster"), B- type of food myths such as(" Eating too much bread leads to extra weight", "Eating fats will make you fat", "Yoghurt with lemon decrease abdominal fats before sleeping", "Olive oil with lemon at the morning can reduce weight", and "Eat more sweetie food to increase weight"), C- Myths related to certain fluid and weight control such as ("Drinking water within meals leads to abdominal obesity /water not permitted during eating", "Hot water at wake up important to control weight", "Drinking lemon and vinegar and eggplant can reduce weight", "Water with cumin and lemon can reduce weight", "Drink diet soda to lose weight", and "Tea with milk can lead to fix weight") and finally, D- Metabolism myths which include("Personal who have high metabolic rate can eat freely", "Hot pepper is increase metabolism", and "Fasting stop metabolism").

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Secondly, the studied parents and their adolescents and the youth center staff elaborated that there are five main myths related to healthy food which are; **A- Cost of healthy food myths** such as *("Healthy eating costs more", and "Eating protein is expensive"),* **B- Certain fluid myths and healthy food** such as*("Eight Glasses of water a day is good for health", "Black tea is essential after eating heavy meals", and "Coffee is unhealthy and should be avoided"),* **C- Vegetables and fruit myths** such as *("Carrots improve eyesight", "Eating banana prior breakfast is not good; as it is affecting the stomach, we should drink water at first", "Apple affecting human liver badly", and "Eating fruits at night is bad"),* ***D- Protein myths*** *such as ("Protein is present in meat and fish only", "Brown eggs / egg balady are healthier than white eggs", "All products made from milk are part of the dairy group", and "Milk is the only food that contains calcium"),* and **E- Chocolate myths** such as *("Chocolate causes acne", "Chocolate improve mood", and "Chocolate is an aphrodisiac").*

Lastly, as shown in the table the respondents discussed **some pregnancy and lactation food myths** such as *("Pregnant women have to "eat for two" while pregnant", "Halwa Thenaya can increase breast milk", "Postpartum women must avoid drinking water", and "Drinking Fenugreek "Helba" and other herbs useful only for postpartum women").*

Table (3) Egyptian Food Myths Main Themes from Adolescents', Their Parents' and Youth Center Staff Members' Point of Views:

The Main Themes of Egyptian Food Myths according to the Focus Group Dissection Results
Firstly: Weight control myths
A. Eating time myths:
• Do not eat after 7pm. • Eating at late night leads to weight gain. • Skipping breakfast is a good way to cut calories and lose weight faster.
B. Type of food myths:
• Eating too much bread leads to extra weight. • Eating fats will make you fat. • Yoghurt with lemon decrease abdominal fats before sleeping. • Olive oil with lemon at the morning can reduce weight. • Eat more sweetie food to increase weight. • Salty food help in increasing person appetite
C. Myths related to certain fluid and weight control:
• Drinking water within meals leads to abdominal obesity /water not permitted during eating. • Hot water at wake up important to control weight. • Drinking lemon and vinegar and eggplant can reduce weight. • Water with cumin and lemon can reduce weight. • Drink diet soda to lose weight. • Tea with milk can lead to fix weight.
D. Metabolism myths:
• Personal who have high metabolic rate can eat freely. • Hot pepper is increase metabolism. • Fasting stop metabolism.
Secondly: Healthy food myths
A. Cost of healthy food myths:
• Healthy eating costs more. • Eating protein is expensive.
B. Certain fluid myths and healthy food:
• Eight Glasses of water a day is good for health. • Black tea is essential after eating heavy meals. • Coffee is unhealthy and should be avoided • Soft drinks are helping in digestion heavy meals.
C. Vegetables and fruit myths:
• Carrots improve eyesight. • Eating banana prior breakfast is not good; as it is affecting the stomach, we should drink water at first.

The Main Themes of Egyptian Food Myths according to the Focus Group Dissection Results
• Apple affecting human liver badly. • Eating fruits at night is bad.
D. Protein and diary myths:
• Protein is present in meat and fish only. • Brown eggs / egg balady are healthier than white eggs. • All products made from milk are the dairy group. • Eating ice cream is substitute milk products (it contains milk) • Milk is the only food that contains calcium. • All babies should take calcium supplement especially during teething and walking and when practicing sports.
E. Chocolate myths:
• Chocolate causes acne. • Chocolate improve mood. • Chocolate is an aphrodisiac.
Thirdly: Pregnancy and breastfeeding myths
• Pregnant women have to "eat for two" while pregnant. • Halwa Thenaya can increase breast milk. • Postpartum women must avoid drinking water. • Drinking Fenugreek "Helba" and other herbs useful only for postpartum women.

Figure (3) showed the distribution of the studied adolescents according to their body mass index (BMI) classifications, slightly more than three quarters (76%) of them have average body weight, slightly around tenth (14%) of them have overweight, and exactly one tenth of them were underweight.

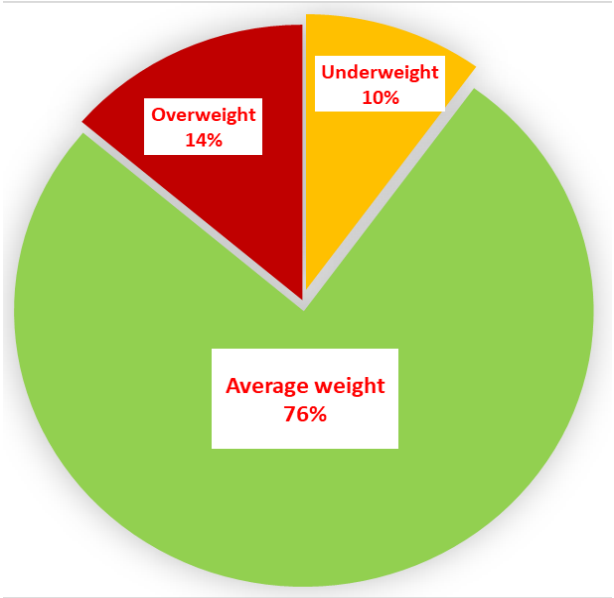

Figure (3) Adolescent Body Mass Index Classification (n.80)

With respect to the adolescent's opinion regarding their eating pattern and their weight **Table (4)** revealed that, forty percent of the adolescents thinking that their diet does not contain all the essential elements for their body. Regarding their perception about their weight, it noticed that less than thirty percent (28.7%) of them perceived that they are overweight, compared to more than one quarter (26.3%) who perceived that they are underweight. Furthermore, although 86.3% of the adolescents reported that they didn't follow special diet regiment, it also found that 13.8% of them follow it either to increases, decreases, or to maintains their weight (2.5%, 8.8%, and 2.5% respectively).

As regard to the adolescent trial for weight reduction, it was observed that, one fifth of the adolescents tries to decrease their weight, among them slightly more than one tenth using medications or playing sports to achieve their goal for weight reduction with the same percentage for both (15.0%) compared to more than two third (70%) of them who reported that

they tried to lose weight thorough follow diet regimen, and only 5% of them consult physician to do. Finally, only one quarter (25.0%) of them achieved their goal for weight reduction.

In relation to the adolescent's trail to increase their weight, it was observed that there are fifteen percent of the adolescent tries to increase their weight, among them three quarters (75.0%) resorted to overeating in order to increase their weight, whereas one quarter (25.0%) of them using medications, among them more than two fifths consult physician and they success to increase their weight (41.7% with the same percentage for both).

Table (4) Distribution of The Studied Adolescents According to Their Opinion Regarding Eating Pattern and Their Weight

Adolescent opinion regarding their eating pattern and their weight	**No. (n.80)**	**%**
Thinking that their diet contains all the essential elements for the body		
No	32	40.0
Yes	48	60.0
Adolescents perception about of their weight		
Underweight	21	26.3
About the right weight	36	45.0
Overweight	23	28.7
Follow special diet regimen		
No	69	86.3
Yes, to increasing weight	2	2.5
Yes, to decreasing weight	7	8.8
Yes, to maintain my weight now	2	2.5
Any trial from the adolescent to decrease their weight		
No	60	75.0
Yes	20	25.0
Weight reduction methods	**(n.20)**	
By medications	3	15.0
By follow diet regimen	14	70.0
By sports	3	15.0
Consult the doctor for weight reduction		
No	19	95.0
Yes	1	5.0
Success to decrease the weight		
No	15	75.0
Yes	5	25.0
Any trial from the adolescent to increase their weight	**(n.80)**	
No	68	85.0
Yes	12	15.0
Methods used to increase weight	**(n.12)**	
By overeating	9	75.0
By using medication	3	25.0
Consult the physician to increase the weight		
No	7	58.3

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Adolescent opinion regarding their eating pattern and their weight	No. (n.80)	%
Yes	5	41.7
Success to increase the weight		
No	7	58.3
Yes	5	41.7

Tables (5) presented the adolescent food intake according to Food Dome Dietary Guideline for Arab Countries pre and post the nutritional awareness campaign implementation. It was observed that, carbohydrate analysis revealed that, there is an observed improvement in the adolescent intake of it(especially from the whole grain and fortified cereals), where less than one tenth (8.8%) of the adolescent received adequate intake of carbohydrate pre the campaign compared to slightly less than two thirds (62.5%) post the campaign with no statistically significant difference. Furthermore, vegetables analysis revealed that, less than one third (30%) of the adolescent received adequate intake of vegetables pre the campaign compared to slightly less than half (47.5%) post the campaign with a statistically significant difference between them (χ^2:35.545, P: <0.001). It was observed that, fruit analysis revealed that, there is slight improvement of the adolescent intake, where less than two thirds (62.5%) of the adolescent received adequate intake of fruit pre the campaign compared to the majority(93.8%) of them post the campaign with no statistically significant difference.

A significant finding regarding milk and dairy products analysis observed, where slightly less than one third (31.3%) of the adolescents reported that they didn't received it pre the campaign as compared to zero percent post the campaign, additionally, it was observed that less than two fifths (38.8%) of them reported that they consumed adequate amount pre the campaign which increased to 62.5% nearly the double post the campaign, an observed statistically significant difference was noticed (χ^2:30.310, P:<0.001).Meat products analysis revealed that forty percent of the adolescents reported overtaken of meat products pre the campaign which subsided to only 10% post the campaign, those who adequately received it constituted more than half (56.3%) post the campaign as compared to more than two fifths (43.8%) pre the campaign, with a statistical significant difference (χ^2:17.057, P:0.009) .

Adolescent's practice of sports according to Food Dome Dietary Guideline for Arab Countries assessed by searching for the physical exercise activity. Where, walking 30 minutes for adults and 60 minutes for children most days was considered medium activity. In this regard slight improvement of physical activity was noticed among the studied adolescents, where the percent of those who do exercise pre the campaign were 42.5%, compared to 53.8% post the campaign, with a statistically significant difference between them (χ^2:44.614, P:<0.001). Finally, it was observed that there is a statistically significant difference observed pre and post the campaign in the mean number of cup of water intake per day (4.15±2.2, 5.9±1.7 respectively) where the ANOVA test was (F:2.715, P:0.011).

Table (5) Adolescent Food Intake according to Food Dome Dietary Guideline for Arab Countries Pre and Post The Nutritional Awareness Campaign implementation

Adolescent Food Intake according to Food Dome Dietary Guideline for Arab Countries	Pre		Post		Test of significance
	No. (n.80)	%	No. (n.80)	%	
***Carbohydrate analysis (Cereals and their products) (6-11 serving)**					
Adequate	7	8.8	50	62.5	χ^2:5.013 P:0.542
Inadequate	46	57.5	29	36.3	
Over intake	26	32.5	1	1.3	
Not taken	1	1.3	0	0.0	
***Vegetables analysis (3-5 serving)**					
Adequate	24	30.0	38	47.5	χ^2:35.545 P: <0.001*
Inadequate	50	62.5	41	51.2	
Not taken	6	7.5	1	1.3	
***Fruit analysis (2-4 serving)**					
Adequate	50	62.5	75	93.8	χ^2:6.344

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Adolescent Food Intake according to Food Dome Dietary Guideline for Arab Countries	Pre		Post		Test of significance
	No. (n.80)	%	No. (n.80)	%	
Inadequate	3	3.8	4	5.0	P:0.609
over intake	27	33.8	1	1.3	
***Milk and dairy products (2-3 serving)**					
Adequate	31	38.8	50	62.5	χ^2:30.310
Inadequate	16	20.0	23	28.7	P:<0.001*
Overtaken	8	10.0	7	8.8	
Not taken	25	31.3	0	0.0	
***Meat products analysis (Meat, chicken, fish, eggs) (2-4 serving)**					
Adequate	35	43.8	45	56.3	χ^2:17.057
Inadequate	12	15.0	27	33.8	P:0.009*
Overtaken	32	40.0	8	10.0	
Not taken	1	1.3	0	0.0	
Adolescent Practice of sports according to Food Dome Dietary Guideline for Arab Countries #					
No	46	57.5	37	46.3	χ^2:44.614
Yes	34	42.5	43	53.8	P:<0.001*
Water intake					
Less than 2 cups	3	3.8	0	0.0	
2-3 cups	32	40.0	4	5.0	
4-5 cups	28	35.0	30	37.5	
6-7 cups	9	11.3	28	35.0	
8-10 cups	8	10.0	18	22.5	
Mean±SD	4.15±2.2		5.9±1.7		F:2.715
Minimum- Maximum	1-10		2-10		P:0.011*

* Serving amounts from food groups according to food dome dietary guideline for Arab countries and the local food composition tables of the Egyptian National institute of nutrition.

Physical exercise activity (Medium activity according to food dome dietary guideline for Arab countries means walking 30 minutes for adults and 60 minutes for children most days).

χ^2: Chi-square test F: ANOVA test P: P value of test of significance *Significance at p ≤0.05

Table (6) presented the nutritional awareness level of the adolescents pre and post the campaign. a significant improvement in nutritional awareness level was observed post the campaign than pre, where only 8.8% of the adolescents were have good nutritional level pre the campaign that improved to 40% post the campaign. Furthermore, those who have poor nutritional awareness pre the campaign were decreased post the campaign implementation (50%, 10% respectively), with a statistically significant difference (χ^2:23.709, P:<0.001).

Table (6) Distribution of the Studied Adolescents According to Their Nutritional Awareness Level Pre and Post The Campaign Implementation

Nutritional awareness level	Pre (n.80)		Post (n.80)		Test of significance (p value)
	no.	%	no.	%	
Good nutritional awareness	7	8.8	32	40.0	χ^2:23.709
Fair nutritional awareness	33	41.3	40	50.0	P:<0.001*
Poor nutritional awareness	40	50.0	8	10.0	

χ^2: Chi-square test P: P value of Chi-square test *Significance at p ≤0.05

Table (7) presented the nutritional practice level of the adolescents pre and post the campaign. A significant improvement in nutritional practice level was observed post the campaign than pre, where only 18.8% of the adolescents were have good nutritional practice level pre the campaign that improved to 27.5% post the campaign. Furthermore, those who have poor nutritional practice pre the campaign were decreased post the campaign implementation (28.7%, 15.0% respectively), with a statistically significant difference (χ^2:19.591, P:<0.001).

Table (7) Distribution of The Studied Adolescents According to Their Nutritional Practice Level (n.80)

Nutritional practice level	Pre		Post		Test of significance (p value)
	no.	%	no.	%	
Good practice	15	18.8	22	27.5	χ^2:19.591 P: 0.001*
Fair practice	42	52.5	46	57.5	
Poor practice	23	28.7	12	15.0	

χ^2: Chi-square test P: P value of Chi-square test *Significance at p ≤0.05

4. DISCUSSION

Understanding the community food myths and its consequences that shaping adolescents' eating habit is the key to evaluate nutrition adequacy and to preventing diet-related diseases later in life. With the aim of developing effective dietary interventions for adolescents, it is necessary to understand the factors that determine eating behaviors and food consumption pattern in this population (**McClain et al, 2009**).

Regarding to the adolescents' eating pattern, the results of the present study revealed that, about one fifth of adolescents skipped one or two meals per day (mainly breakfast or dinner), these results were concurring with **Elkaluby (2006)** and **Yousef (2008)** studies. These findings may be attributed to adolescents' unaccustomed way of eating especially their breakfast or dinner with their family, and also due to having weight control myths. Adolescents' and their families thought that skipping breakfast is a good way to cut calories and lose weight faster. The current study shed the light on the importance of raising the studied adolescent's awareness regarding the effect of this malpractice to avoid its consequences and weight effect. In this regard, **Kahleova et al (2017)** and **Kahleová et al (2016)** in their studies confirmed that number of meals affecting BMI, where breakfast eaters experienced a decreased BMI compared with breakfast skippers. Additionally, family who eat breakfast on regular base has a healthier high-quality meal (**Berge et al, 2017**).

Fast food is a way of life for many adolescents, with a busy lifestyle adolescent frequently eat away from their homes (**Abdel-Hadyet al. 2014**). Another important factors that affecting eating behavior especially among adolescents, known as intake of fast food or junky food that have non-nutritional elements and value, it was noticed that the vast majority of adolescents in the current study prefer fast food such as Indomie or Noodles (as their preferred snack). Sadly, speaking one of the rationales behind eating for Indomie or Noodles of the studied adolescents is the places that serve it, "*Indomie or Noodles are served at schools, youth centers that's mean this type of food is healthy*" stated adolescents. So, an enabling environment for healthy nutrition requires empirically sound, good coherence between sectors including schools and youth centers, sufficient capacity to build commitment to healthy food to implement of nutritional awareness campaigns and ensure that the presence of fast-food restaurants and grocery stores mainly influences access to and availability of foods, so it must be only serve healthy meals (**Gillespie et al, 2013, Gordon-Larsen, 2014**). In addition, fast foods are popular choices because both adolescents and their families have myths regarding healthy food that may affect their food selection as they thought that healthy food costs more and take a lot of time to prepare it. So they consider fast food an inexpensive, easily available almost any hour of the day or night.

Moreover, in fact, food marketers are interested in youth as consumers because of their spending power, their purchasing influence, and as future adult consumers **(Story and French, 2004).** The problem is not eating fast food per say, but eating unhealthy one, most of the markets who serve fast food didn't focus on the quality of served food they mainly looking for good taste that mainly grasp the consumers. That was reported by adolescents' themselves *"It is very important to select food which tastes good, smells nice, and has pleasant texture and looks nice)* in **Yousef et al (2019)** study. Moreover, **Zabinski et al (2006)** found that adolescents who reported frequent fast-food restaurant visits were

more likely to report that healthy foods tasted bad, that they did not have time to eat healthy foods, and that they cared little about healthy eating. Taste preferences of the adolescents are a strong predictor of their food selection.

Nowadays, screen time is considered one of the essential times to be concerned. Arab adolescents may not be any different, in terms of screen time, than those from the developed countries. The Arab Gulf countries are heavy consumers of electric devices such as cellular-phone, computer, television, and PlayStation (**Saquib, 2018**). Eating in front screen is a fact, since they didn't have a special time for eating. The present study revealed that, sixty percent of the adolescents eat in front screen (Television or computer screen), nearly the same findings presented by **Pearson et al, (2017a)** in their study as they concluded that, there is a high prevalence of screen time and unhealthy eating, and screen time is coupled with unhealthy dietary behaviors, **Pearson et al, (2017b)** also added that, eating energy dense snack was positively associated with the frequency of eating in front the TV. So, nutritional awareness must highlight the importance of this issue to keep the adolescents oriented by the consequences of eating in front screen especially when coupled with unhealthy eating behaviors.

Coffee, tea, caffeinated soda, and energy drinks are important sources of caffeine in the diet (**Reyes and Cornelis, 2018**) that may affect adolescent health. There is growing concern about the increased consumption of caffeinated foods/drinks including coffee, energy drinks, tea, and chocolate products, particularly among adolescents (**Pennington et al, 2010**). The principle sources of caffeine intake among adolescents are sweetened coffee and energy drinks, with a daily caffeine intake below the current suggested maximum acceptable levels for adolescents (2.5 mg/kg body weight/day or 100-175 mg/day with body weight 40-70 kg) (**Mitchell et al, 2014**). **Mackus et al** (2016) found that, participants had poor knowledge on the relative caffeine content of caffeinated beverages as they overestimated the caffeine content of energy drinks and cola and underestimated the caffeine content of coffee beverages. There is clear evidence to show that tea drinking limits the absorption of non-hem iron. Among those who at risk of iron deficiency the advice should be to drink tea between meals and to wait at least one hour after eating before drinking tea (**Nelson and Poulter, 2004**).However, some researchers have reported that excessive caffeine intake by adolescents has been associated with a number of detrimental health effects such as nervousness, irritability, nausea, cardiovascular symptoms, sleep impairment, osteoporosis, and gastric ulcers (**Orbeta et al, 2006, Cho, 2018**).In contrast, consuming glasses of tea is popular and labeled national habit by Egyptian population, the current study found that, more than half of them drink tea immediately after meals especially after lunch, while in 2014, **Abd-Elhady et al** had found that 80% of adolescents drink tea more than three times per day and 87.5% of them drink tea immediately after meals and about 20% of students consume soft drink on daily bases. In fact, majority of adolescents replaced the natural drinks with commercially carbonated ones. In this study the vast majority of adolescents preferred soft drinks intake especially with meals. It is worth mentioning that, the food and beverage myths regarding tea and coffee/soft drinks affecting on their behavior. The studied adolescents and their parent stated that, "*Black tea is essential after eating heavy meals", soft drinks is helping in digestion heavy meals*" whereas, parents only stated that "*Coffee is unhealthy and should be avoided*", and they added some chocolate myths such as "*Chocolate causes acne",* "*Chocolate improve mood*", and **"***Chocolate is an aphrodisiac*" and give no concern to the caffeine content of this chocolate.

Factually, if caffeine consumption is a concern, it is important to inform consumers about the caffeine content of all caffeine containing beverages, including coffee, tea and chocolate. Nutritional awareness campaign must be highlighting that, caffeine has been shown to be associated with both beneficial and harmful health effects. Scientific and epidemiological evidence has shown that amongst the healthy adult population, moderate caffeine consumption (400 mg) per day is not associated with adverse health effects such as general cardiovascular effects, increased incidence of cancer, or effects on bone status (**Heckman et al, 2010, Nordt et al, 2012**). The amount of caffeine required to produce adverse effects varies from person to person, depending on gender, age, weight, and differences in susceptibility (**O'Keefe et al, 2013**). So, everyone has to know these limits to be considered in planning for healthy meals.

The current study elaborate the Egyptian food myths from the adolescent and their parent's as well as youth center staff perspectives and it was observed that food myths as mentioned by them were divided into three main categories; firstly "Weight control related myths", "Healthy food related myths", and "Pregnancy and lactation related myths". As regard weight control myths, the respondents elucidated four main myths related to weight control which including time myths,

type of food myths, myths related to certain fluid and weight control, and metabolism myths. Nearly the same findings were discussed in a study done by **Lesser et al** (2015) which entitled "Nutrition Myths and Healthy Dietary Advice in Clinical Practice" which documented that the common theme for dietary myths is a reductionist view of diet that emphasizes selected food constituents as opposed to whole foods in order to weight control. The current study denote that eating time myths include differential myths that found a link between eating time and weight control where they stated that "*Don't eat after 7pm.", "Eating at late night leads to weight gain", "Skipping breakfast is a good way to cut calories and lose weight faster".* Some of these myths documented in researches that concerned with meal timing and other not supported till now (**Kahleova et al, 2017 and Kahleová et al, 2016**).

Among the important deeply rooted culture in the Egyptian society regarding type of food myths, the current study reported that, some of the adolescents and their parents stated that "*Eating too much bread leads to extra weight", "Eating fats will make you fat", "Yoghurt with lemon decrease abdominal fats before sleeping", "Olive oil with lemon at the morning can reduce weight", and "Eat more sweetie food to increase weight*". They also added some myths related to certain fluid and weight control such as "*Drinking water within meals leads to abdominal obesity/water not permitted during eating*", "*Hot water at wake up important to control weight", "Drinking lemon and vinegar and eggplant can reduce weight", "Water with cumin and lemon can reduce weight", "Drink diet soda to lose weight", and "Tea with milk can lead to fix weight*". Some of these myths are discussed in recent researches such as **Charvet and Huffman** (2019) research entitled "Beverage Intake and Its Effect on Body Weight Status among Women Infant and Children (WIC) Preschool-Age Children" that highlight the importance of providing nutrition education in order to maintain body weight. Community health nurse has to discuss these myths and help adolescents and their parents to differentiate between healthy and unhealthy myth.

For the issue of thorough understanding of the nutritional status of the adolescents in the current study, the following steps were done; the adolescent's BMI where calculated and each adolescent's BMI was compared to the CDC clinical growth chart; accordingly, percentiles position held were identified. Then the following references weight values were used (BMI-for-age $\geq 5^{th}$ - $<85^{th}$ percentile recorded as normal weight, BMI-for-age$<5^{th}$percentile recorded as underweight. BMI-for-age $\geq 85^{th}$ -$<95^{th}$ percentile recorded as at risk of overweight, and BMI-for-age $\geq 95^{th}$ percentile recorded as obese(**CDC, 2017**).Despite of the actual assessment of the studied adolescents' weight, there is a significant discrepancy between adolescents' perception regarding their body weight and their actual body mass index the adolescents had a tendency to either underestimate or overestimate their body weight. Adolescents lacked information about the ideal body weight, and they may have a distorted body self-image, which may have led them to either over or under eat amounts of foods not corresponding to their dietary requirements (**Elkaluby,2006**). Moreover, **AL-Sendiet al** (**2003**) on their study for body weight perception among Bahraini adolescents found that, the majority of adolescents have distorted body image as reflected by their failure to perceive their actual body weight.

It is interesting to note that slightly more than one tenth (13.8%) of adolescents tried to do something with their body weight either to loosen or gain weight. However, they did so without medical consultation. According to **Kalantari et al** study (2017) and **Yousef** (2008), one of the major concerns of the adolescents is their weight and body shape either for boys or girls. So, they always have at least one weight control trial. Moreover, some researches also showed that, adolescents may have been involved in improper weight management techniques in order to either overcome negative family' comments regarding their weight or to improve their appearance (**ELkaluby, 2006 and Yousef, 2008**). All of these findings shed the light on the importance of assessment of the adolescent's weight on a regular base and interpret the findings with them in order to have deeper understanding of their weight status and be able to take action only when needed in other words adolescents need for more nutritional awareness and counseling.

The milestone of success in combating Egyptian food myths and conducting a useful reality based nutritional awareness campaign is to get in touch with the adolescent food intake according to Food Dome Dietary Guideline for Arab Countries. Assessment of food consumption pattern is one of the important steps in implementing nutritional awareness sessions (**Almiron-Roig et al, 2017)**. The current study used Food Dome dietary guideline for Arab countries in order to assess the adolescents eating consumption and physical activity pattern before and after implementing the nutritional awareness campaign. The food dome analyzes the consumption pattern of carbohydrate, vegetables, fruits, milk and dairy

products, and meat group, as well as the adolescent practice of sports**(Musaiger and Arab Centers for Nutrition, 2012)**.It was observed that, carbohydrate analysis revealed that, there is an observed improvement in the adolescent intake of it(especially form the whole grain sources as brown bread and fortified cereals, where less than one tenth of the adolescent received adequate intake of carbohydrate pre the campaign compared to slightly less than two thirds post the campaign with no statistically significant difference. These findings go in line with the review article entitled "Macronutrients in adolescence" written by **Ozdemir (2016).**

Low consumption of fruits and vegetables in many regions of developing world is a persistent phenomenon (**Abdel-Hady et al,2014)**. In line with this phenomenon, vegetables analysis in the current study revealed that, less than one third of the adolescent received adequate intake of vegetables pre the campaign compared to slightly less than half post the campaign with a statistically significant difference between them. It was also observed that, fruit analysis revealed that, there is slight improvement of the adolescent intake, where less than two thirds of the adolescent received adequate intake of fruit pre the campaign compared to the majority of them post the campaign. Although there is an observed improvement, adolescents still in need for increasing their consumption pattern, these findings may be attributed to the fact that, parents have a significant effect on their adolescent's selection pattern for vegetables and fruits. Their vegetables and fruit related myths and culture affecting their food choices pattern. Some parents not concerned with the importance of vegetables and fruits as vitality group and give higher priority to purchase other food. Some of the study group had food myths regarding fruits and vegetables as they thought that, *"Eating banana prior breakfast is not good; as it is affecting the stomach, we should drink water at first, Apple affecting human liver badly, fruits and vegetables is not a complete diet, Eating fruits at night is bad"* These findings support **Vereecken et al (2015)** in their study for the fruit and vegetable consumption trends among adolescents, as they concluded that, overall, a positive trend was noticed in daily fruit and vegetable consumption, however, increases in its consumption are still indicated. Whereas, **Van Ansem et al (2014)** declared that children of mothers with a high educational level consumed more pieces of fruit per day, more grams of vegetables per day and were more likely to have breakfast on a daily basis than children of mothers with a low educational level. Additionally, **Johnson (2016)** studied the developmental and environmental influences on young children's vegetable preferences and consumption and added that, parent's feeding styles and strategies convince their children preferences and consumption pattern.

Dairy products such as milk, cheese and yoghurt are an important source of essential micronutrients including calcium, riboflavin, phosphorus, potassium, magnesium, zinc, vitamin A and vitamin B12 they also provide a combination of protein, carbohydrate and fat (**McNulty, 2013**). Most of study subjects reported that they did not prefer to drink milk and they substitute it by eating ice cream. They had a myth that all babies should take calcium supplement especially during teething and walking and when practicing sports and they falsely consider milk the only source of calcium. However, a significant improvement regarding milk and dairy products intake by adolescents pre and post the campaign were reported, additionally, it was observed that less than two fifths of them reported that they consumed adequate amount pre the campaign which increased nearly to the double reaching 62.5% post the campaign. These findings incongruent with a study done by**Bao et al (2018)** who documented that overall, 68% of the studied subjects consumed dairy.

Although the importance of protein as one of the essential macronutrients, and the importance of it among adolescent who extremely in need for protein from both sources either animal or plant source as protein plays an important role in building their body during this critical growth and development period. One of the alarming myths reported by the studied adolescents and their parents in the current study is linked to the cost of healthy food where they stated that "*Healthy eating costs more*", and "Eating protein is expensive". These findings didn't match with **Darmon and Drewnowski** (2015) in their study for the contribution of food prices and diet cost to socioeconomic disparities in diet quality and health declared that, diets consistent with a set of 6 nutritional guidelines cost 10% more. So, it is highly important to keep the adolescents and their parents oriented by this fact, the nutritional awareness campaign must handle such myths correctly to encourage those to pay a healthy meal and confirm that this is considered investment in health. Moreover, other myths related to protein that denotes poor adolescents' and family's' knowledge regarding protein especially regarding its source. Where some of the adolescents and their parents stated that "*Protein is present in meat and fish only*", "*Brown eggs / egg balady are healthier than white eggs*", These findings doesn't go in line with **Katzand Meller** (2015) who reported that low-carbohydrate diets, of necessity, shift dietary intake to relatively higher levels of fat and/or

protein as a percentage of total calories. In the context of widespread obesity, protein is noteworthy for its high satiety index "high-protein intake offers the potential benefits related to enhanced satiation".

Moreover, in relation to meat products analysis, the current study revealed that forty percent of the adolescents reported overtaken of meat products pre the campaign which subsided to only 10% post the campaign, those who adequately received it constituted more than half post the campaign as compared to more than two fifths pre the campaign, with a statistical significant difference. In accordance with this study an Egyptian study done by**Galal** (2002) reported significantly more female adolescents and more urban adolescents have protein in their diet. Moreover, these findings may be attributed to that the studied adolescents prefer fast food which is mostly containing processed meat. These findings support **KubberÖd et al (2002)** results who indicated that there is no differences between gender for "eat little meat" or "eat only processed meat". The biggest gender difference was found for the category "eat white meat preferably". Forty-five percent of the females reported they preferred white meats, in comparison to 10% of the males.

Adolescents' sports related practice according to Food Dome Dietary Guideline for Arab Countries in the current study assessed by searching for the physical exercise activity, where, walking 30 minutes for adults and 60 minutes for children most days was considered medium activity (**Musaiger et al,2012**). In this regard slight significant improvement of physical activity was noticed among the studied adolescents pre the campaign comparing to post the campaign. Despite this significant improvement, physical activity was still not satisfactory. This finding may be attributed to lack of adherence to specific and regular exercise or fitness campaign, where, vast majority of the adolescents visiting youth center for recreational related reason as compared to only one fifth who visiting it for sports related reasons, and only two fifths of them have membership at the youth center. These results reflect the adolescents' difficulty in establishing their habitual physical activity as a part of their lifestyle, and they may have wrong conception that physical activity means participation in a club or team sport only. Moreover, this study reflects the need for parenting guidance regarding the importance of sports to adolescents and how to help them in managing their time to allow for both studying as well as for sports. Parents should emphasize the importance of regular physical activity and show their adolescents that, physical activity can be fun. Moreover, they can set a positive role model to their children for performing physical activity. So, it is highly important to consider practicing physical activity as is an important component of healthy life style and motivate these adolescents to have a membership at the youth centers in addition to put a plan of motivating and competitive sport related activities, as well as, build a team of adolescents to support sports activities. These findings go in line with **Duke (2003)** who reported that, despite the national guidelines for physical activity, many young persons are not regularly physically active, and fewer participants reported involvement in organized sports. Additionally, **Wall et al (2011)** reported in their study entitled "Trends by age in youth physical activity: Youth Media program Longitudinal Survey" that, free-time physical activity participation prevalence declined linearly from ages 9 to 17 in both sexes.

To sum up the current study presented the nutritional awareness level of the adolescents' pre and post the campaign. A significant improvement in nutritional awareness level was observed post the campaign than pre. Furthermore, the nutritional practice level of the adolescents' pre and post the campaign showed a significant improvement post the campaign than pre with a statistically significant difference. Thus, motivate the community health nurse to conduct similar campaigns to raise public awareness, promote community health as well as empowering the adolescents to maintain a sustainable healthy environment.

5. CONCLUSION

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

The assessment of the nutritional status a of the studied adolescents based on their body mass index (BMI) classifications revealed that slightly more than three quarters of them have average body weight, slightly around tenth of them have overweight, and exactly one tenth of them were underweight. The adolescent food intake according to Food Dome Dietary Guideline for Arab Countries pre and post the nutritional awareness campaign application revealed a significant improvement regarding all food elements in addition to practicing of sports. Food myths as mentioned by the adolescents, their parents and youth center staff were divided into three main categories; firstly "weight control related myths", "Healthy food related myths", and "Pregnancy and lactation related myths" which affecting their food consumption

negatively. The nutritional awareness and practice level of the adolescents revealed a significant improvement post the campaign than pre which positively empowering them regarding their healthy food consumption**.**

6. RECOMMENDATIONS

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

1- Public awareness campaigns are needed to raise adolescent's awareness using multiple channels focusing on reducing consumption of specific unhealthy foods especially reducing sugar-sweetened beverage (SSB), high salt consumption and fast food.

2- Provision of affordable and attainable food safety awareness campaigns are needed at different adolescents' existing facilities as schools, clubs, and youth friendly clinics.

3- Arabic scientific nutrition web sites and resources that covering nutrition healthy messages should be directed to empower the adolescents to combat unhealthy nutrition related myths.

4- Further study must be directed to study the effect of empowered adolescent on their peers in the area of nutrition awareness.

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Conflict of interest

The authors declared that they have no conflict of interest.

Author contribution

All 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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