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# Alarming Eating Behaviours among Adolescents in Egypt

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**Abstract**

**BACKGROUND:** Adolescence is a phase of rapid growth and increased nutritional needs. It includes the stressful burden of pubertal changes, both physically and psychologically. Moreover, it is associated with the utmost need for independence and identity formation. An adolescent finds a great way to practice taking their own decisions by making personal food choices. But unfortunately, wrong dietary choices lead to unsatisfactory nutritional status.

**AIM:** To investigate the prevalence of six eating behaviours among adolescents.

**SUBJECTS AND METHODS:** A case-control study was conducted on ninety Egyptian adolescents from 10 to 18 years old. Anthropometric measurements were taken. Body Mass Index (BMI) was calculated. The cases were forty-five children with body mass index ≥ 85th percentile. The control group involved forty-five of matched peers with body mass index < 85th centile. A questionnaire form was constructed according to local customs in Egypt.

**RESULTS:** Two unhealthy behaviours were mostly found in our study group. The first and the predominant one was multitasking while eating practised by 92.1% of candidates and showing the equal distribution in both groups. The second was skipping breakfast and was adopted by 51.7% of the study group with a significantly higher distribution in the < 85th centile group.

**CONCLUSION:** Faulty eating is a behaviour encountered in adolescence irrespective to BMI category. Thus, a normal BMI does not reflect healthy dietary behaviours.

## Introduction

As a result of globalisation, heterogeneous western food habits were intruded in developing countries. This went in parallel with an increment in the frequency of chronic non-transmissible diseases. Thus, it became crucial to reassess the eating patterns in these countries and to evaluate their possible contribution as risk factors for these diseases [1].

Chronic non-transmissible diseases include overweight and obesity. The pervasiveness of high body mass index in the Middle East has been ranked the second worldwide, next to North America. Obesity is considered a serious health hazard, universally [2].

A sedentary lifestyle and faulty eating habits are two key threats that predispose to chronic non-transmissible diseases. Fortunately, these two risk factors are adjustable [3].

The World Health Organization (WHO) announced that almost 66.7% of early deaths, and 33.3% of grown-up illnesses, are consequent to undesirable behaviours that started in youth [4].

Thus the negative behaviours in adolescence are real challenges to face and overcome as early as possible before jeopardising lifetime health status [5]. That is why we should do this research.

## Subjects and methods

The current study was conducted in the Nutrition Immunotherapy Clinic at the Medical Research Centre of Excellence (MRCE), National Research Centre (NRC). As a part of the in-house project entitled "Early Renal injury markers in obese adolescents".

Ninety Egyptian adolescents of both sexes were enrolled in this case-control study. The cases were forty-five children with BMI above or equal to 85$^{th}$ centile. The control group involved forty-five of matched peers with BMI below the 85$^{th}$ centile.

*Inclusion criteria:* adolescents of both sexes who are 10 to 18 years old.

*Exclusion criteria:* syndromic (e.g. Prader–Willi syndrome) and endocrinal (e.g. hypothyroidism) causes of obesity

*Anthropometric measures:* were assessed with a record of the height and the weight of each candidate. The height was measured to the nearest 0.5 cm on a Holtain portable anthropometer. The weight was determined to the nearest 0.1 kg on a Seca scale Balance with the subject dressed minimum clothes and no shoes. BMI was calculated as Weight (kg)/Height ($m^2$). Data were plotted on WHO curves through the software AnthroCalc v1.66 Home

*A questionnaire form* was constructed in the light of literature and modified according to local customs in Egypt. A "yes", or "no" or "sometimes" answers were obtained for each question by a personal interview with every child. The six questions were about: breakfast meal, fast food, multitask eating, dinner meal content, dinner meal timing and intake of sweetened beverages.

### *Ethical approval*

The protocol of the study was approved by the “Ethical Committee” of the NRC. Written informed consent was signed by the legal guardian of each participant before enrollment in the study by the code of ethics of the world medical association (Declaration of Helsinki) approval number 16130.

### *Statistical analysis*

Analysis of data was performed by using Statistical Package for the Social Science SPSS version 16.G. Data were presented as a mean and standard deviation. Chi-square test was conducted for the variables and was used to detect the significant difference in the distribution between groups at P - value < 0.05 (SPSS version 16.G.)

## Results

The study group comprised of ninety adolescents. They were 31 (34.4%) males and 59 (65.6%) females. Their mean age was (12.62 ± 2.6) and (13.05 ± 2.61) for case and control groups respectively. According to BMI percentiles, we stratified the candidates into two equal groups of 45 children each. The cutoff BMI for the case group was ≥ 85$^{th}$ centile. While the cutoff BMI for the control group was < 85$^{th}$ centile, this was done according to the WHO growth charts. Detailed anthropometric data are presented as mean and standard deviation in Table 1.

**Table 1: Anthropometric data**

| Variable | Case group (n = 45) | Control group (n = 45) |
|---|---|---|
| | Mean ± SD | |
| WT | 73.41 ± 18.26 | 37.39 ± 10.68 |
| WT Centile | 96.26 ± 4.80 | 27.43 ± 25.05 |
| HT | 154.16 ± 10.65 | 146.05 ± 13.04 |
| HT Centile | 51.50 ± 28.89 | 32.60 ± 28.74 |
| BMI | 30.55 ± 5.61 | 17.22 ± 2.71 |
| BMI Centile | 98.30 ± 2.68 | 34.40 ± 28.16 |

Every child was personally interviewed to answer a form of questionnaires. This form was composed of six questions to monitor one desirable and five undesirable behaviours. The desirable one was tackled in question (Q1) and was about commitment to the breakfast meal. More than half of the participants (51.7%) skipped their breakfast either daily or sometimes with a per cent of 34.8% and 16.9% respectively.

The most prominent undesirable behaviour found was multitask eating (eating + watching TV) in Q3, it was adopted by a vast majority of 92.1% participants whether daily versus sometimes with a per cent of 91% and 1.1% respectively.

Otherwise, less than half of the study group members practised the four-remaining unhealthy behaviours, either daily or sometimes, as follows in a decrement order:

Ingestion of fast food > 2 times\week (Q2) and eating a heavy meal at dinner (Q4) were both encountered in a comparable per cent of participants (46.1%).

To a lesser extent, unhealthy intake of sugary beverages (Q6) was found in a per cent of 38.2%. A slightly lower per cent of 35.9% of candidates slept post-dinner by less than two hours (Q5), as illustrated in Table 2.

**Table 2: Questions and per cent of different answers in the whole study group**

| Nine questions | Per cent | | |
|---|---|---|---|
| | Yes | No | Some-times |
| Q1. A daily commitment to breakfast intake | 48.3 | 34.8 | 16.9 |
| Q2. Eat ready-made fast food more than twice a week | 27.0 | 53.9 | 19.1 |
| Q3. Eating in front of the television | 91.0 | 7.9 | 1.1 |
| Q4. Eat a heavy meal at dinner | 28.1 | 53.9 | 18.0 |
| Q5. Sleep after dinner by less than two hours | 25.8 | 64.0 | 10.1 |
| Q6. Three sugary drinks per day (soft drink/juices reserved / warm drinks + 3 teaspoonful extra sugar per cup) | 32.6 | 61.8 | 5.6 |

Then a comparison between the two groups was made as regards the frequency of each behaviour (as shown in Table 3).

A significantly higher number among obese

adolescents consumed breakfast everyday (n = 27) compared to non-obese group (n = 16) (P-value = 0.042).

The fast-food consumption was more frequent in obese (13 daily + 12 sometimes) than non-obese (11 daily+ 5 sometimes) adolescents but with insignificant P-value.

The majority of candidates in both groups were eating while watching TV (93.3% of the obese and 88.6% of the non-obese).

Almost similar per cent of candidates from the two groups was drinking three sugary beverages daily (33.3% of the obese and 31.8% of the non-obese).

Unexpectedly, the two unhealthy behaviours of ingesting a heavy dinner and late dinner time were both encountered in a greater number of the non-obese (n = 15 and n = 14) versus the obese ones (n = 10 and n = 9).

**Table 3: Comparison of the dietary habit's responses of the two groups**

| Parameters | Groups | | Obese | Non-Obese | Chi-Square | P-value |
|---|---|---|---|---|---|---|
| Q1. Regular Breakfast intake | Yes | N | 27 | 16 | 6.361 | 0.042* |
| | | % | 60.00% | 36.40% | | |
| | No | N | 14 | 17 | | |
| | | % | 31.10% | 38.60% | | |
| | Some-times | N | 4 | 11 | | |
| | | % | 8.90% | 25.00% | | |
| Q2. Fast Food > twice\week | Yes | N | 13 | 11 | 4.372 | 0.112 |
| | | % | 28.90% | 25.00% | | |
| | No | N | 20 | 28 | | |
| | | % | 44.40% | 63.60% | | |
| | Some-times | N | 12 | 5 | | |
| | | % | 26.70% | 11.40% | | |
| Q3. Eating in front of the TV | Yes | N | 42 | 39 | 1.243 | 0.537 |
| | | % | 93.30% | 88.60% | | |
| | No | N | 3 | 4 | | |
| | | % | 6.70% | 9.10% | | |
| | Some-times | N | 0 | 1 | | |
| | | % | 0.00% | 2.30% | | |
| Q4. Heavy Dinner meal | Yes | N | 10 | 15 | 1.739 | 0.419 |
| | | % | 22.20% | 34.10% | | |
| | No | N | 27 | 21 | | |
| | | % | 60.00% | 47.70% | | |
| | Some-times | N | 8 | 8 | | |
| | | % | 17.80% | 18.20% | | |
| Q5. < 2 hours dinner\bed-time | Yes | N | 9 | 14 | 2.047 | 0.359 |
| | | % | 20.00% | 31.80% | | |
| | No | N | 32 | 25 | | |
| | | % | 71.10% | 56.80% | | |
| | Some-times | N | 4 | 5 | | |
| | | % | 8.90% | 11.40% | | |
| Q6. Three Sugary Beverages\day | Yes | N | 15 | 14 | 0.241 | 0.886 |
| | | % | 33.30% | 31.80% | | |
| | No | N | 27 | 28 | | |
| | | % | 60.00% | 63.60% | | |
| | Some-times | N | 3 | 2 | | |
| | | % | 6.70% | 4.50% | | |

*P-value < 0.05 considered significant.

## Discussion

The WHO described adolescence as a highly vulnerable stage of life. Because, children at this stage, have a deceiving grown-up a physique that hides an immature psychosocial aspect. Therefore, the concern of the current study was directed towards children at this critical age. Same age group was also chosen to investigate dietary habits in Syria, Sudan, Arabian Gulf countries, China, India, Britain and many other countries [6], [7], [5], [8], [9], and [10].

The participants were grouped according to BMI percentiles. As in numerous studies and various fields of research, the BMI categorisation was the criteria of stratifying the candidates into case and control groups. This "BMI-based selection" in Egyptian studies was adopted by many authors [11], [12], [13], [14].

We classified the studied population into a case group with a BMI ≥ 85$^{th}$ centile and a control group with a BMI < 85$^{th}$ centile. The same cutoff for BMI percentile was chosen by bin Zaal and co-workers in their study about adolescents' dietary habits [15].

A personal face-to-face interviewing was chosen to ensure complete data collection by avoiding questions' misunderstanding and missing answers. The structured questionnaire used was quick, easy, reproducible, coded and interpreted. Six straightforward, closed-ended questions were the tool to retrieve information. These were questions with a limited fixed set of responses (yes\no\sometimes). In other studies, the self-administered questionnaires were used instead of interviewing technique. For example, the Arab Teens Lifestyle Study (ATLS) in which the large study group rendered personal interview impossible. Also, in the ATLS survey, a set of scaled questions was used [1].

In the current study, Q1 monitored the healthy behaviour of regular breakfast intake. More than half of the participants (51.7%) were breakfast skippers either daily or sometimes. Comparably, in the ATLS survey, 52% to 82% of Arab adolescents did not have breakfast every day [16]. Smaller per cent was reported in a Sudanese study where only 244 out of 945 adolescents (25.8%) were skipping breakfast meal [16]. While, in the survey done by Li et al., in China, the majority (93%) of the adolescents were having breakfast regularly (1661 from a total of 1774) [8].

A significantly higher number of breakfast consumers was noticed among the case group compared to the control group (P-value 0.042). On the contrary, several studies linked omitting breakfast with high BMI in childhood and adolescence [17], [18], [19], [20], [21]. Although Albertson et al., and Berkey et al., and recently Casazza et al., and Dhurandhar et al., did not support this "breakfast skippers\high BMI link" in their researches [22], [23], [24], [25]. This contradictory is due to the variability of meal content. If the consumed meal were rich in fibres and micronutrients, then it would have been an addition to the healthy eating index score. Also, it would have contributed to a lower intake of sweets and Trans-fat. But if the consumed meal was of poor quality high in fat and sugar, then skipping, it would not be harmful [26] and [27].

According to responses to Q2, candidates

with BMI < 85th centiles were consuming less fast food than those with BMI ≥ 85th centiles. This finding matched with the conclusion deduced by Bhadoran et al. They stated that junk food intake more than once a week was linked to a higher risk of obesity while eating fast food more than twice a week was associated with a higher risk of metabolic syndrome [28]. Similarly, Bhattacharjee et al. found a positive correlation between the frequency of junk food intake and high BMI among Indian adolescents [9].

As regards the answers to Q3, multitask eating was the most prominent undesirable behaviour found in the study group. It was practised daily by 91% of participants irrespective to BMI categories. This bad habit results in overeating, improper chewing; distraction of the brain from appropriate processing of eating and deprive the child of family interaction during mealtime. In an Egyptian study conducted in Cairo, a comparable per cent of 87.5% of adolescents were taking snacks while watching TV [29]. In Canadian research, eating in front of the TV was positively associated with unhealthy food choices [30].

Through the unpredictable answers to Q4 and Q5, it was noticed that the combined two unhealthy behaviours of late and heavy dinner meal were commoners in non-obese candidates and not their counterparts. The reverse was detected by Ong et al., who noted an association between high BMI and ingesting calorie-dense food late at night [31]. This unexpected finding may be due to the widespread Egyptian habit of skipping lunch and getting the main meal at dinner time. Thus, the total caloric intake may be adequate or even below the requirement of the day. Also, awareness of the overweight/obesity problem may be the reason for those with high BMI to get a light early dinner meal as a way of caloric restriction.

The unhealthy behaviour of drinking three sugary beverages per day, in Q6, showed an equivocal distribution in both groups (33.3% of the obese and 31.8% of the non-obese). This comparable per cent may be due to adolescents' tendency to imitate their friends in drinking soft drinks and preserved juices. Moreover, in Egypt, dark sweetened tea is quite popular, and it is considered the everyday beverage in most Egyptian homes. So, it is an Egyptian society issue rather than a high BMI related one. In an Egyptian study conducted in both rural and urban sectors, by Abdel-Hady et al., eighty per cent of adolescents had more than 3 small glasses of sweetened black tea daily [32]. In Oman and the United Arab Emirates, more than 50% of the teenagers' males and about 50% of the teenagers' females consumed ≥ 1 soft drink/day in the month before the study. While in Qatar, 60%/65% of adolescent's boys/girls respectively drank soft drinks every day [5].

In conclusion, many undesirable dietary behaviours are acquired in adolescence. Such behaviours are encountered in all BMI categories. Thus, a normal BMI does not always reflect healthful dietary intake. The rectification of faulty eating "behaviours" in youth is mandatory before becoming "habits" in adulthood.

*Recommendations;* The most powerful influencers on eating behaviours in adolescence are family, friends and media. Thus, good parental support and understanding have a major imprint on reforming such harmful conduct. 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. The advertisements about food products 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.

*Limitations:* The study was limited by the small number of participants.

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