

DIET QUALITY OF ADOLESCENT PREGNANT FEMALES IN PRIMARY HEALTH CARE

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ABSTRACT: To evaluate the quality of the diet of adolescent pregnant females in primary health care units. A cross-sectional study with 42 pregnant females. Dietary intake data were obtained through the 24-hour dietary recall, whose analysis resulted in the Adapted Diet Quality Index for Pregnant Women (ADQIPW). Pearson's correlation test analyzed each ADQIPW component with the index score. The average score of ADQIPW was 46.1 ± 14.3 points. The correlation of components with the final index score ranged between 0.85 for fiber and 0.11 for Omega 3. The ADQIPW classification showed that 59.5% of pregnant women had a "poor" diet quality and 40.5% "improvement required". ADQIPW showed poor diet quality, characterized by a low intake of fruits, vegetables, and foods rich in calcium, iron, Omega 3, and folate. The consumption of ultra-processed foods was high.

KEY WORDS: Adolescent nutrition; Food consumption; Maternal nutrition.

QUALIDADE DA DIETA DE GESTANTES ADOLESCENTES ASSISTIDAS NA REDE BÁSICA DE SAÚDE

RESUMO: Avaliar a qualidade da dieta de gestantes adolescentes usuárias da rede básica de saúde. Estudo transversal com 42 gestantes adolescentes. Os dados de ingestão dietética foram obtidos por meio do recordatório alimentar de 24h, cuja análise resultou no Índice de Qualidade da Dieta Adaptado para Gestantes (IQDAG). O teste de correlação de Pearson foi utilizado na análise entre cada componente do IQDAG com a pontuação do índice. A pontuação média do IQDAG foi de $46,1 \pm 14,3$ pontos. A correlação dos componentes com a pontuação final do índice variou entre 0,85 para fibras e 0,11 para ômega 3. A classificação do IQDAG mostrou que 59,5% das gestantes apresentaram qualidade da dieta "pobre" e 40,5% "precisam melhorar". O IQDAG mostrou uma baixa qualidade da dieta caracterizada pela baixa ingestão de frutas, hortaliças e alimentos ricos em cálcio, ferro, ômega 3 e folato. O consumo dos alimentos ultraprocessados foi elevado.

PALAVRA-CHAVE: Consumo de alimentos; Nutrição materna; Nutrição na adolescência.

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Received in: 11/12/2019
Accepted on: 21/06/2020

INTRODUCTION

Pregnancy is a physiological state characterized by an increase in energy and nutritional demands to supply needs due to fetal growth and development and to anatomical and physiological changes in the mother¹. When nutrition needs in adolescent pregnant females are compared to adult pregnant ones, they are higher due to the mother's growth process². Consequently, proper feeding is a determinant factor in the evolution of pregnancy providing required nutrients that would avoid the occurrence of co-morbidities and foment their prevention during the pregnancy and puerperal period³, such as hypertensive syndromes, gestational diabetes, iron-deficiency anemia and other consequences to the newly born with low birth weight and prematurity⁴.

Several studies showed that adolescents' feeding is characterized by low quality, high rates of non-healthy food and low ingestion of essential nutrients for growth and development.⁵ Persistence of intake patterns during pregnancy is highly problematic due to unfavorable risks for the pregnant female and the newly born baby².

Pregnant females' dietetic patterns should be evaluated within the context of nutrition care during the prenatal period to avoid nutritional disorders that may affect obstetric results^{6,7}. Evaluation comprises a diet quality index, which synthesizes the diet's whole quality, taking into account food complexity and the principles of variety, equilibrium, and moderation. Its use enhances the promotion of adequate and healthy feeding and the prevention of chronic diseases related to ingestion of nutrients through dietetic counseling⁶.

Dietetic indexes were developed to evaluate diet quality, such as the Diet Quality Index (DQI), which assesses the adequacy of nutrients⁶. Indexes were adapted for different types of users, taking into consideration food recommendations for Brazilian people and the specific items for each stage in life⁶. In the case of diet during the gestational period, Crivellenti et al.⁸ prepared the Adapted Diet Quality Index for Pregnant Women (ADQIPW) that takes into account the nutritional needs that pregnancy requires (IQDAG)⁸. The tool complies with recommendation of the updated Food Guide for Brazilian Population (FGBP) which foregrounds, among other

things, that food should be made up of *in natura* products or minimally processed, great variety and predominantly vegetables, and that the intake of ultra-processed food with its unbalanced nutritional composition and related to the development of non-transmissible chronic diseases, should be avoided⁹.

Taking into consideration that ADQIPW comprehends a new food dimension, or rather, ultra-processed food, and that it was developed and applied to adult pregnant females⁸, the current paper evaluates diet quality by ADQIPW in adolescent pregnant females, followed throughout the prenatal period in primary health care in the municipality of Niterói, RJ, Brazil.

METHODOLOGY

The current study analyzed data retrieved from transversal research.¹⁰ Convenience sample comprised 42 adolescent pregnant females, patients at primary health units in Niterói, RJ, Brazil, between 13 and 19 years old, who undertook prenatal tests in primary care units, between February 2008 and March 2014. Inclusion criteria comprised one-fetus pregnancy, primigravid patient, lack of chronic diseases before pregnancy, maternal age under 20 years at childbirth. Data were retrieved through pregnancy chart and interviews at the Laboratório de Avaliação Nutricional e Funcional da Universidade Federal Fluminense (LANUFF).

Food intake data were obtained by a 24-h food report (R24h), applied by a telephone interview within a scheduled timetable in at least two non-consecutive days, including weekends. During the interview, the size of food portions was estimated using an album with photos of food and food preparations given to the pregnant female during the first interview at LANUFF. Foods were converted into energy, fiber, macro, and micronutrients, following the Brazilian Chart of Food Composition (TACO)¹¹. When TACO data are missing, the Food Composition Database (USDA) was employed¹². SAS 9.2 was used for statistical analysis.

Diet quality was measured by R24h analysis, and ADQIPW was calculated. The index comprises nine components representing three food groups (vegetables, legumes, and fresh fruit), five nutrients (food fibers,

Omega 3, calcium, folate, and iron) and the moderator component. The ninth component consisted of the percentage of total daily energy rate from ultra-processed food.⁹ Reference rates were used as food intake aims to obtain the highest scores. Nutrient adequateness was evaluated by mean ingestion rates for rate in Dietary Reference Intakes (DRI's), plus Estimated Average Requirement (EAR) rates; when the above is missing, Adequate Intake (AI) rate was used¹³⁻¹⁶. In the case of food, groups analyzed, recommendations described in Care for Low-risk Prenatal period⁷, proportional to 1000Kcal ingested by diet, were taken into account to obtain the number of portions taken and scores. Portions of fruits, vegetables, and legumes described from preparations were also taken into account.

In the case of the moderating item, ultra-processed food was classified according to FGBP⁹, identified as components in cooking preparations whose amounts were estimated in a receipt bank prepared with data from a previous study¹⁰. The table for the evaluation of food intake in household measures was employed when preparations in databases are missing¹⁷. Due to the lack of ingestion reference rates for ultra-processed food, energy percentages provided for this type of food concerning total energy ingestion were calculated. Percentiles 16 and 85 of consumed energy distribution were used as cross-section⁸. Chart 1 gives criteria for each ADQIPW component.

Chart 1. Criteria for scores for each component of ADQIPW

| Component | Scores | | |
|-----------------------------------|--------|--------|-----|
| | 0 | 10 | 20 |
| Fresh fruits/1000 kcal (portions) | 0 | ≥ 1.5 | |
| Vegetables/1000 kcal (portions) | 0 | ≥ 1.5 | |
| Legumes/1000 kcal (portions) | 0 | ≥ 0.5 | |
| Food fibers (g) | 0 | ≥ 28 | |
| Calcium (mg) | 0 | ≥ 1300 | |
| Iron (mg) | 0 | ≥ 23 | |
| Omega 3 (g) | 0 | ≥ 1.4 | |
| Folate (mcg) | 0 | ≥ 520 | |
| Ultra-processed food (% VET) | p85 | | p16 |

Source: Ministério da Saúde^{11,8}, IOM¹⁵⁻¹⁸.

ADQIPW scores were derived from two equations given by Crivellenti et al.⁸ and described below. Equation

1 is applied to eight components – three food groups and five nutrients, as previously provided, ranging between 0 and 10. A maximum rate of 10 scores is maintained even in ingestion cases that exceed adequacy. Equation 2 refers to the moderating component, represented by ultra-processed food. The maximum and minimum scores are 20 and 0. The higher the intake of this food, the less is the diet quality and, therefore, the less is the score obtained by the equation. The index rate corresponds to the sum of all nine components, totaling 100 scores. In the equations below, QICx is the amount of each component taken by the pregnant female; Min is the minimum score; Max is the maximum score:

$$\text{Equation 1} = 10 * (\text{QICx} - \text{Min}) / (\text{Max} - \text{Min})$$

$$\text{Equation 2} = 20 * (\text{Max} - \text{QICx}) / (\text{Max} - \text{Min})$$

Scores demonstrate that diet is classified as “good” when rates are above 80; “improvement required” when scores range between 51 and 80; “poor,” when scores are below 51. Classification complied with Healthy Eating Index (HEI) to evaluate the amount of diet of US citizens and foreground the construction of the other indexes¹⁸. Further, ingestion mean/day of portions of fruit and vegetables by pregnant females was calculated to compare data of previous studies¹⁹.

Data are given in the Tables, expressed in relative frequency and means ± standard deviation. Kolmogorov Smirnov test revealed the distribution of normality of continuous variables. Pearson's correlation coefficient evaluated the co-relationship between scores of each component and the final score obtained. Partial co-relationship plus final score were obtained by the coefficient of determination (R2). Data analysis was undertaken with SPSS 13.0) at 5% significance level.

The Committee approved the current research for Ethics in Human Beings of the Universidade Federal Fluminense, n. 022/08. All pregnant females gave consent by signing the Free Consent Form (TCLE).

Table 1. Mean (\pm SD) of scores of components of ADQIPW and their independent and partial co-relationship with final scores. Niterói, 2019. (n=42)

| Components | Pontuação | | | |
|-----------------------------------|---------------------|-----------------------|---------------------------------------|-------|
| | Mean (\pm SD) | Pearson´s Correlation | Partial correlation (R ²) | P |
| Fresh fruits/1000 kcal (portions) | 2.95 (\pm 3.19) | 0.48 | 3% | 0.001 |
| Vegetables/1000 kcal (portions) | 2.06 (\pm 2.56) | 0.26 | 3% | 0.090 |
| Legumes/1000 kcal (portions) | 7.93 (\pm 3.14) | 0.57 | 2% | 0.000 |
| Food fibers (g) | 8.51 (\pm 2.02) | 0.85 | 1% | 0.000 |
| Calcium (mg) | 4.63 (\pm 2.15) | 0.16 | 1% | 0.320 |
| Iron (mg) | 4.97 (\pm 1.77) | 0.56 | <1% | 0.000 |
| Omega 3 (g) | 0.06 (\pm 0.24) | 0.11 | <1% | 0.500 |
| Folate (mcg) | 4.27 (\pm 2.06) | 0.78 | 1% | 0.000 |
| Ultra-processed food (% VET) | 10.69 (\pm 6.99) | 0.81 | 14% | 0.000 |

Source: Research data.

RESULTS

ADQIPW applied for the evaluation of adolescent pregnant females' diet quality had a mean of 46.10 (\pm 14.37) scores, varying between 4.62 and 70.73. Final ADQIPW score reached 59.5% (n=25) of adolescent pregnant females with "poor" quality diet and 40.5% (n=17) with "improvement required" for diet quality. No pregnant adolescent had a score above 80, corresponding to a good quality diet.

Percentiles 16 and 85 of consumed energy distribution derived from ultra-processed food respectively represented 22.4% and 48.8% of total energy value (TEV). Percentage of pregnant females with maximum score for adequacy according to each component was 4.8% (n=2) for the vegetables; 64.3% (n=27) for legumes; 7.1% (n=3) for fruits; 47.6% (n=20) for food fibers; 7.1% (n=3) for calcium; 2.4% (n=1) for iron and 16.7% (n=7) for ultra-processed group. No pregnant female reached maximum score for components Omega 3 and folate. Pregnant adolescents provided mean ingestion of 207 g/day for intake of fruit and vegetables, or rather, 2.5 portions.

Except for scores in vegetables, calcium, and Omega 3, scores for the other ADQIPW components had a significant statistical co-relationship with the final index score (Table 1). Ultra-processed food and fibers were the most robust components associated with the final score. As a rule, 24% of index variation may be explained by their components. The component with the highest

relationship rate corresponds to ultra-processed food (R²=14%), followed by fruits and vegetables (R²=3%), legumes (R²=2%), calcium, folate, and fibers (R²=1%), and iron and Omega 3 (R²<1%).

DISCUSSION

The mean score (46.10 \pm 14.37) applied to adolescent pregnant females in the current study was lower than average in adult pregnant females (70.2 \pm 11.9)⁸ and demonstrated that adolescents' diet has a more inferior quality to that of adults. No adolescent pregnant female exhibited rates indicating a good quality diet (80 scores), with a 60% intake of a poor quality diet. There are only a few recent studies on the quality of diet in adolescent pregnant females. Solani et al.² showed that, despite demonstrated positive changes in food habits during pregnancy, diet quality was reduced due to low consumption of food with essential vitamins and minerals for the gestational period (vitamins B complex, D, calcium, and iron), such as beef, eggs, fish oil and cheese².

Despite a particular gap in the diet quality of adolescent pregnant females, several studies have insisted that adolescents' eating habits are, as a rule, unhealthy^{5,20,21}, and results in the current study have revealed that such habits are replicated during pregnancy. Enes et al.²¹ has discussed poor eating habits during adolescence in their study on 200 adolescents in Campinas, SP, Brazil. Researchers showed that 50.6% of

daily energy intake came from ultra-processed food with low feeding quality²¹. Gomes et al.²⁰ corroborated these results and indicated a high intake of hydrocarbons and ultra-processed food with high energy density and low intake of fibers among children and adolescents (between 6 and 17 years old)²⁰.

So that chronic disease such as heart conditions, cancer, Type 2 diabetes, and obesity could be avoided, the World Health Organization (WHO) recommends for the daily population ingestion of at least 400 g of fruits and vegetables, or preferably, approximately five portions of this type of food¹⁹. Although no specific number of portions is recommended for adolescent pregnant females, the importance of the intake of this type of food is evident, particularly for this phase in the life cycle⁹. The results of the current study have revealed that adolescent pregnant females had an average 207 g/day ingestion of fruit and vegetables, which is equivalent to approximately 2.5 portions, which is below the intake mean established by WHO for people in general¹⁹. Only 19% of pregnant females (n=8) attained the proposed recommendation.

Among the other ADQIPW components evaluated, legumes had the highest percentage adequacy rate (64.3%; n=27), with beans as the most representative of the group. Its intake in meals is generally associated with cereals, particularly rice, which is part and parcel of Brazilian food culture⁹. The combination makes up a complete protein pattern, which is fundamental for the synthesis of maternal and fetal tissues and favors gestation development, especially the adolescent pregnant female who is still within the growth process²². Less than 50% of the pregnant females analyzed (47.6%; n=20) exhibited adequate fiber ingestion. The nutrient is crucial for intestine health at this phase of life since it aids in the prevention of constipation, common in pregnancy. The intake of this group should be underscored²².

It should be underscored that the small percentage of adolescent pregnant females had adequate calcium and iron (7.1% and 2.4%, respectively), which are crucial nutrients for the formation of fetal bones and proper blood flow. Iron-deficiency anemia is widespread at this stage and requires great care due to possible severe damage to the mother-child health²³. Veiga et al.⁴ detected that 42.8% of 107 adolescent pregnant females were

diagnosed with maternal anemia. The deficiency of the two nutrients is related to the restriction of intrauterine growth and premature birth. Therefore, the adequate ingestion of the two minerals should be integrated within prenatal care²².

No pregnant adolescent reached a maximum score in Omega 3. However, scores may have been underestimated due to the absence of rates in food composition tables. New composition tables are required for better ingestion estimates of the polyunsaturated fatty acid. However, several studies have demonstrated that regular fish intake, an essential source of Omega 3, is not a habit for Brazilians and may have been the cause of the rates detected in the analysis²⁴.

Folate, another component without maximum score by adolescent pregnant females, should be highlighted due to its crucial role in forming the fetus's neural tube. Iron and folic acid are supplemented during pregnancy as a strategy for the prevention of disease, following recommendations by the Ministry of Health²³. The current study failed to consider the supply of nutrients by supplementation due to the evaluation of food intake through the diet quality index.

The intake of ultra-processed food involved the analysis of energy contribution for total energy ingestion. Measurement is generally underestimated since it does not include ultra-processed food in the cooking process. The current study's different stance is the inclusion of all ultra-processed food in the analysis, including those used as ingredients in cooking. The analysis showed that ultra-processed food contributed at an average of 34.8% of TEV, which is higher than the rate reported by Louzada et al., who evaluated the energy contribution of food consumption of adolescents and adults for the Research in Family Budgets 2008-2009 and detected 21.5% TEV²⁵. However, a study with adolescents from private and government-run schools in Palmeira das Missões, RS, Brazil, demonstrated that 49.2% of TEV corresponds to ultra-processed food intake.²⁶ Enes et al.²¹ also reported a similar rate (50,6%), and thus demonstrated that the quality of adolescents' diet is lower than that of adults.

As a contrast to an early edition of FGBP²⁷, current guidelines⁹ do not indicate food portions. The authors justify such an attitude because of the innumerable

combinations and amounts of food that may become healthy food and principles on eating and eatability, eating regularly and carefully, and the practice of culinary skills for food contact and food recovery. It deals with guidelines that are not focused on the ingestion of food groups but in the processing degree in which they are inserted⁹. Due to changes in paradigms on healthy food-focused by current FGBP, diet quality indexes should be adapted to the new dimensions which take into account food processing suggested by ADQIPW with the insertion of the moderator. The reason for such adaptation due to the association between the intake of ultra-processed food with different manifestations of chronic diseases such as diabetes mellitus and hypertension in several contemporary investigations^{25,28}.

Consequently, adolescent pregnant females' diet quality was evaluated according to an index that comprised ultra-processed food as a moderator. In the analysis of the partial co-relationship between ADQIPW and its components, variation in index rate is mainly explained by ultra-processed food. The above reveals the importance of evaluating the food category's contribution to daily energy ingestion and its role in other food groups, taking into account risks associated with its intake.

CONCLUSION

ADQIPW applied to adolescent pregnant females revealed a low-quality diet characterized by low ingestion of fruits, vegetables, and food rich in calcium, iron, Omega 3, and folate. The energy contribution of food intake of ultra-processed food is high. Feeding based on *in natura* and minimally processed food should be enhanced in the population, as mentioned above, due to the influence of diet quality in the evolution of pregnancy in adolescence.

ACKNOWLEDGMENTS

The authors would like to thank Dr. Luiz Antonio dos Anjos for his collaboration with the databases' analysis.

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