Original Article

# Analysis of the Nursing Diagnosis low weight in adolescents of public schools

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## ABSTRACT

The objective was to analyze the Nursing Diagnosis low weight and related factors in adolescents. A cross-sectional study developed in 2013, with 372 adolescents from state schools in Natal/RN, who were submitted to physical examination and completeness of a form. Three groups were created: adolescents with the Diagnosis low weight (n=52), eutrophics (n=247) and overweight (n=73). The data from the third group was not considered in the comparisons. The prevalence of adolescents with Diagnosis low weight was 14%. Factors related to the diagnosis were: low income and maternal education; low consumption of milk and cheese; low means of body mass index, fat percentage and bone tissue; higher means of water and muscle. An elevated prevalence was seen of the Nursing Diagnosis low weight. Socioeconomic, social, nutritional and clinical aspects presented association with this Diagnosis and, thus, should be target of Nursing prevention actions and interventions.

**Descriptors:** Nursing; Nursing Diagnosis; Primary Care Nursing; Adolescent; Malnutrition.

## INTRODUCTION

Adolescence is a dynamic phase, from 10 to 19 years[1], when deep biopsychosocial changes occur[2]. It is a challenge to promote health in this population, because adolescents look for services with priority when taken by a disease, and by the organization of services that have few health activities developed for this clientele[3].

Adolescent care contributes with the creation of a healthier adult population. In this assistance, one of the main strategies is the nutritional accompaniment, once the ingestion of food, an important factor for the human health and wellbeing, is a crucial element in this phase of life because it influences growth and it creates eating behaviors during adult life[4]. In addition, inadequate food consumption of this population, corroborates with health issues that are manifested on short- and long-term.

In this context, population studies allow to assess the magnitude of nutritional issues and contribute with the planning of efficacious public health actions, which can also constitute an important strategy for nutritional investigation in this population[5].

From this perspective, recent studies are giving more emphasis to verify factors contributing and related to the large number of overweight and obesity cases among adolescents, as well as, studies investigate eating habits, physical activity and clinical aspects of this clientele[6-8].

However, to conduct studies focused on the verification of low weight prevalence and related factors should be stimulated, once this nutritional deviation has a direct effect on physical growing, cognitive development, and negatively affects the health of adolescents[4].

Low weight is a Nursing Diagnose in accordance with the International Classification of Nursing Practices (CIPE®), code 10027316, focused in presenting the following description: compromised weight and body mass condition[9].

As a way to search for an answer for the magnitude of this problem and to contribute with the planning of nursing care, the question was formulated: “What is the prevalence of the Nursing Diagnose low weight in adolescents from public schools? What are the factors related to this diagnosis?”.

We believe in the pertinence of this study, due to difficulties faced by nurses when caring for this population and the need to identify related factors, to contribute with care planning. For this, the present study aimed to analyze the Nursing Diagnosis low weight and the related factors in adolescents.

## METHODS

A cross-sectional study, developed in 2013, with adolescents from state schools of a capital in the Northeast Region of Brazil.

For the study sample plan, we opted for stratified sampling, being: Extract 1 (students from the educational state network form the north region of Natal); Extract 2 (from the west region); Extract 3 (from the east region); Extract 4 (from the south region).

The variable considered, for effects of the sample calculation definition, was p = prevalence of students from the referred population with overweight. We searched for a study with reliable methods with the most similar characteristics of the analyzed population, therefore, we considered a study result indicating an average of 16.5% of adolescents with overweight living in Northeast capitals[6]. Thus, the sample size was calculated as:

$$n = \frac{(0,15)N}{N^2 D + 0,15}$$

Being: n = sample size of students from the state educational network of Natal, N = 27,377 students;[10] and D = $\varepsilon^2$ /4, being $\varepsilon$ an error limit for estimation of p, satisfying: $P(|p - \hat{P}| < \varepsilon) = 0,95$. Being $\hat{P}$, an estimative for p.

Defining n, the allocation was done after, that is, it was considered $n_j$ as the sample size and $N_j$ the size of the j- related extract, j= 1, 2,3,4, so $n_j = nw_j$ , with:

$$w_j = \frac{N_j}{\sum_{i=1}^{4} N_i} = \frac{N_j}{N}$$

It was considered $\varepsilon$ 0,04 and the values on the n formula above were substituted, and it was obtained n= 372. On the other hand, it is known that $N_1$= 8289, $N_2$= 5410, $N_3$= 8070 and $N_4$= 5608 (SEEC, 2011). Thus, it was substituted on the formula $w_j$ above and it was obtained $w_1$= 0.30; $w_2$=0.20, $w_3$= 0.29 and $w_4$= 0.21. Thus, the sample sizes for each extract were: $n_1$= 112 (north), $n_2$= 74 (west), $n_3$= 108 (east) and $n_4$= 78 (south).

The sampling plan was calculated by the statistical advisory from Universidade Federal do Rio Grande do Norte, denominated Laboratory of Applied Statistics (LEA).

After concluding the stratification by number of students enrolled per region; we a sorting was conducted of two schools per region; the subsample was divided for both; one class was sorted per school. The researcher visited the class, explained the study, and handed Consent Terms for their parents to sign.

At the scheduled day, the researcher returned to the class and received the signed terms, the students stayed sitting in the classroom and they were asked to go to a nutritional assessment place, considering the chairs' order from left to right, students were called from the first to the last sit in the row. In the study, we admitted the equivalent to the sample calculation, that is, when the number of adolescents per school was reached, the nutritional assessment ended. Their participation occurred after parenting consent.

The inclusion criteria were to be between 10 and 19 years and to be enrolled in a state school in the city. The exclusion criteria was to be absent on the scheduled date.

We conducted the data collection between March and June of 2013. Adolescents were submitted to physical examination (anthropometry, abdominal circumference, blood pressure and bioimpedance exam) and they answered a form with socioeconomic and eating habits data.

For anthropometry, we considered the mean of two measurements. For weight, we used a digital scale from the brand *Beurer*®, with 10g precision, with the adolescents barefoot, wearing light clothes and positioned in the middle of the platform. We measured height with a stadiometer from the WCS® brand, 0.5cm precision, with adolescents barefoot, in orthostatic position, arms along the body, united feet, knees extended, head oriented to the Frankfurt horizontal plan, after a deep inspiration[11].

For the abdominal circumference measurement, we used a non-elastic tape from the brand Cardiomed®, with 0.1 cm precision, at the mean point between the superior point of the iliac crest and the

last costal margin, with the adolescent standing up, nude abdomen, arms along the body and on the expiratory breathing phase[12].

We took the blood pressure in three moments, with two-minute intervals, according to the VI Brazilian Hypertension Guidelines. We considered the mean of the two last measurements[13]. We used a sphygmomanometer and stethoscope from the brand BD®.

For bioimpedance, we used a device of the *Beurer*® brand, with adolescents barefoot, without metallic objects, positioned in the middle of the platform, holding the receptor of electric frequency (50kHz). The device identifies the percentages of body fat, water and, muscle, besides the quantity of bone tissue.

Data were tabulated and analyzed at IMB Statistical Package for the Social Science® (SPSS®) version 19.0, using frequencies, Chi-Squared test, non-paired t test and odds ratio. We considered a significance of 5%.

The participants had their nutritional state classified in accordance with the Centers from Disease Control and Prevention: very low weight (≤3rd), low weight (>3rd and≤10th), eutrophic (>10th and ≤85th), overweight (>85 and ≤95th), obese (>95th and ≤97th) and heavily obese (>97th)[14].

We determined the Diagnosis by the presence of low weight or very low weight. From the classification of the nutritional state, we divided the sample in three groups, Diagnosis of low weight, eutrophics, and with excess weight (overweight, obese or heavily obese). For the present study, we did not consider the data from adolescents with excess weight, once for the comparison group, the ideal is to not change their nutritional state.

We considered eating habits used by the Brazilian National Survey for School Health. For the markers of healthy eating (fruits, vegetables, milk and cheese), we considered satisfactory the consumption of those food five or more days per week. For the markers of unhealthy eating (soda, candies, catchup/mustard/mayonnaise and fried food), we considered satisfactory if lower than twice a week[15].

The study was approved by the Ethics in Research Committee of the Universidade Federal do Rio Grande do Norte under the protocol nº 183.885 and CAAE nº 10200812.0.0000.5537. The participation of adolescents occurred after parenting consent and signature of the Free and Informed Consent Term.

## RESULTS

Within the 372 adolescents, it was noted the female participation (72%), non-white (73.9%), those with family income of up to two monthly minimum wages (45.9%) – during the data collection period, the minimum wage was R$678.00, living with four or more people (75.8%) and maternal education of up to 9 years (60.8%). The prevalence of the Nursing Diagnose low weight was 14% (CI 95% = 11.5 to 15.6%) in the studied population.

In the creation of groups of interest, these 14% (n=52) were part of a group of adolescents with the Diagnosis low weight, once they were low weight or very low weight. Two hundred and forty-seven (66.4%) adolescents classified as eutrophic formed the comparison group. The 73 adolescents classified with weight

excess (overweight, obese or heavily obese) were not considered (13.5%), once they would compromise the comparison between groups.

We verified (Table 1) the association in groups for the following socioeconomic variables: monthly family income and maternal education. Individuals with the Nursing Diagnose low weight had 1.94 more likelihood to have an income of up to one minimum wage; and 2.8 times of their maternal education to be lower than nine years.

**Table 1:** Association between socioeconomic variables and the Nursing Diagnosis low weight in adolescents (n=299). Natal, RN, Brazil, 2013.

| Variable | Group | | OR CI |
|---|---|---|---|
| | Low weight n (%) | Eutrophic n (%) | |
| **Minimum wage*** | | | |
| Up to 1 | 28 (53.8) | 122 (49.6) | 1.94 |
| ≥ 1 | 24 (46.2) | 125 (50.4) | (1.74-2.09) |
| **Number of people in the house** | | | |
| > 4 | 10 (19.2) | 58 (23.5) | 0.77 |
| ≥ 4 | 42 (80.8) | 189 (76.5) | (0.36-1.64) |
| **Maternal education (years)** | | | |
| < 9 | 32 (61.5) | 108 (43.7) | 2.80 |
| ≥ 9 | 20 (38.5) | 139 (56.3) | (2.43-3.48) |

* During the data collection period, the minimum wage was R$678,00. OR – odds ratio; CI – confidence interval.

About the consumption of marker products for healthy eating (Table 2), we verified association for the following foods: milk and cheese. The group frequencies for the Diagnosis low weight were lower. It was noted that individuals with low weight had 3.71 more likelihood for unsatisfactory cheese consumption and, 2.26 more likelihood to consume milk. It was also noted the unsatisfactory consumption of fruits and vegetables in both groups.

**Table 2:** Association between food consumption and the Nursing Diagnose low weight in adolescents (n=299). Natal, RN, Brazil, 2013.

| Food consumption/week | Groups | | OR CI |
|---|---|---|---|
| | Low weight n (%) | Eutrophic n (%) | |
| **Fruits** | | | |
| ≥5 | 26 (50.0) | 104 (42.1) | 1.37 |
| <5 | 26 (50.0) | 143 (57.9) | (0.75-2.50) |
| **Vegetables** | | | |
| ≥5 | 17 (32.7) | 71 (28.7) | 1.20 |
| <5 | 35 (67.3) | 176 (71.3) | (0.63-2.28) |
| **Cheese** | | | |
| ≥5 | 9 (17.3) | 191 (77.3) | 3.71 |
| <5 | 43 (82.7) | 56 (22.7) | (3.32-4.55) |
| **Milk** | | | |
| ≥5 | 18 (34.6) | 148 (59.9) | 2.26 |
| <5 | 34 (65.4) | 99 (40.1) | (1.67-3.36) |
| **Soda** | | | |
| ≤2 | 16 (30.8) | 69 (27.9) | 1.14 |
| >2 | 36 (69.2) | 178 (72.1) | (0.59-2.19) |

| | | | |
|---|---|---|---|
| **Ketchup/mustard/mayonnaise** | | | |
| ≤2 | 40 (76.9) | 110 (44.5) | 2.67 |
| >2 | 12 (23.1) | 137 (55.5) | (1.66-5.34) |
| **Candies** | | | |
| ≤2 | 46 (88.5) | 54 (21.9) | 4.46 |
| >2 | 6 (11.5) | 193 (78.1) | (3.18-5.15) |
| **Fried food** | | | |
| ≤2 | 7 (13.5) | 43 (17.4) | 0.73 |
| >2 | 45 (86.5) | 204 (82.6) | (0.31-1.74) |

OR - *odds-ratio*; CI- confidence interval.

About the marker products of unhealthy food (Table 2), we saw an association between ketchup/mustard/mayonnaise and candies, being the consumption frequency higher in the eutrophic group. The eutrophic adolescents had 2.67 higher likelihood to unsatisfactory consume ketchup/mustard/mayonnaise; and 4.46 to consume candies. The high consumption of soda and fried food was present in both groups.

At last, we observed associations for weight, body mass index, abdominal circumference, body fat percentage, and quantity of bone tissue (Table 3), once means was significantly lower in adolescents with low weight diagnosis. Similarly, we observed associations for percentages of corporal water and muscle; however, the mean values were superior in eutrophic adolescents.

**Table 3:** Association between clinical variables and the Nursing Diagnosis low weight in adolescents (n=299). Natal, RN, Brazil, 2013.

| Variable | Grups | | *p-value** |
|---|---|---|---|
| | Low weight / Mean ± standard deviation | Eutrophic / Mean ± standard deviation | |
| Weight (kg) | 43.43±7.24 | 52.07±8.34 | 0.000 |
| Height (m) | 1.61±0.09 | 1.61±0.08 | 0.415 |
| Systolic blood pressure (mmHg) | 102.77±10.20 | 105.60±11.05 | 0.091 |
| Diastolic blood pressure (mmHg) | 64.14±9.72 | 65.03±9.13 | 0.531 |
| Body Mass Index | 15.61±1.88 | 20.17±2.04 | 0.000 |
| Abdominal circumference | 63.25±5.64 | 69.22±5.81 | 0.000 |
| Fat percentage | 14.54±5.40 | 17.85±6.33 | 0.001 |
| Water percentage | 61.98±4.85 | 57.61±5.40 | 0.000 |
| Muscle percentage | 44.90±4.89 | 42.01±4.98 | 0.000 |
| Bone tissue (kg) | 9.70±0.88 | 10.33±0.92 | 0.000 |

* Non-paired t test.

## DISCUSSION

In the study population, the prevalence of the Diagnosis low weight was 14%. A different result from a study with students from all Brazilian capitals that pointed a prevalence of 1.8% in adolescents[16].

A study conducted with 2,782 adolescents aged 10 to 17 years, enrolled in public and private school in different Brazilian states, described a prevalence of undernutrition in this population group of 13.3% (CI 95% = 12%- 14.6%), a similar result from our findings[17].

The low weight in adolescents seemed associated, within other factors, to maternal education and income. In an analogue way, a study conducted with individuals aged 10 to 19 in India also showed statistical

associations between those variables (p<0,000) and demonstrated that lower levels of maternal education and economic level were present in adolescents with low nutritional state[18].

This relationship between income and low weight can be explained, because the food choice of families with small financial resource is affected by the purchasing power. These people prefer to purchase cheap products and in quantity, due to the little money available to spend with food[19]. Thus, it is assumed that poorest populations have less access to items that provide a more diverse nutrition and, therefore, satisfy caloric and nutritional needs of all family members.

Beyond this economic factor, the educational level also relates to the nutritional level at the measure that it interferes in how people choose their food. Those with lower educational levels might perceive processed food rich in sugar, fat and/or sodium as important for healthy eating[20]. In this sense, it is noted that having money to purchase food is not enough, it is necessary to be educated to choose healthy food that will satisfy nutritional needs.

The low weight also presented a significant statistical relationship with unsatisfactory consumption of cheese and milk, important sources of calcium. It is noted that this nutrient is available in many products, but still, only 11.7% of adolescents consume an adequate daily quantity[21].

The inadequate ingestion of calcium in young people can harm their development, it causes low stature, osteoporosis, and low scholar performance[22]. For those reasons, health professionals recommend to inform those subjects, as well as to those responsible for them, about the source of food rich in calcium and about the importance of this nutrient for bone formation and prevention of diseases[21].

Regarding eating habits, it is important to consider the ingestion of unhealthy food present in both studied groups. The adolescents affirmed to unsatisfactory consume fruits, vegetables, soda, and fried foods. A similar result was found in the Brazilian National Survey for School Health, in which 71.1% of adolescents affirmed to consume soda at least twice a week, and 73.4% consumed candies[15].

About clinical variables, groups with the Diagnostic low weight presented lower values for weight, body mass index, abdominal circumference, and fat percentage, expected in low weight individuals[23].

In this group, it was noted low values for bone tissue. This result is worrying, because adolescents are expected to have, at least 10 kg of bone tissue. The repercussions are low stature, joint problems and bone demineralization[23].

Thus, to prevent or interfere in this Diagnosis in adolescents, Nursing is suggested to be the mediator between the health service, the school and the family, considering the factors related to eating habits, socioeconomic and clinical conditions.

It is believed to be relevant to identify factors related to Diagnosis low weight from CIPE®, because it collaborates with the fast measurement and easy understanding, and it can affect the quality of the Nursing process. Thus, more studies with temporal tendencies, to confirm the related factors should be conducted.

As study limitations, we identified: the data collection occurred in state schools, what did not allowed comparison with a population of higher income; and the cross-sectional design did not allow to establish

causational relationships from the associations between Diagnosis low weight and related factors.

## CONCLUSION

We conclude that the prevalence of the Nursing Diagnose low weight in the adolescent population of state schools of Natal was 14%. Besides, the economic factor, eating habits and clinical variables are related to the Diagnose in a way that there were associations with the following variables: low income and maternal education; reduced ingestion of food enriched with calcium; and weight, body mass index, abdominal circumference, quantity of bone tissue and lower percentages of fat than in the comparison group.

The low weight prevalence found here constitutes an alert to services of nutritional vigilance, aimed to program prevention measures and periodical follow-up. We highlight the existence of a specific Nursing Diagnosis for low weight individuals. The identified related factors can interfere in the quality of life and health of these adolescents, leading them to nutritional losses that can be also present during adulthood, causing other health problems due to the lack of essential nutrients. This conjunct of information can contribute with nursing awareness regarding the responsibility to assist this clientele, especially in the Primary Health Care, and in the planning of resolute actions.

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