

# Adaptation of the night eating questionnaire for Brazilian adolescents

Francisco Gireludo Coutinho da Silva  
Thisciane Ferreira Pinto  
Evanice Avelino de Souza  
Veralice Meireles Sales de Bruin  
Pedro Felipe Carvalho de Bruin\*

Department of Clinical Medicine,  
Federal University of Ceará, Brazil.

## ABSTRACT

**Introduction** Night Eating Syndrome (NES) is characterized by a delay in the circadian rhythm of food intake and affects 1.5% of the general population, occurring more frequently in obese people. The Night Eating Questionnaire (NEQ) was originally developed for the American adult population. It is a self-administered instrument widely used in the identification and follow-up of individuals with NES. Although the NEQ has been translated and validated for Brazilian adults, there are no reports of its adaptation for use in Brazilian adolescents. The present study aimed to adapt and evaluate reliability and reproducibility of the NEQ for Brazilian adolescents. **Material and Methods** Initially, a semantic adaptation of the Portuguese version of the NEQ was performed by 3 professionals with experience with adolescents. The suggested text was analyzed and consolidated item by item by the researchers and then presented to 21 adolescents from an intermediate school in Fortaleza. The questions with low level of understanding (<90%) were modified and the questionnaire was re-applied to 23 adolescents, obtaining satisfactory understanding. **Results** The version of the NEQ for Brazilian adolescents, compared to the adult version, contains changes in items 3, 5, 6, 7 and 13. The questionnaire was administered to 463 students aged 11 to 17 years (mean  $\pm$  SD = 13.7  $\pm$  1.2), from 3 schools. The internal consistency, measured by the Cronbach's alpha coefficient, was 0.73. The reproducibility that was measured after one week in 27 adolescents was 0.92 (95% CI 0.82-0.96). **Conclusion** The new version of the NEQ for Brazilian adolescents presents excellent reproducibility and good internal consistency and is a simple and useful instrument to evaluate nocturnal eating symptoms in this age group.

**Keywords** Surveys and Questionnaires; Night Eating Syndrome; Adolescent.

## \*Corresponding author

Pedro Felipe Carvalho de Bruin  
E-mail pedrobruin@gmail.com

Received: September 16, 2018;  
Accepted: June 17, 2019.

DOI 10.5935/1984-0063.20200002

## INTRODUCTION

Night Eating Syndrome (NES), originally described by Stunkard et al., in 1955, is characterized by a delay in the pattern of food intake<sup>1</sup>. According to population surveys, the frequency of NES is estimated to be 1.5% in adult individuals, ranging from 6 to 14% in obese patients in clinical treatment<sup>2,3</sup> and reaching 42% in the candidates for bariatric surgery<sup>4</sup>. Although a strong relationship between NES and obesity is recognized, this condition has also been observed in eutrophic individuals<sup>5</sup>. Data on the frequency and characteristics of NES in children and adolescents are scarce<sup>6</sup>.

The fundamental criterion for the diagnosis of NES is an abnormal increase in nocturnal food intake manifested by consumption of more than 25% of total daily calories after dinner and/or nocturnal awakenings accompanied by food intake at least twice a week. In addition, at least three of the five following criteria must be met: morning anorexia; insomnia; strong desire to eat between dinner and bedtime; necessity to eat to start sleeping or going back to sleep and depressed mood, more often at night. There should be memory for the events of nocturnal intake and suffering or functional impairment for the patient<sup>7</sup>. According to the Diagnostic and Statistical Manual of Mental Disorders - 5 (DSM-5), NES is also characterized by a significant stress with or without an impairment of daily function<sup>8</sup>.

The Night Eating Questionnaire (NEQ) is a widely used tool for screening and assessing the severity of NES. It was originally developed for the American adult population<sup>8</sup> and has been translated and adapted for use in several countries<sup>9-12</sup>. Adaptation of the NEQ for use in children has been reported in a single study conducted in Canada<sup>6</sup>. We are not aware of a similar study in young teenagers.

In Brazil, two previous Portuguese language versions of the questionnaire were appropriately adapted for use in adult patients. Comparing the two versions, significant differences can be observed in items 3, 9 and 13, as well as less pronounced differences in items 5, 7 and 12. The remaining items are very similar. In the present study, we chose to use the version of Dantas et al.<sup>13</sup> based on a better internal consistency and better understanding of the questions<sup>13,14</sup>.

The present study aimed to adapt and evaluate reliability and reproducibility of the NEQ for Brazilian adolescents.

## MATERIAL AND METHODS

### Study Setting and Participants

The study included 507 students aged 11 to 17 years, of both genders, enrolled full time (7:00 am to 5:00 p.m.) at four public teaching institutions in the city of Fortaleza, Brazil, randomly selected from a list provided by the Municipal Department of Education. For the initial process of adaptation of the questionnaire, 44 students from one of those four institutions were randomly selected to participate. To determine the reliability and reproducibility of the final version, 463 students from the three remaining schools took part. Adolescents who were not present at the time of the

administration of the questionnaire and those who did not agree to participate in the study were excluded.

The protocol was approved by the Research Ethics Committee of the Federal University of Ceará (CAAE: 47263415.1.0000.5054) and all participants signed the free and informed consent form. The consent of the parents or guardians was obtained in writing in all cases.

### Night Eating Questionnaire

The Night Eating Questionnaire (NEQ) is a tool for screening and assessing the severity of NES, which contains a total of 14 items scored on a Likert scale from zero to four and a subjective question (item 15: "How long have you had difficulties with eating at night?"), which is not scored (Table 1). It should be noted that item 13 ("When you snack in the middle of the night, are you aware that you have eaten?") is used only to exclude other diseases, and does not enter into the calculation of the final score. Questions 1, 4 and 14 are reverse scored. A global score greater than or equal to 25 is considered indicative of the presence of NES<sup>8</sup>.

All these questions can be grouped together to form four assessment components related to four fundamental aspects of NES: (i) nocturnal hyperphagia, evaluated by the sum of the scores of questions 3, 4 and 5; (ii) nocturnal intake, by the sum of the scores of questions 9, 10, 11, 12 and 14; (iii) morning anorexia, by the scores of questions 1, 2 and 5 and (iv) sleep / mood changes, by the sum of the scores of questions 6, 7 and 8. Questions 1 through 9 are answered by all participants. Questions 10 through 12 should be answered only by those who present a non-zero score in question 9, and questions 13 and 14, only by participants with a score greater than 0 on question 12, which are those who eat upon awakening during the night<sup>7</sup>.

### Stages of the Adaptation of the Night Eating Questionnaire for Adolescents

The version of the NEQ previously translated and adapted for Brazilian adults by Dantas et al.<sup>13</sup> was used as the basis for the present adaptation. In the first step, each item was independently adapted by three professionals with college degrees (two university professors and one pediatrician), with wide experience with young adolescents and without knowledge of the objectives of the study.

The three versions were compared by the researchers, who elaborated a preliminary version (P). This version was then administered to 21 students who were requested to inform the degree of comprehension about each item [(a) I did not understand; (b) I have reasonably understood; (c) I completely understood]. The items in which more than 10% of the students indicated option "a" were modified by the researchers and this new version (F) was reapplied to a new group of 23 students from the same school, who did not participate in the previous stage. The degree of understanding was reevaluated and all students reported full or reasonable understanding of all items.

Subsequently, the questionnaire was administered to students from three schools that did not participate in the

previous phases of adaptation, in order to determine reliability. The reproducibility of the final version (F) was measured by test and retest, with a 7 day interval, in 27 students from one of the three schools.

## STATISTICAL ANALYSIS

The characteristics of the sample are presented as mean  $\pm$  standard deviation (SD) or percentage. Internal consistency of the new version of the NEQ was evaluated by Cronbach's alpha statistics. The intraclass correlation coefficient was used to assess test-retest reliability. Data were analyzed by the Statistical Package for the Social Sciences (SPSS) software for Windows, version 20.0.

## RESULTS

The final version (F) for adolescents, compared to the original version for Brazilian adults, presents changes in items 3, 5, 6, 7 and 13 (Table 1). The Night Eating Questionnaire was applied to 463 students (mean age  $\pm$  SD = 13.7  $\pm$  1.3 years, female = 50.3%) from three public schools, with an internal consistency of 0.73. Test-retest reproducibility, measured by the intraclass correlation coefficient in 27 adolescents, was 0.92 (95% CI: 0.82-0.96).

## DISCUSSION

In the present study, an adaptation of the Night Eating Questionnaire (NEQ) for Brazilian adolescents was performed.

The NEQ is an instrument used to identify cases and provide information on the severity of the symptoms of

**Table 1.** Night Eating Questionnaire adapted for the Brazilian adolescent population.

Itens do Questionário Alimentar Noturno para Adolescentes
1. Como é a sua fome pela manhã?
2. Qual o horário em que você se alimenta pela primeira vez?
3. Você tem desejo ou vontade comer após o lanche da noite, até a hora de dormir?
4. Que controle você tem sobre sua alimentação entre o jantar e a hora de dormir?
5. Considerando o seu consumo diário total de alimentos, o quanto você come depois do jantar?
6. Você geralmente se sente triste ou "pra baixo"?
7. Quando você está triste ou "pra baixo", em que momento isso acontece?
8. Com que frequência você tem dificuldade para adormecer?
9. Quantas vezes por semana você se levanta no meio da noite, sem contar as vezes em que você vai somente ao banheiro?
10. Você tem desejo ou necessidade de comer quando acorda à noite?
11. Você precisa comer para voltar a dormir quando acorda à noite?
12. Quando você acorda no meio da noite, com que frequência você lancha?
13. Quando você faz um lanche no meio da noite, você está ciente de que comeu?
14. Que controle você tem sobre a sua alimentação quando está acordado à noite?
15. Há quanto tempo você tem tido dificuldades com a alimentação durante a noite?

the Night Eating Syndrome (NES). The final version of the questionnaire adapted for the adolescent population showed satisfactory reproducibility and excellent internal consistency.

The NEQ has been widely used in research and in clinical practice. Two Portuguese versions adapted for use in adult patients have been previously published in Brazil<sup>13,14</sup>. Comparing these two previous versions for adults, it is observed that there are differences in the wording of items 3, 9 and 13, as well as small variations in items 5, 7 and 12. In the present study, we chose to adopt the version of Dantas et al.<sup>15</sup> for its better internal consistency and degree of understanding.

Current knowledge about NES in children and adolescents has been limited, to a large extent, by the lack of adequate instruments designed for those age groups. In the version of the NEQ for children developed in the province of Quebec, Canada, the internal consistency was lower than in this study, of the order of 0.54<sup>6</sup>. The internal consistency of the present scale may be considered satisfactory and similar to most previous studies with American<sup>9</sup>, German<sup>10</sup>, Spanish<sup>11</sup> and Israeli<sup>12</sup> adults. In the version translated and adapted for the Brazilian adult population, a somewhat greater internal consistency was observed, of 0.87<sup>13</sup>.

The reproducibility observed in this study can be considered excellent, with an intraclass correlation coefficient of 0.92. The Spanish version of Moizé et al.<sup>11</sup> reached a coefficient of 0.86. In Brazilian adults, Dantas et al.<sup>13</sup> obtained coefficients of intra- and interobserver reproducibility, respectively, between 0.95 and 1.0 and 0.92 and 1.0 in each of the items.

This study has some limitations. Firstly, it must be considered that, although the present sample contains an adequate number of participants, they all came from the public education system. Therefore, it is possible that the inclusion of adolescents with diverse socioeconomic and cultural characteristics, such as those who attend private schools and/or those who are out of school, could have caused some changes in the adapted final version of the questionnaire. Further studies may clarify this issue. A complete assessment of the psychometric properties of NEQ, including the determination of convergent validity, goes beyond the scope of this study and should be performed in future research.

In a previous study conducted in the city of Fortaleza, 39% of the adolescents were identified as obese. In another study, 20% of the males and 19% of the female adolescents were found to be obese<sup>15,16</sup>. Since inadequate food intake and sedentary lifestyle may contribute to cardiovascular risk, among other health problems<sup>17</sup>, it is very important to detect the presence of nocturnal eating symptoms in adolescence. Therefore, it is necessary to develop and validate appropriate assessment instruments for these age groups, since adolescence is a phase of changes which bring with them new behaviors that can become consolidated and persist into adult life, particularly in relation to eating habits<sup>18,19</sup>.

In conclusion, the NEQ version adapted for Brazilian adolescents presents a high level of comprehension, excellent reproducibility and good internal consistency. Its use may contribute to a better understanding of the characteristics of NES in this age group.

## REFERENCES

1. Stunkard AJ, Grace WJ, Wolff HG. The night-eating syndrome; a pattern of food intake among certain obese patients. *Am J Med.* 1955;19(1):78-86.
2. Allison KC, Grilo CM, Masheb RM, Stunkard AJ. Binge eating disorder and night eating syndrome: a comparative study of disordered eating. *J Consult Clin Psychol.* 2005;73(6):1107-15.
3. Rand CS, Macgregor A, Stunkard AJ. The night eating syndrome in the general population and among postoperative obesity surgery patients. *Int J Eat Disord.* 1997;22(1):65-9.
4. Hsu LK, Sullivan SP, Benotti PN. Eating disturbances and outcome of gastric bypass surgery: a pilot study. *Int J Eat Disord.* 1997;21(4):385-90.
5. Harb ABC, Caumo W, Raupp P, Hidalgo MPL. Síndrome do comer noturno: aspectos conceituais, epidemiológicos, diagnósticos e terapêuticos. *Rev Nutr.* 2010;23(1):127-36.
6. Gallant AR, Lundgren J, Allison K, Stunkard AJ, Lambert M, O'Loughlin J, et al. Validity of the night eating questionnaire in children. *Int J Eat Disord.* 2012;45(7):861-5.
7. Allison KC, Lundgren JD, O'Reardon JP, Geliebter A, Gluck ME, Vinai P, et al. Proposed diagnostic criteria for night eating syndrome. *Int J Eat Disord.* 2010;43(3):241-7.
8. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders.* 5th ed. Arlington, VA: American Psychiatric Association; 2013.
9. Allison KC, Lundgren JD, O'Reardon JP, Martino NS, Sarwer DB, Wadden TA, et al. The Night Eating Questionnaire (NEQ): psychometric properties of a measure of severity of the Night Eating Syndrome. *Eat Behav.* 2008;9(1):62-72.
10. Meule A, Allison KC, Platte P. A German version of the Night Eating Questionnaire (NEQ): psychometric properties and correlates in a student sample. *Eat Behav.* 2014;15(4):523-7.
11. Moizé V, Gluck ME, Torres F, Andreu A, Vidal J, Allison K. Transcultural adaptation of the Night Eating Questionnaire (NEQ) for its use in the Spanish population. *Eat Behav.* 2012;13(3):260-3.
12. Latzer Y, Tzischinsky O, Hason Rozenstein M, Allison K. Reliability and cross-validation of the Night Eating Questionnaire (NEQ): Hebrew version. *Isr J Psychiatry Relat Sci.* 2014;51(1):68-73.
13. Dantas GM, Pinto TF, Pereira EDB, Magalhães Júnior RM, de Bruin VMS, de Bruin PFC. Validation of a new Brazilian version of the "Night Eating Questionnaire". *Sleep Sci.* 2012;5(1):7-13.
14. Harb AB, Caumo W, Hidalgo MP. [Translation and adaptation of the Brazilian version of the Night Eating Questionnaire]. *Cad Saude Publica.* 2008;24(6):1368-76.
15. Albuquerque LP, Cavalcante ACM, De Almeida PC, Carrapeiro MM. Relação da obesidade com o comportamento alimentar e o estilo de vida de escolares brasileiros. *Nutr Clín Diet Hosp.* 2016;36(1):17-23.
16. Campos LA, Leite AJM, de Almeida PC. Prevalência de sobrepeso e obesidade em adolescentes escolares do município de Fortaleza, Brasil. *Rev Bras Saúde Matern Infant.* 2007;7(2):183-90.
17. Guimaraes ICB, Guimaraes AC. Síndrome Metabólica na infância e adolescência. Um fator maior de risco cardiovascular. *Rev Baiana Saúde Pública.* 2006;30(2):349-62.
18. Lundgren JD, Allison KC, Vinai P, Gluck ME. Assessment Instruments for Night Eating Syndrome. In: Lundgren JD, Allison KC, Stunkard AJ, eds. *Night Eating Syndrome: Research, Assessment, and Treatment.* New York: Guilford Press; 2012.
19. de Sousa JG, Lima LR, Fernandes CRS, dos Santos GM. Atividade física e hábitos alimentares de adolescentes escolares: Pesquisa Nacional de Saúde do Escolar (PENSE), 2015. *Rev Bras Nutr Esp.* 2019;13(77):87-93.