CLINACAL NUTRITION
DOI: 10.12957/demetra.2022.69629

Diana de Araujo Eymael[1]
Lúcia Rota Borges[2]
Ana Maria Pandolfo Feoli[3]
Antonio Orlando Farias Martins Filho[1]
Débora Kilpp[4]
Caroline Santos Leal[2]
Anne y Castro Marques[2]
Renata Torres Abib Bertacco[2]

[1] Universidade Federal de Pelotas, Faculdade de Nutrição, Programa de Pós-graduação em Nutrição e alimentos. Pelotas, RS, Brasil.

[2] Universidade Federal de Pelotas, Faculdade de Nutrição, Departamento de Nutrição. Pelotas, RS, Brasil.

[3] Pontifícia Universidade Católica do Rio Grande do Sul, Escola de Ciências da Saúde. Departamento de Nutrição. Porto Alegre, RS, Brasil.

[4] Empresa Brasileira de Serviços Hospitalares, Hospital Escola UFPEL/EBSERH. Pelotas, RS, Brasil.

This article comes from a Master's Thesis, entitled "Eating behavior in outpatients with type 2 diabetes and/or hypertension: a cross-sectional study", authored by Diana de Araujo Eymael. under the guidance of Renata Torres Abib Bertacco, defended on August 2, 2021, at the Graduate Program in Nutrition and Food, at the Federal University of Pelotas.

Correspondence
Diana de Araujo Eymael
diana-eymael@hotmail.com

Eating behavior in outpatients with type 2 diabetes mellitus and/or systemic arterial hypertension: a cross-sectional study

Eating behavior in outpatients with type 2 diabetes mellitus and/or systemic arterial hypertension: a cross-sectional study

Abstract

Objective: Evaluate the eating behavior of patients with diabetes and/or hypertension assisted in a nutrition clinic, and to associate this behavior with sociodemographic, clinical and nutritional factors. ***Methods***: This is a retrospective cross-sectional study that used data from individuals with type 2 diabetes and/or hypertension, adults and elderly, of both genders, in their first outpatient consultation with Nutrition. To obtain data on eating behavior, the Three Factor Eating Questionnaire was used, reduced to 21 items, and nutritional anamnesis to obtain independent variables, such as sociodemographic, clinical and nutritional. Data were analyzed descriptively and analytically. ***Results***: Fifty five patients were evaluated, most of them overweight women and elderly, diagnosed with concomitant diabetes and hypertension. The eating behavior related to cognitive restriction had the highest median among the evaluated domains. Emotional eating was significantly associated with female gender (p=0.0079); however, lack of dietary control was associated with the use of antidepressant medications (p=0.0403). ***Conclusion***: It is suggested that future research be carried out to explore long-term eating behavior.

Keywords: Eating behavior. Noncommunicable diseases. Adult. Aged

Resumo

Objetivo: Avaliar o comportamento alimentar de pacientes com diabetes e/ou hipertensão assistidos em um ambulatório de nutrição, e associar este comportamento a fatores sociodemográficos, clínicos e nutricionais. ***Métodos***: Este é um estudo transversal retrospectivo, que utilizou dados de indivíduos com diabetes tipo 2 e/ou hipertensão, adultos e idosos, de ambos os sexos, em primeira consulta ambulatorial com a Nutrição. Para a obtenção de dados sobre o comportamento alimentar, foram utilizados o Three Factor Eating Questionnaire, versão reduzida em 21 itens, e anamnese nutricional para obtenção das variáveis independentes, tais como sociodemográficas, clínicas e nutricionais. Os dados foram analisados de forma descritiva e analítica. ***Resultados***: Foram avaliados 55 pacientes, sendo a maioria mulheres e idosos com excesso de peso, com o diagnóstico de diabetes e hipertensão concomitantemente. O comportamento alimentar referente à restrição cognitiva apresentou maior mediana dentre os domínios avaliados. A alimentação emocional apresentou associação significativa com o gênero feminino (p=0,0079); já o descontrole alimentar apresentou associação com o uso de medicamentos antidepressivos (p=0,0403). ***Conclusão***: Sugere-se que sejam realizadas pesquisas futuras que explorem o comportamento alimentar a longo prazo.

Palavras-chave: Comportamento alimentar. Doenças não transmissíveis. Adulto. Idoso.

.

INTRODUCTION

Chronic non-communicable diseases (NCDs) are one of the biggest public health problems, causing loss of quality of life and a high number of deaths, accounting for approximately 63% of deaths in the world annually. Among the main CNCDs are diabetes mellitus (DM) and systemic arterial hypertension (SAH).[1] According to the International Diabetes Federation, it is estimated that 463 million adults were suffering from the disease in 2019, and that the total number of people with DM will have increased to 578 million by 2030, and to 700 million by 2045.[2] Type 2 diabetes mellitus (DM2) represents the majority of cases, and is usually accompanied by SAH, since 4 out of 10 patients already show high blood pressure measurements when diagnosed with diabetes.[3] Data from 2018 show that 32.5% of adult individuals and more than 60% of the elderly had SAH in Brazil.[4]

The etiology and ways to control these diseases are associated with eating behavior and lifestyle, among other factors.[5] The balance between food choices, food intake and energy expenditure, together with the adequate distribution of nutrients, is essential.[6] Dietary interventions to reduce blood pressure modify eating habits,[7] as well as important behaviors and attitude related to diabetes control promote changes in food intake, which can lead to altered or disordered eating patterns.[8]

Eating behavior can be understood as the individual's relationship with food, which ranges from feelings and choices of ingestion, in addition to all aspects related to the act of eating,[9] and can be acquired throughout life, according to the way the individual lives and how it affects them.[10] Eating behavior can be understood in three psychological dimensions, namely: emotional eating (EE), cognitive restriction (CR) and uncontrolled eating (UE).[11-13] CR is characterized by an intentional restriction on food consumption in order to maintain or reduce weight; EE refers to food consumption triggered by mood, feelings, emotions or tensions; and UE is defined by the loss of one's own standards in relation to eating, that is, loss of self-control and high food consumption, regardless of being hungry or not.[14] It is worth noting that eating behavior can also be influenced by several factors, such as social, economic and other conditions.[15]

Although the knowledge about the eating behavior of individuals with DM2 and/or SAH is of fundamental importance for an effective cognitive therapeutic approach, the behavioral profile of these patients is still not clear in the literature. In this context, this study aimed at describing the eating behavior and associated factors in patients with DM2 and/or SAH assisted in a specialized Nutrition outpatient clinic.

METHODS

This study is a cross-section of a larger research entitled "Eating behavior of overweight patients assisted in a diabetes and hypertension outpatient clinic", approved by the Research Ethics Committee of the Faculty of Medicine of the Federal University of Pelotas (protocol number 4.145.604). For this study, data from the first consultation of adults (aging between 18 and 59 years) and elderly (aging 60 years or over[16]) diagnosed with DM2 and/or SAH were included. Subjects, from both genders, were tended between February 2019 and March 2020, the period in which the main research was carried out at the Nutrition clinic of Diabetes and Hypertension Center of the Federal University of Pelotas. They agreed to participate in the study by signing the Term of Free and Informed Consent. Data that were excluded consisted of data from patients with DM1; incomplete or non-existent TFEQ data; and data collected before the period that was chosen for this research.

The variables collected from the standard anamnesis of the clinic were: gender (female/male); age, later categorized according to age group (adults/elderly); education (illiterate/incomplete elementary school; complete elementary school/incomplete high school; complete high school/incomplete higher education; complete higher education); marital status (single/married/divorced/widowed); underlying pathologies, such as SAH (yes/no) and DM2 (yes/no) confirmed by medical records; sleep duration (<6h, 6-8h, >8h); use of medications, which was obtained openly and then categorized into

anxiolytics (yes/no) and antidepressants (yes/no); previous nutritional monitoring (yes/no); weight and height for classification of nutritional status based on BMI, with different classifications being adopted for adults (underweight ≤ 18.5 kg/m2; eutrophic 18.5 – 24.9 kg/m2; overweight 25 – 29.9 kg/m2; grade I obesity 30 – 34.9 kg/m2; grade II obesity 35 – 39.9 kg/m2; grade III obesity ≥ 40.0 kg/m2), according to the WHO,[17] and elderly (underweight ≤ 22 kg/m2; adequate or eutrophic >22 - <27 kg/m2; overweight ≥27 kg/m2), according to Lipschitz;[18] and the domains of eating behavior: uncontrolled eating (0-100 points), cognitive restriction (0-100 points) and emotional eating (0-100 points).

The UE, CR and EE domains were considered outcome variables, while the others were considered exposure variables. The instruments used to collect each variable will be described below. The nutritional anamnesis was applied by a trained team and was used to obtain the independent variables, such as sociodemographic, clinical and nutritional factors.

In order to obtain data on eating behavior, the "Three-Factor Eating Questionnaire – R21" (TFEQ-R21) was used. Originally developed by Stunkard and Messick[13] in 1985, the TFEQ-R21 had its version reduced to 21 items by Tholin et al.[19] in 2005. It was translated and validated by Natacci and Ferreira Júnior[20] in 2011, and is considered to be a tool to categorize the eating behavior pattern into three domains: cognitive restriction, emotional eating and lack of food control.

The TFEQ-R21 has 6 items that address cognitive restriction, identifying dietary control aimed at influencing weight. The emotional eating scale, also with 6 items, indicates how much negative emotional states can influence overeating. And there are also 9 items on uncontrolled eating, which assess the patient's tendency to lose control of eating when hungry or when receiving external stimuli, amounting to the total of 21 items. This instrument generates a scale from 0 to 100 points and, the closer to 100, the greater the dimension of the behavioral aspect.[19,21]

For data analysis, a database was initially created in the Microsoft Excel® 2016 software program. It was then exported to the statistical program Stata 13.0, in which the analyzes were performed. Descriptive analysis of sociodemographic, clinical and nutritional data was performed to characterize the sample. For the description of categorical variables, the absolute number and relative frequency were used, and for continuous variables, the median and interquartile range, according to the distribution of the variables.

In order to assess the normality of the distribution of variables, the Shapiro-Wilk test was used. The T-test or Mann-Whitney test was used for dichotomous exposure variables, whereas for nominal polytomous exposures, the ANOVA test or the Kruskall-Wallis test was used, depending on the nature of the variable. For all statistical associations, a significance level of 5% was adopted.

RESULTS

During the evaluation period, 123 patients were seen at the first consultation at the Nutrition Outpatient Clinic, of which 68 were excluded for not having complete data for this study or met any of the exclusion criteria. Thus, the sample consisted of 55 patients, most of them were elderly female diagnosed with DM2 and concomitant hypertension, self-reported illiterate or with incomplete elementary education, and whose marital status was "married". Most reported at least 6 hours of sleep a day, not using anti-anxiety or antidepressant medications, and having already undergone previous nutritional monitoring elsewhere. Overweight, understood as the sum of overweight and obese adult individuals, was found in most of the sample, both in adults and in the elderly (Table 1). As for eating behavior, the cognitive restriction domain had the highest median (39, 28 – 67) when compared to the other domains ($p<0.0001$).

[a] Índice de Massa Corporal (IMC): baixo peso ≤ 18,5; eutrófico 18,5 – 24,9; sobrepeso 25 – 29,9; obesidade grau I 30 – 34,9; obesidade grau II 35 – 39,9; obesidade grau III ≥ 40,0. Analisado segundo OMS[17]. n=18.

Table 1. Characterization of a sample of patients assisted in a Nutrition outpatient clinic of a Diabetes and Hypertension Center (n=55). 2020.

Variable	n (%)
Sociodemographic characteristics	
Gender	
Female	31 (56,36)
Male	24 (43,64)
Age Group	18 (32,73)
Adult	37 (67,27)
Elderly	
Scholarity	29 (52,72)
Illiterate/Incomplete Elementary	11 (20,00)
Complete Elementary/Incomplete High School	13 (23,64)
Full High/Incomplete Higher	2 (3,64)
Graduated	
*Marital status**	9 (16,98)
Single	22 (41,51)
Married	9 (16,98)
Divorced	13 (24,53)
Widower	
Clinical features - Base pathology	
*Clinical features - Sleep duration**	
Less than six hours	1 (1,88)
Between six and eight hours	26 (49,06)
More than eight hours	26 (49,06)
Use of anxiolytic medications	6 (10,91)
Use of antidepressant medication	11 (20,0)
Nutritional characteristics	
Previous nutritional monitoring	30 (54,55)
Nutritional status of adults (BMI)[a]	4 (22,22)
Eutrophy	3 (16,67)
Overweight	11 (61,11)
Obesity	
Nutritional status of the elderly (BMI)[b]	1 (2,70)
Thinness	6 (16,22)
Eutrophy	30 (81,08)
Overweight	
Domains of eating behavior	Median (P25-P75)
Emotional Eating (EE)	6 (0 – 28)
Uncontrolled Eating (UE)	19 (7 – 33)
Cognitive Restriction (CR)	39 (28 – 67)

*Marital status and sleep duration: n=53.

[a] Body Mass Index (BMI): underweight ≤ 18,5; eutrophic 18,5 – 24,9; overweight 25 –

*Marital status and sleep duration: n=53.

[a] Body Mass Index (BMI): underweight ≤ 18,5; eutrophic 18,5 – 24,9; overweight 25 –

29,9; obesity grade I 30 – 34,9; obesity grade II 35 – 39,9; obesity grade III ≥ 40,0. Analyzed second OMS[17]. n=18.

[b] Body Mass Index (BMI): underweight ≤ 22; adequate or eutrophic >22 - <27; overweight ≥27. Analyzed second Lipschitz[18]. n=37.

Statistically significant associations were observed between female gender and the emotional eating domain (p=0.0079), and between the use of antidepressant medication and the lack of eating control domain (p=0.0403). The variables age, use of anxiolytic medication and previous nutritional monitoring were not associated with the eating behavior domains (Table 2). There was no significant difference between the medians for eating behavior domains in relation to the underlying pathology, sleep duration, education, nutritional status and marital status (Table 3).

Table 2. Domains of eating behavior according to sociodemographic, clinical and nutritional characteristics (n=55). Nutrition Outpatient Clinic of the Diabetes and Hypertension Center, 2020.

Variable	Emotional Eating (EE) Median (P25-P75)	Uncontrolled Eating (UE) Median (P25-P75)	Cognitive Restriction (CR) Median (P25-P75)
Gender			
Male (n=24)	6.0 (0 – 11.0)	22.5 (7.0 – 33.0)	36.0 (28.0 – 67.0)
Female (n=31)	17.0 (6.0 – 50.0)	15.0 (7.0 – 41.0)	44.0 (22.0 – 61.0)
P	**0.0079***	**0.8848**	**0.6520**
Age			
Adults (n=18)	8.5 (0 – 56.0)	31.5 (7.0 – 48.0)	36.0 (28.0 – 50.0)
Seniors (n=37)	6.0 (0 – 17.0)	15.0 (7.0 – 33.0)	44.0 (28.0 – 72.0)
P	**0.4744**	**0.1348**	**0.4182**
Use of anxiolytic medications			
Yes (n=6)	11.0 (11.0 – 17.0)	28.0 (15.0 – 44.00	30.5 (17.0 – 50.0)
No (n=49)	6.0 (0 – 28.0)	19.0 (7.0 – 33.0)	39.0 (28.0 – 67.0)
P	**0.2613**	**0.2491**	**0.3862**
Use of antidepressant medications			
Yes (n=11)	11.0 (6.0 – 56.0)	37.0 (15.0 – 52.0)	44.0 (22.0 – 72.0)
No (n=44)	6.0 (0 – 22.0)	17.0 (7.0 – 33.0)	39.0 (28.0 – 64.0)
P	**0.1967**	**0.0403***	**0.7919**
Previous nutritional monitoring			
Yes (n=30)	11.0 (6.0 – 28.0)	22.5 (15.0 – 37.0)	36.0 (28.0 – 61.0)
No (n=25)	6.0 (0 – 17.0)	15.0 (4.0 – 33.0)	44.0 (28.0 – 72.0)
P	**0.2071**	**0.1489**	**0.2817**

**Statistical significance (p<0,05), test of Mann-Whitney.

Table 3. Association between the domains of eating behavior in relation to sleep duration, presence of non-communicable chronic diseases, education, nutritional status and marital status (n=55). Nutrition Outpatient Clinic of the Diabetes and Hypertension Center, 2020.

Variable	Emotional Eating (EE) Median (P25-P75)	Uncontrolled Eating (UE) Median (P25-P75)	Cognitive Restriction (CR) Median (P25-P75)
*Sleep duration***			
Less than six hours (n=1)	0 (0 – 0)	4.0 (4.0 – 4.0)	11.0 (11.0 – 11.0)
Between six and eight hours (n=26)	6.0 (0 – 17.0)	15.0 (4.0 – 37.0)	39.0 (22.0 – 72.0)
More than eight hours (n=26)	11 (6.0 – 33.0)	28.0 (15.0 – 33.0)	41.5 (28.0 – 61.0)
P	**0.0719**	**0.1667**	**0.3327**
Base pathology			
Type 2 Diabetes Mellitus (n=9)	0 (0 – 6.0)	7.0 (0 – 26.0)	33.0 (22.0 – 44.0)
Systemic Arterial Hypertension (n=10)	11.5 (6.0 – 56.0)	33.0 (7.0 – 48.0)	36.0 (28.0 – 61.00
Both (n=36)	11.0 (0 – 28.0)	19.0 (9.0 – 33.0)	41.5 (28.0 – 67.0)
P	**0.0526**	**0.1870**	**0.6096**
Scholarity			
Illiterate/Incomplete Elementary (n=29)	6.0 (0 – 11.0)	19.0 (7.0 – 37.0)	39.0 (28.0 – 56.0)
Complete Elementary/Incomplete High School (n=11)			
Full High/Incomplete Higher (n=13)	17.0 (11.0 – 78.0)	26.0 (15.0 – 48.0)	39.0 (17.0 – 61.0)
Graduated (n=2)	0 (0 – 28.0)	7.0 (0 – 33.0)	33.0 (22.0 – 72.0)
P	47.0 (0 – 94.0)	14.5 (7.0 – 22.0)	58.0 (44.0 – 72.0)
	0.1498	**0.2554**	**0.7523**
Nutritional status of the elderly			
Thinness (n=1)	11.0 (11.0 – 11.0)	33.0 (33.0 – 33.0)	33.0 (33.0 – 33.0)
Eutrophy (n=6)	3.0 (0 – 6.0)	7.5 (0 – 33.0)	36.0 (11.0 – 89.0)
Overweight (n=30)	11.0 (0 – 28.0)	17.0 (7.0 – 33.0)	44.0 (28.0 – 72.0)
P	**0.2356**	**0.3682**	**0.9308**
*Marital status***			
Single (n=9)	6.0 (0 – 22.0)	11.0 (7.0 – 37.0)	28.0 (22.0 – 50.0)
Married (n=22)	6.0 (0 – 17.0)	19.0 (7.0 – 33.0)	58.5 (33.0 – 72.0)
Divorced (n=9)	11.0 (11.0 – 57.0)	33.0 (19.0 – 37.0)	44.0 (33.0 – 50.0)
Widower (n=13)	17.0 (0 – 28.0)	15.0 (7.0 – 33.0)	28.0 (22.0 – 44.0)
P	**0.5576**	**0.5065**	**0.1754**

DISCUSSION

This study investigated the eating behavior of 55 patients with DM2 and/or SAH, and its association with possible related factors, with CR being the domain with the highest median in the sample. The EE domain was associated with the female gender, while the UE domain was associated with the use of antidepressant medications, while cognitive impairment was not associated with the tested sociodemographic, clinical and nutritional variables.

The present study had a predominance of female participants, an aspect noted by Rojas-Gomez et al.[22] in a cross-sectional study on eating behavior that also included participants aged between 18 and 72 years (n = 629), of which 72.3% were women. It is noted that a greater number of women seek assistance and demonstrate greater concern with health, when compared to males.[23]

As for eating behavior, it can be observed that the score with the highest median was in the CR domain ($p<0.0001$), a finding that differs from a similar cross-sectional study[22] carried out in a population of Chileans aged over 18 years (n=629); in this study, it was not observed whether there was the presence of pathology in the participants, but the TFEQ-21 was used and a higher prevalence of UE was found, followed by CR. This difference can be justified by the fact that our sample consists of patients with diabetes and hypertension, while the study in question evaluated Chilean individuals regardless of having DM2 and/or SAH; thus, it is possible that individuals with these underlying pathologies have a higher CR due to the very condition imposed by the disease(s). Corroborating this hypothesis, a randomized trial carried out by Koopman et al.,[24] which addressed eating behavior in a sample of patients aged between 40 and 75 years who had a diagnosis of DM2 (n=120), also observed higher CR scores, specifically in females.

Regarding the possible relationship between eating behavior domains and the other analyzed variables, an association was found between the EE domain and female gender, corroborating with Hootman et al.[25] in a prospective longitudinal cohort studyusing the same instrument to evaluate the eating behavior of participants aged over 18 years (n=1001), in which it was possible to observe that the EE and CR scores were higher in women. Thus, these data suggest that possibly the female hormonal factor may have an influence on eating behavior and should be taken into account when carrying out this type of association, requiring future research to address this aspect.

The UE domain, in turn, was associated with the use of antidepressant drugs; however, no studies that specifically related the use of these drugs to uncontrolled eating were found. All the same, significant correlations between BMI, TFEQ-R18 scores, impulsivity and anxiety or depression were observed in a study carried out by Aoun et al.[26] with university students aged ≥18 years, who found a lower CR among women with higher depression scores, while higher anxiety scores were associated with UE among men. Furthermore, it is worth noting that users of antidepressant medications possibly have a previous diagnosis of anxiety or depression, but this information was not collected in the present study, preventing us from making such an inference; nevertheless, future research is valid for further clarification on this topic.

The only article found, whose focus was to relate eating behavior to chronic diseases DM2 and SAH, was carried out cross-sectionally by González-Cantú et al.[27] in a sample of Mexican patients (n=578). It indicated that eating behavior may be related to CNCDs, presenting an association between LA and systolic blood pressure ($p = 0.018$); however, such association was not observed in the present sample. Perhaps this difference was due to environmental and cultural factors that may be different in each country and that were not addressed in the studies, such as differences in cuisine. In addition, these researchers observed an association between SE and age ($p = 0.001$).[27] In this regard, the variable "age" was also observed in another cross-sectional study on eating behavior carried out by Rojas-Gomez[22] (n = 629), who also used the TFEQ and

concluded that individuals with a lower BMI and of older age were more likely to have a restrictive behavior. In turn, in the present study, no specific association with age was found, but there was similarity regarding the highest score in the CR domain.

In this research, the nutritional status was assessed based on the BMI, and although no significant associations were found regarding eating behavior, some studies show a relationship between them. Two longitudinal studies, one by Sung et al.[28] and the other by Fahrenkamp et al.,[29] respectively showed that higher levels of BMI were associated with greater reports of emotional eating, using the Dutch Eating Behavior Questionnaire (DBEQ);[28] and that a greater change in BMI in the long term is related to greater dietary restriction, assessed through the TFEQ.[29] Therefore, it is possible that we did not obtain such findings because the observed changes were long-term, and future follow-up surveys in the population in question would be interesting for further clarification.

Sleep duration was verified not only in our study, but also in other studies that used the TFEQ tool, presenting, however, controversial results. A follow-up study carried out by Kilkus et al.[30] with adults who had a paternal history of DM2 (n = 53) found no significant association between the amount of sleep and any of the eating behavior factors, as in the present sample. However, a positive association was demonstrated in a longitudinal study (n = 5,024) carried out in Finland by Konttinen et al.[31], in which a shorter sleep duration was associated with a higher EE score, suggesting greater vulnerability to weight gain. These differences may be due to the different populations addressed in relation to CNCD, or even due to different sample sizes.

It is worth noting that no associations were found between eating behavior and previous nutritional monitoring, education, marital status and use of anxiolytic medication, as well as studies making associations between them, being of paramount importance that these fields of behavior be addressed in future studies.

Regarding the limitations of this study, the sample size stands out, since the number of participants was small due to the COVID-19 pandemic, which caused data collection to be interrupted. Future research should, therefore, should be conducted in a range-wide population of patients with DM2 and/or SAH, to evidence changes and their long-term effects. On the other hand, even with the limited sample size, it was possible to describe the eating behavior of this population for the first time, helping professionals direct their therapeutic approach to better intervene, and in addition, it was possible to compare and find significant differences in eating behavior among the evaluated subgroups.

CONCLUSION

The domain of eating behavior that presented the highest score among patients with DM2 and/or SAH was cognitive restriction in the evaluated sample. The findings support the hypothesis that women are more prone to emotional eating. In addition, an association was found between the use of antidepressant medication and the domain of uncontrolled eating. The other sociodemographic, clinical and nutritional variables that were evaluated were not associated with eating behavior domains. Furthermore, it was possible to describe the eating behavior of this population for the first time; however, it is suggested that future research be carried out with a larger sample size.

REFERENCES

1. Malta DC, De Araujo Andrade SSC, Oliveira TP, Moura L, Prado RR, Souza MFM. Probabilidade de morte prematura por doenças crônicas não transmissíveis, Brasil e regiões, projeções para 2025. Rev Bras Epidemiol. 2019; 22:E190030. https://doi.org/10.1590/1980-549720190030.

2. International Diabetes Federation. Atlas de diabetes da IDF. 9ª ed. 2019. [acessado 12 Mai 2020]. Disponível em: <https://www.diabetesatlas.org/en/sections/worldwide-toll-of-diabetes.html>.

3. Sociedade Brasileira de Diabetes. Transtornos alimentares pioram a saúde e a qualidade de vida de adolescentes. 2019. [acessado 21 mar 2020]. Disponível em: <https://www.diabetes.org.br/publico/temas-atuais-sbd/1852-transtornos-alimentares-pioram-a-saude-e-a-qualidade-de-vida-de-adolescentes-com-diabetes>.

4. Magalhães LBNC, Amorim AM, Rezende EP. Conceito e aspectos epidemiológicos da hipertensão arterial. Rev Bras Hipertens. 2018; 25(1):6-12.

5. Ministério da Saúde. Sobre a vigilância de DCNT. 2019. [acessado 04 Jul 2020]. Disponível em: <https://www.saude.gov.br/noticias/43036-sobre-a-vigilancia-de-dcnt>.

6. World Heath Organization. Healthy Diet, 2018. [acessado 21 Fev 2020]. Disponível em:<https://www.who.int/en/news-room/fact-sheets/detail/healthy-diet>.

7. Malachias MVB, Souza WKSB, Plavnik FL, Rodrigues CIS, Brandão AA, Neves MFT. Decisão e metas terapêuticas. Rev Bras Hipertens. 2017; 24(1):33-7.

8. Nip ASY, Reboussin BA, Dabelea D, Bellatorre A, Mayer-Davis EJ, Kahkoska AR, et al. Disordered Eating Behaviors in Youth and Young Adults With Type 1 or Type 2 Diabetes Receiving Insulin Therapy: The SEARCH for Diabetes in Youth Study. Diabetes Care. 2019; 42(5):859-866. DOI: https://doi.org/10.2337/dc18-2420.

9. Souza MPG, Sampaio R, Cavalcante ACM, Arruda SPM, Pinto FJM. Comportamento alimentar e fatores associados em servidores: Contribuições para a saúde coletiva. Rev Aten Saúde. 2020; 18(63):99-109. DOI: https://doi.org/10.13037/ras.vol18n63.6162.

10. Alvarenga M, Antonaccio C, Figueiredo M, Timerman F. Nutr Comp. 1ª ed. São Paulo: Editora Manole; 2015.

11. Souza MAA, Gomes VCS, Garcia e Silva EI, Messias CMBO. Incidência da síndrome do comer noturno e compulsão alimentar em estudantes de nutrição. Rev Saúde e Pesquisa. 2017; 10(1):15-23. DOI: https://doi.org/10.17765/1983-1870.2017v10n1p15-23.

12. Vieira TQ, Berleze KJ. Relação entre o estado nutricional e o comportamento alimentar dos funcionários de uma escola estadual de Gravataí. RBONE. 2019; 13(79): 457-463.

13. Stunkard AJ, Messick S. The Three Factor Eating questionnaire to measure dietary restraint, disinhibition and hunger. J Psychosom Res 1985; 29(1):71-83.

14. Bossa R, Evangelista MM, Paula HN, Oliveira MRM. Contribuição da condição ocupacional de indivíduos obesos no comportamento alimentar. AHS. 2019; 26(3): 158-162.

15. Dias OS, Brito JAS, Costa AM. Influência da condição socioeconômica no comportamento alimentar de universitários do sexo masculino. Rev AT. 2016; 4(4):927-944. DOI: https://doi.org/10.15210/REAT.V8I4.7368.

16. Ministério da Saúde. Saúde da pessoa idosa. 2020. [acessado 12 Mar 2021]. Disponível em:< https://www.gov.br/saude/pt-br/assuntos/saude-de-a-a-z-1/s/saude-da-pessoa-idosa#>.

17. World Heath Organization. Obesity:preventing and managing the global epidemic. Geneva. 2000. [acessado 02 Fev 2020]. Disponível em: <http://www.who.int/nutrition/publications/obesity/WHO_TRS_894/en/>.

18. Lipschitz DA. Screening for Nutritional Status in the Elderly. Prim Care 1994; 21(1):55-67.

19. Tholin S, Rasmussen F, Tynelius P, Karlsson J. Genetic and environmental influences on eating behaviour: the Swedish young male twins study. Am J Clin Nutr. 2005; 81(1): 564-569. DOI: https://doi.org/10.1093/ajcn/81.3.564.

20. Natacci LC, Ferreira Junior M. The three factor eating questionnaire - R21: tradução para o português e aplicação em mulheres brasileiras. Rev Nutr. 2011; 24(3):383-394. DOI: https://doi.org/10.1590/S1415-52732011000300002.

21. Natacci LC. The Three Factor Eating Questionnaire – R21 (TFEQ-R21): tradução, aplicabilidade, comparação a um questionário semiquantitativo de frequência de consumo alimentar e a parâmetros antropométricos. Rev Nutr. 2011; 24(3):383-394.

22. Rojas-Gomez DM, Giacometto M, González CO, Arias V, Muñoz-Carvajal Y, Pérez-Leighton C, et al. Comportamiento hacia los alimentos y su asociación con el estado nutricional y la actividad física en una población general chilean. Nutr Hosp. 2018; 35(6):1316-1323. DOI: https://doi.org/10.20960/nh.1805

23. Dalmazo AL, Fetter C, Goldmeier S, Irigoyen MC, Pellanda LC, Barbosa ECD, et al. Estresse e Consumo Alimentar em Pacientes Hipertensos. Arq Bras Cardiol. 2019; 113(3):374-380. DOI: https://doi.org/10.5935/abc.20190175.

24. Koopman ADM, Ven M, Beulens JW, Welschen LM, Elders PJ, Nijpels G, et al. The Association between Eating Traits and Weight Change after a Lifestyle Intervention in People with Type 2 Diabetes Mellitus. J Diabetes Res. 2018. DOI: https://doi.org/10.1155/2018/9264204

25. Hootman KC, Guertin KA, Cassano PA. Stress and psychological constructs related to eating behavior are associated with anthropometry and body composition in young adults. J Appt. 2018; 1(125):287-294. DOI: https://doi.org/10.1016/j.appet.2018.01.003

26. Aoun C, Nassar L, Soumi S, El Osta N, Papazian T, Rabbaa Khabbaz L. The Cognitive, Behavioral, and Emotional Aspects of Eating Habits and Association With Impulsivity, Chronotype, Anxiety, and Depression: A Cross-Sectional Study. Front Behav Neurosci 2019; 6(13):204. DOI: https://doi.org/10.3389/fnbeh.2019.00204.

27. González-Cantú A, Mireles-Zavala L, Rodríguez-Romo A, Olavide-Aguilar E, De La Garza-Hernández NE, & Romero-Ibarguengoitia ME. Eating behaviors and emotional distress are predicted by treatment and adverse outcome in patients with type 2 diabetes. Psych, Health and Med. 2017; 23(3):325–336. DOI: https://doi.org/10.1080/13548506.2017.1363897

28. Sung J, Le K, Song Yun-Mi. Dietary Restraint Is Non-Genetically Associated with Change in Body Mass Index: The Healthy Twin Study. Yonsei Med J. 2014; 55(4):1138-1144. DOI: https://doi.org/10.3349/ymj.2014.55.4.1138

29. Fahrenkamp AJ, Darling KE, Ruzicka EB, Sato AF. Food Cravings and Eating: The Role of Experiential Avoidance. Int J Environ Res Public Health. 2019; 16(7):1181. DOI: https://doi.org/10.3390/ijerph16071181.

30. Kilkus JM, Booth JN, Bromley LE, Darukhanavala AP, Imperial JG, Penev PD. Sleep and eating behavior in adults at risk for type 2 diabetes. Obesity. 2012; 20(1):112-127. DOI: https://doi.org/10.1038/oby.2011.319.

31. Konttinen H, Van Strien T, Männistö S, Jousilahti P, Haukkala A. Depression, emotional eating and longterm weight changes: a population-based prospective study. Int J Behav Nutr Phys Act. 2019; 16(28):11. DOI: https://doi.org/10.1186/s12966-019-0791-8

Contributors

Eymael DA, Marques AC and Bertacco RTA contributed to the design and design; analysis and interpretation of the data; revision and approval of the final version. Borges LR and Feoli AMP contributed to data analysis and interpretation; revision and approval of the final version. Martins Filho AOF, Kilpp D and Leal CS contributed to design and design.

Conflict of Interests: The authors declare that there is no conflict of interest.

Received: August 12, 2022
Accepted: October 14, 2022