

Food Insecurity in Higher Education Students [†]

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Abstract: Food insecurity (FI) indicates a situation in which there is no regular access to food in satisfactory quantity and quality. To characterize FI in students from Portuguese higher education institutions, a study was conducted in a non-random sample of students, with an online questionnaire consisting of sociodemographic questions and the Portuguese version of the IF scale. There were 200 valid questionnaires and 27.5% of the participants were classified as having some degree of FI. Participants with FI reported fewer visits to the family's home ($p = 0.024$) and less financial resources ($p < 0.001$). The results indicate that interventions are needed in this area.

Keywords: student; higher education; food insecurity



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1. Introduction

Food insecurity (FI) implies not having regular access to food in satisfactory quantity and nutritional quality [1], and occurs in situations of limited financial resources, affecting families, and being associated with a higher risk of malnutrition, overweight and obesity [2]. The scientific literature has been identifying this situation as a growing public health problem in higher education students, with potentially adverse effects on physical and mental health [3]. Students with FI report that only a small portion of their budget is allocated to food, due to costs associated with other expenses, with a decrease in the ability to purchase nutritious food [4].

The students' transition to higher education (HE) can imply drastic changes at a social and economic level, with evidence of deterioration in eating habits [5], aggravated by the costs associated with attending an HE degree, and, in many situations, with geographic displacement [6], where food is added to the cost of accommodation, transport, and other services. In Portugal, in 2022, there was a worsening in the cost of living and an increase in rental prices [5], with an impact on the living conditions of higher education students, who reported having difficulty paying for residence in the new city. During that year, 11.6% of the students placed in HE courses did not register [7], and 73% of registered students said they felt some type of financial difficulty [8].

Associated with the above facts, sociodemographic characteristics of gender, age, education, income, household composition and place of residence can lead to FI, with the highest risk factors being single-parent families, low educational attainment, low household income, unemployment or precarious employment, and the perception of an insufficient financial situation [6]. By contrast, households of individuals with HE studies are known to be protected from all degrees of FI [9].

Wolfson et al. [10] report that FI is a barrier to obtaining an HE degree, with students more likely not to finish their studies and, when they do, they finish shorter degrees [10].

Research suggests that in the United States of America, 11.8% of HE students may be in a situation of FI [11–13]. In Portugal, data from the EPITeen cohort (Porto, Portugal), collected in 2017, show that the prevalence of some degree of FI in young adults (26 years old) is 11% [14].

Considering the lack of studies in Portugal, it is considered extremely important to identify FI situations and contribute to the analysis of FI determinants and their impact on HE students.

2. Materials and Methods

A cross-sectional, descriptive study was carried out in a non-random sample of higher education students, with inquiries through an online questionnaire composed of sociodemographic questions and the Portuguese version of the FI scale [9]. Information about the study and call for participation were sent to the official contacts of all public higher education institutions, and also through social networks and discussion forums aimed at students. Data collection took place between 13 and 20 April 2023.

The FI questionnaire used in this study was previously used in the INFOFAMÍLIA study [9] and was originally developed by the United States Department of Agriculture [15] and adapted for Portugal [9]. It consists of a total of 14 closed-ended items related to the experience of food insufficiency at various levels of intensity in the past 3 months. Responses are classified as 0 for negative answers and 1 for affirmative answers. The final score is the sum of the values of affirmative responses, allowing participants to be categorized as follows: (1) mild food security (1–5 points)—no indications of problems or limitations in accessing food, perhaps one or two indications, typically related to anxiety about food sufficiency or scarcity in the household, and little or no indication of changes in food consumption or eating habits; (2) moderate food insecurity (6–9 points)—indication of consuming food with reduced quality, variety, or desirability, and little or no indication of changes in eating habits or a reduction in the quantity of food consumed; (3) severe food insecurity (10–14 points)—simultaneous indications of reduced quality, variety, and desirability of food, accompanied by a reduction in the quantities consumed because the family lacked money or other resources to acquire/obtain their food in a socially acceptable manner [9].

Statistical analysis was conducted using Statistical Package for Social Sciences (IBM-SPSS software, version 29.0). Qualitative variables were described using relative and absolute frequencies, considering the total valid responses. Quantitative variables, on the other hand, were described using mean, median, standard deviation, and interquartile range, as appropriate. The Chi-Square test for independence was used for the analysis of associations or differences between qualitative variables, or, if conditions for its application were not met, Fisher's exact tests or Fisher–Freeman–Halton tests were employed.

The adherence of the distribution of quantitative variables to the normal distribution was assessed using the Kolmogorov–Smirnov test, and non-parametric Mann–Whitney tests were used based on the results. The level of statistical significance for all inferential statistical procedures was set at 0.05.

For a more comprehensive statistical evaluation of food insecurity, the three levels of FI (mild, moderate, or severe) were also combined into a single category, which represents the total prevalence of FI.

3. Results

The prevalence of some degree of FI was 27.5% ($n = 55$). Among these, 21.5% ($n = 43$) had mild food insecurity, 4% ($n = 8$) had moderate food insecurity, and four students (2%) had severe food insecurity. Of the students with some degree of FI, 42% ($n = 23$) lived in a household that included at least one member under the age of 18.

Among students with some degree of FI, those with less than one visit per month to the household were significantly ($p = 0.024$) more represented (41%). These students also

reported that the monthly income available for expenses related to their degree was very insufficient (89%).

No statistically significant differences were found between FI and age ($p = 0.215$), gender ($p = 0.672$), residence in Portugal ($p = 0.182$), region of residence ($p = 0.113$), time of residence in Portugal ($p = 0.273$), academic degree ($p = 0.632$), field of study ($p = 0.759$), and occupation ($p = 0.678$).

4. Discussion

The prevalence of FI (27.5%) in this study was significantly lower than several international estimates presented in a recent literature review, at 38% and 48% [16].

In our data, FI was more prevalent in students who report that the monthly income available for the expenses associated with their degree is very insufficient, and also in students that are displaced from their families and that visit their homes less than once a month. These results seem to be in accordance with the literature that suggests that students who are from low-income backgrounds are more likely to experience food insecurity [17], especially displaced students, as the costs associated with college attendance (which include housing, transportation, and food costs) represent a very high portion of the monthly income [18,19].

FI was not associated with field of study, academic degree, or with being a working student.

We identified some limitations in our study. Considering that the study was aimed at students from all Portuguese higher education institutions, our sample size was smaller than expected, which had been designed for a total of 385 participants. This may have introduced a bias in our results that we cannot analyze further. Additionally, it is known that FI is a sensitive subject, with a strong social and psychological weight. Answers can be biased by social desirability, leading to an underestimation of real FI, as suggested by the literature [20]. Furthermore, considering that the participants are, for the most part, students at the University of Algarve, the only public higher education institution in the south of Portugal, our results have limited external validity.

5. Conclusions

We found a prevalence of FI below international estimates but, considering the implications of FI, any one case of FI requires intervention. Our results show that this problem is not associated with a particular sociodemographic characteristic and is more prevalent concerning displaced students.

Higher education institutions should put in place ways to assess and intervene in cases of FI, as academic achievements and dropout rates associated with this problem should be addressed.

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References

1. de Moura, E.R.B.B.; Mendes, M.L.M.; Sotero, A.M.; de Omena, C.M.B. Segurança Alimentar de Acadêmicos de uma Universidade Pública do Estado do Piauí. Conjecturas. Available online: <https://conjecturas.org/index.php/edicoes/article/view/1428/1060> (accessed on 23 June 2023).
2. Pourmotabbed, A.; Moradi, S.; Babaei, A.; Ghavami, A.; Mohammadi, H.; Jalili, C.; Symonds, M.E.; Miraghajani, M. Food insecurity and mental health: A systematic review and meta-analysis. *Public Health Nutr.* **2020**, *10*, 1778–1790. [CrossRef] [PubMed]
3. Payne-Sturges, D.C.; Tjaden, A.; Caldeira, K.M.; Vincent, K.B.; Arria, A.M. Student Hunger on Campus: Food Insecurity Among College Students and Implications for Academic Institutions. *Am. J. Health Promot.* **2018**, *2*, 349–354. [CrossRef] [PubMed]
4. Engel, M.D.; Shelnutt, K.P.; House, L.A.; El Zein, A.; Mathews, A.E. Differences in Measured and Self-Categorized Food Security Status and Related Coping Strategies among College Students. *Nutrients* **2022**, *14*, 3569. [CrossRef]
5. Guerreiro, C. CNN Portugal. Available online: <https://cnnportugal.iol.pt/oe2023/orcamento-do-estado/universitarios-vao-ter-apoio-ate-288-euros-por-mes-para-arrendar-casa/20221010/634423090cf2ea367d5266f1> (accessed on 18 June 2023).
6. Martins, N.C. Avaliação da Situação de (in)segurança Alimentar e Nutricional de Estudantes Universitários em Tempos de Pandemia (COVID-19). Master's Thesis, Universidade de Fortaleza, Fortaleza, Brasil, 8 February 2021.
7. Neves, C. Diário de Notícias. Available online: <https://www.dn.pt/sociedade/ensino-superior-menos-quartos-mais-caros-e-muitos-estao-ocupados-por-quem-ja-acabou-curso--15218662.html> (accessed on 18 June 2023).
8. Fórum Estudante. Available online: <https://forum.pt/estudantes/como-vivem-os-estudantes-de-ensino-superior-em-portugal> (accessed on 18 June 2023).
9. Gregório, M.J.; Graça, P.; Santos, A.C.; Gomes, S.; Portugal, A.C.; Nogueira, P.J. *Relatório Infofamília 2011–2014—Quatro Anos de Monitorização da Segurança Alimentar e Outras Questões de Saúde Relacionadas com Condições Socioeconómicas, em Agregados Familiares Portugueses Utentes dos Cuidados de Saúde Primários do Serviço Nacional de Saúde*; Direção Geral da Saúde: Lisboa, Portugal, 2017; pp. 30–93.
10. Wolfson, J.A.; Insolera, N.; Cohen, A.; Leung, C.W. The effect of food insecurity during college on graduation and type of degree attained: Evidence from a nationally representative longitudinal survey. *Public Health Nutr.* **2022**, *2*, 389. [CrossRef]
11. Nikolaus, C.J.; An, R.; Ellison, B.; Nickols-Richardson, S.M. Food Insecurity among College Students in the United States: A Scoping Review. *Adv. Nutr.* **2020**, *2*, 327–348. [CrossRef] [PubMed]
12. McArthur, L.H.; Gutschall, M.; Fasczewski, K.S.; Jackson, A. Food Insecurity Among College Students with and without Medical Disorders at a University in Appalachia. *J. Appalach. Health* **2020**, *2*, 36. [PubMed]
13. Owens, M.R.; Brito-Silva, F.; Kirkland, T.; Moore, C.E.; Davis, K.E.; Patterson, M.A.; Mketinas, D.C.; Tucker, W.J. Prevalence and Social Determinants of Food Insecurity among College Students during the COVID-19 Pandemic. *Nutrients* **2020**, *12*, 2515. [CrossRef] [PubMed]
14. Maia, I.; Monjardino, T.; Lucas, R.; Ramos, E.; Santos, A.C. Household food insecurity and socio-demographic characteristics in a nationally representative sample of Portuguese adults. *Public Health Nutr.* **2019**, *18*, 3431–3441.
15. Pérez-Escamilla, R.; Segall-Corrêa, A.M. Food insecurity measurement and indicators. *Rev. De Nutr.* **2008**, *21*, 15s–26s. [CrossRef]
16. Loofbourrow, B.M.; Scherr, R.E. Food Insecurity in Higher Education: A Contemporary Review of Impacts and Explorations of Solutions. *Int. J. Environ. Res. Public Health* **2023**, *10*, 5884. [CrossRef] [PubMed]
17. Shi, Y.; Lukomskyj, N.; Allman-Farinelli, M. Food Access, Dietary Acculturation, and Food Insecurity among International Tertiary Education Students: A Scoping Review. *Nutrition* **2021**, *85*, 111100. [CrossRef] [PubMed]
18. Whatnall, M.C.; Hutchesson, M.J.; Patterson, A.J. Predictors of Food Insecurity among Australian University Students: A Cross-Sectional Study. *Int. J. Environ. Res. Public Health* **2020**, *17*, 60. [CrossRef] [PubMed]
19. Brescia, S.A.; Cuite, C.L. Underestimating College Student Food Insecurity: Marginally Food Secure Students May Not Be Food Secure. *Nutrients* **2022**, *14*, 3142. [CrossRef] [PubMed]
20. Taylor, L.C.; Delavega, E.; Jin, S.W.; Neely-Barnes, S.L.; Elswick, S.E. The Prevalence and Correlates of Food Insecurity among Students at a Multi-Campus University. *J. Poverty* **2019**, *23*, 621–633. [CrossRef]

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