

## Perception of the level of food security in university students of an educational program

## Percepción del nivel de seguridad alimentaria en estudiantes universitarios de un programa educativo

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### Abstract

Objective: to estimate the situation in the students of the degree in Food Science regarding the perception of their level of food security. Material and methods: A four-question questionnaire was applied to 132 students covering food safety and stress factors in their diet. Food security indices were constructed, weighted and unweighted, under the cut-off points: very bad=0%, bad=25%, average=50%, good=75% and very good=100%. Results: the total sample presented an unweighted security index of 67.73%, and 66.11% (good food security) in a weighted index giving more weight to concern about their eating habits. The stressor related to lack of resources presented the lowest food security index: 60.49%, It is confirmed with the weighted index showing greater concern about the means they have to feed themselves: 59.88% (regular food security). Conclusions: in the general population there are perceptions of food insecurity mainly due to a nutritional issue, still maintaining the category of good food security. 20.5% of the population perceive considerably greater experiences of food insecurity due to issues that have more to do with access.

### Resumen

Objetivo: estimar el nivel de seguridad alimentaria en el alumnado de la licenciatura en Ciencia de los Alimentos desde su percepción. Material y métodos: Se aplicó un cuestionario de cuatro preguntas a 132 estudiantes que abarcan seguridad alimentaria y factores estresantes en su alimentación. Se construyeron índices de seguridad alimentaria, ponderados y no ponderados, bajo los puntos de corte: muy malo=0%, malo=25%, regular=50%, bueno=75% y muy bueno=100%. Resultados: el total de la muestra presentó un índice de seguridad no ponderado de 67.73%, y un 66.11% (seguridad alimentaria buena) en un índice ponderado dando más peso a la preocupación por sus hábitos alimenticios. El factor estresante referente a la falta de recursos presentó el más bajo índice de seguridad alimentaria: 60.49%, se confirma con el índice ponderado mostrando mayor preocupación por los medios que disponen para alimentarse: 59.88% (seguridad alimentaria regular). Conclusiones: en la población general existen percepciones de inseguridad alimentaria dadas principalmente por una cuestión nutricional, conservando aún la categoría de seguridad alimentaria buena. El 20.5% de la población perciben experiencias de inseguridad alimentaria considerablemente mayores por cuestiones que tienen que ver más con el acceso.

### Access to food, Nutrition, Eating habits

### Acceso a los alimentos, Nutrición, Hábitos alimenticios

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## Introduction

The 1948 Universal Declaration of Human Rights proclaimed: "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food" (Risk Sharing Trust, 2018). This was a very important step in the process of constructing the concept of food security. Currently, the most widely accepted definition is the one given at the 1996 World Food Summit: "Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their daily energy needs and dietary preferences for an active and healthy life" (Food and Agriculture Organization of the United Nations (FAO), 2011).

Student nutrition is an often overlooked and particularly risky issue, as it is characterised by a lack of variety, low nutritional quality and often falls short of what they need for their daily activities (Fernandez and Lopez, 2020). This is compounded by the fact that it is a population that tends to experience high levels of stress, poor sleep hygiene and little physical activity, due to lifestyle changes brought about by the course of their own studies, which leads to the acquisition of unhealthy habits such as poor diet, sedentary lifestyles, alcohol consumption and smoking (Deforche et al., 2015).

Historically, university students have been considered a nutritionally vulnerable group (Lopez et al. 2003; Lopez, 1998; Lopez, 1999) as they tend to skip meals frequently, snack between meals, opt for fast food and consume alcohol frequently (Bellisle et al., 1995; Gottschalk et al., 1977; Jakobovits et al., 1977; Miller and Coffman, 1980; Richmond, 1999; Truswell and Darnton, 1981; Webb et al., 1996). The intake of other unhealthy and high-calorie products such as soft drinks, energy drinks, fruit juices, snacks, sweets, baked goods, refined and ultra-processed products is also mentioned, situations that continue to be repeated today (Latasa et al., 2018; Singh et al., 2015).

The university stage contributes significantly to possibly detrimental changes in eating habits, as it is characterised by the need to change residence or move away from home, giving students independence in their diet, according to their new lifestyle and possibilities in the school context (Mancilla et al., 2020; Martínez et al., 2021).

These changes are generated according to various factors, such as class schedules, alcohol consumption, economic situation and even the influence of other students (Porto et al., 2018). In addition, the availability of food of low nutritional value, such as fast food, is predominant in educational institutions (Quintero, 2020).

Knowing the degree of food insecurity experienced by this population sector from their perspective takes on great relevance considering that these are professionals in training. This research aims to show what are the main concerns of students regarding their food situation and to generate a bibliographical background that contributes to the understanding of a general student vision that can be used to address this problem with specific strategies, safeguarding the health and well-being of the population.

## Material and methods

A descriptive study was carried out at the Centro Universitario de Ciencias Biológicas y Agropecuarias (CUCBA) of the University of Guadalajara in Zapopan, Jalisco, Mexico, where a survey was administered to 132 students of the Bachelor's Degree in Food Science, who were informed of the research methodology, and who gave their consent to fill out the survey, guaranteeing anonymity and confidentiality of the information. The survey was carried out using the free software "Google Forms®", which consisted of three questions that collected information on the availability of food that the students have, the means they have to acquire it and how they use it. It was assumed that data such as their semester, age and gender would not affect the estimation results. (Mazón y Uset, 2019).

A Likert-type scale was used as a measurement instrument on the basis of Hernández et al. (2010). The respondent gave a rating of one to five for each question, where 1) is never, 2) is almost never, 3) is neutral, 4) is almost always and 5) is always.

In order to give a more accurate context of the food situation at the university, a multiple choice question was added with several options about the stressors that make it difficult to eat properly.

With the results obtained from the surveys, the perception of the level of food security was estimated using two measurement indices, one unweighted and the other where the relevance of each question is weighted on a scale of 1 to 3 in the importance range. The final estimate was given as a percentage scaled as follows: Very bad=0%, Bad=25%, Fair=50%, Good=75% and Very good=100%.

For statistical analysis, Student's t-test (Statgraphics, 2023) was performed on the data grouped by response. Statistical significance was accepted with a confidence level of 95 %.

**Results**

Table 1 shows the results of the applied surveys, the value selected by the respondents according to the scale and the sum of the total response frequency of that value for each statement (score).

The statistic revealed that there is no significant difference ( $p > 0.05$ ) between the responses "always", "almost never" and "never". However, there is a significant difference ( $p < 0.05$ ) between these and the responses "almost always" and "neutral" (table 1).

Affirmations	Always (5)	Almost always (4)	Neutral (3)	Almost never (2)	Never (1)	Total
The food I prefer is available in the quantity and quality required.	6	47	61	16	2	132
I have the means to purchase them to the extent of my needs	17	64	42	9	0	132
My food consumption habits are healthy	5	43	58	24	2	132
<b>Total</b>	28 <sub>a</sub>	154 <sub>b</sub>	161 <sub>b</sub>	49 <sub>ac</sub>	4 <sub>ac</sub>	

Different literals indicate significant differences at the  $p < 0.05$  level.

**Table 1** Survey results  
*Source: Own elaboration*

The reading of this scale is that a value of 5 (always) represents the highest food security and a value of 1 (never) is the most severe case of food insecurity, while the others are intermediate values.

Given that there are three statements, the minimum score that a student respondent can obtain is 3, in the case that in all three statements he/she has answered with the correct answer.

While the maximum score is 15, if he/she answered only with the value of "always":  $5+5+5=15$ . With 132 students surveyed, the minimum score for the whole sample would be  $3 \times 132=396$ , and the maximum score would be  $15 \times 132=1980$ . The maximum scores for each value on the scale can be seen in table 2.

The actual score obtained from the sample of 132 was:  $4 \times 1 + 49 \times 2 + 161 \times 3 + 154 \times 4 + 28 \times 5 = 4 + 98 + 483 + 616 + 140 = 1341$  points. It is closer to the "neutral (3)" value. The food security index is calculated with the following expression:  $(1341/1980) \times 100 = 67.73\%$ . According to the scale of the final estimate, the estimated food security level is closer to the "good" category".

	Always (5)	Almost always (4)	Neutral (3)	Almost never (2)	Never (1)
For one person:	15	12	9	6	3
For 132 persons:	1980	1584	1188	792	396

**Table 2** Maximum possible scores to the sample size according to the scale values  
*Source: Own elaboration*

A different estimate can be obtained by focusing on a particular statement and making it more relevant. The literature points more to the nutritional risk faced by university students than to issues of availability and access. Likewise, the first statement is of utmost importance for the object of study, since, if there is not enough quantity and quality of what students need and want, their food choices will be even worse.

Under this argument, a weighting of 3 is assigned to the third statement, 2 to the first and 1 to the second. Thus, the new results are shown in table 3. Table 4 shows the maximum score for this case for each value of the scale.

Affirmations	Always (5)	Almost always (4)	Neutral (3)	Almost never (2)	Never (1)	Total
The food I prefer is available in the quantity and quality required.	6*2=12	47*2=94	61*2=122	16*2=32	2*2=4	264
I have the means to purchase them to the extent of my needs	17*1=17	64*1=64	42*1=42	9*1=9	0*1=0	132
My food consumption habits are healthy	5*3=15	43*3=129	58*3=174	24*3=72	2*3=6	396
<b>Total</b>	<b>44</b>	<b>287</b>	<b>338</b>	<b>113</b>	<b>10</b>	

**Table 3** Results with weighted statements  
Source: Own elaboration

	Always (5)	Almost always (4)	Neutral (3)	Almost never (2)	Never (1)
For one person:	30	24	18	12	6
For 132 persons:	3960	3168	2376	1584	792

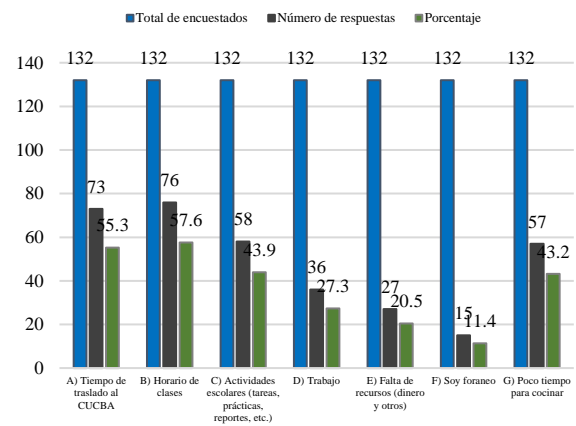
**Table 4** Maximum possible sample size scores with weighted statements  
Source: Own elaboration

The score obtained from the sample of 132 with the weighted statements was:  $10 \times 1 + 113 \times 2 + 338 \times 3 + 287 \times 4 + 44 \times 5 = 10 + 226 + 1014 + 1148 + 220 = 2618$  points. It is closer to the "neutral (3)" value.

Expressed in the food security index it would be as follows:  $(2618/3960) \times 100 = 66.11\%$ , which turned out to be the lowest percentage of all the weighting combinations performed, 1.62 points lower than the unweighted index.

As with the results of the unweighted table, the final percentage is closer to the "good" category within the scale of the final estimate. This corresponds to an estimation with an emphasis on the students' eating habits.

Regarding the last question of the survey, concerning the students' perspective on the stressors that make it difficult for them to eat, the most repeated options are: B) Class timetable and A) Travel time to CUCBA, with 76 and 73 responses, representing 57.6% and 55.3% of the sample respectively. They are followed by factors C), G), D), E) and F) (see Figure 1). This is with respect to the 132 respondents, who were free to select more than one stressor.



**Figure 1** Eating stressors from the students' perspective  
Source: Own elaboration

The data were analysed and the responses in the statements were filtered with the responses of the stressors in order to construct the food security index for each one and to find out which of them is more relevant. Following the same procedure for the construction of the general index, table 5 shows the results of the construction of the food security indexes by stressor, understood as the sum of the products of the multiplication of the scores by the value on the decision scale, divided by the maximum possible score and multiplied by 100.

Narrowing factor	Always (5)	Almost always (4)	Neutral (3)	Almost never (2)	Never (1)	Total	Percentage	Food security
A)	70	376	243	54	3	746	68.13%	good
B)	75	356	282	56	2	771	67.63%	good
C)	60	280	210	42	1	593	68.16%	good
D)	35	164	135	30	0	364	67.41%	good
E)	10	88	105	40	2	245	60.49%	fair
F)	10	80	57	6	1	154	68.44%	good
G)	55	260	207	44	4	570	66.67%	good

**Table 5** Food security index by stressor  
Source: Own elaboration

The stressor "E) Lack of resources (money or other)" was found to have the lowest food security index, with a percentage of 60.49%, placing it in the "fair" category, while the rest had indexes with smaller differences, all placing them closer to the "good food security" category.

Another weighted index was constructed but taking only the 27 respondents who selected the stressor "Lack of resources". All possible weighting combinations were tested and it was found that assigning a value of 3 to the second statement, 2 to the first and 1 to the third (table 6) results in the lowest food security index with a percentage of 59.88% (fair food security) (table 7). The maximum possible score for this case is 810.

Affirmations	Always (5)	Almost always (4)	Neutral (3)	Almost never (2)	Never (1)	Total
The food I prefer is available in the quantity and quality required.	0*2=0	8*2=16	13*2=26	5*2=10	1*2=2	54
I have the means to purchase them to the extent of my needs	0*3=0	5*3=15	15*3=45	7*3=21	0*3=0	81
My food consumption habits are healthy	2*1=2	9*1=9	7*1=7	8*1=8	1*1=1	27
<b>Total</b>	2	40	78	39	3	162

**Table 6** Survey results for the stressor "Lack of resources", with weighted statements

Source: Own elaboration

Stressor	Always (5)	Almost always (4)	Neutral (3)	Almost never (2)	Never (1)	Total	Percentage	Food security
E)	10	160	234	78	3	485	59.88%	regular

**Table 7** Food security index to stressor "Lack of resources", with weighted statements

Source: Own elaboration

This result confirms the concern that exists among this group of students about the means available to them to access their food and shows that they suffer from food insecurity attributed mainly to the lack of necessary resources, and secondarily due to the little or poor availability of sufficient and quality food based on their preferences, discarding the concern about their consumption habits as a relevant perception.

## Discussion

Mazón and Uzet (2019), mention that the food security index in university students is closer to the "almost always" category. And in the weighted index, it is closer to the good category, a situation similar to the findings of the present study.

In a previous study carried out on students from three degree courses at the same university as in the present study (they applied the Latin American and Caribbean Food Security Scale (ELCSA)), it was found that 33.77% of the students' households were slightly insecure, 13.33% were moderately insecure and 4.88% were severely insecure. And when analysing the Bachelor's Degree in Food Science, 31.67% were found to be slightly insecure, 15.52% moderately insecure and 4.96% severely insecure (González, et al., 2021). This shows that different methodologies can lead to different accuracies in the results.

The method replicated for this study presents several irregularities in terms of accurately diagnosing the level of food security of a population. Inaccuracy in the wording of the questions predisposes to generalisation and confusion on the part of the respondent: question 1 does not emphasise whether it refers to the availability of food near the university environment, the home or both, unlike the ELCSA, whose questionnaire collects concrete information on experiences at home (FAO, 2012). Moreover, "quantity" and "quality" are entirely different attributes - there may be ample supply of poor food, or quality food that is in short supply, and assuming the respondent understands what quality refers to.

Complementary studies are needed that accurately reflect the resources students have to acquire their food, in terms of physical access and economic access, with the characteristics encompassed by the National Council for the Evaluation of Social Development Policy (CONEVAL) (2010), and provide information on students' eating practices, both in terms of schedules and number of meals per day, as well as diet quality, in order to identify whether their perception of unhealthy eating habits is reflected in the reality of their eating practices and whether it is influencing their academic performance and health.

Studies point out that an unbalanced and inadequate diet can have negative repercussions on students' attention span and academic performance, as well as presenting various ailments such as gastritis, headaches and colitis, since a high energy intake is necessary to carry out school activities (Bonvecchio et al., 2015; IMSS, 2016; Martínez et al., 2021).

It is worth arguing the importance of applying it to the entire population, without disregarding the stressor group "Lack of resources", since, although their eating habits seem to be of less concern to them, the fact that they do not have the appropriate means and their food availability is limited, may lead them to opt for foods of low nutritional value.

This is supported by the study conducted by Martínez et al. (2021), who found that students' eating habits are related to access, with a tendency towards foods that are not recommended or have low nutritional value because they are inexpensive. The authors suggest that this phenomenon is also due to issues of practicality due to their busy schedules and prioritising school activities, stressors that were highly selected by the participants in this study.

This has been reported in several studies. The results of the research by Espeche and Rojo (2021), reflect that there are students who consider that healthy eating also involves the money available to buy and prepare food, as well as the lack of time, their own tastes and few options to choose healthy food at university. And when choosing they prefer the cheapest even though they recognise them as unhealthy. And Flores (2019), in his study on perceptions of food security, mentions that 86% of households suffer from food insecurity (mild 35%, moderate 30% and severe 21%), associated with limitations in access to food both in quality and quantity due to lack of money.

Eche and Hernández-Herrera (2018) conclude that both private and public university students suffer from food insecurity, despite the fact that the former have better access to and availability of food than the latter.

In a study conducted by Sánchez et al. (2019) at the Centro Universitario del Sur (CUSur) of the University of Guadalajara, it was found that unhealthy eating behaviours of university students are based on the beliefs they have about it. The authors recognise the importance of investigating these beliefs related to the student's perspective on their eating, arguing for the generation of timely and contextualised data that pave the way for targeted interventions in universities, the same justification given to the present research.

For its part, question 2 does not specify exactly what means it refers to, and how it is defined in the literature, there is physical and economic access, with all the variables that these confer; the answer to this question is not sufficient to determine food security from the dimension of access.

And finally, question 3 is based directly on what the respondent believes, without going into the foods they eat, meal times, dietary variety, among other issues related to their food practices, so it is not possible to demonstrate experiences from the dimension of utilisation in its entirety.

For these reasons, for the purpose of this study, this method is understood as the measurement of the level of food security, but starting from the paradigm that it is only about the superficial perception that individuals have of it, and not a real and accurate diagnosis. It is valid to compare the results obtained with those of another methodology that has been endorsed and proven to work, in order to try to understand how far away or how close what the population perceives is to what happens in reality, in order to give the method more validity.

It is inevitably ironic that students on a course of study that deals with food issues present levels of food insecurity from their perspective. It is contradictory that the main promoters of food, academically speaking, perceive food vulnerabilities. It raises the question of whether it is an act of incongruence on the part of the student body, negligence and indifference on the part of the authorities, the social inequality that has reached even the food system that cannot meet the needs of all, or whether it is simply a matter of misinformation on the subject.

In the study by Fuentes et al. (2021), it is mentioned that the diet of university students is inadequate and that new knowledge about food, nutrition and physical exercise should be encouraged for good health.

Castillo et al. (2017) emphasise that providing information on healthy eating habits is not enough in the case of eating disorders and obesity in Mexican university students, as it is essential to involve the family and school environments in order to have a successful prevention programme. In any case, it is important to insist on the dissemination of this type of content through various media, with the aim of providing students with the necessary basis and knowledge on how to improve their eating practices and the impact these have on their time at school and their daily lives.

In this sense, educational authorities and students in this field have an ethical obligation to participate in the collection and communication of this research, in order to identify opportunities for action that can offer innovative solutions to these problems.

### Conclusions

In the sampled population there are perceptions of food insecurity mainly due to a nutritional issue, although with a minimal difference and still retaining the category of good food security, however, 20.5% of the sampled population perceive considerably greater experiences of food insecurity due to issues more related to access.

Although the stressor "Lack of resources" is not the most common among the students, it is the one that causes the worst experiences of food insecurity in combination with other factors, which highlights the importance of paying special attention to it when focusing studies that provide more information and formulate strategies for solutions.

The responses reflect that the majority of the population perceives itself as undecided (neutral) with respect to the questions asked, which suggests that an educational intervention strategy can define their level of perception.

Due to the application of the method, the food security indices constructed for the sampled population fall into the category of "good food security", as they are closer to the cut-off point that corresponds to this condition, but it is still a regular level of security on the way to being good, it could be said that it is barely acceptable, but not optimal.

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