

FROM CAFETERIA TO CLASSROOM: UNRAVELING THE NEXUS OF SOCIOECONOMIC FACTORS AND FOOD SECURITY AMONG UNIVERSITY STUDENTS IN BANGLADESH

Abstract

This study investigates the food security status of students enrolled in public universities in Bangladesh, utilizing Household Dietary Diversity as a measure. The research reveals a varied distribution, wherein 71.32% of students are classified as food secure, while 28.68% face food insecurity. The results of the binary logistic regression analysis indicate that there is a positive association between food security status and variables such as gender, income levels, and father's occupation. On the contrary, the residential status demonstrates a negative correlation. Prominent factors that contribute to the issue of food insecurity include the lack of accessibility to reasonably priced and nourishing food inside the school premises, the limited range of choices available in university dining facilities, insufficient provisions of food, the absence of proper kitchen facilities, and a significant dependence on external sources for sustenance. This study highlights the importance of promptly addressing these complex challenges to improve students' ability to obtain nutritious food and promote their overall well-being in the context of university environment.

Keywords: University students, Household Dietary Diversity, Food security, Socio-economic status, Eating facilities.

INTRODUCTION

Food security plays a crucial role in the comprehensive investigation of multifactorial systems about health and overall well-being. According to Jaron & Galal (2009), the practice of food security not only yields substantial advantages for human well-being, but also establishes a fundamental framework for attaining long-term economic development. The contemporary industrialized society is experiencing significant economic progress, with a strong emphasis on the prioritization of food security across various domains (Zabir et al., 2020).

Food security is a state in which individuals can consistently obtain an adequate supply of food that is both safe and nutritious, so enabling them to lead healthy and productive lives (FAO, IFAD and WPF, 2002). The concept is characterized by multiple dimensions, which include six pillars: food availability, food access, food utilization, stability, agency, and sustainability (Barrett, 2010). Also, food security is defined as the state in which individuals can consistently obtain adequate amounts of food that is both safe and nutritious, so enabling them to sustain their well-being and productivity. In the context of food security, there has been a growing recognition of the significance of nutrition, food safety, and quality. It is now understood that issues related to food intake extend beyond hunger and malnutrition, encompassing concerns such as underweight and obesity as well (Dev et al., 2020).

The prioritisation of food security has been heightened by a series of concerning occurrences, such as significant fluctuations in food prices, financial crises, and the impact of climate change and associated weather disruptions on food production (Leroy et al., 2015). As per Food and Agriculture Organization (FAO) in 2023, a significant number of individuals, comprising

between 702 to 828 million, encountered hunger in the year 2021. This figure underscores the considerable challenge in attaining the objective of zero hunger by 2030. Notably, approximately 2.3 billion people, which accounts for nearly 30% of the global population, experienced moderate or severe food insecurity. This represents an increase of over 350 million individuals compared to the levels observed in 2019. The rise in food insecurity can be attributed to the impact of the COVID-19 pandemic. The conflict in Ukraine presents an extra obstacle in the pursuit of eradicating hunger, thereby negatively impacting the status of food security and nutrition in numerous nations (Hassen, 2022).

The countries situated in Southern Asia harbor the second-largest populations of impoverished individuals and those experiencing undernourishment globally. These nations have significant health difficulties, with a substantial portion of their populations enduring severe hunger (FAO, IFID, UNICEF, WFP and WHO, 2017). However, Bangladesh has demonstrated noteworthy advancements in the realm of food security in recent times when compared to several other Asian nations. As stated by the Integrated Food Security Phase Classification (IPC) report of 2022, a staggering 58.5 million individuals in Bangladesh are confronted with mild chronic food insecurity. Additionally, 69.8 million people experience either no or low levels of chronic food insecurity, while approximately 35 million individuals face moderate to severe chronic food insecurity. The escalating occurrence of food insecurity among university students is a substantial risk to their physical well-being and educational achievements (Ahmad et al., 2021). The prevalence of food insecurity among university students has been significantly higher compared to the estimates of food insecurity in the general population for the past decade (Ellision et al., 2021). For many students, enrolling in a university marks their first experience with independence, which can potentially influence their level of food security (Vidgen, 2014). Individuals with low income and insufficient financial resources, as well as limited food management skills, are at an increased risk of experiencing food insecurity (Gaines et al., 2014). Additionally, their reliance on borrowed funds and ineligibility for food assistance programs further exacerbate this vulnerability. McCoy et al. (2022), suggested a positive correlation between food insecurity among students and the presence of stress and depression symptoms. This finding is consistent with previous research by Weaver et al. (2020), which suggests that these psychological factors can have a detrimental impact on students' academic performance. Following Zein et al. (2019), the occurrence of food insecurity among students, even if it is temporary and confined to the duration of their degree program, can lead to the development of unhealthy habits and an elevated susceptibility to chronic illnesses. According to O'Brien et al. (2021), students are experiencing a deficit in caloric intake, leading to adverse effects on both their physical and mental well-being.

According to the Bangladesh Education Statistics (BES) report of 2021, the public universities in Bangladesh have an estimated student population of 901,509. Among these students, 105,646 individuals, accounting for approximately 12% of the total, are classified as resident students, while the other 88% are categorized as non-resident students. The food security condition of university students in Bangladesh is increasingly becoming a matter of concern due to their role as the future generation of the country. The escalating cost of commodities has prompted significant attention to be given to the matter of food security among university students in Bangladesh. However, the available data on the prevalence of food insecurity among university students in Bangladesh is inadequate. Furthermore, the majority of research conducted on food

security in Bangladesh mostly concentrates on the household level. However, it is imperative to have comprehensive knowledge of the various facets of food insecurity that impact university students. The primary objective of this study is to assess the food security status of university students in Bangladesh, as well as to determine the factors that influence their food security status. This study examines the current state of food security among university students and explores the various elements that contribute to their food security status.

METHODOLOGY

Study area and Design

The present study was carried out at public universities located in Bangladesh, which are committed to providing higher education to a significant number of students. These universities have been established by the government and function with a significant degree of autonomy. These educational institutions attracted a diverse student body, encompassing individuals from different cultural, ethnic, and socio-demographic origins. The individuals comprising the faculty and students of public universities actively participate in the advancement of knowledge and the development of novel ideas through their contributions to research and innovation. The public university in Bangladesh functions as both an institution of higher education and a significant contributor to the country's overall development. A cross-sectional survey was constructed in order to evaluate the prevalence of food security and the factors related to it among students attending public universities. The data collection process involved the administration of a self-reported questionnaire, which was administered online using Google Forms. The study's sample size consisted of 272 participants, and the assessments were conducted during the period of June to July in the year 2023. The hyperlink to the questionnaire was sent via electronic mail and several social media platforms in order to target a wide range of students. A link to the questionnaire is included in the email that was sent out to university students with information about the study. The researchers also shared the questionnaire on their Facebook and Instagram profiles, as well as the social media platforms and groups affiliated with the public university student association. Only university students were considered as participants in the survey. Out of the total 287 responses received, a total of 272 students were subsequently included in the study, while the remaining responses were excluded owing to incomplete information.

Questionnaire Development

Data was obtained using a standardized questionnaire in order to evaluate the food security status of the participants. The first part of the questionnaire encompasses the socio-demographic attributes of the participants. Socio-demographic parameters encompassed age, gender, academic year, familial relationships, monthly household, and personal income, as well as the jobs of parents. The subsequent section of the questionnaire pertains to the participant's dietary intake in relation to food items consumed on the preceding day. The final section of the questionnaire pertains to the limitations and restrictions individuals encounter in relation to food security. Prior to administering the final survey questionnaire, a pretest was conducted, and any necessary

adjustments were made. To ensure comprehensibility for all participants, the questionnaire was translated into the Bengali language.

Variable Measurements

In order to assess food security, the researchers employed the Household Dietary Diversity Score (HDDS), a widely utilized metric for measuring food security. The scoring system encompasses a range of values from 0 to 12, wherein a higher score corresponds to a greater level of dietary diversity. Specifically, the scoring categories are classified as high dietary diversity (scores ranging from 7 to 12), medium dietary diversity (scores ranging from 4 to 6), and low dietary diversity (scores ranging from 0 to 3). This approach takes into account the dietary history of participants, necessitating their recollection and reporting of all food types consumed within the preceding 24-hour period. The dietary diversity of the respondents was evaluated using a scale consisting of 12 food groups, as depicted in Table 1. A score of one (1) was assigned to each food category consumed within the specified time frame, resulting in a cumulative dietary score of 12 points for individuals whose food intake included items from all food categories. Students with a dietary diversity score of 4 or lower were classified as experiencing food insecurity, while students with a dietary diversity score of 5 or higher were classified as being food secure.

Analytical Framework

Logistic regression

The researchers employed the binary logistic regression model to examine the variables influencing the food security of university students, drawing upon the studies conducted by Wongnaa and Babu (2020) and Zabir et al. (2020). The variable of food security was included as the dependent variable. The dependent variable encompassed two distinct outcomes, namely food security and food insecurity. The binary outcome necessitated the adoption of a logistic regression model as a suitable analytical approach for this research.

The food security model employed in this study is grounded in the threshold theory of decision-making, as originally posited by Hill and Kau in 1973. The food security status of individuals is contingent upon a critical or threshold value. These scenarios are commonly depicted subsequent using a model:

$$y_i = \beta_i x_i + \mu_i \quad (1)$$

The variable y_i denotes the food security status of the respondents, while the variable x_i indicates the factors that influence the food security status. In the context where x_i surpasses x^* , students are considered to be food-secured, denoted by $y_i = 1$. Conversely, if x_i does not exceed x^* , students are classified as not being food-secured, represented by $y_i = 0$.

Table 1: Categories of food groups used for the survey.

No.	Food groups	Points
1	Foods made from peas, lentils, nuts or beans	1
2	Any eggs	1
3	Any vegetables	1
4	Any goat, lamb, rabbit, beef, wild game, duck, chicken, wild game, other birds, kidney, pork heart, liver or other organ meats	1
5	Foods made from wheat, sorghum, rice, maize, millet, biscuits, bread, rice, or other locally available grain, or any noodles	1
6	Any fruits	1
7	Any cassava, yams, manioc, potatoes, or any other foods made from tubers or roots	1
8	Any other foods such as coffee, tea or condiments	1
9	Any fresh, dried fish or shellfish	1
10	Any sugar or hone	1
11	Any yoghurt, cheese, milk or other milk products	1
12	Any foods made with fat, butter or oil	1
Total points		12

The binary model seeks to determine the level of food security among students, denoted as y , based on a set of independent variables, x . The chance of individual students achieving food security, denoted as $\beta_i x_i > x^*$, is stated as follows:

$$P_i = \text{Prob}(y_i = 1) = F(\beta_o + \beta_i x_i) \quad (2)$$

The likelihood of students experiencing food insecurity ($\beta_i x_i < x^*$) is as indicated:

$$P_i = \text{Prob}(y_i = 0) = F(\beta_o + \beta_i x_i) \quad (3)$$

The model, $F(\beta_o + \beta_i x_i)$, uses a logistic cumulative distribution function to estimate probability which is as follows:

$$p_i (y=1) = \frac{e^z}{1+e^z} \quad (4)$$

$$p_i (y=0) = 1 - \frac{e^z}{1+e^z} = \frac{1}{1+e^z} \quad (5)$$

where $z_i = \beta_o + \beta_i x_i$

The marginal effects (log of odd) of the respective independent variables effects had to be estimated as:

$$\frac{pi(y=1)}{pi(y=0)} = \frac{1+e^{Zi}}{1+e^{-Zi}} = e^{Zi} = e^{\beta_1 + \beta_2 x_i} \quad (6)$$

The logarithm of odds serves as a representation of the ratio between the likelihood of a certain student being food secure and the likelihood of the same student not being food secure.

Finally, the binary logistic regression model was specified as follows:

$$\text{food security status} = \beta_0 + \beta_1 \times \text{Gender} + \beta_2 \times \text{Residential Status} + \beta_3 \times \text{Income} + \beta_4 \times \text{Family Size} + \beta_5 \times \text{Father's Occupation} + \beta_6 \times \text{Cultural Food Habit} + \mu$$

Here, β_0 represents the intercept of the model.

Table 2: Description of the variable used in the logistic regression model.

Variable	Description
Independent variable	
Gender	D =1 if student is male; 0 = otherwise
Residential status	D =1 if student is staying in residential hall; 0 = otherwise
Income	Monthly household income of student
Family size	Number of family members
Father's occupation	D =1 if father's occupation is jobholder; 0 = otherwise
Cultural food habit	D =1 if student maintains cultural food habit; 0 = otherwise
Dependent variable	
Food security	D = 1 if student is food secure; 0 = otherwise

Constraints facing index (CFI)

In line with the study conducted by Muzahid et al. (2017), the researchers employed the CFI index as a means to assess the constraints experienced by students in relation to food security. The researchers employed a structured questionnaire to assess the stated restrictions. A total of eight constraints were chosen for evaluation, and students were requested to express their opinions on these constraints. Each respondent's constraint score was calculated using a four-point rating scale. In order to quantify the level of constraint, a constraint score of 3, 2, 1, and 0 was assigned to represent strong, medium, low, and no constraint, respectively. The aggregate constraint scores were calculated for each participant by calculating their individual scores across all restrictions. The following formula was used to compute the Constraint Facing Index,

$$CFI = (C_h \times 3) + (C_m \times 2) + (C_l \times 1) + (C_n \times 0)$$

Where, CFI = Constraints Facing Index; C_h = Number of respondents having high constraints; C_m = Number of respondents having medium constraints; C_l = Number of respondents having low constraints; and C_n = Number of respondents having no constraints.

RESULTS AND DISCUSSION

Socio-economic characteristics of respondents

Table 3 illustrates the socioeconomic attributes of the participants. Out of the total sample size of 272 respondents, it was observed that 43.38% identified as male, while 56.62% identified as female. This distribution of gender indicates a nearly equal representation of males and females within the sample. Approximately 41.18% of individuals between the age range of 20-21 were enrolled as second-year students, whereas 31.62% of the total student population fell within this category. Furthermore, nearly half of the students (47.79%) came from families of medium size. The monthly family income of the respondents exhibited variation, with approximately 38.24% of the students falling within the income range of 30001-50000 BDT. Nearly 43.56% of individuals indicated that they had no of personal income, implying their financial support is derived from parental or alternative sources. Almost half of the respondents' fathers were employed, suggesting that employment was the prevailing occupation among fathers. However, the situation differed for mothers' jobs, as almost 63.97% of them were identified as housewives.

Table 3: Socio-economic status of the respondents

Variables	N	%
Gender		
Male	118	43.38
Female	154	56.62
Age		
20-21	112	41.18
22-23	86	31.62
24-25	44	16.18
Above 25	30	11.03
Education		
First year	74	27.21
Second year	86	31.62
Third year	54	19.85
Fourth year	40	14.71
Graduate	18	6.62
Monthly Household income (Thousand Tk)		
Up to 20000	32	11.76
20001-30000	92	33.82
30001-50000	104	38.24
Above 50000	44	16.18
Monthly Personal income (Thousand Tk)		
No Income	94	34.56

Up to 2000	58	21.32
2001-6000	86	31.62
Above 6000	34	12.50
Family size		
Small (up to 3)	48	17.65
Medium (4-6)	130	47.79
Large (above 6)	94	34.56
Father's occupation		
Job holder	134	49.26
Businessman	96	35.29
Others	42	15.44
Mother's occupation		
Housewife	174	63.97
Job holder	98	36.03

Factors Affecting Food Security

A logistic regression analysis was utilized to ascertain the primary determinants that impact the food security status of university students. The results of this investigation are displayed in Table 4. Researchers frequently utilize a diverse range of methodologies when examining the determinants that influence food security. For this study, a careful examination of the existing literature and interviews with subject matter experts were conducted to identify specific independent factors. The selected independent factors encompass age, gender, hall status, income level, and family size, concerning the studies conducted by Ahmed et al. (2021) to support their pertinence and importance. Table 4 displays the food security status of the surveyed students.

The research findings suggest a significant correlation between the food security status and the gender of university students in Bangladesh. The analysis reveals that there is a substantial difference in food security between male and female students. Specifically, the findings indicate that male students have a considerably higher degree of food security compared to their female counterparts. The data suggests that the effect of gender on food security is noteworthy, with males being 4.47 times more likely to experience food security than females.

Table 4: Food security status of the public university students

Food security status	Frequency	Percentage
Food Secure	194	71.32
Food Insecure	78	28.68

A possible explanation for this discrepancy is the differential degrees of engagement in part-time employment among male and female students. Furthermore, variations in accommodation arrangements between male and female students could also contribute to this disparity. Female students who reside in university residence halls frequently experience stricter time limits and regulations regarding their mobility in comparison to their male counterparts. This circumstance

may impose constraints on individuals' capacity to avail themselves of food alternatives beyond certain periods, so potentially impacting their overall food security.

Table 5: Logistic regression of factors influencing food security of university students

Variables	B	S.E.	Wald	Sig.	Exp(B)
Constant	-2.011	1.137	3.126	0.077	0.134
Gender (Male)	1.498	0.549	7.453	0.006	4.471
Residential Status (Hall)	-0.836	0.381	4.830	0.028	0.433
Income	0.851	0.313	7.376	0.007	2.343
Family Size	-0.140	0.222	0.400	0.527	0.869
Fathers occupation (Govt. Job)	1.057	0.456	5.373	0.020	2.877
Cultural Food Habit (Yes)	-0.502	0.432	1.353	0.245	0.605
Hosmer and Lemeshow Test	Chi-square=9.254; p-Value=0.321				

*Dependent variable= Food Security Status. Reference categories for Gender = Female, Residential Status=Others, Fathers Occupation= Others, Cultural Food Habit=No

The findings of the study indicate a statistically significant correlation between the living conditions of students and their level of food security. The findings from the marginal effects analysis revealed that students who lived on-campus exhibited a 0.433-fold increase in food security compared to their off-campus counterparts. **These findings are consistent with the results from investigations undertaken by Hiller et al. (2021) and Ukgbu et al. (2019), who observed that students residing off-campus generally exhibit higher levels of food security in comparison to their on-campus counterparts.** One of the primary elements that contributes to this discrepancy seems to be the accessibility of cooking facilities and meal alternatives. A common challenge faced by students residing on campus is the restricted availability of cooking facilities and food options. This constraint may result in individuals depending on costlier and perhaps less nourishing food alternatives, such as meals provided by dining halls or takeaway services. Consequently, this can place a burden on their food expenditures and undermine the nutritional value of their diets. On the other hand, students who reside off-campus generally possess a larger degree of freedom when it comes to their dietary options, as they have the opportunity to cook meals in their own residences. This increased autonomy in food selection may be a contributing factor to their elevated levels of food security.

A significant statistical association was observed between income and food security, indicating a positive relationship between the two variables. The study found that the marginal effect of income was estimated to be 2.343. This suggests that a one-unit increase in a household's income level is associated with a 234.3% increase in the probability of attaining food security. This

phenomenon can be explained by the observation that households with higher incomes typically allocate a greater proportion of their resources towards spending on food, in contrast to households with lower incomes. A higher level of income enables individuals to have the financial means to consistently access an adequate supply of food, therefore mitigating the likelihood of facing food insecurity. This observation is consistent with the results of prior investigations undertaken by Baker et al. (2019) and Muhammad et al. (2013), which similarly revealed a positive association between income and food security.

The data presented in Table 5 demonstrates a negative correlation between family size and food security. Nevertheless, the p-value of 0.527 suggests that family size did not exhibit statistical significance as a predictor, implying that its influence was not statistically significant. The empirical analysis demonstrates that a one-unit increase in family size is associated with a substantial reduction of 86.9% in food security. This implies that in households with more members, the distribution of household income may result in a reduced proportion for each individual, hence potentially constraining their capacity to procure an adequate quantity of nutritious food to fulfill the nutritional requirements of all members. The results presented in this study are consistent with the findings provided by Zabir et al. (2020), wherein a negative correlation between the number of family members and the level of food security was seen.

The investigation unveiled a statistically significant association between food security and the occupational status of fathers, with a significance level of 5%. The level of food security among students whose fathers are jobholders is 2.877 times higher compared to students whose fathers are businessmen. Students whose fathers are employed tend to have better levels of food security. The stability of a job holder's monthly income and the provision of additional employee benefits enable them to adhere to a consistent eating plan.

The study revealed that students who adhere to cultural eating habits exhibit a 0.605 times higher level of food security compared to those who do not adhere to any cultural food habits. However, there was no substantial correlation found between cultural dietary patterns and food security. Numerous university dining facilities fail to adequately accommodate the dietary needs of students who adhere to certain cultural eating practices. Furthermore, it is worth noting that students frequently have time constraints when it comes to preparing meals, primarily owing to the demanding nature of their academic commitments and other obligations. This predicament can further exacerbate the likelihood of experiencing food insecurity.

Constraint faced by university students

This section delves into the various problems associated with the accessibility of affordable and nutritious food for university students. This investigation examines the impact of financial limitations on students' dietary choices, the differences in food pricing on campus, and the consequences of restricted budget allocations. Furthermore, a comprehensive analysis is undertaken to investigate the impact of dining hall restrictions, availability of external food options, level of staff professionalism, and emotional repercussions within the wider framework of food security among university students. Many students face budgetary limitations regarding

their food consumption, which poses a difficulty in providing inexpensive and nutritious campus meals intended to enhance academic performance. Out of the total sample size of 272 participants who were polled, a majority of 146 individuals reported facing considerable limits, while 108 respondents encountered moderate issues. A smaller subset of 12 participants experienced fewer difficulties, and only 6 individuals reported no constraints. The obtained Constraint Facing Index (CFI) value of 666 highlights the primary issue that university students have in relation to their ability to obtain affordable and nutritious meals on campus.

Table 6: Challenges Faced by University Students in Accessing Nutritious Meals

Statement	High	Medium	Low	Not at all	CFI Score	Rank
Access to affordable and nutritious food on campus	146	108	12	6	666	1
The limited option in university dining hall make it difficult to find food that fit dietary need and preferences	152	72	32	16	632	2
University dining hall provide less food than we need	136	90	32	14	620	3
Lack of kitchen facilities in university hall limit's ability to prepare own meals	130	94	22	26	600	4
Relying on food on external sources to meet our food needs	114	110	28	20	590	5
The dining hall staff is not always convenient, attentive or responsible	120	96	32	24	584	6
Can't afford to buy healthy food on limited budget	118	106	14	34	580	7
Feeling ashamed or embarrassed about the lack of access to food or inability to afford meals	100	114	34	24	562	8

The imposition of strict financial constraints and procurement regulations necessitates that university dining halls restrict their menu options, leading to a lack of alignment with the interests of students. Out of the total sample size of 272 participants, a majority of 152 individuals reported facing severe constraints, followed by 72 participants who encountered medium limitations. Additionally, 32 respondents reported experiencing low constraints, while 16 individuals reported no restraints at all. These figures contribute to a calculated Constraint Facing Index (CFI) value of 632. The importance of guaranteeing academic achievement and the welfare of students requires the provision of a food supply that is nutritionally balanced. Nevertheless, a notable impediment to attaining food security stems from the persistent inadequacy of food quantities provided by university dining halls. Out of the total sample size of 272 participants, 136 individuals reported encountering severe constraints, while 90 participants faced medium limitations. Additionally, 32 respondents indicated experiencing low constraints,

while 14 individuals reported encountering no restraints. These findings were further supported by a Comparative Fit Index (CFI) value of 620.

Dining facilities on university campuses may fall short in providing meal options that align with the interests of students, leading a significant number of individuals to turn to economical cooking alternatives. Nevertheless, the presence of inadequate kitchen amenities presents many difficulties, hence amplifying the likelihood of experiencing food insecurity. Among the sample of 272 participants, it was found that 130 individuals encountered high constraints, 94 individuals had medium obstacles, 22 individuals reported moderate difficulties, and 26 individuals experienced no restraints. These findings contributed to the calculation of a CFI value of 600. Many students face difficulties in finding affordable on-campus meals, leading them to rely on other sources, which might result in financial and time-related issues. Out of the total sample size of 272 participants, it was found that 114 individuals encountered high constraints, 110 individuals had medium obstacles, 28 individuals reported moderate difficulties, and 20 individuals experienced no restraints. The computed CFI was determined to be 590. The presence of inconsistent service and a dearth of professionalism exhibited by dining hall workers are contributing factors to the difficulty faced in ensuring food security. Out of the total sample size of 272 participants, 120 individuals reported facing severe constraints, 96 individuals encountered medium obstacles, 32 individuals reported moderate difficulties, and 24 individuals experienced no limits. This distribution of responses resulted in a CFI value of 584. Students with restricted finances face a huge problem in finding a balance between the substantial costs associated with their education and the expenses incurred in accessing healthy food options. Out of the total sampled participants, a majority of 118 individuals reported facing high constraints, while 106 respondents encountered medium obstacles. A smaller proportion of 14 participants reported low difficulties, and 34 individuals did not experience any restraints. These findings collectively contribute to a CFI value of 580. A significant number of students have conveyed sentiments of shame or humiliation in relation to their restricted access to food, which has had adverse effects on their mental well-being, physical health, and academic achievements. Among the 272 participants who were surveyed, it was found that 100 individuals encountered high constraints, 114 individuals faced medium obstacles, 34 individuals reported moderate difficulties, and 24 individuals experienced no restraints. The computed CFI was determined to be 562.

CONCLUSION AND RECOMMENDATION

The present study conducted a detailed examination of the food security status among public university students in Bangladesh, highlighting the complex interplay of various factors that impact the overall welfare of this particular population. The paradox seen in this study, wherein 71.32% of students are categorised as food secure but 28.68% experience food insecurity, highlights the pressing need to address the root causes of this issue.

The logistic regression studies have revealed significant positive associations between food security and many variables, including gender, income, and father's career. These findings offer

valuable and complex insights into the relationship between these factors and food security. The results of this study indicate that the implementation of customised interventions that take into account socio-economic factors could play a crucial role in improving the existing difficulties related to food security.

On the other hand, the unfavourable correlation with residential status underscores the necessity of examining and addressing particular difficulties encountered by students who reside on campus. Further enquiry is necessary to discover specific techniques that might be employed to enhance the food security of residential students.

The primary obstacles identified include limited availability of affordable and nutritious meals inside the college premises, limited choices in dining hall menus, inadequate food supplies, absence of kitchen facilities, and dependence on external food sources. These factors constitute the core of the problem. These difficulties not only have an adverse effect on food security but also have implications for the general health and academic achievement of pupils.

Given the thorough analysis conducted on the food security situation among undergraduate students attending public universities in Bangladesh, it is crucial to develop comprehensive strategies that specifically target the identified obstacles and foster a comprehensive approach to overall welfare.

To minimise student food insecurity, it's crucial to tailor interventions based on diverse socio-economic backgrounds. Customized financial assistance initiatives considering factors like gender, income, and parental occupations are vital. Collaborative efforts are needed to enhance affordable and supporting food options on campuses, prioritizing regions with higher student food insecurity. Improving variety and quality in dining hall choices, involving dietitians, and providing cooking facilities promote good eating habits and self-reliance. Campus-wide awareness campaigns about available resources and the link between diet and academic performance fill information gaps. Partnerships with external food sources ensure accessibility for students relying on alternatives beyond campus, contributing to a comprehensive solution.

Authors' Contributions: Author SAU and AAZ designed the study, selected the methodologies, analyzed the data, and wrote the draft of the manuscript. Authors MSB, MK, and MA performed literature searches, assisted in designing the manuscript, and contributed to the final manuscript.

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