



## Prevalence and Predictors of Food Insecurity among Public and Private University Lecturers: A Cross Sectional Study in Nangarhar, Afghanistan

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### ARTICLE INFO

#### ORIGINAL ARTICLE

##### Article history:

Received: 26 Jul 2021

Revised: 19 Sep 2021

Accepted: 13 Oct 2021

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### ABSTRACT

**Background:** Food security (FS) is a substantial right of human beings and should be addressed in all groups of the society. This study aims to investigate the prevalence and predictors of food insecurity (FI) among university lecturers in Nangarhar province. **Methods:** 287 university lecturers were selected from public and private universities through stratified random sampling technique. FS was assessed over the past 30 days and through the 10-item short US FS survey module. Data were collected by a well-structured questionnaire in face to face interviews. **Results:** Results revealed that 55.05% of university lecturers suffered from FI with a higher prevalence among private university lecturers ( $P = 0.001$ ). Moreover, FI was significantly associated with ethnicity ( $P = 0.04$ ), education level ( $P = 0.01$ ), academic position ( $P = 0.001$ ), monthly income ( $P = 0.01$ ), and having another job besides being a lecturer ( $P = 0.001$ ). Furthermore, lecturers between 36-40 year (OR = 0.043, CI = 0.006-0.292,  $P = 0.001$ ) with a bachelor's degree (OR = 0.130, CI = 0.033-0.518,  $P = 0.004$ ) had the lowest odds, and those with senior teaching assistant position (OR = 9.350, CI = 3.371-25.932,  $P < 0.001$ ), and monthly income of less than 350 US dollar (OR = 162.70, CI = 9.315-2841.92,  $P < 0.001$ ), had greater odds of FI. **Conclusion:** FI is prevalent among university lecturers. Therefore, prompt interventions should be conducted by relevant departments to minimize the risk of FI among the lecturers.

**Keywords:** Food insecurity; Prevalence; Predictors; Universities' lecturers

### Introduction

Food produces energy in human body. It is then used to do daily activities. Survival would be impossible without calorie-based sustenance (Fortin *et al.*, 2021). Therefore, food security (FS) is a fundamental human right which is essential for the development of higher-level capabilities, critical thinking (Thorman and

Dhillon, 2021), and a healthy life (Adamovic *et al.*, 2020). There are about 200 definitions for FS (Hoddinott, 1999, Smith *et al.*, 1993); but, the most thorough and comprehensive one defines FS as "when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food, which meets their dietary needs

This paper should be cited as: Banuree SAH, Pakteen RS, Rahimi N, Banuree SZ, Rahmani MM. Prevalence and Predictors of Food Insecurity among Public and Private University Lecturers: A Cross Sectional Study in Nangarhar, Afghanistan. *Journal of Nutrition and Food Security (JNFS)*, 2023; 8 (1): 37-46.

and food preferences for an active and healthy life” (Committee on World Food Security of FAO, 2012). In contrast, food insecurity (FI) is “the limited or uncertain availability of nutritionally adequate and safe foods, or the limited or uncertain ability to acquire acceptable foods in socially acceptable ways” (USDA Economic Research Service, 2020a). The detrimental health outcomes of FI are poor cognitive, social, and emotional development in young children; depression and suicidal thoughts in adolescents; higher risk of diet-related chronic disorders and relevant consequences in adults; and malnutrition among all age groups (Adamovic *et al.*, 2020). In addition, depression and apparent stress in undergraduate students are linked to both short- and long-term FI (Diamond *et al.*, 2020). It is also documented that youngsters with FI are at an elevated risk of low academic achievements, eating less nutritious food and having poorer mental, social and physical health (Jyoti *et al.*, 2005, Kleinman *et al.*, 1998, Rose, 1999).

Experts should evaluate FI for all groups of population, according to the US Department of Agriculture (USDA). This is because it is frequently regarded as a "direct measure of well-being" and has several possible health repercussions (Nord and Prell, 2007). The prevalence of FI among university students is different and varies around the world. It is reported that the prevalence of FI among university students is 48% in New Jersey Public University (Weaver *et al.*, 2020), 54.4% in Pahang, Malaysia (Bakar *et al.*, 2019), 62.8% in Putra University in Malaysia (Ahmad *et al.*, 2021), and 45.0%, and 35.7% as very low and low in southeast Nigeria (Ukegbu *et al.*, 2019). Several studies have identified different associated factors and predictors of FI among university students. According to their reports, age, living without parents, having low income or receiving government assistance, race and ethnicity, educational program, and other factors are significant predictors of FI (Adamovic *et al.*, 2020, Davidson and Morrell, 2020, Hughes *et al.*, 2011, Martinez *et al.*, 2018, Micevski *et al.*, 2014,

Olauson *et al.*, 2018, Reeder *et al.*, 2020, Sabi *et al.*, 2020, Whatnall *et al.*, 2020).

FI is more common among Afghans. According to the most recent data, 33% of Afghan people suffer from food insecurity, and this percentage is rising day by day (World Food Programme, 2017). In the eastern region of Afghanistan, some researchers have reported that 46.9% of families faced FI, 49.6% experienced hunger in the previous month, and 48 % of households had a low or borderline food intake score. In addition, insecurity, poverty, unsustainable livelihoods, lack of job possibilities, poor wage and income, landlessness in rural areas, and the massive influx of refugees and internally displaced people were the main reported causes of FI (Ahmadzai and Akbay, 2020).

There are few studies concerning FS assessment among different groups in Afghanistan, particularly in eastern region. University lecturers, as part of Afghan community, are also vulnerable to FI; their FS status has not been investigated yet. This is the first study which investigates the prevalence and factors related to FS. Moreover, it determines the predictors of FS among university lecturers in Nangarhar province.

### Materials and Methods

*Study design and sampling techniques:* This was a cross-sectional study conducted on university lecturers in Nangarhar province, located in eastern region of Afghanistan. Nangarhar has one public and six private universities with 1127 lecturers (1095 males + 32 females). The sample size of 287 was calculated with a 95% confidence interval (CI) and 5% margin of error. The sample was proportionate to the population and was selected through stratified random sampling. The authors collected the study variables through a pre-tested and well-structured questionnaire in a face-to-face interview. Moreover, a consent form was signed by all participants prior to data collection.

*Socio-economic status of participants:* In order to assess the association of FS with their risk factors, experts selected the followings as independent variables: age, gender, marital status,

ethnicity (Pashtun, Tajik, Pashae,, others), education level, academic position (teaching assistant, senior teaching assistant, assistant professor, associate professor, professor), university type (public, private), monthly income (less than 350 USD, 351-450 USD, 451-650 USD, more than 650 USD), having another job along with being a lecturer to support family (yes, no) , and the type of house (owned, rented).

*Measurement of FS:* Researchers determined FS status of participants over the past 30 days. This was done using the 10-item short form US adult FS module (USDA Economic Research Service, 2020b). According to the module, responses of “yes,” “often,” “sometimes,” “almost every month,” and “some months but not every month” were considered affirmative. The sum of affirmative responses was coded by authors as raw score, which classified the FS into four categories namely: high (zero raw score), borderline (1-2 raw score), low (3-5 raw score), and very low FS (6-10 raw score). As the module states, the first and last two categories have FS and FI, respectively.

*Anthropometrics measurements:* The weight (kg) and height (m) of respondents were measured using a digital scale with 0.01 kg sensitivity and stadiometer to the nearest 0.1 cm respectively. All objects and items (excluding light clothing) were removed from participants upon measuring weight and height. Finally, body mass index (BMI) was calculated based on the following equation:

$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m)}^2}$$

There are four categories of BMI, namely underweight: <18.5, normal:  $\geq 18.5$  to <25, overweight:  $\geq 25$  to <30; and obese  $\geq 30$  kg/m<sup>2</sup> (Weir and Jan, 2020).

*Data analysis:* The collected data on studied variables were analyzed using SPSS v.23. The association of socio-economic variables with FS was determined by Chi-square test. Furthermore, socio-economic predictors of FI were studied through binary logistic regression. P-value < 0.05 was considered statistically significant in finding the associations and predictions of socio-economic

variables with FS. CI of 95% was set for all statistical tests. All categorical variables were reported as frequency and percentage. The graphs were drawn using Graphpad Prism9.

## Results

*Socio-economic status of respondents:* The results of socio-economic characteristics of participants are portrayed in **Table 1**. The majority of respondents were from private universities (56.45%). Moreover, male lecturers (95.12%) are dominant in number in Nangarhar province universities. The lecturers who participated in this study were mostly Pashtuns (89.55%) and 31-35 year (37.63%). Most of them were married (83.97%) with a master's degree (55.05%). As previously indicated, most of the respondents were from private universities; therefore, the majority of lecturers did not have the specified academic criteria (29.09%). But, in public universities, most of the lecturers were senior teaching assistants (26.83%), had a monthly income ranging from 351 to 450 USD (62.16%), and resided in their own houses (60.28%). Furthermore, they (69.34%) did not have another position to support their family besides being a lecturer in university. Finally, the majority of lecturers who participated in the present study were overweight (52.96%), followed by normal, obese and underweight cases.

*Prevalence of FI and its association with socio-economic characteristics:* The results of prevalence of FS regarding socio-economic characteristics are presented in **Figure 1**. Data demonstrates that more than half of the university lecturers (55.05%) experienced FI. In terms of the university type, the high proportion of FI belonged to private university lecturers (63.58%) compared to the public ones (44.00%). The analysis of data showed that FS status was significantly associated with the type of university ( $P = 0.001$ ), ethnicity ( $P = 0.04$ ), education level ( $P = 0.01$ ), academic position ( $P = 0.001$ ), monthly income ( $P = 0.01$ ), and having another position along with being a lecturer to support family ( $P = 0.001$ ). The higher

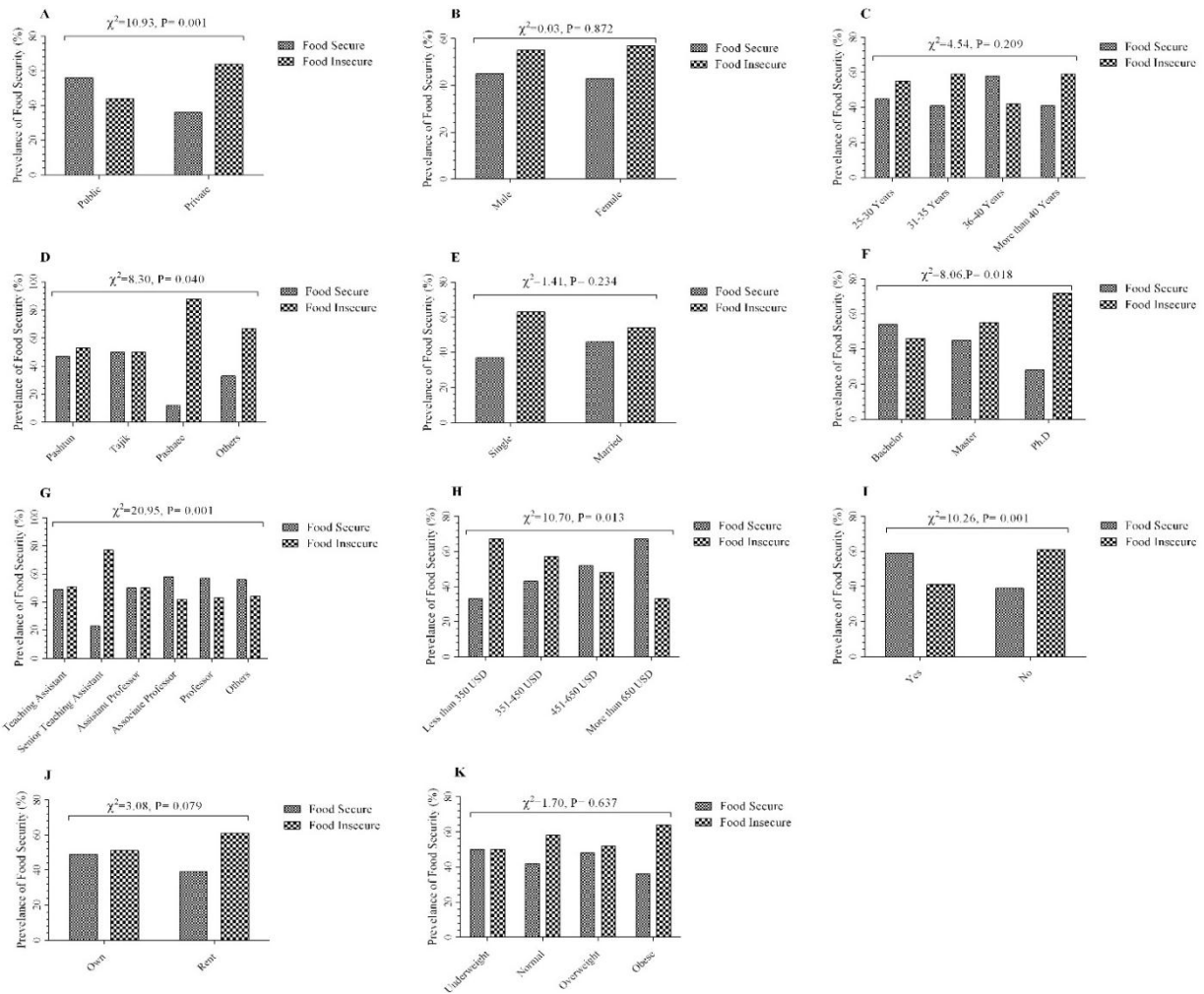
prevalence of FI was recorded for Pashae ethnic group (88.24%), was followed by others (66.67%), Pashtun (52.29%) and Tajik (50.00) ethnic groups. In terms of educational level and academic position, FI was more prevalent in PhD holders (71.74%) and senior teaching assistants (76.63%) in comparison with other groups. Moreover, those who had a high monthly income (more than 650 USD) experienced the lowest FI (33.33%). This was followed by lecturers with 450-650 USD, 350-450 USD, and a monthly income of less than 350 USD. Lastly, the increased prevalence of FI was recorded for those lecturers who did not have another job along with being a lecturer (61.31%).

*Predictors of FI among the lecturers:* The results of binary logistic regression of FI status regarding the socio-economic status of university lecturers are presented in **Table 2**. Age, education level, academic position, monthly income, and having another job along with being a lecturer to support family are the significant predictors of FS status among university lecturers. Furthermore, the lecturers who aged 36-40 year had the lowest odds

(OR = 0.043, CI = 0.006-0.292,  $P = 0.001$ ) of FI compared to those above 40. Lecturers with a bachelor's degree had the lowest odds (OR = 0.130, CI = 0.033-0.518,  $P = 0.004$ ) of FI followed by those with a master's degree (OR = 0.239, CI = 0.006-0.070,  $P = 0.814$ ) in comparison with PhD holder lecturers. Similarly, lecturers of senior teaching assistant position were at a high risk of FI (OR = 9.35, CI = 3.37-25.93,  $P < 0.001$ ) compared to those who did not have any specified academic position. Finally, those lecturers who had the monthly income of less than 350 USD, had 162.70 times greater odds of FI (OR = 162.70, CI = 9.31-2841.92,  $P < 0.001$ ) compared to those with a monthly income of more than 650 USD.

**Figure 1** shows the prevalence of FS and its association parameters. Bars portray prevalence of FIFI. The results demonstrate that FI was significantly associated with the type of university, ethnicity, education level, academic position, monthly income, and having another job along with being a lecturer to support family.





**Figure 1.** Prevalence of food insecurity (FI) and its association with socio-economic characteristics. (A) type of university, (B) gender, (C) age, (D) ethnicity, (E) marital status, (F) education level, (G) academic position, (H) monthly income, (I) having another job along with being a lecturer to support family, (J) the type of house, (K) and BMI.

**Table 1.** Socio-economic characteristics of respondents (n = 287).

Variables		N	%
Type of university	Public	125	43.55
	Private	162	56.45
Gender	Male	273	95.12
	Female	14	4.88
Age (year)	25-30	94	32.75
	31-35	108	37.63
	36-40	48	16.72
	Above 41	37	12.89
Ethnicity	Pashtun	257	89.55
	Tajik	10	3.48
	Pashae	17	5.92
	Others	3	1.05
Marital status	Single	46	16.03
	Married	241	83.97

**Table 1.** Socio-economic characteristics of respondents ( $n = 287$ ).

Variables		N	%
Educational level	Bachelor's degree	83	28.92
	Master's degree	158	55.05
	Ph.D. degree	46	16.03
Academic position	Teaching assistant	82	28.57
	Senior teaching assistant	77	26.83
	Assistant professor	16	5.57
	Associate professor	12	4.18
	Professor	14	4.88
	Others	86	29.97
	Monthly income (USD)	Less than 350	72
351-450		121	42.16
451-650		67	23.34
More than 650		27	9.41
Having another job besides being a lecturer to support family	Yes	88	30.66
	No	199	69.34
Type of house	Owned	173	60.28
	Rented	114	39.72
Body mass index (kg/m <sup>2</sup> )	Underweight	4	1.39
	Normal	106	36.93
	Overweight	152	52.96
	Obese	25	8.71

**Table 2.** The results of binary logistic regression of food insecurity status with socio-economic characteristics of university lecturers in Nangarhar province ( $n = 287$ ).

Variables		OR	95% Confidence interval (CI)		P-value
			Lower	Upper	
Type of University	Public	0.477	0.190	1.195	0.114
	Private	Reference			
Gender	Male	0.831	0.195	3.541	0.803
	Female	Reference			
Age (year)	25-30	0.058	0.009	0.394	0.004
	31-35	0.067	0.10	0.448	0.005
	36-40	0.043	0.006	0.292	0.001
	Above 41	Reference			0.014
Ethnicity	Pashtun	0.327	0.021	5.036	0.423
	Tajik	0.223	0.010	5.207	0.350
	Pshae	2.100	0.080	55.297	0.657
	Others	Reference			0.186
Marital status	Single	1.603	0.655	3.924	0.301
	Married	Reference			
Education level	Bachelor's degree	0.130	0.033	0.518	0.004
	Master's degree	0.239	0.070	0.814	0.022
	Ph.D.	Reference			0.014
Academic position	Teaching assistant	3.094	1.235	7.750	0.016
	Senior teaching assistant	9.350	3.371	25.932	0.000
	Assistant professor	3.016	0.449	20.272	0.256
	Associate professor	9.909	0.587	167.296	0.112
	Professor	3.021	0.178	51.341	0.444
	Having no academic position	Reference			0.001

**Table 2.** The results of binary logistic regression of food insecurity status with socio-economic characteristics of university lecturers in Nangarhar province (n = 287).

Variables		OR	95% Confidence interval (CI)		P-value
			Lower	Upper	
Monthly income (USD)	Less than 350	162.705	9.315	2841.922	0.000
	351-450	68.491	4.437	1057.162	0.002
	451-650	43.336	3.013	623.405	0.006
	More than 650	Reference			0.003
Having another job along with being a lecturer	Yes	0.467	0.244	0.894	0.002
	No	Reference			
Type of house	Owned	0.668	0.356	1.255	0.210
	Rented	Reference			
Body mass index (kg/m <sup>2</sup> )	Underweight	0.744	0.064	8.655	0.813
	Normal	1.520	0.454	5.086	0.497
	Overweight	1.073	0.330	3.490	0.907
	Obese	Reference			0.689

## Discussion

FI has crossed the midline and is prevalent (55.05 %) among the lecturers in Nangarhar University. Private university lecturers were more vulnerable compared to the public ones. In addition, FI was significantly associated with the type of university, ethnicity, education level, academic position, monthly income, having another job along with being a lecturer to support family, and socio-economic characteristics. On the other hand, binary logistic regression analysis revealed that age, education level, academic position, monthly income, and having another job along with being a lecturer to support family were important predictors of FI among university lecturers.

The investigation of prevalence and predictors of FI among university lecturers has been overlooked both in Afghanistan and other countries because target population was from middle class of the society. The present study revealed that FS of university lecturers should be investigated especially in developing countries. The prevalence of FI among university lecturers (55.05%) was a little high compared to the public FI status as reported by other study (Samim and Zhiquan, 2020). They reported that 53.2% of Afghans faced FI and 11 million needed food aid. The mentioned prevalence was also far greater than the one

reported by (Riddle *et al.*, 2020). They stated that 19.6% of college community members at north east university of United States of America suffered from FI in spring, and suggested taking measures to reduce the rate of FI in college campuses. The possible reason for elevated prevalence of FI among lecturers in Nangarhar, Afghanistan is the low monthly income of the lecturers.

The results of the present study also documented that the lowest FI was observed among lecturers aged 36-40 year compared to other groups. This might be because those lecturers who aged 36-40 year probably had fewer family members and a medium level of academic position. Martinez *et al.* reported that the FS status of students was significantly associated with the age of the student and documented the higher rate of FI (79%) for younger students compared to the older ones. Moreover, they documented higher odds (1.6) for younger students compared to older ones (Martinez *et al.*, 2018).

The education level of lecturers is one of the most important predictors of FS. As the level of education increases, the level of FS decreases. This reflects the fact that FI is higher among Ph.D. holders compared to the lecturers with M.S and B.S degree. These results may be due to the fact that, in the context of higher education in

Afghanistan, there is little financial support regarding Ph.D. degree to increase the final gross salary of the lecturers. Moreover, with higher education level, lecturers become older, and their family members increase. Thus, they are more likely to face FI compared to those with lower level of education. Whatnall *et al.* reported that the prevalence of FI among students in an Australian university was 52.9% and 26.6% among undergraduates and postgraduates respectively. Undergraduate students were 3.5 times more likely to suffer from FI compared to postgraduate students (Whatnall *et al.*, 2020). Soldavini also reported a higher prevalence of FI for undergraduates (25.2%) and a lower rate for graduates (17.8%) (Soldavini *et al.*, 2019). Likewise, the higher prevalence of FI among students was reported for the University of Free State in South Africa. The results of the study demonstrated that the level of education is significantly associated with FS, and the prevalence of FI was 65.8% and 50.7% among undergraduate and postgraduate students respectively (Van den Berg and Raubenheimer, 2015). This indicates that education level is a changeable predictor of FS among different groups of university population; hence, it should be fully investigated

The monthly income and having another job along with being a lecturer to support family are highly associated with variables and predictors of FS status among university lecturers in Nangarhar province. The results of the present study revealed that as the amount of monthly income increases, the prevalence of FI decreases. In other words, lecturers with a monthly income of lower than 350 USD had 162.7 times greater odds of facing FI compared to those lecturers who had a monthly income of more than 650 USD. Moreover, those lecturers who had another job besides being a lecturer to support family had a 46.7% lower odds of facing FI in comparison with those who did not have another job. The results of the present study are supported by (Amiresmaeili *et al.*, 2021). They indicated that monthly income is a significant factor and determiner of FI regarding slum

households. Likewise, Zace reported that the status of FS is associated with annual income of the household (Zace *et al.*, 2021). Other studies, too, documented that the prevalence of FS has increased with increasing the monthly income of the individuals and households (Tantu *et al.*, 2017, Turnbull *et al.*, 2021).

### Conclusion

FI is prevalent among university lecturers especially in private universities in Nangarhar province. This study revealed that FI is significantly associated with the type of university, ethnicity, education level, academic position, monthly income, and having another job along with being a lecturer to support family. Age, education level, academic position and monthly income are the significant predictors of FI among university lecturers. The high risk of FI is due to the low gross monthly income of the lecturers for several socio-economic factors. Thus, measures should be taken by all the responsible departments to increase the gross monthly income of the lecturers in order to address the risk of FI.

### Acknowledgments

Authors thank all the departments involved in provision of facilities, and the respondents for participating and dedicating their valuable time to this study.

### Conflict of Interest

Authors declared no conflict of interest.

### Authors' contributions

Banuree SA designed the research project, analyzed data, and wrote the draft of the manuscript; Pakteen RS and Rahimi N collected data, entered the data into SPSS, and reviewed the manuscript; Banuree SZ and Rahmani MM helped regarding data analysis and reviewed the manuscript. All authors read and approved the final manuscript.

### References

Adamovic E, Newton P & House V 2020. Food insecurity on a college campus: Prevalence, determinants, and solutions. *Journal of American college health*. **70** (1): 58-64.



- Ahmad NSS, Sulaiman N & Sabri MF** 2021. Food Insecurity: Is It a Threat to University Students' Well-Being and Success? *International journal of environmental research and public health*. **18 (11)**: 5627.
- Ahmadzai AK & Akbay C** 2020. The Factors Affecting Food Security in the Eastern Region of Afghanistan. *Kahramanmaraş Sütçü İmam Üniversitesi Tarım ve Doğa Dergisi*. **23 (2)**: 467-478.
- Amiresmaeli M, Yazdi- Feyzabadi V & Heidarijamebozorgi M** 2021. Prevalence of food insecurity and related factors among slum households in Kerman, south of Iran. *International journal of health planning and management*. **36 (5)**: 1589-1599.
- Bakar WAMA, Ismail S, Sidek S & Rahman RA** 2019. Prevalence and factors affecting food insecurity among university students in Pahang, Malaysia. *Malaysian journal of nutrition*. **25 (1)**: 59-68.
- Committee on World Food Security of FAO** 2012. Global strategic framework for food security and nutrition. FAO Rome (Italy).
- Davidson A & Morrell J** 2020. Food insecurity prevalence among university students in New Hampshire. *Journal of hunger & environmental nutrition*. **15 (1)**: 118-127.
- Diamond KK, Stebleton MJ & delMas RC** 2020. Exploring the relationship between food insecurity and mental health in an undergraduate student population. *Journal of student affairs research and practice*. **57 (5)**: 546-560.
- Fortin K, Harvey S & Swearingen White S** 2021. Hidden Hunger: Understanding the Complexity of Food Insecurity Among College Students. *Journal of the American college of nutrition*. **40 (3)**: 242-252.
- Hoddinott J** 1999. Operationalizing household food security in development projects: an introduction. *Technical guide*. **1**: 1-19.
- Hughes R, Serebryanikova I, Donaldson K & Leveritt M** 2011. Student food insecurity: The skeleton in the university closet. *Nutrition & dietetics*. **68 (1)**: 27-32.
- Jyoti DF, Frongillo EA & Jones SJ** 2005. Food insecurity affects school children's academic performance, weight gain, and social skills. *Journal of nutrition*. **135 (12)**: 2831-2839.
- Kleinman RE, et al.** 1998. Hunger in children in the United States: potential behavioral and emotional correlates. *Pediatrics*. **101 (1)**: e3-e3.
- Martinez SM, Webb K, Frongillo EA & Ritchie LD** 2018. Food insecurity in California's public university system: What are the risk factors? *Journal of hunger & environmental nutrition*. **13 (1)**: 1-18.
- Micevski DA, Thornton LE & Brockington S** 2014. Food insecurity among university students in Victoria: A pilot study. *Nutrition & dietetics*. **71 (4)**: 258-264.
- Nord M & Prell M** 2007. Struggling To Feed the Family: What Does It Mean To Be Food Insecure? Economic Research Service U.S Department of Agriculture.
- Olauson C, Engler-Stringer R, Vatanparast H & Hanoski R** 2018. Student food insecurity: examining barriers to higher education at the University of Saskatchewan. *Journal of hunger & environmental nutrition*. **13 (1)**: 19-27.
- Reeder N, Tapanee P, Persell A & Tolar-Peterson T** 2020. Food insecurity, depression, and race: Correlations observed among college students at a university in the Southeastern United States. *International journal of environmental research and public health*. **17 (21)**: 8268.
- Riddle ES, Niles MT & Nickerson A** 2020. Prevalence and factors associated with food insecurity across an entire campus population. *PloS one*. **15 (8)**: e0237637.
- Rose D** 1999. Economic determinants and dietary consequences of food insecurity in the United States. *Journal of nutrition*. **129 (2)**: 517S-520S.
- Sabi SC, Kolanisi U, Siwela M & Naidoo D** 2020. Students' vulnerability and perceptions of food insecurity at the university of KwaZulu-Natal. *South African journal of clinical nutrition*. **33 (4)**: 144-151.
- Samim S & Zhiquan H** 2020. Assessment of Food security situation in Afghanistan. *SVU-*

- International journal of agricultural sciences*. **2** (2): 356-377.
- Smith M, Pointing J & Maxwell S** 1993. Household food security: Concepts and definitions: An annotated bibliography. Institute of Development Studies Brighton, Sussex.
- Soldavini J, Berner M & Da Silva J** 2019. Rates of and characteristics associated with food insecurity differ among undergraduate and graduate students at a large public university in the Southeast United States. *Preventive medicine reports*. **14**: 100836.
- Tantu AT, Gamebo TD, Sheno BK & Kabalo MY** 2017. Household food insecurity and associated factors among households in Wolaita Sodo town, 2015. *Agriculture & food security*. **6** (1): 1-8.
- Thorman A & Dhillon H** 2021. No Food for Thought: Documenting the Prevalence of Food Insecurity among Medical Students at One Western University. *Journal of hunger & environmental nutrition*. **16** (5): 643-649.
- Turnbull O, Homer M & Ensaff H** 2021. Food insecurity: Its prevalence and relationship to fruit and vegetable consumption. *Journal of human nutrition and dietetics*. **34** (5): 849-857.
- Ukegbu P, Nwofia B, Ndudiri U, Uwakwe N & Uwaegbute A** 2019. Food insecurity and associated factors among University Students. *Food and nutrition bulletin*. **40** (2): 271-281.
- USDA Economic Research Service** 2020a. Food Security in the U.S.: Measurement. USDA.
- USDA Economic Research Service** 2020b. Food Security in the U.S.: Survey Tools. USDA.
- Van den Berg L & Raubenheimer J** 2015. Food insecurity among students at the University of the Free State, South Africa. *South African journal of clinical nutrition*. **28** (4): 160-169.
- Weaver RR, et al.** 2020. University student food insecurity and academic performance. *Journal of American college health*. **68** (7): 727-733.
- Weir CB & Jan A** 2020. BMI Classification Percentile And Cut Off Points. StatPearls Publishing, Treasure Island (FL).
- Whatnall MC, Hutchesson MJ & Patterson AJ** 2020. Predictors of food insecurity among Australian university students: A cross-sectional study. *International journal of environmental research and public health*. **17** (1): 60.
- World Food Programme** 2017. Afghanistan Zero Hunger Strategic Review.
- Zaçe D, Di Pietro ML, Reali L, de Waure C & Ricciardi W** 2021. Prevalence, socio-economic predictors and health correlates of food insecurity among Italian children-findings from a cross-sectional study. *Food security*. **13** (1): 13-24.