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FOOD INACCESSIBILITY AND UNHEALTHY CONSUMPTION PATTERNS LEADS TO FOOD INSECURITY IN PAKISTAN. A CASE STUDY FROM SOUTHERN CITY OF PUNJAB, PAKISTAN

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Abstract:

Many national and international organizations were struggling hard to find out the exact picture of food insecurity prevailing in the country. Most of these organizations like UNICEF and FAO focus on women and infant food insecurity but the purpose of this research is to discover main features which are affecting the under-privilege households of country. Data collection were performed by multistage random sampling and proportionate sampling technique from 349 rural households via face to face interview. The impact of different factors affecting household food security was determined by logistic regression model and food security status was determined by using cost of calorie method. This research concludes that majority of the people in this research study belong to 41-50 category of age. Majority of people had above matriculation education. The widely accepted occupation is agriculture. Most often people face issues regarding food inaccessibility and unhealthy consumption patterns. The results of cost of calorie method show that two third of the respondents were food insecure. The logistic regression model shows that demographic attributes had an impact on food security but only the respondents' income and education had a significant impact on their food security. A blend of food security assessment methods employed in this research provides a clear picture of food insecurity prevailing in Pakistan.

Keywords: Food insecurity; Food inaccessibility; Unhealthy consumption patterns

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Introduction

Food security is the key development objective in all developing counties of Asia Continent. The combination of three primary dimensions may be used to describe other complicated phenomena, such as access, availability, and consumption (FAO, 2014). There are three main pillars which directly affect the food security, fist one is food availability, second one is accessibility of food and third one is food utilization. Availability means that plenty of food items are available through personal production. Food accessibility means lessening in local level poverty, in another way we can say that all household of a specific area have ability to purchase all type of food items. Food utilization means poor households are purchasing food that is full of nutrients (Austin, 2021).

Insufficient food supply is a result of individual's limited buying capacity, insufficient supply of qualitative food and lack of accessibility at domestic and national scales. Consequently, advances in global agriculture, urbanization and security of supply during the previous 30 years should be despised (FAO, 2023). More than eight hundred million people are underfed and mostly all belongs to underdeveloped nations throughout the world (Abid *et al*., 2016). Moreover, in many developing countries major threats to food security are droughts, floods, extreme variability in rain fall and temperature (FAO, 2024). Too much prices of food items are due to reduced crop production and high level of food demands and it directly affects the food availability and food access for poor and less income households. Pakistan is also pretentious by poverty, food scarcity and natural catastrophes just like other developing countries of world (Adeeba *et al*., 2018). Pakistan's countrysides are home to around 67% people, who depends on agriculture for both of food and income (Bashir *et al.,* 2012). Nevertheless, majority of Pakistan's rural residents have limited availability of living amenities and resources and are small landholders having less than two hectares of land. In addition, local food security and agriculture production is badly affected by mismanagement of environmental disasters and low adaptive capacity (Abid *et al.* 2011). Sustainable local food security can be achieved by low transportation cost and low food item prices, moreover ease to market access and excellent infrastructure can play a vital role in it. (UNDP, 2023).

Approximately 1/10 of total world's population remain undernourished due to over population and that's why food security became a worldwide problem. About 92% of the world's unnourished people are residing in Asia and Africa accounting 552 million and 226 million of world's undernourished people. Almost 294 million human who are facing food insecurity problem are living in South Asia hence covering 35% of the total unnourished population of world. (FAO 2013).

Despite the significant efforts by private and public sector organizations to help out the poor household to secure their food, one out of every ten household is still incapable to secure food. About 30 lac children live in local household face lack of food. Dimensions of food security ranges from national, regional, local and household to every individual facing lack of food is considered to be a multi-dimensional marvel surrounding climate change, natural disaster, social norms and civil conflicts (Burman, *et al*.,2022).

A well-known concept regarding food insecurity has been developed which is known as "Resilience to food insecurity" since the last decade (Alinovi, *et al*. 2010). It might be demarcated as the ability of a household to knob risks and handle the stress or shocks via available resources and options. The resilience and susceptibility both have parameters e.g., shocks, strains and stresses which can be experience by a Social and financial system, depiction with its adjustable parameters (Ladaninezhad, *et al.*, 2023). The investigation of pliability to food insecurity tells us that how disturbance and changes affect the food security structure and how we can overcome to fulfill its basic need (Burman, *et al*.,2022).

Pakistan is ranking among list of countries which are facing food insecurity problem at 78th position. Pakistan is a greatest agricultural producer worldwide but daily, 150 million people fall asleep famished. Asians poorest countries are among the world's most food unreliable, and for Pakistan, the matter of adequate nutrition has grown into an awful reality (Asghar and Muhammad, 2013). The residents of Pakistan may be categorised into four groups based on how safe their access to food is: those who are food reliable, those who are on the edge of having enough to eat, those who are malnourished, and those who are extremely susceptible to hunger and severe hunger (Ahmad, *et al*. 2015).

Pakistan is the world's largest agricultural producer, but 150 million each night went to sleep starving. South Asians developing nations are among the continent's most food insecure populations, and for Pakistan, the issue of hunger is now a dreadful dream. The food insecurity condition is far worst in South Punjab region of Punjab than the other regions especially in the Muzaffargarh and Rajanpur districts. Therefore, it is need of the hour to conduct a thorough research in these areas to find out the main causes of this worsening condition.

1. Methods

This study was conducted to investigate the food insecurity report of Muzaffargarh a city of the province of Punjab, Pakistan. As the most underdeveloped and food insecure district in Punjab, District Muzaffargarh was purposefully chosen as the research area (Suleri and Haq, 2009: UNDP, 2016). The participant population study consisted of each and every owner of family in the district of Muzaffargarh.

Data collection

Data were collected by applying multistage random sampling and proportionate sampling technique via organized interview schedule. This interview schedule was pre-examined formerly by conducting a definite survey and after that it was brought orally to most of participants because of occurrence of prevalent analphabetism in the examined area. There were 3819 homes in all throughout the eight chosen communities. The total count of houses was determined using village lists that were on hand at the offices of the Union council. The programme from www.surveysystem.com produced an amount of data of 349 with a 95% confidence level and a 5% margin of error.

Statistical Analysis

After that, descriptive statistics, the cost of calorie method, and logit regression model were used to investigate the collected data. At first stage descriptive statistics was applied to analyze all the variables when it comes to the access, affordability, and consumption of food. As the results showed that food was available and food insecurity is mainly caused by food accessibility and utilization issues so cost of calorie method was applied to present the results. Besides this, logit regression model was applied to find impact of demographic profile on food security.

Cost of calorie method was employed in the research to determine the level of food security. Food is readily available in marketplaces, yet the major contributor to healthy food is cost. This approach will help the food insecurity line is expressed as;

$$LNX = \alpha + bC \qquad (1)$$

X represents comparable adults cost of food (in Rs), and,

C is the exact calories intake/adult equivalents of a family (in calories). The advised minimal dietary level's caloric content (FAO, 2012) was utilized to figure out the line(s) of food insecurity by applying the equation:

$$S = e^{(a+bL)} \qquad (2)$$

S represents the price of purchasing the recommended number of calories (the "food insecurity line"), where a and b are estimated parameters from formula (1);

L = 2350 kcal per day is the minimal amount of nutrients that should be consumed. Irrespective of whose side of the divide a family falls on, the S calculation will determine whether that home is food secure or not?

The logistic regression model: The supply of food served as a dependent factor in the binary logistical regression approach, with age, level of schooling, wealth, marital status, size of family, and farmland serving as influencing factors. This approach suited the data well ($R^2=0.512$) & were substantially distinct ($P<0.05$).

The logistic slope between dependent variable and independent variables X (demographic characteristics) can be expressed as.

$$P = \frac{e^{a+bX}}{1 + e^{a+bX}}$$

P represents value of 1, e is the exponential logarithm's base, and a and b were the method parameters. When X is 0 the value of a yield P determines how rapidly the chance of happening will shift if X is increased or decreased by just one unit. Also, b in this framework does not have an obvious meaning since the relationship involving X and P is non-linear.

In Logist regression, the natural log of the chances is the logit, and it's the variable that depends on it for example.

$$\log(odds) = logit\ (P) = \ ln\left(\frac{P}{1-P}\right)$$

The chances of alternative are 1-P while P is the estimated likelihood of the detrimental component.

Then P can be showed as

$P = \frac{1}{1+e^{-z}}$

$1 - P = \ 1 - \frac{1}{1+e^{-z}}$

Then

$$\frac{P}{1-P} = e^{z}$$

By applying log on both sides

$$L_i = ln\left(\frac{P}{1-P}\right) = z$$

Where

L_i Represents log odd ratio which also referred as the logit

$z = \ \beta_0 + \beta_1 X_1 + \cdots\cdots\cdots + \beta_n X_n$

Where Y is a binary variable, meaning it is either 1 if there is enough food for the family's consumption or 0 if not

β1 – βn = Logistic regression coefficients

X1 = Age :(Years)

X2 = Level of Education

X3 = income

X4 = Family size

X5 = Agricultural land (in acres)

2. Results

Table 1: Frequency distribution table of demographic attributes of respondents.

Characteristics	Frequency		Percentage (%)
	Age		
Below 30 years	48		14
31-40 years	69		20
41-50 years	122		35
51-60 years	76		22
Above 60 years	34		9.0
Total	349		100.0
	Marital Status		
Single	38		11.0
Married	251		72
Widowed	42		12
Divorced	18		5
Total	349		100.0
	Family size		
Upto 5	141		40.3
6-10	153		44.4
Above 10	55		15.3
Total	349		100.0
	Sources of income		
Job	31		9.0
Agriculture	178		51.0
Job+Agriculture	28		8

Remittances/small industry	60		17
Business	52		15
Total	349		100.0
	Educational Status		
Illiterate	73		21
Up to primary	56		16
Primary to middle	119		34
Middle to matriculation	21		6.0
Above matriculation	80		23
Total	349		100.0

Table 1 shows that slightly above one fifth (21.5%) of those surveyed was within the ages of 31 and 40, while 12.9% of respondents were under the age of 30 and 34.7% of the overall participants was between the ages of 41 and 50, while 22.9% were between the ages of 51 and 60. The findings show that youths are less inclined to engage in businesses that generate less revenue like the agricultural sector, which provides a living approximately over fifty per cent of surveyed in research region. Possibly older individuals work in agricultural and other industries that provide cash. This age gap might negatively affect technical development that might have aided in the agricultural manufacturing procedure. Slightly less than a quarter (22.9%) of those surveyed possessed schooling over matriculation, according to findings analyzing interviewees' levels of schooling. Somewhat over one third (33.2%) of participants had academic levels within primary and middle school. Only 6.2% of those surveyed had completed schooling among middle and matriculation, while 17.1% of the participants just completed their elementary school. Little more than one fifth of the respondents (20.6%) were uneducated. Lack of educational opportunities at the local level constitutes one of the causes of poor academic achievement. Most of the villages only have middle schools that is why; children are unable to develop their social, emotional and cognitive skills to cope the challenges of their society.

Results indicate that slightly more than half (51.6%) of the respondents belonged to crop production, dairy production, and fish farming i.e. all aspects of the agricultural sector. Fewer than one fifth (16%) of those surveyed claimed to have a company or another means of earnings, such as repatriation or an insignificant business, while 14.9% of participants reported owning some form of enterprise. Slightly less than one tenth (9.2%) of the respondents were dependent on their jobs for livelihood purposes. Only 8.3% of interviewers belonged to both job and agricultural sectors for their livelihood. The main reason of the respondents for being agriculturists is that the study area was rural and most of the people are reliant on agricultural for a living in rural regions. In terms of marital status, nearly all of the participants (70.8%) were married, followed by widower participants (13.8%) and those who are unmarried (11%). Divorce rates among respondents varied by 5.4%. Data was obtained from the heads of families, and almost all of them fall within their ages of 31 and 60, which explains why the bulk of those surveyed are married. According to information on family size, more than half of those surveyed (44.4%) had 6–10 members of their family. Only 16.3% of the participants possessed a family consisting of over ten individuals, while 39.3% of participants had a household members of up to 5 people.

Table 2: Impact of demographic profile on food security status

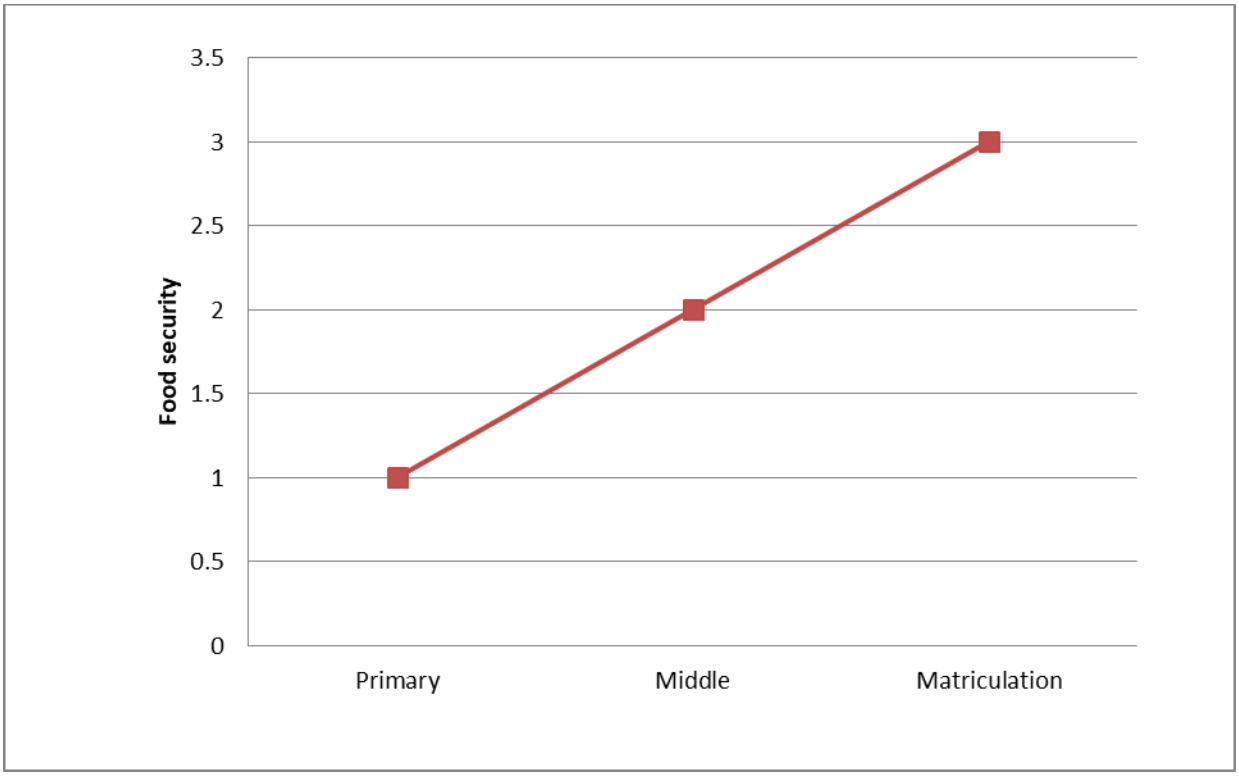
Demographic profile	Coeff.	S.E.	Wald	Sig.
Age	0.143	0.238	0.422	0.581
Education	0.608	0.466	0.749	0.031*
Income	0.301	0.329	0.838	0.000**
Marital status	-0.410	0.752	0.841	0.182
family size	-0.382	0.512	0.320	0.574
agricultural land	0.150	0.320	0.238	0.550
Pseudo R^2= 0.512, P<0.05, Log likelihood= 497.18				

Dependent variable: food security status

Age, schooling, earnings, marital relationship, the number of children, and land usage are independent factors.

Findings from table 2 show that, aside from the education and income, all other demographic factors: including age, marital status, family size, and agricultural land, were statistically insignificant when compared to food security (P>0.05). Only the respondents' income and

education had a significant impact on their food security (P>0.05). The respondents' level of education was statistically significant with a coefficient of 0.608 (P>0.05). This leads to the conclusion that the likelihood of food security seems to be improved by 60% (β = 0.608) with each additional unit of schooling for the respondents. This can be best depicted from the graph which indicates that as the educational level increases from primary to matriculation food security increases in the same manner.



Similar relation can be observed between income and food security which can be shown in the graph below. This graph indicates that the with each unit increase in income food security will increase each unit.

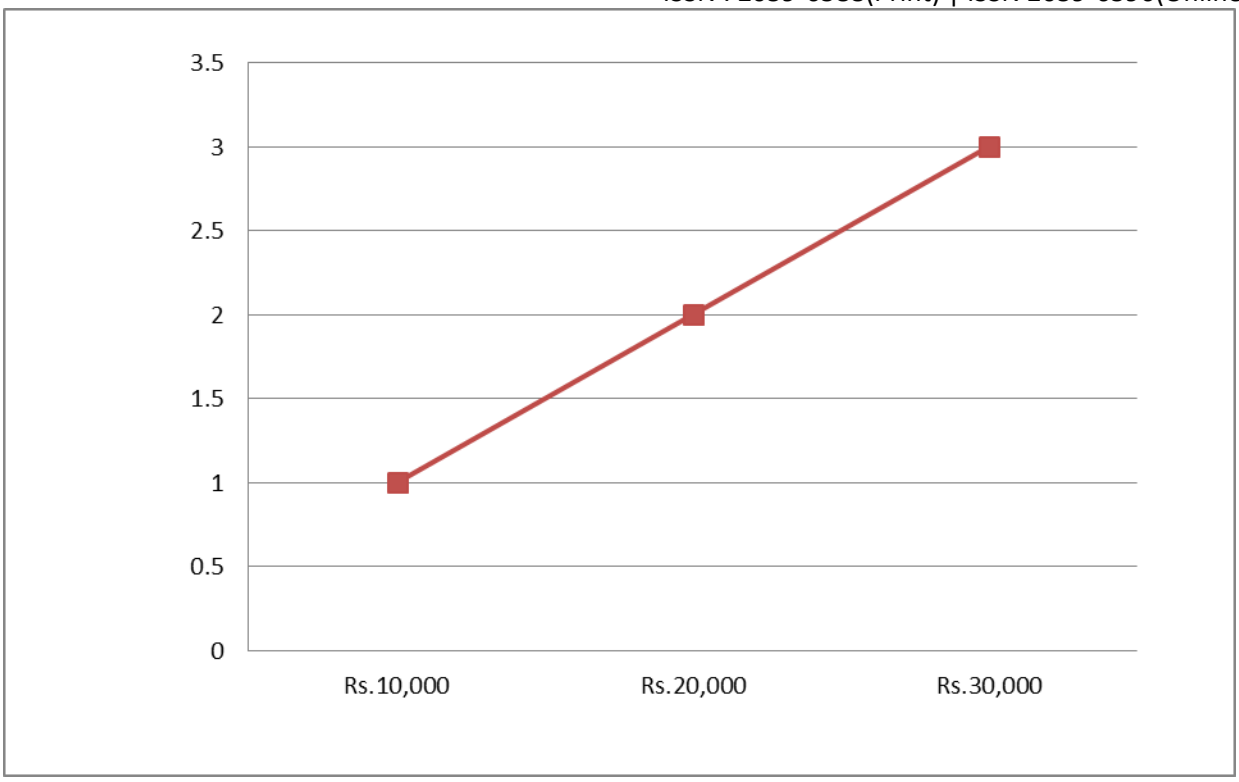


Table 3: Food security status of respondents

House hold food Security Characteristics	
Cost of calorie equation	LNX = a+bC
Equation for minimum cost	$S = e^{(a+bL)}$
Slope Coefficient	0.00628
Constant	6.496
FAO Recommended Daily Energy (L)	2350 kcal/day
Food Security Line	Rs. 673.23 Rs
Percentage of Household (For Food Secure)	30.70
Percentage of Household (For Food Insecure)	69.30
Number of food secure Household	107
Number of Food Insecure Household	241
Average Expenditure Gap	Rs.458.53

The data presented in Table 3 demonstrate that the food security line (Z) used for studying population of 349 families computed at Rs. 673.23 each day per equivalent of an adult according to the minimum energy level of 2350 kcal per day. Merely 30.7% of the homes had access to sufficient nutrition, whereas 69.3% of the families did not. Additionally, based on the median spending discrepancy, every family would must have Rs. 458.53 to cover their basic food needs.

4. Discussion

According to the results of sixth population and housing census the household number has been increased while the family size has been decreased. The household numbers has increased by 13 million and the trend for urban housing has increased 100% than from the previous housing survey that was conducted 19 years ago. The annual growth rate was increased to 2.69% (Shahbaz, 2017). The vast majority of those surveyed, according to their demographic outcomes, were between the ages of 41 and 50. Results for the age component are consistent with (Amir, 2015) who discovered that the majority of responders ranged in age from 41 to 60. The outcomes, nevertheless, conflict with (Lassi *et al.* 2013) who discovered that older respondents made up the bulk of the sample. The outcomes contrast with those of Abdul Kalam (2021), who stated that just 23% of those surveyed had completed more schooling than matric (Amir, 2015) who discovered the 33.33% held a degree or above. The career path that respondents acquired with majority was agriculture. Comparable findings shown by (FAO, 2024) shown the Asian sub-continent's most widely adopted employment was agriculture. The findings, nevertheless, are in opposition to the HIES statistics, which demonstrated that a majority of those surveyed earned their income through working in both the commercial and public sector. The statistics also disputed both factors, namely agricultural and business; in accordance with HIES statistics, business is ranked second in Pakistan while farming is ranked third (HIES, 2020). Most of the married respondents had their families ranged in size from 6 to 10 individuals. The same results were disclosed by (Lyocks *et al*. 2013) It revealed that just 7.36 percent of young people were unmarried. Another poll revealed that most couples (88.10%) who worked as farmers had been wed, while the remainder were single (Naamwintome and Bagson, 2013). Similar outcomes were reported by (Shahbaz, 2017) It demonstrated that families in Pakistani homes often consist of six to seven people.

People with education can choose from a variety of jobs and ways to pay for their food. They might be able to find a good job that would serve as a reliable source of income and assist them in achieving food security. Results were consistent with the report of World Bank (2021) as they mentioned low level of education in the rural part of the Pakistan has direct relation with poverty and ultimately food insecurity. With a coefficient value of 0.031 ($P>0.05$), the respondents' income was also very significant. The likelihood of reaching food security looks to be 30% ($\beta = 0.031$) for every unit increase in the respondent's income. Results are quite simple in this regression analysis. Education and income are the two major drivers of getting food. A well-educated person can earn more and can surpass the food security level easily. Further socioeconomic resources for buying food, transportation were equally responsible factors. It can also be observed that all these factors positively affect low income people than from the rich sector of society (Jaeggi *et al.*, 2021).

Results indicating interviewees' food security status conflict with those of (Habib *et al.* 2019) Surveys with key informants were used to get the data, that revealed that Muzaffargarh had a 47% food insecurity rate while neglecting the area's poor population. According to UNICEF's national nutrition survey, 37% of Muzaffargarh families have a shortage of food related to dietary habits, or are otherwise undernourished, and 63% of children below the age of five have anemia according to survey (National nutrition survey, 2011). According to data from the World Food Program (2018), 60% of the population of Pakistan experiences food insecurity. The statistics, nevertheless, conflict with the facts (Bashir *et al*. 2012) reported that 31% of participants in Pakistan's Punjab region were food insecure.

Conclusion

This research concludes that majority of the people in this research study belong to 41-50 category of age. Majority of people were educated ranging between middle to matriculation. The widely accepted occupation is agriculture, so food is available to the rural communities, but most often people face issues regarding food accessibility and unhealthy consumption patterns. Therefore, a novel method i.e. the cost of calorie method is employed and results of this method shows that two third of the respondents were food insecure. Logistic regression model demonstrated that all the demographic attributes had an impact on food security but only the respondents' income and education had a significant impact on their food security. A blend of

food security assessment methods employed in this research provides a clear picture of food insecurity prevailing in Pakistan.

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