

Analyzing Food (in) Security Among Low and Low-middle-income People Residing in Dhaka South City: Exploration of Four Pillars of Food Security

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ABSTRACT

The study aims at unfolding the major causes of food (in) security status among people living in Dhaka South City (DSC) in Bangladesh. Drawing on the 'Four Pillars of Food Security' model, the study collected data from 288 randomly selected respondents from among low and low-middle-income people during a field survey. The study was carried out between November, 15 and December 20, 2022. Examining the 'four pillars of food security' model, developed by the Food and Agricultural Organization (FAO, 2003), the study investigated the current state of food availability, accessibility, utilization, and stability among the respondents. The study applies quantitative research tools, specifically the chi-square correlation test, and multilinear regression (MLR) to answer the research questions. The chi-square correlation test results reveal that a few factors of the four pillars, such as the global economic crisis and price hikes in oil and gas, lead to less food production in the country. It also shows that the lower income of the respondents affected their purchasing capability and their lack of adequate quality food hindered them from maintaining quality mental and physical health. The MLR analysis reveals that respondents' resources, adequate access to safe drinking water, and interruption of food supply due to recent climatic hazards had greatly impacted food insecurity among the people in the study area. The research recommends that the government prioritize local production of foodstuffs and provide the required policies, and then ensure that these are actually enforced.

KEY WORDS

Food Security, Four Pillars of Food Security, Availability, Accessibility, Utilization, Stability, Food Security, Dhaka South City (DSC), Bangladesh.

ARTICLE HISTORY

Received: 12 February 2023

1st Review: 18 April 2023

2nd Review: 27 May 2023

3rd Review: 29 June 2023

Accepted: 25 August 2023

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1. Introduction

From one perspective, everything that human beings do, is to ensure the sustainability of their lives on Earth. The fundamental approach to that is eating nutritious food and drinking enough water to stay alive. Without food, life would unquestionably tend to cease. Thus, food and food-related issues are of great importance socially, economically, politically, nationally, and internationally. As Nath (2015) says, food occupies the top of the hierarchy of needs and it is most essential for the sustenance of life. With food comes the question of its security, the chances of getting it, its availability, and its accessibility. According to FAO, food security involves four dimensions: availability, accessibility, food utilization, and stability (Nath, 2015).

Food security as a concept was defined at the World Food Summit (WFS) of the Food and Agriculture Organization (FAO) in 1996 (Ahmed *et al.* 2018). It claims that adequate food security occurs when all people always have access to enough, harmless, nutritious food to live a healthy and active life. Thus, the polar opposite of this circumstance is food insecurity. When people do not have access to enough food, it becomes uncertain whether they will be able to have their next meal or not. This is an inhuman condition where people find that they might have to sleep unfed. It

leads to hunger, malnutrition, and many other health-related personal and social problems. Although Bangladesh is a fast-growing economy and a developing nation, one of the major public health security problems here is food insecurity (Haque *et al.*, 2022).

Food security is one of the topics of most concern at the present time. Due to various reasons such as COVID-19, climate change, and war among countries, people of a certain income level find it very difficult to have bread on their plates. Like many other nations, Bangladesh is also experiencing day-to-day increases in the cost of basic goods. Additionally, it is generally far more expensive to live in a capital city in today's world. So is the cost of living in Dhaka, the capital city of Bangladesh. In this situation, people of low and lower-middle income in developing nations, like Bangladesh, are becoming the worst sufferers. They are facing food insecurity more than any other group of people at present.

Rahman *et al.* (2013) reveal the relationship between poverty and food security. According to them more than 42% of these families are borderline food consumers, and 20% of them are subjected to poor food consumption. The other percentage of people belong beneath these two levels of food consumers. In another study, Panezai *et al.* (2021) points out

the condition of food security in the coastal areas of Bangladesh and its determinants. The results found show that the size of the farm, income, other income sources, and the amount of crop production have had positive impact on the food security of these households. On the other hand, natural disasters like floods, heavy rainfall, the salinity of the soil, and reductions of the productivity of the land pose a great threat to landless farm households. Rahman and Zaman (2017) argue that the 3As model (Availability, Accessibility, and Application) nicely explores the elements of food security. The paper mostly talks about the understanding of the issue of food security and the targeted people are the southeast coastal residents of Bangladesh.

Using a logistic regression model, Ali *et al* (2016) find that 65% of the households in Rangpur City are insecure about their food. They applied the expenditure method of food security status to obtain the data. Burton *et al* (2013) studied urban food security extensively. In the study, they talk about a certain level of people who are having difficulty buying food in urban areas in Australia. The major reasons for the problem are associated with natural disasters, which reduce the production of food to a certain extent. On August 16, 2022, *The Times* of the UK published an article stating the

current condition of the UK's urban residents. They are eating less due to food price hikes. Naturally, the situation is more alarming in countries like Bangladesh.

Urban residents are heavily troubled by food insecurity because it is increasing day by day. In the Informal Settlements Baseline Survey dataset of the World Bank, Bhattacharjee, and Sassi (2021) find that there is a food calorie gap, which indicates various health issues. They also talk about the three pillars of food security; food availability, food access, and food utilization. All three of these factors emerge as significant factors in determining the calorie gap that is happening in the food intake of slum dwellers. Ahmed *et al* (2018) conducted a study on food security based on a comparison of two harvesting seasons in Bangladesh. The study examines the low and middle-income people's food insecurity in the southern part of the capital city of Dhaka. It reveals the determinants of how much these families are food insecure based on the head of the family, his/her level of education, and earnings from farming.

In a blog published in 2012, Husain emphasizes the importance of clarity to know how the middle-income status is defined and categorized on the basis of income threshold, which Hussain finds in the definition of the World Bank. It is based on nominal

Gross National Income (GNI) measured in Atlas dollars, not real Gross Domestic Product (GDP). Economies are divided according to the 2012 GNI per capita, which is calculated using the World Bank Atlas method. The income thresholds are low income—\$1,025 or less; lower middle income—\$1,026 to \$4035; upper middle income—\$4036 to \$12,475; and high income—\$12,476 or more.” That is just one perspective of defining it. From an economic perspective, the Asian Development Bank (ADB) categorizes individuals who earn between \$2 and \$20 per day as being middle class. Thus, if this is what we consider the standard, then around 37 to 40 million people in Bangladesh – about 22% of the total population – fall into the middle class. Dhaka, the capital of Bangladesh, is currently home to 22,478,116 people. It is a city along the river Buriganga. It is situated in the southern part of the city. The local government, with the amendment bill of 2011 on November 29, following the President’s approval, divided the city into two city corporations as a part of re-creating, re-modeling, and re-shaping the present and future of the city. Under “The Local Govt. (City Corporation) Amendment Act (2011)”, Dhaka City Corporation was divided and re-created as Dhaka South City Corporation (DSCC) and Dhaka North City Corporation (DNCC) on December

4, 2011. The current population of the Dhaka South City Corporation is more than 12 million people (official website of DSCC) and this study has been strictly restricted to this specific region in analyzing the food insecurity of this area’s low and middle-income people.

There have been several studies carried out on food insecurity of the rural people of Bangladesh. But, there is not much work done on the city dwellers, especially the low and middle-income people of the city. This study emphasizes bringing these two groups into focus and analyzing their condition on food security based on the four pillars mentioned above. Therefore, it is guided by the following research questions: how do low and middle-income people face the current food insecurity considering the four pillars of food security, such as food availability, access to food, utilization of food, and food stability? In order to answer these questions, the study pursued the following objectives: (i) to unearth the extent of food availability among people living in Dhaka South City, Bangladesh; (ii) to explore what is sufficient food accessibility to dietary foods; (iii) to examine food stability, which is central to the ability to obtain food over time; and (iv) to explain the responses of informants in their purchases of nutrient food items at

times of economic crisis and climatic hazards.

The current research plays a vital role in developing a picture of the recent price hikes and associated adverse effects on people living in the study area. The outcomes of the research are expected to help policymakers adopt practical and effective strategies for mitigating the dangers posed by rising food prices.

2. Methods and Procedures

2.1 The Conceptual Framework

The following conceptual framework has been prepared by reviewing a number of relevant research articles. In the process, the four pillars of food security have been examined to explore the dependent and independent variables. Evidence published by FAO (2008) and Ahmed et al. (2013) demonstrates that the concept of 'food security is a multi-dimensional aspect having close relationships with the four different pillars: (a) food availability, (b) food accessibility, (c) utilization, and (d) stability. Peng and Berry (2019) show a causally linked pathway of food security recognized in several domains from production to consumption through distribution and processing.

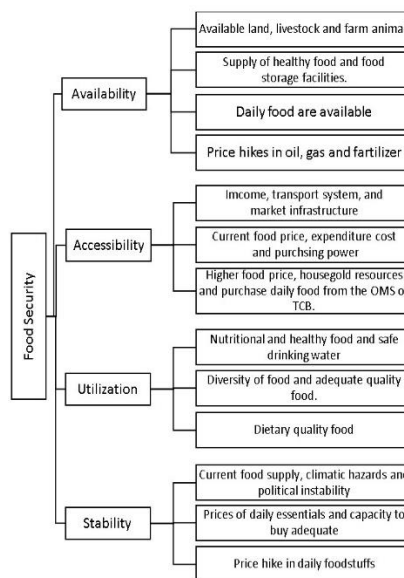
The present study adopts a conceptual framework for addressing the extent of food security and understanding people's views on it.

Food security is a complex scenario that connects socio-cultural and physical aspects of food production, distribution, utilization, ultimately resulting in prolonged food stability (World Food Program, [WFP], 2006).

2.1a Food Availability

The goal of food security is to guarantee that there will always be enough food to meet consumers' demands at costs in line with their income. Thus, food security can be achieved when people have equal purchasing capacities to buy consistently good-quality food sufficient for maintaining an active and healthy life (FAO, 2006).

Figure 1: The Four Pillars of Food Security



(Source: FAO, 2003)

In Bangladesh, food availability is determined by local production of

daily food items, public and private stockpiling, and international trade.

2.1b Food Accessibility

One of the important aspects of food access is to ensure the affordability and distribution of food, as well as the preferences of individuals and household levels (FAO, 2003). Food accessibility depends on whether an individual or household has adequate income to buy daily foodstuffs at regular prices or has enough land, assets, remittances, and other resources to avail themselves of daily essentials.

2.1c Food Utilization

The third pillar of food security is 'food utilization' which refers to the nutritional values of the foodstuff and can be impacted by processing, preparation, and cooking of essential food for individuals and households (FAO, 2003). Once food is obtained by an individual or household, a wide variety of factors shape the quality and quantity that reaches the individual or household. The food ingested must be safe and must have enough dietary and nutritional values to fulfill both the physical and mental necessities of each individual member of the household.

2.1d Food Stability

One of the main objectives of food stability is to achieve the capacity to obtain daily essential food over time. Food security can be short-lived, seasonal, or chronic, and it may be

unavailable during economic crises or climatic hazards. During food production time, natural hazards, such as flash floods and drought, can cause crop failure and thus diminish food stability. Therefore, FAO (2003) argues that the regular type of food production may be affected by seasonal food insecurity. The instability of food production, price volatility, employment instability, instability of import flow, the and volatile political situation may affect the persistence of food security.

2.2 Study Design and Analysis Techniques

2.2a Study Area

The study was conducted in selected wards, no# 32, 35, and 40, in Dhaka South City (DSC) in Bangladesh. Dhaka, the capital city, of Bangladesh has been divided into two city corporations, Dhaka South City (DSC), and Dhaka North City (DNC) by amending the Local Government (City Corporation) Act 2009. Dhaka South City (DSC) is one of the important city corporations of Bangladesh and is considered the center of the capital city of the country. It is one of the oldest metropolitan cities in Bangladesh, which was established during the Middle Ages around 1670. DSC was declared a city corporation in 2011. The Local Government and Rural Development Ministry, through a gazette notification on June 28, 2011, made the city corporation

effective from November 29, 2012. With this gazette notification, it became the fifth city corporation in the country. It is an emerging urban center, and the magnification rate of the urban population has been increasing at an expeditious rate: commercialization activities have been on the rise, placing most of the inhabitants, who are mostly shopkeepers, handicraftsmen, businessmen, and traders under economic stress. The study area is situated within DSC and its location is just adjacent to the Lalbagh bazaar with a total of 2,3022 households and nearly 78,990 inhabitants.

2.2b Sampling Procedure

DSC is divided into 55 wards. The population of the study was purposefully drawn from respondents who are mainly low- and middle-income people. The segment includes small traders, handicraft workers, private job holders, and others. The present study adopted a range of sampling procedures to select the study area as well as the respondents to collect data, central to the research objectives. At the outset, based on purposive sampling, the study selected Dhaka South City (DSC) for conducting the research. In the second stage, on the basis of purposive sampling, we have chosen lower and lower-middle-class people for meeting the study purposes. Afterwards, a total of 250

respondents were selected through a convenient sampling technique for participation in the survey using the structured questionnaire. The sampling procedures of the study are considered purposive in that, only low- and middle-class people were interviewed and found to have knowledge and views about the perception on food security and its associated issues. Since the population density in all the three wards is almost the same the samples were drawn in an almost equal proportion from the three wards of DSC.

2.2c Variables of the Study

The study explains the theoretical framework and finds food security as a dependent variable, while four pillars- food availability, accessibility, utilization, and stability- the independent variables. Along with those, we have selected another 16 independent variables extracted from the four pillars of food security.

2.2d Selection Strategy of the Independent Variable

We organized the independent variable selection strategy into two parts. At first, the determinants of food insecurity were selected in combination with empirical literature reviews, following the conceptual framework of food security developed by FAO (2003). The framework is linked to the fundamental pillars of food and nutrition security at the

household and individual levels. The variables were organized representing the four pillars of food security: (i) food availability, (ii) food access, (iii) utilization, and (iv) stability. Low and lower-middle-income people hold some distinctive characteristics such as greater dependency on cash income and less reliance on agriculture and natural resources; low wages from mostly informal jobs; a large number of women working outside the home; legal obstacles, including insecure land and housing tenure; inadequate access to safe water, sanitation, and health services; and weak coverage of the government safety net. These attributes were also taken into consideration while selecting the independent variables. In the second step of the variable selection, we performed statistical tests on the shortlisted independent variables to check for a significant association with the dependent variable and multicollinearity among themselves. Each considered independent variable was regressed against the dependent variable on an individual basis, and if any of them had a p-value less than 0.05. For the continuous variables, we excluded those from having correlation values greater than 0.05 in the correlation matrix. In order to select the categorical variables, we performed the chi-square test among the related group of variables with a

95% confidence level to observe their association with each other. In total, 56 variables were considered in the first stage of the variable selection, which eventually came down to 10 variables to incorporate in the final model.

2.2e Data Collection

Data collection was carried out during the period from December 12, 2022, to January 30, 2023, from a selected area. Drawing on the 'Four Pillars of Food Security' model, a draft structured questionnaire was tested among a few informants in the study area to find out whether the questionnaire was intelligible to the informants or whether any changes and amendments were necessary. A structured questionnaire was then prepared by uncovering a wide variety of factors regarding food availability, food accessibility, food utilization, and food stability among the respondents in the study area. The questionnaire was translated into Bangla (the local language of the informants) before distributing it so that the informants could easily understand the structured questionnaire.

2.2f Reliability Test

The study tested the Cronbach Alpha coefficient, which aimed to assess the internal consistency of the collected data. We have found that the coefficients for all the variables were over 0.8, which is acceptable for this study. Cronbach Alpha for food

availability is .700, while accessibility is .767, utilization is .728 and stability is .718. Based on the test, the study has removed the factors that found a value under 0.7 for the above mentioned factors. In the same sense, the following factors have been selected for regression analysis. Consequently, six criteria were chosen for further investigation.

Table1: Cronbach Alpha for all Variables Taken in the Study.

Factors	Cronbach Alpha	No. of items
Availability	.700	9
Accessibility	.767	10
Utilization	.728	7
Stability	.718	4

(Source: SPSS test, 2022)

2.2g Data Analysis and Management

For data analyses, a number of statistical tools, such as the Chi-square test and multilinear regression analysis were employed to determine the relationship between the respondents’ current status of food security and the various levels of food status resulting from it. We considered respondents’ level of food insecurity as the dependent variable while the various factors of the ‘four pillars’ of food security have been taken into consideration as independent variables. It merits mention that multilinear regression analysis is the limited dependent variable regression technique. Thus,

we have taken one dependent variable in response to a wide range of independent variables ranging from respondents’ socio-demographic variables and the variables obtained from the four pillars of food security. All the data have been examined using SPSS version 22.

We analyzed the collected data using descriptive statistics, food security index estimation, and logistic regression analysis. Firstly, a set of brief descriptive statistics summarizes given data sets, which either have been a representation of the entire population or a sample. The measures used to describe the data set are measures of central tendency and measures of variability. Secondly, we employ a food security index, e.g., the four pillars of food security, to illustrate the respondents’ food security status. Thirdly, multiple regression is used to determine the effects of some socioeconomic characteristics of the households on their food security status. The parameter of the multiple regression models is estimated with the Maximum Likelihood Estimation (MLE) technique. Multiple regression is designated and estimated by the various independent and single-dependent variable procedures.

2.2h Ethical Consideration

Before conducting the questionnaire, we obtained oral consent from the selected respondents. The study

confirmed that the respondents felt comfortable with the process of data collection. After receiving the oral consent from the respondents, we conversed with them politely and amiably to avoid confrontation. Additionally, we repeated the questions whenever required, and a few examples were added for more clarification about the questions.

3. Data Analysis and Findings

Studies have pinpointed that food security is connected with the socio-economic profiles of the human population. The important factors are gender, age, education level, occupation, income level, and number of family members. The study reveals that 73.6% of the respondents were male and 26.4% were female (Annex Table 1). 8.7% of the informants were younger than 25 years, followed by 22.6% in the "36 to 45" age group and 10.4% in the "46 to 55" age group, and above 65 years accounted for 0.7%. The majority of the respondents (41.3%) earned between BDT 10001 and BDT 30000 (1 USD = 102 BDT) per month. Occupationally, a maximum number of respondents are in private services, accounting for 56.9%. A very small minority (5.2%) are government employees. The study shows that a maximum of 36.5% of informants had completed their undergraduate education, while about 2.8% were illiterate. About 37.8% of respondents have families comprised of between

five and six members while 9% reported having less than three members in the family.

The socio-demographic factors are interrelated, (annex table 1) and have a substantial degree of significance. There are correlations among socio-demographic factors considered under the categorical variables: e.g., level of education, occupation, ethnicity, and monthly income. As shown by differing Cramer's V values, all those association-ships are found to be highly significant (i.e., at $p > 0.01$), which shows that the four socio-demographic factors have very high correlations.

4. Descriptive Analysis

Annex Tables 2, and 3 represent a 'Chi-square test model', which means they are used to compare results observed and results expected. On the question of food availability, it can be seen that 45.1% of the people living in this region do not have their own land for daily food production; only 45.8% have it to some extent. The result showed that 61.1% of the people do not have available livestock, farm animals, or poultry for their livelihood. On the question of storage facilities, the significance of the correlation is lower. But, on the question of affordability and consumption, a higher rate of correlation is found. Having food available in nearby stores does not

mean that people can purchase or consume it.

A very high significance is found between the question of food availability and the Russian invasion of Ukraine ($P < .001$). People have this conception and belief that it is due to the war that the food price is hiking and the consumption level is also going down. Price hikes in oil, gas, and fertilizer also show a significant correlation between food availability and these issues.

The third pillar of food security is access to food. It is found that there is a greater correlation ($P < .024$) between people's income, livelihood, and access to food. It is quite natural that the income of the people is likely to affect the way they live or maintain their livelihood. An interesting part of this section was the question on the market infrastructure for food preservation; although it seems to be insufficient, according to the local people, it is highly likely to be all right. Thus, quite a common correlation has been found between the current market infrastructure and access to food ($P < .030$). The next highly significant correlation has been found between the current prices of the goods and people's affordability ($P < .001$). Also, a higher significant correlation is found between people's income and expenditure ($P < .001$). A higher significant correlation has been found between people's necessity for

daily groceries and their inability to purchase basic goods for sustenance ($P < .001$). On the question of price hikes as the reason for less access to food it, has been found to have a significant correlation ($P < .001$). In the study, it is also found that there is a significant correlation between individual or household resources, such as land, money, and other household resources that may contribute to the reduction of food security ($P < .003$). Transportation systems and access to food also have a significant correlation in terms of getting food from a distant place or within the city ($P < .001$).

As the government has been trying to minimize the price hike, there are other attempts and initiatives taken by them, e.g., TCB (Trading Corporation of Bangladesh, a wing of the Commerce Ministry of Bangladesh to deal with different trades and businesses) and OMS (Open Market Sales) where local people can buy their daily necessities at a reasonable price. There is a significant correlation found between access to food and the operations of TCB and OMS in the city areas ($P < .051$).

There are more related issues that this study has focused on, viz. food utilization and the stability of food are two of the main ideas of this study. The same amount of data has been collected and analyzed to get more insights into these issues. At first, it

was the issue of food utilization. People in the selected areas for this study were asked if they were aware of the fact that foods are nutritious and healthy for them to eat. There has been a significantly high correlation found between the concern and the utilization of food ($P < .001$). There is a significant correlation between nutritional balance and daily food consumption ($P < .055$). On the matter of safe drinking water, a significantly high correlation has been found ($P < .068$). People's daily food intake and the preservation of their physical and mental health also have a significant correlation ($P < .024$). A similar question on another important note was there, which is linked to the dietary quality of food and physical and mental health; it also has a significant correlation ($P < .001$).

The participants were asked a number of questions regarding the stability of food. There has been a significant correlation found between food supply damage and climate hazards ($P < .001$). On the price stability of the essential goods, most of the people disagreed, so the correlation is significantly high ($P < .009$). Another interesting finding came out as highly significant correlatives ($P < .001$) that say there is a complete connection between political instability and the production of food. Next, sadly there is a significantly high correlation between the lack of capacity to buy

adequate quantities of safe and nutritious food during the recent economic crisis ($P < .001$). Again, there is a significant correlation between the price hike in daily foodstuffs and people's purchase capacity ($P < .001$).

5. Summary of the Regression

Model

The regression model is used to assess the determinants relying on the regression table shown below. It can be illustrated that there is a significant association between the dependent factor (food insecurity) and the independent factors (food availability, food access, food utilization, and food stability). The table reveals that at the 1% level of significance, the correlation is 59.04%. Here, the adjusted R-square is 0.392 which means that about 40% of the variation of the outcome variable is explained by explanatory variables in the model (Table 2).

Table-2: Summary Table of Regression Model

REGRESSION MODEL

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig .
1	.594 ^a	.452	.392	.58728	5.461	.001

(Source: SPSS analysis, 2022)

Coefficient analysis revealed the association between the outcome (dependent) variable (food insecurity) and the explanatory (independent) variables. It is a fact that the explanatory variables that have been found statistically significant with the Cramer's V and Phi values (5% level of

significance) were considered at multiple regression analysis (Annex table 4).

Additionally, the coefficient analysis examined the association between the outcome/ dependent variable and each explanatory/ independent variable. Multiple regressions, age, profession, monthly income, individual or household resources, adequate access to safe drinking water, interruption of food supply due to recent climatic hazards, and lack of dietary quality food have significantly influenced rural people's food insecurity.

6. Discussion

The study found that the occupation and level of income of the respondents had a significant relationship with their food security. A study conducted by P Anezai, et al. (2022) revealed that the uneducated women working in urban informal arrangements face various disadvantages like long work hours, low wages, and job insecurity. Furthermore, they have to share income with other family members. Thus, this group of people suffers from food insecurity. Burton et al. (2013) indicated that natural or human-induced disasters, like natural calamities, global economic crises, and peak oil are contributing to the vulnerability of food security among cities. This study reveals that the recent invasion by Russia in Ukraine

has very high significance in terms of food availability and food insecurity in the study area. It is also found that price hikes in oil, gas, and fertilizers have a significant correlation with the respondents' food insecurity.

The study illustrated that price hikes in oil and gas have led to less food production in the country. It also showed that the price hike in fertilizer adversely affected food production in the study area. Thus, the people lacked the necessary food items to maintain a healthy lifestyle. A recent study conducted by Nath (2016) shows that the prices of fruit and vegetables were disproportionate, which made good food choices difficult for poor families. People with disabilities in villages are deemed to be at great risk of food insecurity (Begum, et al. 2013). At times of financial crisis, food would be the first commodity that these people would run out of. This higher food insecurity rate among the ethnic population reveals inequalities within the food insecurity in the country.

The study reveals that the lower income of the respondents affected their purchase ability of the foods that they required. It was also argued that high prices of dairy products and the unavailability of daily essentials in nearby shops interrupted respondents' ability to have food security. A recent study carried out by Islam et al. (2022) pointed out that

individual or household resources, such as land, money, and other household resources, contribute to the reduction of food security. This study pinpoints that transportation systems (bicycle/motorcycle/others) played a vital role in getting access to food, particularly from OMS. A recent study points out that old adults are at risk of food insecurity, as in low-middle-income countries across the world. Most adults enter old age after a lifetime of poverty and deprivation. They experience higher food insecurity than those headed by younger persons, as they are not capable of driving bicycles or cannot frequently move outside for food.

The study argues that adequate food qualities are important for maintaining quality mental and physical health. Bose and Dey (2007) pointed out that in Bangladesh the progress in achieving household and individual nutritional food security has remained slow as the food security is mainly cereal-based. The outcomes of the study have revealed widespread disparities in income and expenditure distribution.

Additionally, the analysis of food insecurity and its dependency and severity have shown a typically hidden poverty that could not be brought up by illustrating economic poverty. Additionally, the study findings show that people's consciousness regarding nutrition and healthy food was

significant among the respondents. Nath (2015) reveals that food security involves ensuring micronutrients to people with a particular focus on the old, women, and children for an active and smart life. It is found that there is self-sufficiency in starchy foods except for wheat. Many foodstuffs like vegetables, fruit, eggs, and meat are closer to self-sufficiency. There is a large nutritional imbalance in food intake reflected in the deficiency in food intake relative to normative consumption requirements. Therefore, food security is not only a matter of the quantity of food intake but also of its composition. The deficiency of micronutrients in food intake is considerable, making hidden hunger a big concern for the health and nutrition of the population of Bangladesh.

The analysis makes out a case for maintaining steady prices of daily necessities, and the policymakers ought to be committed to making proper strategies for ensuring required food production. According to Roy et al. (2019), although Bangladesh experiences numerous challenges regarding food insecurity, it has made significant improvements in terms of food availability, access, and utilization in the last few years. However, the food is of poor quality, despite the increase in people's income. To change such circumstances, the GoB has

undertaken a range of initiatives, although, they are still not sufficient to tackle this perpetual issue.

Rahman et al. (2017) argue that the 3As model (food availability, accessibility, and application) does not reveal the real scenarios of food security. We need to embrace the constructive paradigm so that we can produce the total meaning of food security and illustrate the significance of integrating non-food issues in conceptualizing food security in a developing country like Bangladesh. Dawson et al. (2019) show that studies on the poor's well-being and tenure security can be used to guide future policies. To support more comprehensive results, marginal, and poor rural groups require rights to land and the capacity to manage it through pro-poor initiatives. The capacity to invest in effectively managing land for food-yielding and economic solvency requires secure tenure, control, and authoritative rights.

Although food and social assistance exist to help those living in food insecurity, they are not enough. To improve their efficacy, system navigation, encouraging social connectedness, and improving human capital should be given more priority to those working directly with this population group. Considering how social and contextual aspects work with the household increases our

perception of household food insecurity in the rural area. To gain food security, García et al. (2021) argue that technical and human resources are important to guarantee food stability. Several household characteristics appear to be significantly associated with food security indicators, which could be important in identifying individuals and households that are food insecure (Faridi and Wadood, 2010). A comparative study on various professional groups was also accomplished and it was found that self-employed people in both sectors are better off on their food security status than wage earners, both daily wage and salary wage earners. Haque, M. et al. (2022) make out the case that attending income-generating activities — having access to cultivable land, being members of operatives or saving committees, engaging in horticulture or poultry, and increasing asset ownership — lower the risk of experiencing food insecurity.

7. Conclusion and Recommendations

The study explores the level of food security among the people in the study area in terms of the four pillars - availability, accessibility, utilization, and stability - that are important to the informants in the study locale. The findings reveal that 42% of the respondents do not have the means to purchase necessary food on a daily

basis. Domestic food production is seriously hampered as the costs of food production, have soared drastically. The findings convincingly reflect the status of the other three pillars of the food security situation in rural Bangladesh.

Given that the cost of each staple food has significantly increased, informants' access to food shows that 60% of the respondents lacked sufficient purchasing power. Moreover, the physical distance required to be covered to procure daily foodstuffs has prevented respondents from purchasing food. Thus, they have to go to bed with only a minimum quantity of food, which leads to potential long-term hunger. The study reveals that the daily per capita consumption of calories and nutrients does not meet the standard level that respondents require. About 27% of the respondents do not receive adequate food and the necessary daily calories. Regarding food stability, it is revealed that climate change-related hazards, such as drought and flash floods, have seriously hampered this year's production of Aman rice in the northern region of Bangladesh. Added to this, the high prices of urea and oil have disrupted the production of staple foods. These factors have accelerated less stable food production in the region. Thus, food security has been hugely affected.

The research suggests urgent evidence-based recommendations to be implemented as follows:

(i) In order to import basic staples like rice and wheat at reasonable costs, the Government of Bangladesh (GoB) should locate a new market.

(ii) The GoB needs to take action to protect the socio-economically poor by meeting their consumption and production requirements. Social protection strategies need to be put in place to be aligned with the country's current challenges and what they seek to achieve.

(iii) The government must prioritize the production of food products locally, establish the necessary policies, and then see to it that they are carried out.

(iv) There is an urgent need to bring down the prices of food items so that the extremely poor might have some means to pay for them.

(v) OMS services need to be enhanced and expanded to guarantee that society's most vulnerable citizens are not left in a state of dire need.

(vi) It is evident that the global market may remain unstable for quite some time because of the current Russia-Ukraine war. Therefore, the government should take steps to ensure that the country's food grain supplies remain stable in the near future.

Declaration of Interests: We, the authors of this research manuscript,

declare that we have no financial interest. We have provided written consent to publish the research manuscript in this journal.

To Cite this Article: Rahman, M, M., Islam A. and Islam M, T.(2023). Analyzing food (in) security among

low and low-middle-income people residing in Dhaka South City: Exploration of four pillars of food security. *Journal of Business and Development Studies (JBDS)*, Vol: 02, Issue: 01, Page: 1:17, ISUCRDP, Dhaka

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Appendix:

Annex Table-1: Socio-demographic Analysis of the Respondents.

Age	No	Percentage	Statistical result	Gender	Number	Percentage	Statistical result		
Less than 25 years	25	8.7	P<.097	Male	212	73.6	P<.919		
25-35 years	158	54.9		Female	76	26.4			
36-45 years	65	22.6		Others	0	0			
46-55 years	30	10.4		Profession	No	Percentage	Statistical result		
56-65 years	8	2.8	P<.249	Unemployed	19	6.6	P<.007		
above 65 years	2	.7		Student	22	7.6			
Level of Education	No	Percentage		Statistical result	Self Employed	27		9.4	
Illiterate	8	2.8		P<.266	Business	32		11.1	P<.001
Below SSC or Equivalent	25	8.7			Private Services	164		56.9	
SSC or Equivalent	11	3.8			Govt. Service	15		5.2	
HSC or Equivalent	35	12.2			Others	9		3.1	
Undergraduate / Degree / Diploma	105	36.5		P<.266	Monthly Income	No		Percentage	Statistical result
Post graduate	99	34.4			Less than TK. 10,000	41		14.2	P<.001
M. Phil or PhD	5	1.7			TK. 10,001-30,000	119		41.3	
No. of Family Members	No	Percentage	Statistical result	TK. 30,001-50,000	77	26.7			
2 Persons	26	9.0	P<.266	TK. 50,001-70,000	27	9.4	P<.001		
3 persons	52	18.1		TK. 70,001-90,000	12	4.2			
4 persons	88	30.6		More than TK. 90000	12	4.2			
5 persons	73	25.3							
6 persons	36	12.5							
More than 6 persons	13	4.5							

(Source: SPSS results, 2022)

Annex Table: 2: Chi Square Results.

Variable (s)	Result	Percentage (%)	Statistical result
Food Availability			
Do you have your own available land for daily food production?	Not at all	45.1	P<.598
	Some extent	45.8	
	Great extent	9.0	
Do you have available livestock, farm animals or poultry for livelihood?	Not at all	61.1	P<.169
	Some extent	33.7	
	Great extent	5.2	
Do you grow your own foods and vegetables in your own land/homestead garden or plot?	Not at all	47.6	P<.175
	Some extent	45.1	
	Great extent	7.3	
Do you think that the supply of healthy food is available in good quality in the nearby food retailers?	Not at all	28.8	P<.268
	Some extent	58.3	

	Great extent	12.8	
Do you think that food preservation/storage facilities such as warehouse and cold storage facilities are available in your locality?	Not at all	37.2	P<.151
	Some extent	49.0	
	Great extent	13.9	
Do you find that daily foods are available in nearby shops or markets meaning that you can adequately purchase and consume them?	Not at all	17.0	P<.067
	Some extent	62.2	
	Great extent	20.8	
Do you think the current Russia-Ukraine war has led to fewer food imports from foreign countries?	Not at all	17.7	P<.001
	Some extent	42.7	
	Great extent	39.6	
Do you think that price hikes in oil and gas have led to less food production in the country?	Not at all	11.1	P<.001
	Some extent	49.3	
	Great extent	39.6	
Do you think the price hike in fertilizer has led to less food production in the country?	Not at all	11.1	P<.001
	Some extent	51.4	
	Great extent	37.5	
Access to food	Result	Percentage (%)	Statistical result
Do you think that your present income is sufficient for your livelihood?	Not at all	59.0	P<.024
	Some extent	34.4	
	Great extent	6.6	
Do you think that present transport system is appropriate for carrying food from production sources to your locality?	Not at all	28.5	P<.224
	Some extent	64.2	
	Great extent	7.3	
Do you think that present market infrastructure is good for food preservation in your locality?	Not at all	38.9	P<.130
	Some extent	50.7	
	Great extent	10.4	
Do you think that current food price affects your purchasing capacity of daily essentials?	Not at all	20.1	P<.001
	Some extent	37.2	
	Great extent	42.7	
Do you think that your expenditure cost is higher than your income?	Not at all	18.1	P<.001
	Some extent	29.9	
	Great extent	52.1	
Do you think that you do not have sufficient purchasing power to buy daily essentials from nearby grocery shops?	Not at all	18.8	P<.001
	Some extent	51.7	
	Great extent	29.5	
Do you think that recent higher food prices lead to less access to foods, particularly for low-income people or households?	Not at all	13.9	P<.001
	Some extent	38.2	
	Great extent	47.9	
Do you think that individual or household resources, such as land, money and other household resources may contribute to the reduction of food security?	Not at all	12.5	P<.003
	Some extent	59.4	
	Great extent	28.1	
Do you think that your transportation system (bicycle/motorcycle/others) plays vital role for getting access to food, particularly from OMS or TCB?	Not at all	18.4	P<.001
	Some extent	63.5	
	Great extent	18.1	
Are you able to purchase daily food from the OMS or TCB?	Not at all	29.5	P<.051
	Some extent	46.9	
	Great extent	23.6	

(Source: SPSS results, 2022)

Annex Table-3: Food Utilization and Stability of Food.

Food Utilization	Result	Percentage (%)	Statistical result
Are you conscious regarding nutritional and healthy food?	Not at all	14.2	P<.001
	Some extent	60.4	
	Great extent	25.3	
Do you have adequacy of nutritional balance in daily food composition?	Not at all	20.5	P<.055
	Some extent	69.1	
	Great extent	10.4	
Do you have to access to safe and nutritious foods?	Not at all	27.8	P<.816
	Some extent	58.0	
	Great extent	14.2	
Do you have adequate access to safe drinking water?	Not at all	33.3	P<.068
	Some extent	43.8	
	Great extent	22.9	
Do you have diversity of food in daily food chart?	Not at all	24.3	P<.070
	Some extent	55.9	
	Great extent	19.8	
Do you have adequate quality food for maintaining quality mental and physical health?	Not at all	23.6	P<.024
	Some extent	58.7	
	Great extent	17.7	
Do you get dietary quality food which is crucial for your mental and physical health?	Not at all	22.2	P<.001
	Some extent	54.9	
	Great extent	22.9	
Stability of food	Result	Percentage (%)	Statistical result
Do you think that current food supply has been interrupted by the recent climatic hazards, such as drought, flashflood?	Not at all	16.3	P<.001
	Some extent	61.8	
	Great extent	21.9	
Do you think that prices of daily essentials are stable?	Not at all	54.5	P<.009
	Some extent	36.5	
	Great extent	9.0	
Do you think that political instability affects to the food production?	Not at all	13.5	P<.001
	Some extent	43.1	
	Great extent	43.4	
Do you think that there is a lack of capacity to buy adequate safe and nutritious food during recent economic crisis?	Not at all	10.4	P<.001
	Some extent	45.8	
	Great extent	43.8	
Do you think that price hike in daily foodstuffs affected to your purchase capacity?	Not at all	9.4	P<.001
	Some extent	42.7	
	Great extent	47.9	

(Source: SPSS results, 2022)

Annex Table-4: Results of Multiple Regression Analysis

Determinants	Unstandardized Coefficients		Standardized Coefficients	Significant t-value	P value
	B	Std. Error	Beta		
Age	.086	.047	.116	1.831	.068
Profession	.081	.027	.164	3.020	.003
Monthly Income	-.081	.039	-.140	-2.046	.042
Availability of daily foods found in nearby shops	-.054	.067	-.048	-.814	.417
Impact of the current Russia-Ukraine	.120	.067	.125	1.802	.073
Price hikes in oil and gas	.030	.075	.028	.396	.693
Price hike in fertilizer	-.010	.068	-.009	-.147	.883
Sufficiency in income for livelihood	.056	.069	.050	.811	.418
Food price affects to purchasing capacity of daily essentials	.075	.060	.082	1.251	.212
Expenditure cost is higher than income	.084	.067	.092	1.250	.212
Sufficient purchase power to buy daily essentials from nearby grocery shop	-.027	.065	-.027	-.417	.677
Higher food prices lead to less access to foods	-.094	.066	-.096	-1.430	.154
Individual or household resources contribute to the reduction of food security	-.154	.069	-.137	-2.239	.026
Transportation system have vital role to access to food	.069	.068	.060	1.014	.312
Daily purchase food from the OMS or TCB	-.013	.057	-.014	-.227	.820
Conscious regarding nutritional and healthy food	.070	.075	.062	.932	.352
Adequacy of nutritional balance in daily food composition	-.085	.085	-.067	-.994	.321
Access to safe and nutritious foods	-.091	.063	-.097	-1.436	.152
Adequate access to safe drinking water	.134	.071	.128	1.903	.058
Diversity of food in daily food chart	.010	.063	.009	.157	.876
Adequate quality food for maintaining quality mental and physical health	.081	.063	.078	1.279	.202
Food supply has been interrupted by the recent climatic hazards	.334	.069	.296	4.843	.000
Prices of daily essentials are stable	-.051	.063	-.048	-.811	.418
Political instability affects to the food production	-.010	.064	-.010	-.149	.882
Lack of capacity to buy adequate safe and nutritious food during recent economic crisis	.105	.073	.099	1.449	.149
Dietary quality food which is crucial for your mental and physical health	.191	.067	.179	2.866	.004

(Source: SPSS Results, 2022)