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Prevalence and Socio-demographic Associations of Household Food Insecurity in Slums Across Bhubaneswar, Odisha - A Cross-sectional Study

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ABSTRACT: Food insecurity remains a significant challenge in urban slums, impacting the health and well-being of vulnerable populations. This cross-sectional study aimed to assess the socio-economic conditions and household food security among slum dwellers in Bhubaneswar, Odisha. Data were collected from households on family structure, education, occupation, income, and socio-economic class. Results revealed that 43.5% of families had 4-6 members, with most households being nuclear. Only 6.5% of households were food secure, while 37% experienced moderate food insecurity. Chi-square analysis showed significant associations between food insecurity and family size (p=0.007), paternal education (p<0.01), and socio-economic class (p=0.000). Despite access to basic amenities, inadequate kitchen infrastructure and poor ventilation were common. The study concludes that higher educational attainment and improved socio-economic status significantly enhance household food security, highlighting the need for targeted educational and economic interventions to mitigate food insecurity in urban slums.

Keywords: slum dwellers, socio economic status, food security.

INTRODUCTION

Food insecurity, as defined by the Food and Agriculture Organization (FAO), refers to the lack of consistent access to sufficient, safe, and nutritious food necessary for healthy growth, development, and an active life (FAO, 2021). It is determined by four key dimensions: food availability, accessibility, utilization, and stability. Despite global recognition of the right to food as an essential component of the right to an adequate standard of living, as articulated in the *Universal Declaration of Human Rights* (UDHR, 1948) and the *International Covenant on Economic, Social and Cultural Rights* (ICESCR, 1966), food insecurity remains a pressing global challenge. One of the 17 Sustainable Development Goals (SDGs) adopted by the United Nations emphasizes the need to "end hunger, achieve food security, improve nutrition, and promote sustainable agriculture."

Although global food production is theoretically sufficient to feed the entire population, hunger continues to rise in various regions (FAO, 2021). The *State of Food Security and Nutrition in the World* report for 2022 revealed that between 702 and 828 million people experienced hunger. Additionally, approximately 2.33 billion individuals faced moderate to severe food insecurity, with 900 million people suffering from severe food insecurity. Alarmingly, over 3.1 billion individuals were unable to afford a healthy diet.

Food insecurity is closely linked to numerous health issues. Studies, such as those by Pengpid *et al.* (2023), have found significant associations between food insecurity and adverse mental health outcomes, including low life satisfaction, insomnia, depressive symptoms, and reduced cognitive function. Physical health challenges, such as chronic lung disease, joint disorders, underweight conditions, and functional disabilities, are also prevalent among food-insecure populations. The primary drivers of food insecurity include the unavailability of food and a lack of resources to access it, making rural populations and economically disadvantaged urban residents, particularly those in slums, especially vulnerable.

UN-HABITAT defines a slum household as a group of individuals living under the same roof in an urban area who lack one or more essential services, such as durable housing, sufficient living space, affordable and safe water access, adequate sanitation facilities, or security of tenure to prevent forced eviction. Urbanization has been increasing rapidly, with more than half of the world's population residing in urban areas since 2007, and this figure is projected to reach 60% by 2030. However, this rapid urban growth has led to a rise in the number of slum dwellers, strained infrastructure and services (such as waste management, water supply, and sanitation systems), increased air

pollution, and unregulated urban expansion (UN, 2019). These factors exacerbate the vulnerability of slum residents to food insecurity.

Despite the significant health risks posed by food insecurity, slum populations remain understudied and overlooked in research. Given this context, the present study aims to assess the socio-economic conditions and household food security among slum dwellers in Bhubaneswar, the capital city of Odisha.

MATERIAL AND METHOD

A. Study Design

This study employed a cross-sectional research design to assess the socio-economic conditions and household food security among slum dwellers in Bhubaneswar, Odisha. The study was conducted across selected slums within the Bhubaneswar, the capital city of Odisha.

B. Sampling Method

A multi-stage random sampling technique was adopted for the selection of participants. In **Stage 1** Based on population size and geographic distribution of slums of Bhubaneswar city, 15 number of slums were randomly selected. In **Stage 2** within each selected slum, two hundred households were selected using simple random method.

C. Data Collection Tools

Data were collected through structured interviews using a pre-tested questionnaire. The questionnaire was divided into three sections:

1. Socio-Demographic Information: Age, gender, education level, household size, family type, occupation and income.

2. Household Food Security: The Household Food Insecurity Scale (FIES), a standardized tool recommended by the FAO, was used to assess the severity of food insecurity.

3. Access to Basic Amenities: Information on housing pattern, access to drinking water, ventilation, fuel used, and possession of assets was collected to understand the living conditions of the respondents.

D. Data Analysis

The households were classified into different socio economic classes following Kuppuswamy classification. The collected data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) version 20. Descriptive statistics, including frequencies, percentages, mean, and standard deviations, were used to summarize socio-demographic characteristics and food security status. Inferential statistics, such as Chi-square tests was employed to identify factors significantly associated with food insecurity. A p-value of less than 0.05 was considered statistically significant.

RESULT AND DISCUSSION

The socio demographic information, Household Food insecurity and housing pattern of the respondents were studied and represented in Tables (1-7).

The family pattern and educational qualification of the respondents are represented in Table 1. As observed from the Table 1, 49.00% of the respondents belonged to families having 3 or less members and 43.50% of them belonged to families with 4 to 6 members while 7.50% of them belonged to more than or equal to 6 members. Majority of families were nuclear type where as only 28 % families were joint in nature.

The educational level of housewives showed that highest number of housewives *i.e.* about 47 % had education up to high school, followed by 28% studies up to intermediate. About 11 to 12 % housewives were either graduates or illiterates. Regarding education of the head of the family, majority were intermediates followed by 21 % graduates, 19 % had educational qualification up to high school. While, 15 % of them were postgraduates and a very few number *i.e.* only 6 % of them were illiterates (Table 1). Joshi *et al.* (2019) from their study observed that more than half were females (73%, n = 285), who had not completed any schooling (51%, n = 202).

Table 1: Distribution of respondents by Family Pattern and Educational qualification.

Variables	Category	Frequency (%)
Family size	≤ 3 member	98 (49.00)
	4-6 member	87 (43.50)
	≥6 member	15 (7.50)
Family Type	Nuclear	144 (72.00)
	Joint	56 (28.00)
Educational qualification of head of family	Illiterate	12 (6.00)
	High school	39 (19.50)
	Intermediate	76 (38.00)
	Graduate	43 (21.50)
	Post graduate	30 (15.00)
Educational qualification of housewife	Illiterate	23 (11.50)
	High school	95 (47.50)
	Intermediate	57 (28.50)
	Graduate	25 (12.50)
	Post graduate	0 (0.00)

Table 2: Distribution of respondents by Occupational Pattern and Family Monthly Income.

Variables	Category	Frequency (%)
Occupation of head of the family	Daily Labourer	04 (20.00)
	Unskilled worker	15 (7.50)
	Skilled worker	107(53.60)
	Self employed	73 (26.50)
	Govt. job	01 (0.50)
Occupation of housewife	Working	46 (23.00)
	House wife	154 (77.00)
Monthly Income (in rupees)	Less than 4000	16 (8.00)
	4001-10000	107 (53.50)
	10001-20000	70 (35.00)
	20001-30000	07(3.50)

Table 2 depicts the income and occupation pattern of the sample respondents. It has been seen from the table that, more than 50 % of respondents were skilled workers, followed by 20.00%, who were engaged in unskilled works. While 7 % were daily labourers, a negligible percentage, *i.e.* 0.5 % of respondents were engaged in government job.

The monthly income of the households revealed that, more than 50 % of households had in the income range of Rs. 4001 to 10000, followed by 35 % in RS. 10,001 to 20,000 income range. Only 8 % households had income less than Rs 4000/- and a very few *i.e.* 3.5% were in the income range of Rs. 20001 to 30,000.

The Respondents Were Classified into Different Socio economic classes by Kuppuswamy classification. The Household food insecurity was assessed following HFIS scale. The findings were represented in Table 3.

Table 3: Distribution of samples by Socio Economic class and Household food insecurity.

Variables	Category	Frequency
SE class	Lower	10 (5.00)
	Upper lower	151(75.50)
	Lower middle	39 (19.50)
	Upper middle	00 (0.00)
	Upper	0
Household food insecurity	Food secure	13 (6.50)
	Mild insecure	113 (56.50)
	Moderate insecure	74 (37.00)
	Severely insecure	00 (0.00)

Regarding distribution of respondents into different socio economic classes it has been observed that, a majority belonged to upper lower socio economic class, followed by 19.50% who belonged to lower middle socio economic class. A very few *i.e.* only 5 % of the respondents were observed to belong to lower socio economic class. Not a single respondent fell under **Upper socio economic class.** Distribution of households based food insecurity showed that majority were in mild security category, followed by 37 % in moderate insecurity category. Only 6.50% of the households were observed to be food secure. Interestingly not a single household with severely insecure was observed.

Joshi *et al.* (2019) from their study indicated that 43% (n = 393) of the participants were food insecure. One-third (n = 128) resided in the Northern Region of Delhi. Findings of the study conducted by Sarkar & Shekhar (2017) revealed that only 20 per cent households were food secure, whereas 44 per cent categorised as 'food insecure', 30 per cent were 'food insecure with hunger (moderately)' and six per cent households identified as 'food insecure with hunger (severe).

The most common coping strategies opted by households were to consume less preferred and less expensive food (98%), followed by borrowed food from relatives (73%). Similarly, common livelihood coping mechanisms were use of past saving cash (95%) and reduction of spending on other expense (94%).

Oluwakemi (2018) from his study observed that food insecurity was found to be prevalent among the slum residents, with about 81% being food insecure.

As evident from the Table 4, all most all of the respondents have pucca house with 2 or less number of rooms. Not a single house is well ventilated. An interesting observation of availability of toilet facility in all the households was observed. However, in majority of the households *i.e.* in 77.5 % of cases did not have a separate kitchen. It is revealed from the table that, about 60 % of the sample respondents use LPG as fuel for their cooking and rest of them use gas stove for cooking purpose. Use of no other source of fuel was observed among the respondents. Municipality supply drinking water is the only source of drinking water of the sample respondents.

Rausch *et al.* (2018) examined issues and alternatives for sanitation in slum households, water supply systems or networks and Yeasmin *et al.* (2020) focused on promoting sanitation in slums. Soma *et al.* (2022) observed that housing conditions reveals that the households with higher level of livelihood assets have better access to durable and permanent alternatives for their housing structure.

Uddin (2018) stated the existence of significant diversity and differences of sustainability indicators, particularly household and housing characteristics, health, drinking water, waste disposal system and security. He further found that slum dwellers have been experiencing with a wide range of substandard, overcrowded and unhealthy housing conditions in one hand. On the other hand, they have scarce and insufficient health, sanitation, water and waste disposal services which are unswervingly impeding to sustainable development in urban areas. Although the majority of slum dwellers have access to electricity, they are still threatened by the insecurities of women, drug dealing, eviction and natural disaster.

Table 4: Distribution of samples by Household characteristics.

Variables	Category	Frequency	(%)
Type of House	Kuchha	0.00	-
	Pucca	135	67.50
	Semi Pucca	65	32.50
No. of rooms	<2	10	5.0
	≤ 2	190	95.0
Ventilation	Present	0	-
	Absent	200	100
Toilet facility	Yes	200	100
	No	0	-
Availability of separate kitchen	Yes	45	22.5
	No	155	77.5
Fuel used	LPG	119	59.5
	Gas stove	81	40.5
	Electric stove	-	-
	Others	-	-
Assets	Television	107	53.5
	Fridge	43	21.5
	Two wheeler	78	39.0
	Auto	56	28.0
	Others	21	10.5
Source of drinking water	Well	-	-
	Bore well	-	-
	Municipality supply	200	100
	Others	-	-

Table 5: Association of household food insecurity with family pattern.

Variables		Food security levels				P value
		Secure	Mild insecure	Mod insecure	Severe	
Size of family	3 or less	9	47	42	0	0.007
	4 – 6	2	61	24	0	
	6 or more	2	5	8	0	
Type of family	joint	11	73	40	0	0.028
	nuclear	2	40	14	0	

Table 5 reveals about the distribution of household food insecurity by size and type of family. It is evident from the table that, most of the middle sized family belong to mild insecure food group. Same trend was observed for joint family group. However, the chi square analysis and the p values for family size and family type were found to be 0.007 and 0.028 and it is inferred that distribution of household family food security was statistically significant with family size and non-significant with family type, respectively.

As seen from the table 8, household food security was distributed by educational level of both father and mother and both of the variables *i.e.* paternal educational qualification were found to statistically significant ($p<0.01$) with food security. Thus it is concluded here that paternal educational qualification affects the household food security of the respondents under study. Oluwakemi (2018) from his study observed that Nine out of every 10 (89.1%) households were male-headed. The largest proportion of the mildly food insecure (37%) household heads were less than 30 years old, while the largest proportion of moderately food insecure (45%) and severely food insecure (38%) household heads were within the age cohort of 31 to 40 years. Less than half of the mildly food insecure household heads had secondary school education while about three quarters of the moderately food insecure households had primary school education. Approximately one out of every food secure, mildly food insecure and moderately food insecure households (50, 54 and 57%, respectively) had five to nine members, while about 62% of the severely food insecure households had the same household size.

Table 6 reveals about the distribution of household food security by socio economic class of the respondents. It is evident from the table that, most of the upper lower and middle lower class family belong to mild and moderate insecure food group. However, the chi square analysis and the p values for SEC were found to be 0.000 and it is inferred that distribution of household family food security was statistically significant with socio economic class of the respondents.

As seen from the Table 7, household food insecurity was distributed by educational level and both of the variables were found to statistically significant ($p<0.01$) with food insecurity. Thus it is concluded that educational qualification has strong association with the household food insecurity. In the study conducted by Sarkar & Shekhar (2017) multivariate binary logistic regression model showed that education of head of the

household, caste, source of income, MPCE status and availability of livestock were significantly associated with the household food security.

Table 6: Association of household food insecurity with Socio Economic Class.

Variables		Food security levels				P value
		Secure	Mild insecure	Mod insecure	Severe	
Socio economic class	Lower	0	0	10	0	0.000
	Upper lower	8	85	58	0	
	Lower middle	5	28	6	0	

Table 7: Association of household food insecurity by parental Educational qualification.

Parental Educational qualification		Secure-1	Mild insecure-2	Mod insecure-3	Severe-4	P value
Educational level of house wife	Illiterate	0	1	3	0	0.000
	Up to high school	0	3	12	0	
	Intermediate	4	58	45	0	
	Graduate	9	50	14	0	
	Post Graduate	0	1	0	0	
Educational level of head of the family	Illiterate	1	8	14	0	0.001
	Up to high school	5	54	36	0	
	Intermediate	1	39	17	0	
	Graduate	6	12	7	0	
	Post Graduate	0	0	0	0	

CONCLUSIONS

The study reveals that household food insecurity is prevalent among slum dwellers in Bhubaneswar, with a significant portion of households experiencing mild to moderate insecurity. Educational attainment of the household head, particularly paternal education, and socio-economic class emerged as critical determinants of food security status. Skilled employment and middle-range income levels were associated with better food security outcomes. However, households with larger family sizes were more vulnerable to food insecurity.

Despite improvements in access to basic amenities such as housing, sanitation, and municipal water supply, inadequate kitchen infrastructure and ventilation remain challenges. The findings underscore the need for integrated approaches that address both educational advancement and socio-economic upliftment to enhance food security in urban slums.

FUTURE SCOPE

This study highlights several avenues for future research and policy interventions including Targeted Educational Programs, Socio-Economic Interventions and Improving Housing Infrastructure. Further research is needed to examine the role of women's education and empowerment in improving food security outcomes, as their educational attainment has a significant influence on household food choices and nutritional practices.

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