

RESEARCH PAPER

Study on Food Security among Beedi Workers' in Murshidabad District of West Bengal

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ABSTRACT

This study examines the determinants of food security amongst beedi workers' households in Murshidabad District, West Bengal, focusing on Suti-II Block in the Jangipur subdivision. A sample of 90 households was selected through the SRSWOR method. Primary data was collected via pre-tested questionnaires, assessing food security based on an 18-question scale reflecting difficulties in meeting basic food needs. A binary logistic regression model was employed to analyse how socioeconomic factors such as income, education, family size, and expenditures influence food security. Results indicate that 80 percent of households are food secure. Education, income, and expenditures on food have a significant positive impact on food security. In contrast, medical and family size exhibit negative effects. These findings highlight the importance of targeted interventions, such as improving education and increasing income, to enhance food security amongst minority groups in rural areas.

HIGHLIGHTS

- ① Education, income and expenditure are important determinants related to food security.
- ② Medical and family size exhibit negative effects on food security.

Keywords: Beedi workers, Food security, Factors, Logistic regression

Based on the 1996 World Food Summit, food security is defined when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Food and Agriculture Organization (2006) has defined food security as the state in which all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

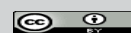
India, a country of around 1.4 billion people, has serious problems with food security. Food insecurity endures despite economic prosperity, especially in poor and rural populations. According to the Global Hunger Index (GHI) 2023, India ranks 111th out of 125 countries, indicating a severe level of

malnutrition and hunger (Global Hunger Index, 2023). Food insecurity is caused by several factors, such as poverty, inequality, and limited access to healthy food. Furthermore, droughts, floods, and irregular rainfall patterns driven by climate change reduce agricultural production and increase food insecurity (Sharma *et al.* 2021).

Beedi workers in India, who roll traditional cigarettes, face significant challenges regarding food security due to their low and irregular incomes, poor working conditions, and lack of access to social safety nets. A majority of beedi workers are women from minority communities, earning

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wages well below the poverty line, which severely limits their ability to afford nutritious food (Ranjan, 2020). These workers often lack formal employment benefits, making them vulnerable to economic shocks, healthcare costs, and food price fluctuations (Gopalakrishnan, 2017).

Studying the determinants of household food security among beedi workers is important because they face unique challenges due to their informal work status, low wages, and hazardous conditions, which directly impact their economic stability and food security (Mitra & Singh, 2021). Additionally, health risks from beedi rolling further strain their income, affecting their ability to afford food (Nandi, 2020). Socio-economic factors, such as income, education, and family size, also play a crucial role in determining food security (Singh & Das, 2019). Insights from such studies can inform policy interventions aimed at improving livelihoods for this vulnerable group (Patel & Kumar, 2022). Food security is a four-dimensional concept comprising the availability of food, access to food, utilisation, and stabilization. An effort has been made in this study to explore the determinants of food security among the Beedi workers in Murshidabad District, West Bengal.

Database and Methodology

The study has been conducted based on primary data. This research focuses on the Murshidabad District of West Bengal, particularly the Suti-II block of the Jangipur sub-division, which was purposively selected due to the large number of beedi workers. The study involved selecting 90 sample households from purposively selected three villages, using the method of simple random sampling. Primary data was collected through a structured questionnaire. The research aims to assess household food security using an 18-question framework that measures food insecurity based on difficulties in capturing basic food needs. The study relies on established food security measures as referenced in previous studies (Bickel *et al.* 1998; Bickel *et al.* 2000; Nord and Bickel, 2002). To analyse the determinants of household food security, the Logistic Regression Model (Hosmer and Lemeshow, 2000) was employed. This model is suitable when the dependent variable is binary, such as in this case where the household is either food secure or food insecure. In this context,

the dependent variable is Household Food Security (denoted as FS), which takes the value, (FS = 1) if the household is food secure and (FS = 0) if the household is food insecure. The general form of the logistic regression model is expressed as follows:

$$\text{Logit}(P_i) = \ln \left(\frac{P_i}{1 - P_i} \right) = \beta_0 + \beta_1 HH_i + \beta_2 Age_i + \beta_3$$

$$Income_i + \beta_4 Education_i + \beta_5 Family\ size_i + \beta_6$$

$$Total\ land\ holdings_i + \beta_7 Exp.\ Food_i + \beta_8 Exp.\ Fuel_i$$

$$+ \beta_9 Exp.\ Medical_i + \beta_{10} Exp.\ Electric_i + \epsilon_i$$

Where,

P_i is the probability that household i is food secure.

$\ln \left(\frac{P_i}{1 - P_i} \right)$ is the log-odds of food security.

β_0 is the intercept.

$\beta_1, \dots, \beta_{10}$ are the coefficients for the independent variables.

ϵ_i is the error term.

The coefficients represent the log-odds of a household being food secure for a one-unit increase in the respective variable, holding other variables constant. Positive coefficients indicate that an increase in the variable increases the probability of food security, while negative coefficients suggest a decrease. This model can be used to estimate how factors such as household head, age, income, education, family size, total land holdings and various types of expenditures influence the likelihood of a household being food secure. The logistic regression approach is widely used in food security studies due to the binary nature of the dependent variable (food secure/insecure) (Welderufael, 2014; Jagnang *et al.* 2019; Biyena *et al.* 2021; Mohammed and Mohammed, 2021).

RESULTS AND DISCUSSION

Tobacco cultivation processing and marketing involves over 30 million people in India. Most of them are living in rural India like beedi rollers, tendu leaves pickers. Women form the major part of the beedi industry with low cost and risk. Beedi workers are poor and mostly unorganised and they face innumerable problems such as poor working

Table 1: Descriptions of variables included in the model

Variable	Type	Descriptions
1. Dependent variable		
(i) Food Security	Dummy	If, Food secure = 1, Food insecure = 0
2. Independent variable		
(i) Household Head	Dummy	Male = 1, Female = 0
(ii) Household head's age	Continuous	Household head's age in year
(iii) Education	Dummy	Literate = 1, Illiterate = 0
(iv) Income	Continuous	Monthly income in number
(v) Total land holdings	Continuous	Total land holdings in number
(vi) Family size	Continuous	Family size in number
(vii) Expenditure on Food	Continuous	Monthly exp. on food in number
(viii) Expenditure on Electric	Continuous	Monthly exp. on electric in number
(ix) Expenditure on Medical	Continuous	Monthly exp. on medical in number
(x) Expenditure on Fuel	Continuous	Monthly exp. on fuel in number

conditions, low wages, fraudulent actions by the contractors, health hazards, etc. (Iti, 2018). Besides, food security is a crucial element in maintaining healthy and sustainable communities. Food security is based on a variety of factors, including how well agricultural production is doing, how much food we import, how many people are employed in the food industry, what public policies are put in place, what decisions farmers make, how well our food is accessible to everyone, how much financial assistance we receive, and how wisely we use our natural resources. Abide & Asfaw (2022) and Assefa & Beyene (2023) rightly pointed out that we need to work together to improve all of these areas in order to achieve food security.

Table 2: Extent of food security of sample households

Households	Number	Per cent
Food insecure	18	20.00
Food secure	72	80.00
Total	90	100.00

If we look at Tables 2 and 3, it appears that 80 percent of the sample households are food secure, while 20 percent are food insecure, and the average age of the food-insecure household head is 43.11 years (Table 3). The mean age of food-secure households is slightly lower at 42.26 years than food-insecure households. This indicates that household heads in both categories are within a similar age range, with no significant difference when food security is considered. Food-secure

households have a higher income as compared to food-insecure households, suggesting that greater financial resources contribute to better food security. The average landholding is 4.17 Katha in food insecure households. In food-secure households, the mean value of landholding is higher at 5.46 Katha. Households with more land holdings tend to be more food secure. The average family size of food-secure and food-insecure households is 6.22 and 5.67, respectively. Larger family sizes are associated with food insecurity, which could be due to higher dependency ratios and the increased financial burden of supporting more family members. The average monthly expenditure on food of food insecure households is ₹ 4,666.67. In food-secure households, the average monthly expenditure on food is higher at ₹ 5,519.31. Food-secure households spend more on food, possibly indicating better access to diverse or nutritious food or a better standard of living. Food insecure households spend (₹ 3427.78/month) more on medical expenses due to the prevalence of health issues. Daily contact with tobacco may be the primary cause of different health issues.

The logistic regression analysis is done by using SPSS software version 26. The results of the regression model are exhibited in Table 4. In the Hosmer and Lemeshow test, the significance level is 0.998, which is above 0.05 and suggests that the model fits the data well. Nagelkerke R Square is 0.800, explaining 80 percent of the variance in the dependent variable (household food security). In

Table 3: Descriptive statistics of variables

Variables	Food Insecure N=18		Food Secure N=72		Total Households N=90	
	Mean	Sd	Mean	Sd	Mean	Sd
Household Head	0.89	0.32	0.92	0.28	0.91	0.29
Age	43.11	8.73	42.26	6.98	42.43	7.32
Education	0.17	0.38	0.51	0.50	0.44	0.50
Income	11116.67	2001.25	12690.28	1098.80	12375.56	1459.05
Total land holdings	4.17	2.15	5.46	1.88	5.20	1.99
Family size	6.22	0.94	5.67	1.27	5.78	1.23
Exp. Food	4666.67	306.79	5519.31	724.63	5348.78	744.64
Exp. Electric	281.39	41.90	275.28	67.22	276.50	62.82
Exp. Medical	3427.78	381.65	2907.92	512.91	3011.89	530.49
Exp. Fuel	567.56	97.60	545.56	112.33	549.96	109.38

Table 4: Results of logistic regression model

Variables	Coefficients	S.E.	p-value	Odds ratio
HH	0.221	2.323	0.924	1.248
Age	0.089	.097	0.359	1.093
Edu	3.595	1.884	0.056***	36.412
Income	0.001	0.001	0.041**	1.001
Total land holdings	.112	0.299	0.708	1.119
Family size	-1.369	0.624	0.028**	0.254
Exp. Food	0.005	0.002	0.006*	1.005
Exp. Electric	0.023	0.013	0.080***	1.023
Exp. Med	-0.002	0.001	.074***	0.998
Exp. Fuel	-0.010	0.007	0.142	0.990
Constant	-24.898	13.131	0.058	0.000

Nagelkerke R Square = 0.800; -2 Log likelihood= 26.660.

***Significant at 10 per cent, **Significant at 5 per cent, *Significant at 1 per cent.

the logistic regression model where the dependent variable is food security among beedi workers' households, the coefficients indicate the effect of each variable on the likelihood of being food secure.

Results further indicate that the education level of household members, particularly the head of the households, positively and substantially impacts household food security. The effect is statistically significant at the 10% probability level. A positive odds ratio of 36.412 shows that with more education of household head, the odds of being food secure are much higher than uneducated head households. Higher education levels are associated with better employment opportunities and utilisation of their food resources, which improves food security. This

finding is consistent with previous studies by Sahn (2010), Debebe (2017), Assefa and Abide (2023), and Bahiru *et al.* (2023).

It has been observed that income has a significant positive effect on food security, and this effect is statistically significant at 5%. The odds' ratio of 1.001 implies that each additional unit of income slightly increases the odds of being food secure. Households with higher income levels have greater purchasing power, enabling them to access more food. On the other hand, Low-income households are more prone to food insecurity due to financial constraints. This result is in conformity with the results of Smith and Subandoro (2007), Bashir (2013), Ahmed *et al.* (2017), and Farzana *et al.* (2017).

Family size has a negative relationship with family food security and is statistically significant at $p < 0.05$. The odds ratio of 0.254 means that as family size increased by one, the odds of being food secure reduced by 0.25. Larger households tend to experience higher rates of food insecurity because of the increased demand for food. Increasing household size can raise the burden on earning members and impact food security due to limited resources. The findings are consistent with other investigations by Gebre (2012), Welderufael (2014), Muche *et al.* (2014), and Ahmed *et al.* (2017), which also found a negative association between an increase in household size and food security status. Higher food expenditure is significantly associated with increased food security. The odds ratio of 1.005 suggests that each additional unit of food expenditure slightly increases the odds of being food secure. The proportion of income spent on food is a key indicator of food security. Households that spend a large share of their income on food are often more vulnerable to food insecurity, as even small increases in food prices can disrupt their access to adequate food. This finding is in agreement with the findings of FAO (2006) and Akbar *et al.* (2023). Medical expenses have negative effects on food security and are statistically significant at 10%. The odds ratio of 0.998 suggests that higher medical expenses slightly decrease the odds of being food secure. When a significant portion of household income is directed toward healthcare, less money is available for food purchases, increasing the risk of food insecurity, especially in households with daily exposure to tobacco. This finding is in conformity with the findings of Gebre (2012) and Ahmed *et al.* (2017).

CONCLUSION

Based on the preceding discussion, it can be concluded that 80 percent of the households among bidi workers have access to enough food and basically, they are food-secure. It has been observed that significant determinants of food security are education and income, which have positive effects on food security, with education having a particularly strong impact. Conversely, food security decreases with the increase in family size. Expenditure on food significantly improves food security, while medical and fuel expenditures

have minimal or negative effects. Total land and age of the head of the household do not significantly influence food security. Overall, improvements in education and income, along with managing food expenditures, are the crucial approaches for enhancing food security among these workers.

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