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Food security of beedi (local cigar) workers with special reference to nutritional intake in Murshidabad District of West Bengal

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Abstract
One of the important unorganized industries especially in rural areas of West Bengal is Beedi making. Beedi making is to be a rural-based industry and the Beedi workers are, in general, economically poor. In this context, the present study has been undertaken to find out the inter alia the nutritional security (accessibility, availability and utilization of food) and highlight on their constraints for development with primary data of 50 sample workers of two villages in Murshidabad (WB) during 2021-22. The ICMR Nutrition Chart is used to estimate the extent of calorie, protein and fat (Gopalan *et al*, 1991). Results show that the overall intake of calorie in the study area is 2476.54kcal/day/CU which is little more than the Recommended Dietary Allowance (RDA) of 2425kcal/day/C. The average intake of protein level in the study area stands at 70.71gm/day/CU which also remains at higher level compared to RDA of 60 gm/day/C. In general, intake of fat in the study area is 28.13 gm/day/CU which is again higher than the RDA level. Workers of Village-I have been found to have higher level of calorie consumption, protein intake and fat consumption.

Keywords: Beedi worker, nutritional Intake, RDA model, calorie, protein, fat

Introduction
Food is necessary for living a decent life. Adequate food in terms of quantity and quality for all people is a necessary requirement for a nation's long-term growth and it is done when everyone has constant access to sufficient, safe, and healthy food.
Food and Nutrition security essentially means that, all people at all times have access to safe and nutritious food to maintain health and active life (FAO, 2009) [3]. This definition implies three dimensions to food security, namely, availability (sufficient quantities of appropriate food for the concerned population should be physically available); access (households have sufficient purchasing power or other resources to obtain adequate and appropriate food) and utilization (food is properly used through appropriate food processing and storage practices for preserving its nutrient contents; sharing food within the household to provide adequate nutrient to each members of the household for maintaining them productive).
Recently, there has been a change in policy attention towards household level food security, and per capita food energy consumption is used as a metric of food security. In terms of average per capita food availability, India is now a food self-sufficient country.
In India, the production of beedis is a long-established industry and serves as a significant employment sector for women in the informal labor force. Beedis, which are essentially hand-rolled and unfiltered cigarettes, hold a dominant position in the Indian smoking market. These beedis are crafted by rolling approximately 0.2 grams of processed sun-dried tobacco flakes in tendu or temburni leaves and securing them with cotton thread. Notably, the type of tobacco used in beedis differs from that used in regular cigarettes.
The task of rolling beedis is primarily undertaken by individuals with the lower socioeconomic status within society. This labor-intensive work is concentrated in rural and semi-urban areas, where it serves as a vital means of livelihood for numerous families. It is especially crucial for Scheduled Castes (SC) and Other Backward Classes (OBC) from the Muslim community who have lost their traditional livelihoods, such as weaving and pottery, due to the emergence of cheaper industrial alternatives and shifting consumer preferences. For these families, beedi making represents an additional income source to compensate for their dwindling earnings. Muslim women are prominently engaged in this profession because religious constraints often prevent them from seeking employment outside their homes.

Consequently, this home-based work is widely accepted and practiced among them (Bhatty 1987; Koli 1990; Mohandas and Kumar 1992; Gopal 2000) [1, 7, 8, 4].

The objective of the Study: The study is based on the following specific objective.
To find out the nutrient status with special reference to calories, protein, and fat in the study area.

Materials and Methods

The present study has been conducted in the District of Murshidabad of West Bengal. From 26 C.D. Blocks of Murshidabad District, only Suti-II Block has been purposively selected for this research work because where the largest Beedi manufacturer of the district, i.e., '502 Pataka', is located and a substantial proportion of the population is engaged with the Beedi making. A cluster of two villages has been purposively selected from Block Suti-II for this study.

Sample design and size: A list complete of women beedi worker's households for two villages is prepared separately. For each village, 25 sample households are randomly selected with the help of the Simple Random Sampling Without Replacement Method (SRSWOR).
Thus, 50 sample respondents were randomly selected for the research study.

Data collection

Pre-tested survey has been used to collect the primary data for the study

Tabular Analysis

The data have been collected and summarized using basic tabular analysis for this present research.

Calculation of Consumer unit: Table 1. A "consumer unit" serves as a measurement to gauge the energy needs of a diverse group of individuals, encompassing various genders and age groups. To establish this standard, the calorie requirements of an average male engaged in sedentary work within the 20-39 age bracket are used as the baseline. The calorie requirements for males and females in other age groups are then expressed relative to this established norm.

Table 1: Number of Consumer Unit Assigned to a Person

Age in completed years	Consumer Unit	
	Male	Female
Below 1	0.43	0.43
1-3 yrs.	0.54	0.54
4-6 yrs.	0.72	0.72
7-9 yrs.	0.87	0.87
10-12yrs.	1.03	0.93
13-15 yrs.	0.97	0.8
16-19 yrs.	1.02	0.75
20-39 yrs.	1	0.71
40-49 yrs.	0.95	0.68
50-59 yrs.	0.9	0.64
60-69 yrs.	0.8	0.51
Above 70	0.7	0.5

***Source*:** NSS Report No. 540: Nutritional intake in India

Calculation of calorie, protein and fat intake Table 2

The amounts of food documented as consumed by the selected households have been transformed into corresponding quantities of calories, protein, and fat using a Nutrition Chart primarily derived from an ICMR publication (Gopalan *et al*., 1991) [5]. This publication provides information about the calorie, protein, and fat contents of various foods prevalent in the Indian diet. The assessment of calorie consumption in this current study has been presented on a 'per consumer unit' basis. This approach of expressing calorie intake per consumer unit is designed to account for variations in calorie requirements due to differences in age and gender. This adjustment ultimately results in a more precise measure of the sufficiency of intake compared to using per capita figures.

Table 2: Calorie, protein and Fat contents of some important food items considered in the study

Item code	Item	Unit	Calories per unit (Kcal)	Protein per unit (gm)	Fat per unit (gm)
(1)	(2)	(3)	(4)	(5)	(6)
1	Rice – other sources	kg	3460	75	5
2	Wheat/atta– other sources	kg	3410	121	17
3	Maida	kg	3480	110	9
4	Moong	kg	3480	245	12
5	Masur	kg	3430	251	7
6	Urd	kg	3470	240	14
8	Milk: condensed/ powder	kg	4960	258	267
9	Sugar: other sources	kg	3980	1	0
10	Edible oil: others	kg	9000	-	1000
11	Eggs	no.	100	8	8
12	Fish, prawn	kg	1050	140	20
13	Beef/ buffalo meat	kg	1140	226	26
14	Pork	kg	1140	187	44
15	Chicken	kg	1090	259	6
16	Potato	kg	970	16	1
17	Onion	kg	550	15	1
18	Cauliflower	kg	300	26	4
19	Cabbage	kg	270	18	1
20	Brinjal	kg	240	14	3
21	Lady's finger	kg	350	19	2
22	Palak/other leafy vegetables	kg	260	20	7
23	Tomato	kg	200	9	2
24	Peas	kg	930	72	1

25	Chillis: green	kg	290	29	6
26	Guava	kg	510	9	3
27	Orange, mausami	no.	50	1	1
28	Mango	kg	740	6	4
29	Pears (naspati)	kg	520	6	2
30	Apple	kg	590	2	5
31	Grapes	kg	710	5	3
32	Garlic	gm	1.45	0.06	0
33	Ginger	gm	0.67	0.02	0.01
34	Turmeric	gm	3.49	0.06	0.05
35	Black pepper	gm	3.04	0.11	0.07
36	Dry chillies	gm	2.46	0.16	0.06

Results and Discussion

This section presents the major findings of the research study.

Frequency of food consumption: The only source of energy for humans is food. Our bodies develop dietary habits and hunger cues to let us know when we need to eat. It is advised to eat at least two main meals every day, as well as morning and afternoon snacks, to maintain a healthy and balanced existence.

Food item-wise annual consumption of food of the sample households: This section consists of food item-wise annual consumption of food of the sample households per Consumer Unit in Murshidabad District of the State of West Bengal.

Table 3: Food item-wise annual per household consumption of food of the sample households of beedi workers in Murshidabad district

Food items	Village-I (Khidirpur) (n=25) (CU=3.96)	Village-II (Mahesail) (n=25) (CU=4.21)	Overall (n=50) (CU=4.08)
Rice (kg)	522.45 (39.76)	514.56 (39.49)	518.51 (39.62)
Wheat (kg)	288.24 (21.95)	291.36 (22.36)	289.80 (22.15)
Pulse (kg)	17.80 (2.24)	15.16 (1.16)	16.48 (1.26)
Edible oil (kg)	28.36 (2.16)	33.31 (2.56)	30.84 (2.36)
Spices (kg)	5.22 (0.40)	5.19 (0.40)	5.21 (0.40)
Tea (kg)	2.33 (0.18)	3.49 (0.27)	2.91 (0.22)
Sugar (kg)	28.36 (2.16)	40.89 (3.14)	34.63 (2.65)
Milk (kg)	3.31 (0.25)	3.25 (0.25)	3.28 (0.25)
Fish (kg)	17.14 (1.30)	14.21 (1.09)	15.67 (1.20)
Meat (kg)	44.83 (3.38)	45.02 (3.46)	44.93 (3.42)
Vegetables (kg)	335.87 (25.58)	312.50 (23.89)	324.19 (24.66)
Fruits (kg)	20.25 (1.54)	24.00 (1.84)	22.13 (1.68)
Total	1326.09 (100.00)	1302.94 (100.00)	1314.51 (100.00)
Egg (no).	214.08	242.40	228.24

NB: *Figures in the parentheses indicate percentage to the total. CU= Per household consumer unit

The Table. 3 shows that among the numerous food products, rice has the highest percentage share for total sample households, accounting for 39.62 percent. Rice was the most popular food among overall sample households, followed by vegetables (24.66 percent), wheat (22.15 percent), meat (3.42 percent), sugar (2.65 percent), edible oil (2.36 percent), fruits (1.68 percent), pulses (1.26 percent), and fish (1.20 percent). The average annual egg intake for the entire sample household is 228.24 in number. Tea, milk, and spices account for a small percentage of overall food consumption.

The total amount of food consumed each year is estimated to be 1314.51 kg for two villages' sample households as a whole.

Food item-wise Calorie Intake for Sample Households of Beedi Workers in Murshidabad District

This sub-section contains food item-wise calorie intake per day per consumer unit for the sample households.

Table 4: Food item-wise calorie intake per day per consumer unit for sample households of beedi workers in Murshidabad District (kcal/day/CU)

Food items	Village-I (Khidir purr) (n=25)	Village-II (Mahesail) (n=25)	Overall (n=50)
Rice	1255.10 (49.89)	1200 (49.24)	1227.55 (49.57)
Wheat	690.25 (27.44)	664.16 (27.25)	677.21 (27.34)
Pulse	68.44 (2.72)	35.27 (1.45)	51.85 (2.09)
Edible oil	189.92 (7.55)	202.88 (8.32)	196.40 (7.93)
Spices	1.02 (0.04)	0.97 (0.04)	0.99 (0.04)
Sugar	80.11 (3.18)	109.90 (4.51)	95.01 (3.84)
Milk	9.91 (0.39)	10.9 (0.45)	10.41 (0.42)
Fish	12.70 (0.5)	10.3 (0.42)	11.50 (0.46)
Meat	34.86 (1.39)	33.15 (1.36)	34.00 (1.37)
Egg	15.18 (0.60)	16.38 (0.67)	15.78 (0.64)
Vegetables	148.12 (5.89)	141.76 (5.82)	144.94 (5.85)
Fruits	10.30 (0.41)	11.50 (0.47)	10.90 (0.44)
Total	2515.91 (100)	2437.17 (100)	2476.54 (100)

*Figures in the parentheses indicate percentage to the total.

Table 4 illustrates the daily calorie consumption per consumer unit for various food items among sample households of Beedi workers in Murshidabad District, West Bengal. The data reveals that in case of households in village-I, rice contributes the most energy at 49.89 percent, followed by wheat at 27.44 percent, edible oil at 7.55 percent, vegetables at 5.89 percent, sugar at 3.18 percent, pulses at 2.72 percent, meat at 1.39 percent, egg at 0.60 percent, fish at 0.50 percent, fruits at 0.41 percent, milk at 0.39 percent, and spices at 0.04 percent. In contrast, for village-II households, rice provides the highest energy at 49.24 percent, followed by wheat at 27.25 percent, edible oil at 8.32 percent, vegetables at 5.82 percent, sugar at 4.45 percent, pulses at 1.45 percent, meat at 1.36 percent, egg at 0.67 percent, fruits at 0.47 percent, milk at 0.45 percent, fish at 0.42 percent, and spices at 0.04 percent. The total daily calorie intake per consumer unit is the highest in village-I at 2515.91 kcal/day/CU and with respected to that in village-II at 2437.17 kcal/day/CU. Overall, Beedi worker households consume an average of 2476.54 kcal/day/CU, surpassing the recommended daily allowance of 2425 kcal/day/capita. Rice constitutes the largest portion of calorie intake at 49.57 percent.

Food item-wise protein intake for sample households of beedi workers in Murshidabad District

Table 5: Food item-wise protein intake per day per consumer unit for sample households of beedi workers in Murshidabad District (gm/day/CU)

Food items	Village-I (Khidir pur) (n=25)	Village-II(Mahesail) (n=25)	Overall (n=50)
Rice	27.21 (37.08)	26.01 (38.23)	26.61 (37.63)
Wheat	24.49 (33.37)	23.57 (34.64)	24.03 (33.98)
Pulse	5.05 (6.88)	2.58 (3.79)	3.81 (5.40)
Edible oil	0 (00.00)	0 (00.00)	0 (00.00)
Spices	0.03 (0.04)	0.03 (0.04)	0.03(0.04)
Sugar	0.02 (0.03)	0.019 (0.03)	0.02 (0.04)
Milk	0.52 (0.71)	0.57 (0.84)	0.54 (0.77)
Fish	1.69 (2.30)	1.37 (2.01)	1.53 (2.16)
Meat	8.28 (11.28)	7.88 (11.58)	8.08 (11.43)
Egg	1.21 (1.65)	1.31 (1.93)	1.26 (1.78)
Vegetables	4.81 (6.55)	4.61 (6.78)	4.71 (6.66)
Fruits	0.08 (0.11)	0.09 (0.13)	0.08 (0.12)
Total	73.39 (100)	68.03 (100)	70.71(100)

*Figures in the parentheses indicate percentage to the total.

The Table. 5 shows the daily protein consumption by consumer unit from various food items for sample households of Beedi workers in Murshidabad District of West Bengal. In terms of total protein consumption, the sample households acquire the most protein from rice (26.61g/day/CU), followed by wheat (24.03), meat (8.08), vegetables (4.71), pulses (3.81), fish (1.53), eggs (1.26), milk (0.54), fruits (0.08), spices (0.03), and sugar (0.02). The corresponding percentage shares are in the range of 37.63 percent, 33.98 percent, 11.43 percent, 6.66 percent, 5.40 percent, 2.16 percent, 1.78 percent, 0.77 percent, 0.12 percent, 0.04 percent, and 0.033 percent. Total protein consumption is higher in village-I in comparison to village-II. The highest amount of protein is obtained from rice.

Food item-wise fat intake for sample households of beedi workers in Murshidabad District

Table 6: Food item-wise fat intake per day per consumer unit for sample households of beedi workers in Murshidabad District (gm/day/CU)

Food items	Village-I (Khidir pur) (n=25)	Village-II(Mahesail) (n=25)	Overall (n=50)
Rice	1.81 (6.15)	1.33 (4.96)	1.57 (5.58)
Wheat	3.44 (11.69)	3.31 (12.34)	3.38 (12.00)
Pulse	0.14 (0.48)	0.07 (0.26)	0.10 (0.37)
Edible oil	21.25 (72.21)	19.25 (71.77)	20.25 (71.99)
Spices	0.01 (0.03)	0.01 (0.04)	0.01 (0.04)
Sugar	0 (00.00)	0 (00.00)	0 (00.00)
Milk	0.53 (1.80)	0.59 (2.20)	0.56 (1.99)
Fish	0.24 (0.82)	0.2 (0.75)	0.22 (0.78)
Meat	0.19 (0.65)	0.18 (0.67)	0.18 (0.66)
Egg	1.21 (4.11)	1.31 (4.88)	1.26 (4.48)
Vegetables	0.56 (1.90)	0.53 (1.98)	0.54 (1.94)
Fruits	0.05 (0.17)	0.04 (0.15)	0.04 (0.16)
Total	29.43 (100)	26.82 (100)	28.13 (100)

*Figures in the parentheses indicate percentage to the total.

The Table 6 shows the food item-wise fat intake per day per consumer unit for sample households of Beedi workers in Murshidabad District of West Bengal. The table reveals that for overall sample households, edible oil provides the highest fat (20.25 gm/day/CU), followed by wheat (3.38), rice (1.57), egg (1.26), milk (0.56), vegetables (0.54), fish (0.22), meat (0.18), pulses ((0.10) and fruits (0.04). The corresponding percentage share of these food items are in the order of 71.99 percent, 12 percent, 5.58 percent, 4.48 percent, 1.99 percent, 1.94 percent, 0.78 percent, 0.66 percent, 0.37 percent and 0.16 percent respectively. The overall fat derived from the consumption of all food items for Beedi worker households is 28.13 gm/day/CU. The total fat intake per consumer unit for Beedi workers households is the highest in village-I (29.43 gm/day/CU) and the lowest in village-II (26.82 gm/day/CU).

Difference between Recommended Doses and Present

Intakes of calorie, protein and fat

The difference between recommended doses and actual intakes of calories, protein, and fat per day per consumer unit for the sample households is shown in this subsection.

Table 7: Difference between Recommended Doses and Present Intakes of Calorie, Protein and Fat

Groups	Energy (kcal/day)	Protein (gm/day)	Fat (gm/day)
Recommended (per capita)	2,425	60	20
Village-I (n=25) (per CU)	2515.91	73.39	29.43
Village-II (n=25) (per CU)	2437.17	68.03	26.82
Total (n=50)	2476.54	70.71	28.13

NB: Recommended doses are calculated by per capita. But in this study intakes of calorie, protein and fat have been calculated by per consumer unit, which is scientifically much more accurate.

The Table 7 depicts the disparities between the recommended daily allowances and the current intake of calories, protein, and fat per consumer unit among the sample Beedi worker households in Murshidabad District. This analysis compares the present calorie and nutrient consumption in each of the sample villages with the Recommended Dietary Allowance (RDA) established by the Indian Council of Medical Research, as detailed in the studies by Chakma *et al*. (2009) [2] and Khandare *et al*. (2008) [6]. The objective is to assess how the calorie and nutrient intake of these sampled households aligns with the recommended standards.

In the study area, the overall current calorie intake is recorded at 2476.54 kcal/day/CU, surpassing the RDA of 2425 kcal/day/capita. Specifically, in village-I, the present calorie intake is 2515.91 kcal/day/CU, while in village-II, it stands at 2437.17 kcal/day/CU.

The overall protein intake in the study area totals 70.71 gm/day/CU, exceeding the RDA of 60 gm/day/capita. Village-I records a protein intake of 73.39 gm/day/CU, and village-II reports 68.03 gm/day/CU. In both villages, protein intake exceeds the recommended levels.

Similarly, the overall fat intake in the study area is 28.13 gm/day/CU for the sample Beedi worker households, surpassing the RDA of 20 gm/day/capita. Village-I records a fat intake of 29.43 gm/day/CU, while village-II reports 26.82 gm/day/CU. In both villages, fat intake exceeds the recommended levels.

Summary and Conclusion

The results show that the overall total quantity of food annually consumed per household is found to be (1314.51kg/annum) for two village's sample households. The overall intake of calories in the study area is 2476.54 kcal/day/CU which is little more than the Recommended Dietary Allowance (RDA) of 2425 kcal/day/capita. The average intake of protein level in the study area stands at 70.71gm/day/CU which also remains at higher level compared to RDA of 60gm/day/capita. In general, intake of fat in the study area is 28.13 gm/day/CU which is again higher than the RDA level. The beedi workers of Village-I have been found to have higher level of calorie consumption, protein intake and fat consumption in comparison to village-II. Though earning from Beedi making is not adequate, the higher level of nutritional security of the sample workers may be attributed to the Govt. services available by them in terms of PDS and other social and developmental schemes. Based on the perceptions of the respondents, few suggestions have been put forward in terms of efficient services of all Govt. schemes, availability of adequate and affordable food supply, introduction of more social and developmental programs, promotion of NGO, FPO or Farmers' Club, alternative livelihood, rehabilitation facilities, etc.

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