Nutrient intake disparities among public distribution system beneficiaries in the Bundelkhand region

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There is a consistent association between dietary diversity, both in terms of quantity and pattern of food consumption, and inadequate growth, development and long-term health outcomes. A total of 16 villages in the Bundelkhand region were chosen to evaluate calorie and nutrition intake using a 24-hour recall time. Caloric and nutrient intake in Chitrakoot district deviated from the recommended dietary allowance, with insufficient dietary diversity. This deficiency, excluding protein and phosphorus consumption, adversely affected the under-nutrition status among beneficiaries of the public distribution system.

A well-balanced diet is essential for optimal mental and physical health. Consumption of a variety of foods from different food groups is an effective way to ensure that an individual is getting enough of the nutrients required to stay healthy, and this concept is known as 'dietary diversity'[1,2]. Malnutrition (low calorie and protein intake), micronutrient deficiencies, and overeating are the 'triple burden' of malnutrition that must be overcome through dietary diversity[3,4]. Less optimal growth, development and long-term health outcomes were consistently linked to dietary diversity in quantity and pattern in the food basket[5]. While undernutrition in adolescents has increased, the overall prevalence of overweight has increased dramatically, from 1.8% to 7.5% among boys, and 1.9% to 6.1% among girls during 1999–2015. Consequently, the rates of overweight and obesity, diabetes and excessive consumption have increased across all socioeconomic groups[6]. India's 447 million anaemic people account for almost 25% of the global burden, according to the 2016 global burden of disease[7]. One of the most effective and inexpensive programmes to fight hunger is India's public distribution system (PDS). Family preferences, practices and backgrounds influence children's food and feeding habits. Fresh produce, legumes, nuts, meat and milk are out of reach for many families. Parents are usually unaware of age-appropriate foods and feeding practices, proper care and health-seeking behaviours. Diet quality, or how well nutritional needs are met, can be indirectly measured by how people's diets are varied. An increase in both energy and nutrients is seen in those who consume a wider variety of foods[8]. Therefore, assessing food security at the household level may be more practical and expedient when understanding dietary diversity. The use of dietary diversity scores to quantify dietary diversity and its relationship to various well-being outcomes, such as nutritional and health outcomes, has increased in recent years[9,10]. The nutritional effects of PDS are undocumented, but it has helped reduce hunger[11]. Few recent studies have shown that higher rates of PDS coverage are associated with higher calorie consumption rates and greater dietary diversity, most likely because of income effects[12–15]. It is reasonable to assume that urban household size, rural household age, fair price shop distance, monthly household income and monthly food expenditure positively and significantly affect dietary diversity in rural and urban areas with good diets and healthy lifestyles. In most cases, cereals and vegetables were the primary sources of energy and nutrients. In every village, cereals, particularly rice and wheat, were the primary source of dietary nutrients. In most villages, the consumption of pulses, oils and fresh fruits was relatively low (less than 1 kg/person/month)[16]. PDS-subsidized wheat may be replaced by the more nutritious superior coarse cereals and millets[17]. Factors such as production diversity[18], household income/expenditure levels, and demographic and socioeconomic characteristics of households influence the dietary diversity of people in each area[19]. According to the findings of Goli *et al.*[20], enhanced land accessibility positively impacts the food and nutrition security of farming households. This is because informal non-farm employment in India is predominantly characterized by casual labour or self-employment with low and unstable remuneration. Knowing what constitutes an appropriate diet for

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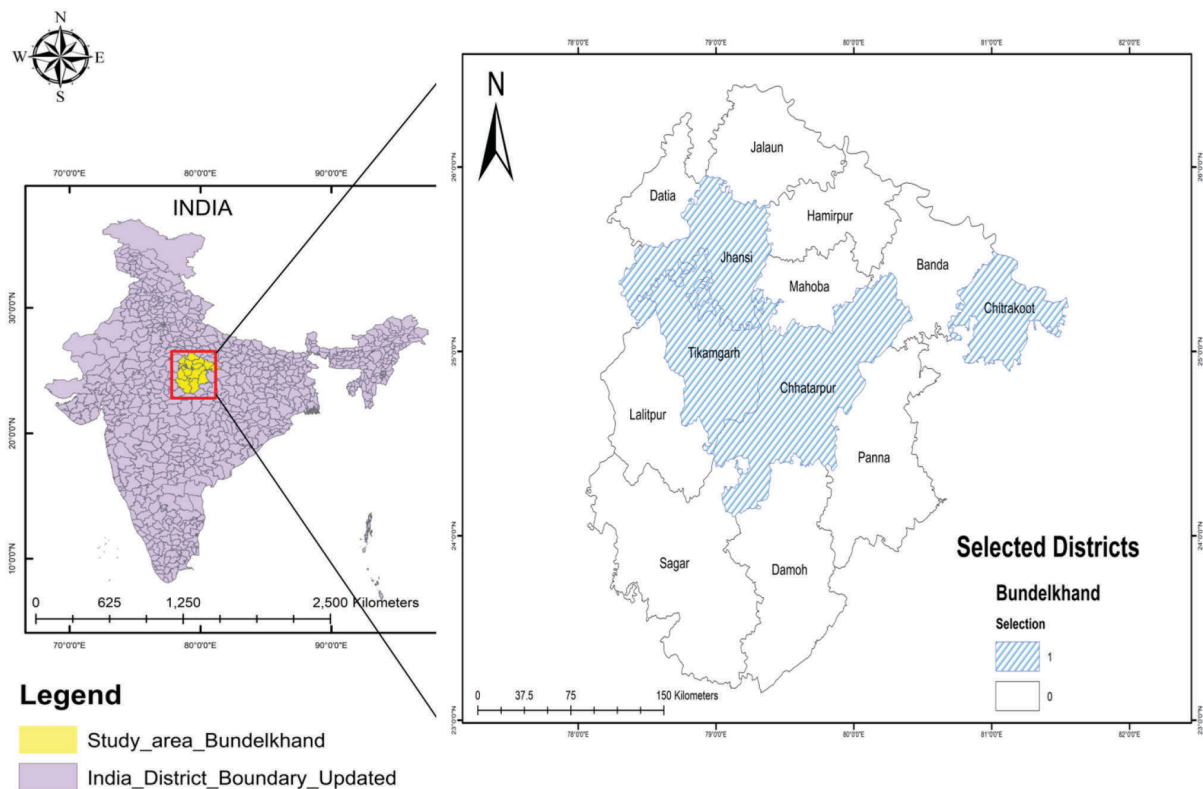
Figure 1. Geographical location of selected districts in Bundelkhand region.

a health condition and having the means, skills and motivation to make healthy food choices are essential for ensuring adequate nutrition and food security[20]. A study[21], discovered that better sanitation and hygiene, which reduced child undernutrition, was linked to increased access to clean water and toilets.

The study was conducted in 16 villages in the Bundelkhand region, which is situated in central India (Figure 1). The region is situated between the Indo-Gangetic Plain to the north and the Vindhya Range to the south, covering approximately 7.08 million hectares. Thirteen districts, consisting of seven from Uttar Pradesh (Banda, Chitrakoot, Hamipur, Jalaun, Jhansi, Lalitpur and Mahoba) and six from Madhya Pradesh (Chhatarpur, Damoh, Datia, Panna, Sagar and Tikamgarh), encompass the entire region. The upland is characterized by its gently sloping, barren and hilly terrain with limited vegetation. However, it should be worth noting that the area was once covered in forests. The region experiences a hot and semi-humid climate with limited rainfall, leading to frequent droughts and drought-like conditions. These conditions have a negative impact on agricultural productivity and the overall socioeconomic development of the region. According to the National Institute of Disaster Management (NIDM) in New Delhi, Bundelkhand is experiencing severe drought conditions resulting in crop failures, widespread migration and scarcity of drinking water in numerous villages[22].

Materials and methods

The study included a total of 16 villages from two states: Jhansi district (Palinda, Pali Pahari, Dhawani and Aupura villages) and Chitrakoot district of Uttar Pradesh State (Nagar, Sarhat, Basingha and Ramnagar villages); Tikamgarh district (Mahuabag, Karibhata, Karmarai and Ganeshganj villages) and Chhatarpur district (Bilahari, Simardha, Chaubar and Udayapura villages) of Madhya Pradesh. In addition to the agro-climatic challenges in the Bundelkhand region, the selection of districts was determined by the multi-dimensional poverty index (MPI). It included the aspirational districts in the Bundelkhand region. The districts chosen for this study were Tikamgarh and Jhansi, selected based on their lowest and highest scores on the MPI respectively. Additionally, Chitrakoot and Chhatarpur were selected as they are considered aspirational districts. The blocks and villages were randomly selected from each district. A total of 320 respondents were randomly selected for this study. This study analyses the food consumption patterns, nutrient intake levels and nutrition gaps among PDS beneficiaries in selected villages. The household consumption data regarding the quantity of food items consumed was collected using the 24 h recall period method. A structured schedule consisting of ninety-one food items categorized into fifteen food groups, such as liquid, baked/fried wheat/grain bread, rice, etc. was prepared.

Table 1. Average consumption of energy and nutrients in sample households of Bundelkhand region (unit/person/day)

District	Village	Average weight (g)	Energy (k cal)	Protein (g)	Fat (g)	Carbohydrate (g)	Calcium (mg)	Phosphorus (mg)	Iron (mg)
Jhansi	Palinda	1587.18	2556.04	66.30	36.86	467.30	1039.61	1813.31	22.58
	Pali Pahari	1417.04	2315.50	58.62	29.28	437.74	845.76	1590.22	20.07
	Dhawani	1224.31	2100.22	51.50	24.53	402.87	738.58	1413.42	17.38
	Aupura	1240.60	2154.62	54.62	28.08	403.23	806.27	1503.29	18.70
Chitrakoot	Nagar	1281.44	2203.88	56.28	29.56	408.64	874.25	1529.21	18.62
	Sarhat	1189.96	2050.30	50.17	25.35	387.94	781.15	1370.81	15.61
	Basingha	1106.88	1959.27	47.64	21.92	378.43	667.55	1306.54	15.90
	Ramnagar	1050.64	1903.33	46.30	22.10	365.20	684.74	1267.92	14.89
Tikamgarh	Mahuabag	1479.14	2408.88	61.43	32.23	447.60	935.72	1668.26	7.76
	Karibhata	1316.17	2182.98	54.47	26.41	415.23	775.69	1485.31	7.19
	Karmarai	1232.13	2109.52	51.75	24.14	405.78	734.88	1406.33	7.19
	Ganeshganj	1268.17	2192.23	55.55	28.22	411.23	808.88	1516.59	6.00
Chhatarpur	Bilahari	1464.42	2404.93	61.21	31.71	448.03	930.81	1650.62	7.14
	Simardha	1365.71	2234.47	55.61	27.72	422.10	825.03	1468.10	7.71
	Chaubar	1269.03	2105.41	50.99	22.59	410.05	678.29	1352.05	6.05
	Udaypura	1250.87	2094.39	51.13	24.83	400.54	760.88	1401.30	6.00

Participants were instructed to provide a detailed account of the food items they consumed in the past 24 h, including the quantities of each item.
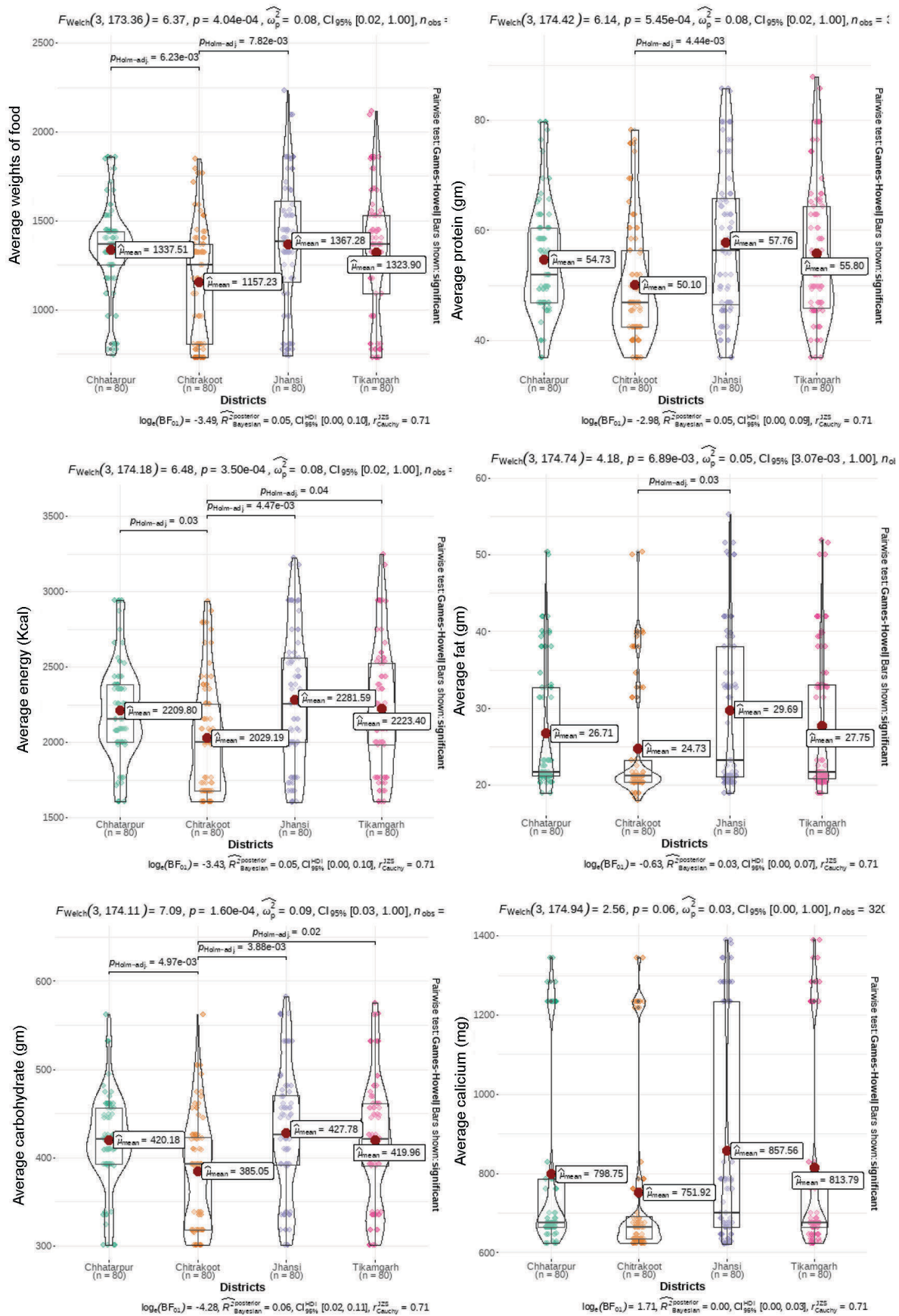
Analytical framework

The food consumption data of households mentioned earlier was used to compute the nutrient compositions of food items. A nutrient conversion chart is employed to approximate the amount of dietary intake in terms of its corresponding energy and other nutrient compositions, including protein, fat, calcium, phosphorus and iron, at the household level[23–25]. The method was additionally employed to assess the 'nutrient gap', which refers to the extent to which the nutritional intake of a household deviates from the recommended dietary allowances (RDA). The study involved a comparison between household dietary intake and the RDA, considering factors such as sex, age groups and daily workload. The nutrient gap was further evaluated by conducting a t-test to compare the means of two groups and draw an inference regarding the disparity in nutritional composition. The defined categories of undernutrition are as follows: 'Extreme' refers to a situation where 75% or more of the population in a village does not meet the recommended intake of a specific nutrient. 'High' is used when the proportion of the population deprived of the recommended intake falls between 50% and 75%. 'Moderate' is assigned when the share of the population with inadequate nutrient intake ranges from 25% to 50%. Lastly, 'low' is used when less than 25% of the population exhibits a deficit in nutrient intake. Household dietary diversity refers to the inclusion of multiple food groups in a comprehensive daily dietary regimen, indicative of an individual's knowledge of nutritious food options and conscientious dietary practices. The data for the household dietary diversity score (HDDS) was obtained using a standardized questionnaire and computed by determining the ratio of food groups consumed within a 24 h recall period in relation to the total number of food groups available. The HDDS was determined based on the availability of foods, resulting in the finalization of a set of 12 food groups, i.e. cereals, roots and tubers, vegetables, fruits, meat and poultry, eggs, fish and seafood, pulses, milk and milk products, oils, sugar and miscellaneous. The household dietary diversity scores of the districts were compared using analysis of variance (ANOVA) and t-tests to conduct a more detailed assessment of each pair of districts.

Results and discussion

Table 1 presents the current state of food consumption in relation to different nutrients. The analysis of dietary parameters across different districts reveals a varied pattern of food consumption. The average weight of food exhibited variation, ranging from 1050 g/person/day in Ramnagar village of Chitrakoot district to 1587 g/person/day in Palinda village of Jhansi district. In terms of dietary intake, Jhansi district was found to be consistently ranked at the top among all other districts. In terms of calorie (k cal), protein (g), fat (g), carbohydrate (g), calcium (mg) and phosphorus (mg) intake disparity, the villages of Palinda in Jhansi, Mahuabag in Tikamgarh and Bilhari in Chhatarpur took the top three positions, while Basingha and Ramnagar in Chitrakoot consistently ranked lower. The consumption of food rich in iron was found to be lower in Ganeshganj village of Tikamgarh district, as well as in Udaypura village of Chhatarpur district. The majority of calories consumed by the beneficiaries of the PDS can be attributed to cereal-based products such as chapati (roti), rice, etc. as these are the primary PDS entitlements[16,26].

Box–Violin plots and the ANOVA test were used to illustrate the disparity in nutrient intake between districts (Figure 2). Significant differences were observed in the average intake of each nutrient among districts, with the
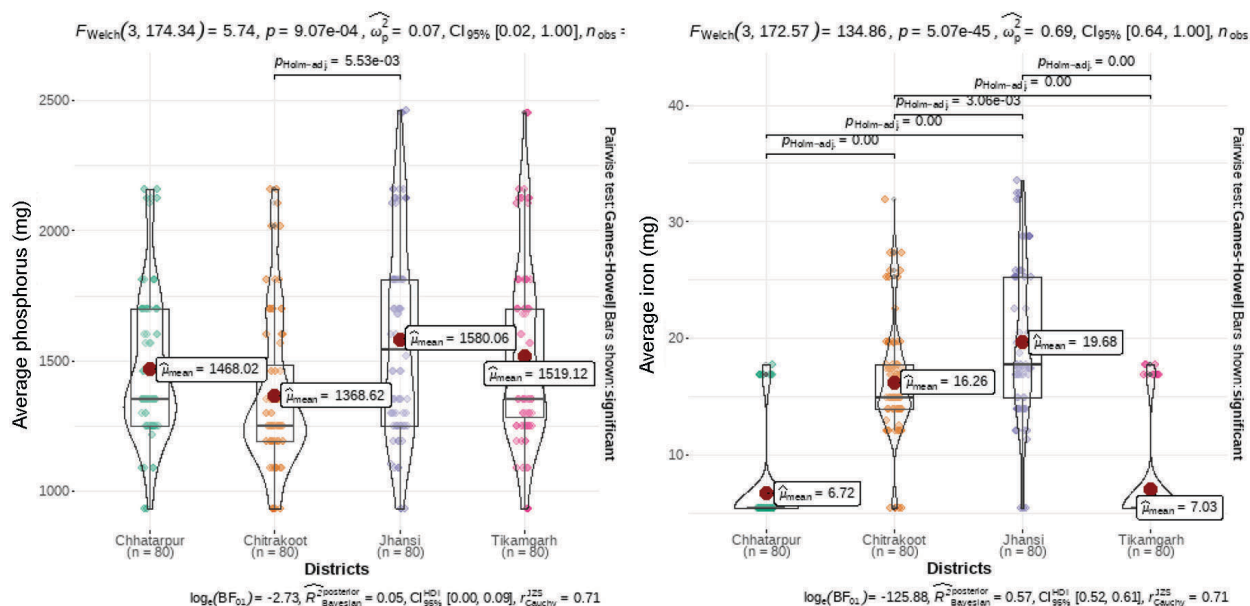
$F_{\text{Welch}}(3, 173.36) = 6.37, p = 4.04e{-}04, \widehat{\omega}_p^2 = 0.08, \text{CI}_{95\%} [0.02, 1.00], n_{\text{obs}} =$

$p_{\text{Holm-adj.}} = 6.23e{-}03$

$p_{\text{Holm-adj.}} = 7.82e{-}03$

$\widehat{\mu}_{\text{mean}} = 1337.51$
$\widehat{\mu}_{\text{mean}} = 1157.23$
$\widehat{\mu}_{\text{mean}} = 1367.28$
$\widehat{\mu}_{\text{mean}} = 1323.90$

Average weights of food

Pairwise test:Games–Howell;Bars shown:significant

Chhatarpur (n = 80) · Chitrakoot (n = 80) · Jhansi (n = 80) · Tikamgarh (n = 80)

Districts

$\log_e(\text{BF}_{01}) = -3.49, \widehat{R}^{2\,\text{posterior}}_{\text{Bayesian}} = 0.05, \text{CI}^{\text{HDI}}_{95\%} [0.00, 0.10], r^{\text{JZS}}_{\text{Cauchy}} = 0.71$

$F_{\text{Welch}}(3, 174.42) = 6.14, p = 5.45e{-}04, \widehat{\omega}_p^2 = 0.08, \text{CI}_{95\%} [0.02, 1.00], n_{\text{obs}} =$

$p_{\text{Holm-adj.}} = 4.44e{-}03$

$\widehat{\mu}_{\text{mean}} = 54.73$
$\widehat{\mu}_{\text{mean}} = 50.10$
$\widehat{\mu}_{\text{mean}} = 57.76$
$\widehat{\mu}_{\text{mean}} = 55.80$

Average protein (gm)

Pairwise test:Games–Howell;Bars shown:significant

Chhatarpur (n = 80) · Chitrakoot (n = 80) · Jhansi (n = 80) · Tikamgarh (n = 80)

Districts

$\log_e(\text{BF}_{01}) = -2.98, \widehat{R}^{2\,\text{posterior}}_{\text{Bayesian}} = 0.05, \text{CI}^{\text{HDI}}_{95\%} [0.00, 0.09], r^{\text{JZS}}_{\text{Cauchy}} = 0.71$

$F_{\text{Welch}}(3, 174.18) = 6.48, p = 3.50e{-}04, \widehat{\omega}_p^2 = 0.08, \text{CI}_{95\%} [0.02, 1.00], n_{\text{obs}} =$

$p_{\text{Holm-adj.}} = 0.04$
$p_{\text{Holm-adj.}} = 4.47e{-}03$
$p_{\text{Holm-adj.}} = 0.03$

$\widehat{\mu}_{\text{mean}} = 2209.80$
$\widehat{\mu}_{\text{mean}} = 2029.19$
$\widehat{\mu}_{\text{mean}} = 2281.59$
$\widehat{\mu}_{\text{mean}} = 2223.40$

Average energy (Kcal)

Pairwise test:Games–Howell;Bars shown:significant

Chhatarpur (n = 80) · Chitrakoot (n = 80) · Jhansi (n = 80) · Tikamgarh (n = 80)

Districts

$\log_e(\text{BF}_{01}) = -3.43, \widehat{R}^{2\,\text{posterior}}_{\text{Bayesian}} = 0.05, \text{CI}^{\text{HDI}}_{95\%} [0.00, 0.10], r^{\text{JZS}}_{\text{Cauchy}} = 0.71$

$F_{\text{Welch}}(3, 174.74) = 4.18, p = 6.89e{-}03, \widehat{\omega}_p^2 = 0.05, \text{CI}_{95\%} [3.07e{-}03, 1.00], n_{\text{ol}}$

$p_{\text{Holm-adj.}} = 0.03$

$\widehat{\mu}_{\text{mean}} = 26.71$
$\widehat{\mu}_{\text{mean}} = 24.73$
$\widehat{\mu}_{\text{mean}} = 29.69$
$\widehat{\mu}_{\text{mean}} = 27.75$

Average fat (gm)

Pairwise test:Games–Howell;Bars shown:significant

Chhatarpur (n = 80) · Chitrakoot (n = 80) · Jhansi (n = 80) · Tikamgarh (n = 80)

Districts

$\log_e(\text{BF}_{01}) = -0.63, \widehat{R}^{2\,\text{posterior}}_{\text{Bayesian}} = 0.03, \text{CI}^{\text{HDI}}_{95\%} [0.00, 0.07], r^{\text{JZS}}_{\text{Cauchy}} = 0.71$

$F_{\text{Welch}}(3, 174.11) = 7.09, p = 1.60e{-}04, \widehat{\omega}_p^2 = 0.09, \text{CI}_{95\%} [0.03, 1.00], n_{\text{obs}} =$

$p_{\text{Holm-adj.}} = 0.02$
$p_{\text{Holm-adj.}} = 3.88e{-}03$
$p_{\text{Holm-adj.}} = 4.97e{-}03$

$\widehat{\mu}_{\text{mean}} = 420.18$
$\widehat{\mu}_{\text{mean}} = 385.05$
$\widehat{\mu}_{\text{mean}} = 427.78$
$\widehat{\mu}_{\text{mean}} = 419.96$

Average carbohydrate (gm)

Pairwise test:Games–Howell;Bars shown:significant

Chhatarpur (n = 80) · Chitrakoot (n = 80) · Jhansi (n = 80) · Tikamgarh (n = 80)

Districts

$\log_e(\text{BF}_{01}) = -4.28, \widehat{R}^{2\,\text{posterior}}_{\text{Bayesian}} = 0.06, \text{CI}^{\text{HDI}}_{95\%} [0.02, 0.11], r^{\text{JZS}}_{\text{Cauchy}} = 0.71$

$F_{\text{Welch}}(3, 174.94) = 2.56, p = 0.06, \widehat{\omega}_p^2 = 0.03, \text{CI}_{95\%} [0.00, 1.00], n_{\text{obs}} = 320$

$\widehat{\mu}_{\text{mean}} = 798.75$
$\widehat{\mu}_{\text{mean}} = 751.92$
$\widehat{\mu}_{\text{mean}} = 857.56$
$\widehat{\mu}_{\text{mean}} = 813.79$

Average calcicium (mg)

Pairwise test:Games–Howell;Bars shown:significant

Chhatarpur (n = 80) · Chitrakoot (n = 80) · Jhansi (n = 80) · Tikamgarh (n = 80)

Districts

$\log_e(\text{BF}_{01}) = 1.71, \widehat{R}^{2\,\text{posterior}}_{\text{Bayesian}} = 0.00, \text{CI}^{\text{HDI}}_{95\%} [0.00, 0.03], r^{\text{JZS}}_{\text{Cauchy}} = 0.71$

(*Contd*)

$F_{\text{Welch}}(3, 174.34) = 5.74$, $p = 9.07\text{e-}04$, $\widehat{\omega_p^2} = 0.07$, $CI_{95\%}$ [0.02, 1.00], n_{obs}

$\log_e(BF_{01}) = -2.73$, $\widehat{R^{2\,\text{posterior}}_{\text{Bayesian}}} = 0.05$, $CI^{\text{HDI}}_{95\%}$ [0.00, 0.09], $r^{\text{JZS}}_{\text{Cauchy}} = 0.71$

$F_{\text{Welch}}(3, 172.57) = 134.86$, $p = 5.07\text{e-}45$, $\widehat{\omega_p^2} = 0.69$, $CI_{95\%}$ [0.64, 1.00], n_{obs}

$\log_e(BF_{01}) = -125.88$, $\widehat{R^{2\,\text{posterior}}_{\text{Bayesian}}} = 0.57$, $CI^{\text{HDI}}_{95\%}$ [0.52, 0.61], $r^{\text{JZS}}_{\text{Cauchy}} = 0.71$

Figure 2. Comparison of districts on the basis of energy and nutrient intake.

Table 2. Status of calorie and nutrient intake gap of public distribution system beneficiaries

Nutrients	Mean as per sex (female/male)	Overall mean	Recommended dietary allowances			
			Male	Female	d	t-Value
Average weight (g)	1258.02/1335.90	1296.50 ± 343.35				
Energy (k cal)	2151.34/2221.52	2186.00 ± 397.22	2710	2130	−230.37	−8.75**
Protein (g)	53.61/55.60	54.60 ± 12.15	54	46	4.64	6.66**
Fat (g)	26.77/27.67	27.20 ± 9.10	59.6	46.8	−25.89	−42.64**
Carbohydrate (g)	406.60/420.05	413.20 ± 66.63	472	367	−5.59	−1.24
Calcium (mg)	806.34/804.64	805.50 ± 246.63	1000		−194.49	−14.10**
Phosphorus (mg)	1461.92/1505.53	1484.00 ± 339.40	1000		483.95	25.50**
Iron (mg)	12.26/12.59	12.42 ± 7.51	19	29	−11.63	−22.83**

Table 3. Status of calorie and nutrient gap of sample population across different districts of Bundelkhand region

District	Block	Villages	Energy (k cal)	Protein (g)	Fat (g)	Carbohydrate (g)	Calcium (mg)	Phosphorus (mg)	Iron (mg)
Jhansi	Babina	Palinda							
		Pali Pahari							
	Chirgaon	Dhawani							
		Aupura							
Chitrakoot	Manikpur	Nagar							
		Sarhat							
	Ramnagar	Basingha							
		Ramnagar							
Tikamgarh	Jatara	Mahuabag							
		Karibhata							
	Tikamgarh	Karmarai							
		Ganeshganj							
Chhatarpur	Nowgon	Bilahari							
		Simardha							
	Rajnagar	Chaubar							
		Udaypura							

🟨 'Low' under-nutrition (<25% population deprived of recommended nutrient intake), 🟧 'Moderate' under-nutrition (25% to <50% population deprived of recommended nutrient intake), 🟧 'High' under-nutrition (50% to <75% population deprived of recommended nutrient intake), 🟥 'Extreme' under-nutrition (>75% population deprived of recommended nutrient intake).
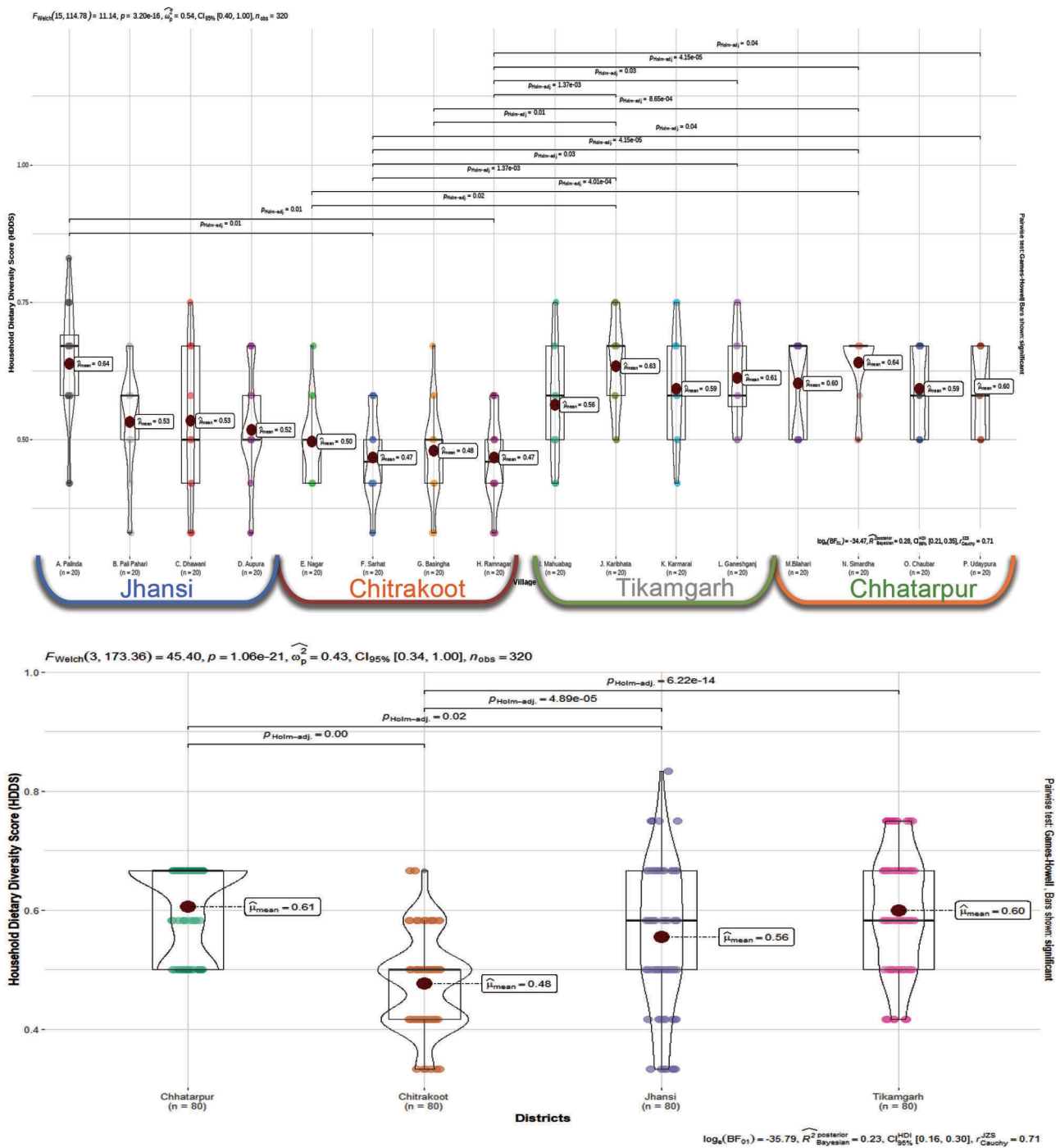
Figure 3. Comparison of household dietary diversity score in sampled area.

exception of calcium (g) intake. This finding provides compelling evidence of disparities in nutrient intake among beneficiaries of the PDS. However, F-values alone are inadequate for determining the superiority of districts. A post-hoc test for each pair of districts revealed the disparity in nutrient intake by identifying significant mean differences[16].

Calorie and nutrient intake gap

Table 2 compares the average calorie and nutrient intake of beneficiaries of the PDS and RDA. It aims to illustrate the calorie and nutrient intake gap among PDS beneficiaries. A notable difference was observed in calorie and nutrient intake compared to the RDA, except for carbohydrate

consumption. The negative difference between calorie and nutrient intake signifies the inability of individual to meet the RDA. This discrepancy suggests that they are facing challenges related to the affordability and availability of food. The consumption of carbohydrates surpassed the RDA, suggesting a dietary inclination towards food groups primarily composed of cereals. This preference reflects the significant reliance of household members on PDS provisions. The consumption of channa dal, black gram, raw milk and milk-based products resulted in a noticeable increase in protein and phosphorus intake.

The total sample villages were categorized into four groups based on the prevalence of under-nutrition, as shown in Table 3. The village of Basingha in the Chitrakoot district was classified as 'Extreme' due to its high prevalence of under-nutrition, affecting over 75% of its population. Additionally, there were 10 other villages categorized as 'High', where 50–75% of the population experienced under-nutrition in terms of calorie intake. A total of six villages were classified under the 'Extreme' category for under-nutrition in protein intake, while eight villages fell under the same category for under-nutrition in fat intake. All of the villages were classified under the 'Low' category in terms of under-nutrition, as less than 25% of the population consumed an adequate amount of carbohydrates, calcium and phosphorus. The villages in Tikamgarh and Chhatarpur districts were categorized as 'Extreme' due to the prevalence of under-nutrition in iron consumption, affecting over 75% of the population. These findings provide a comprehensive understanding of the disparity in calorie and nutrient consumption among the beneficiaries of the PDS within a particular village[16,27,28].

Household dietary diversity score

Households were found to prioritize the inclusion of a minimum of five food groups in their daily diet, aiming to achieve a minimum-dietary diversity. In the sampled region, households consumed more than five food groups in their diets, except Chitrakoot district (Table 4). A high household dietary diversity score signifies the presence of a healthy diet that individuals should aim to consume on a daily basis[8,29]. Chhatarpur and Tikamgarh districts exhibited a higher prevalence of HDDS (0.6 ~ six food groups) compared to the remaining districts. The Chitrakoot district was unable to achieve the minimum dietary diversity

Table 4. Household dietary diversity scores of households in different districts

District	N	Mean	SD
Chhatarpur	80	0.6	0.07
Chitrakoot	80	0.47	0.07
Jhansi	80	0.55	0.11
Tikamgarh	80	0.6	0.09

required, which impacted the under-nutrition status of the beneficiaries of the PDS[30].

The highest HDDS was achieved by Palinda village in Jhansi district and Simardha village in Chhatarpur district, with a score of 0.64. Close behind is Karibhata village in Tikamgarh district, which obtained an HDDS of 0.63. The analysis of Figure 3 reveals a significant difference in the HDDS among the various villages. This difference is statistically significant at a significance level of 1% and is accompanied by a substantial effect size ω_p^2. The villages were represented according to their respective districts to observe and analyse the variations between villages and districts. Notably, no significant differences were observed between pairs of villages within a district, suggesting a consistent food consumption pattern across these villages. Each pair of villages that were significantly different were located in different districts. When comparing districts based on HDDS, a notable distinction was observed between districts at a significance level of 1 per cent. This distinction was accompanied by a substantial effect size ω_p^2. Four pairs of districts exhibited significant differences in the HDDS, except for two pairs of districts: Chhatarpur–Tikamgarh and Jhansi–Tikamgarh.

Conclusion

Within the scope of this study, a total of sixteen villages within the Bundelkhand region were analysed in terms of the calorie and nutritional intake of households that were receiving PDS benefits. The results are reflective of their dependencies on their entitlement to PDS. The prevalent nutrition gap in villages was further classified into four sub-nutrition status categories. Last, the HDDS was calculated, and differences in the foods people ate every day were observed.

Conflict of interest: The authors declare that there is no conflict of interest.

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