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Assessment of the nutritional gap between rural and urban households against ICMR-NIN recommended dietary allowances in Raipur District, Chhattisgarh

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Abstract

Indian dietary patterns are frequently described as sufficient in calories yet deficient in quality but district-level evidence comparing rural and urban households against the revised national reference standard remains limited. The present study assessed the nutritional gap between rural and urban households of Raipur district, Chhattisgarh, benchmarked against the ICMR-NIN 'My Plate for the Day' Recommended Dietary Allowance. A cross-sectional survey of 120 households equally divided between the two strata was conducted through stratified random sampling and a structured schedule in which respondents classified household per-capita intake of eight food groups as below about or above the recommended level and the responses were analysed using percentage distribution and Pearson's chi-square test of independence. The principal shortfalls occurred in protein-rich and protective foods rather than in staples 62.7 per cent of households consumed eggs, meat or fish below the 40 g benchmark and 48.3 per cent consumed green leafy vegetables below 100 g while roughly a third fell short on both milk and fruit. These deficits were shared almost equally by rural and urban households, none of them reaching statistical significance (all $p > 0.24$). By contrast, 63.3 per cent of households exceeded the cereal benchmark and 51.3 per cent the oil benchmark, and the two strata diverged significantly only in cereals ($\chi^2 = 11.32$, $p = 0.004$) and pulses ($\chi^2 = 10.01$, $p = 0.007$), where rural over-consumption was more pronounced. Just over half the respondents (51.7 per cent) regarded their diet as adequate, and awareness of a balanced diet was markedly weaker in rural areas (36.7 against 57.6 per cent). The nutritional gap in Raipur is therefore one of dietary quality rather than quantity and is largely district-wide rather than confined to rural households, so that affordability and awareness measures for protein, vegetables, dairy and fruit are best planned across the district, while cereal and pulse moderation can be directed more specifically towards rural households.

Keywords: Nutritional gap, Rural households, Urban households, ICMR-NIN

Introduction

Undernutrition and poor diet quality persist as leading contributors to the global burden of disease despite steady gains in food production. The latest joint assessment by five United Nations agencies estimated that between 638 and 720 million people around 673 million at the mid-point faced hunger in 2024, while close to 2.3 billion experienced moderate or severe food insecurity (FAO, IFAD, UNICEF, WFP and WHO, 2025). More telling for a study concerned with dietary quality rather than mere calorie sufficiency is the finding that about 2.6 billion people roughly 31.9 per cent of the world's population could not afford a healthy diet in 2024, with the average cost of such a diet reaching 4.46 purchasing-power-parity dollars per person per day (FAO *et al.*, 2025) [3]. Anaemia a direct marker of micronutrient-poor diets, affected an estimated 30 per cent of non-pregnant and 37 per cent of pregnant women of reproductive age worldwide (World Health Organization, 2023) [13].

India occupies a paradoxical position within this global picture. The country has driven much of the recent improvement in South Asian food security yet it continues to carry one of the heaviest absolute burdens of malnutrition. National Family Health Survey data (NFHS-5 2019–21)

placed the prevalence of stunting among children under five at 35.5 per cent, wasting at 19.3 per cent and underweight at 32.1 per cent, while anaemia affected 57.0 per cent of women aged 15–49, 25.0 per cent of men and 67.1 per cent of children aged 6–59 months (International Institute for Population Sciences and MoHFW). The most recent global estimate indicated that 42.9 per cent of Indians were unable to afford a healthy diet underlining that affordability and not only availability, governs what households actually eat. These indicators point less to an outright calorie deficit than to a diet skewed towards cheap, energy-dense staples at the expense of protein-rich and micronutrient-dense foods, the pattern often termed the nutrition transition.

Against this backdrop, the Recommended Dietary Allowance provides an objective yardstick for judging whether households eat in the right proportions rather than simply enough. The Indian Council of Medical Research–National Institute of Nutrition revised its dietary guidelines and the accompanying 'My Plate for the Day' in 2024, specifying per-capita daily quantities for cereals, pulses, milk and milk products, vegetables, fruits, flesh foods and edible oil for a balanced 2,000 kcal reference diet (ICMR-NIN, 2024) [5]. Comparing actual consumption against these food-group

benchmarks converts an abstract concern about diet quality into a measurable gap for each food group which is directly useful for designing targeted interventions. This food-group logic is consistent with the wider scientific consensus on healthy, sustainable diets set out by the EAT–Lancet Commission (Willett *et al.*, 2019) ^[12].

A rural–urban comparison is central to understanding this gap in a state such as Chhattisgarh. Rural and urban households differ in income composition, occupational structure market access, exposure to processed foods and nutrition literacy, and each of these factors pulls dietary patterns in a different direction. The rural dimension carries measurable weight at the global level food insecurity is consistently higher among rural than urban populations and in 2023 an estimated 28.9 per cent of the world's population some 2.33 billion people were moderately or severely food insecure (FAO *et al.*, 2024) ^[2]. Rural households often retain a partial subsistence base and traditional cereal-heavy diets whereas urban households enjoy wider market access but face greater exposure to energy-dense convenience foods. Chhattisgarh presents an acute version of this contrast. State-level survey estimates show that more than 59 per cent of women are anaemic and close to one-third of children under five are stunted both above the corresponding national figures (IIPS and MoHFW, 2021) ^[6], even though the state operates an extensive Public Distribution System. Raipur, the state capital contains a substantial urban population alongside an agrarian rural hinterland within a single administrative unit, which allows a controlled rural–urban comparison without the confounding effect of inter-district variation.

Most existing dietary-adequacy studies in India report at the national or state level focus on a single population group such as children or pregnant women or predate the 2024 ICMR–NIN revision. Relatively few examine the household as the unit of analysis compare rural and urban strata directly within one district and benchmark food-group intake against the current national standard. This leaves a gap in locally grounded evidence of the kind extension agencies and nutrition programmes need in order to prioritise food groups and target areas. Identifying precisely which food groups fall short and whether those shortfalls are shared across both strata or concentrated in one is a prerequisite for cost-effective nutrition planning at the district level.

The present study was therefore undertaken to assess the nutritional gap between rural and urban households of Raipur district against the ICMR–NIN Recommended Dietary Allowances. Specifically, it quantifies, for eight major food groups the share of households consuming below about and above the recommended level tests whether rural and urban households differ significantly in their RDA status and relates the observed consumption gaps to respondents' self-perceived dietary adequacy and awareness of a balanced diet.

Materials and Methods

Study area

The study was conducted in Raipur district of Chhattisgarh, the state capital and one of its fastest-urbanising districts. Raipur was purposively selected because it combines a large urban population with adjoining rural and peri-urban settlements inside a single administrative boundary making it well suited to a rural–urban comparison of dietary behaviour. According to the Census of India (2011) ^[1], the district has a

population of 2,160,876 with a literacy rate of 75.56 per cent. The urban component was drawn from Raipur city, while the rural component was drawn from four villages of the district namely Dharampura, Sarora, Pirda and Abhanpur, selected to represent varying degrees of market access and agrarian dependence.

Research design

A descriptive and analytical cross-sectional design was adopted. The design is descriptive in profiling the socio-economic characteristics and food consumption of the sampled households and analytical in comparing their intake against an external nutritional standard. Data were collected from each respondent at a single point in time.

Sampling procedure and sample size

A stratified random sampling technique was used. The sampling universe was first stratified by area of residence into rural and urban strata and respondents within each stratum were then chosen through simple random sampling. The sampling and analytical unit was the individual household representative responsible for food-related decisions. A total of 120 respondents were surveyed comprising 60 rural and 60 urban households in equal proportion. Equal allocation rather than allocation proportional to the urban-majority district population was adopted deliberately so that the rural sub-sample remained large enough for independent analysis consistent with the comparative purpose of the study.

Socio-economic profile of respondents

The achieved sample was profiled by age, gender, education, occupation, monthly household income and family size. It was dominated by the economically active 20–50 age band which accounted for 86.7 per cent of respondents so the data reflect the decisions of working-age household members. The urban sample was younger with 58.3 per cent aged 20–35 against 46.7 per cent in rural areas while 18.3 per cent of rural respondents were above 50 compared with only 5.0 per cent of urban respondents. Male respondents predominated in both strata. The educational divide was pronounced illiteracy was three times higher among rural respondents (15.0 vs 5.0 per cent), and 73.3 per cent of urban respondents held a graduate qualification against 41.7 per cent in rural areas. Farming was the principal rural occupation (48.3 per cent) but marginal in urban areas (10.0 per cent) where private jobs and small trade dominated. Income distribution was broadly similar across strata the modal bracket being ₹25,000–₹50,000 in both. The full profile of the sample is presented in Table 1.

Data collection instrument

Primary data were gathered through a pre-tested structured schedule using pre-coded categorical and ordinal response formats. The instrument captured the socio-economic profile food consumption frequency for major food groups household per-capita quantity consumed relative to the ICMR–NIN benchmark self-perceived dietary adequacy and awareness of a balanced diet. Secondary data were drawn from NFHS-5 (2019–21) factsheets, ICMR–NIN Dietary Guidelines for Indians (2024) and the Census of India (2011) ^[1].

Table 1: Socio-economic and demographic profile of respondents (n = 120)

Characteristic	Category	Rural	%	Urban	%	Total
Age (years)	Under 20	0	0.0	2	3.3	2
	20–35	28	46.7	35	58.3	63
	36–50	21	35.0	20	33.3	41
	Above 50	11	18.3	3	5.0	14
Gender	Male	46	76.7	39	65.0	85
	Female	14	23.3	21	35.0	35
Education	Illiterate	9	15.0	3	5.0	12
	Primary	4	6.7	1	1.7	5
	Secondary	6	10.0	3	5.0	9
	Higher secondary	16	26.7	9	15.0	25
Occupation	Graduate & above	25	41.7	44	73.3	69
	Farmer	29	48.3	6	10.0	35
	Private job	3	5.0	19	31.7	22
	Government job	9	15.0	8	13.3	17
	Student	8	13.3	4	6.7	12
Monthly income	Others	11	18.3	23	38.3	34
	Below ₹10,000	7	11.7	5	8.3	12
	₹10,000–₹25,000	16	26.7	16	26.7	32
	₹25,000–₹50,000	21	35.0	21	35.0	42
Family size	Above ₹50,000	16	26.7	18	30.0	34
	1–4 members	30	50.0	38	63.3	68
	5–9 members	24	40.0	22	36.7	46
	9–13 members	5	8.3	0	0.0	5
	More than 13	1	1.7	0	0.0	1

Source: Primary data.

Nutritional benchmark

The nutritional gap was assessed against the ICMR-NIN 'My Plate for the Day' Recommended Dietary Allowance for a 2,000 kcal reference diet the current official Indian dietary reference. The benchmark for vegetables (400 g/day) was split in the instrument into green leafy vegetables (100 g) and other vegetables (300 g) to permit a finer assessment since green leafy vegetables are a particularly important and frequently deficient source of iron folate and vitamin A. For

each food group respondents classified their household's average per-capita daily intake as 'less than recommended', 'about recommended' or 'more than recommended'. This yields a respondent-perceived self-reported measure of adequacy rather than intake measured through a 24-hour recall or weightment survey a boundary acknowledged as a limitation of the study. The operational benchmark quantities are presented in Table 2.

Table 2: ICMR-NIN 'My Plate for the Day' recommended per-capita daily intake used as the benchmark

Food group	Recommended quantity (per person/day)
Cereals & millets	250 g
Pulses & legumes (dal)	85 g
Milk & milk products / curd	300 ml
Green leafy vegetables	100 g
Other vegetables / roots & tubers	300 g
Fruits	100 g
Eggs / meat / fish (flesh foods)	40 g
Edible oil & fats	25 g

Source: ICMR–National Institute of Nutrition, Dietary Guidelines for Indians (2024). The oil benchmark used operationally (25 g) is marginally more conservative than the ICMR-NIN reference value (27 g).

Analytical tools

The collected data were coded and tabulated in Microsoft Excel. Frequency and percentage analysis described the distribution of respondents across categories with rural and urban distributions cross-tabulated for direct comparison. The percentage of respondents in each category was computed as the number in that category divided by the relevant base multiplied by 100. The nutritional gap was assessed by cross-tabulating for each of the eight food groups the proportions of rural and urban respondents falling in the below about and above categories relative to the benchmark. The Pearson chi-square (χ^2) test of independence was applied

to test whether the distribution of RDA status differed significantly between rural and urban households with the statistic computed as the summation of $(O - E)^2 / E$ over all cells and degrees of freedom given by $(r - 1)(c - 1)$. Significance was judged at the 5 per cent level.

Results and Discussion

Frequency of consumption of major food groups

Daily consumption patterns confirmed that cereals and vegetables form the foundation of the diet in both strata with almost universal daily intake. Pulses were consumed daily by 90.0 per cent of rural and 81.7 per cent of urban households.

The clearest rural–urban divergences appeared in fruits consumed daily by 55.0 per cent of urban but only 36.7 per cent of rural respondents and in eggs, meat and fish, consumed daily by 23.3 per cent of urban against just 5.0 per cent of rural respondents. Milk and green leafy vegetables were consumed daily by only a minority in both strata the latter being largely a weekly rather than daily item (Table 3). These frequency differences foreshadow the quantity gaps quantified against the RDA in the following section.

Table 3: Proportion of respondents consuming major food groups on a daily basis

Food group	Rural (%)	Urban (%)	Total (%)
Cereals (rice/wheat)	96.7	100.0	98.3
Pulses (dal)	90.0	81.7	85.8
Vegetables	98.3	93.3	95.8
Milk & dairy	46.7	51.7	49.2
Fruits	36.7	55.0	45.8
Green leafy vegetables	11.7	11.7	11.7
Eggs / meat / fish	5.0	23.3	14.2
Junk / fast food	0.0	6.7	3.3

Source: Primary data.

Quantity consumed relative to the ICMR-NIN RDA

The central finding of the study is that the nutritional gap in Raipur district lies not in cereal energy but in protective and protein-rich foods. Eggs, meat and fish recorded the largest shortfall of any food group 62.7 per cent of all households and 66.1 per cent of rural households consumed below the 40 g benchmark. This deficit was statistically indistinguishable between strata ($\chi^2 = 0.58$, $df = 2$, $p = 0.748$) showing that the animal-protein gap runs across the district rather than being concentrated in villages. Green leafy vegetables showed the second-largest gap with 48.3 per cent of households below the 100 g mark again shared almost equally by rural (46.7 per cent) and urban (50.0 per cent) households ($\chi^2 = 0.146$, $p = 0.930$). Milk and dairy fell short for roughly a third of households in both strata ($\chi^2 = 1.13$, $p = 0.569$) and fruit intake was below recommendation for 32.2 per cent overall the fruit shortfall appeared numerically higher among rural households (37.3 vs 27.1 per cent) but did not reach significance ($\chi^2 = 2.79$, $p = 0.247$) and is best read as a directional tendency (Table 4).

A second, less frequently discussed dimension of the gap is over-consumption in the energy-dense low-micronutrient groups. More than three-fifths of households (63.3 per cent) exceeded the cereal benchmark a pattern far stronger in rural (76.7 per cent) than urban (50.0 per cent) areas and this was the clearest statistically significant rural–urban difference in the study ($\chi^2 = 11.32$, $df = 2$, $p = 0.004$). About half of all households (51.3 per cent) exceeded the oil benchmark

somewhat more in rural areas though the difference here was not significant ($\chi^2 = 1.24$, $p = 0.538$). Pulses were the only other group to differ significantly by area ($\chi^2 = 10.01$, $df = 2$, $p = 0.007$) rural households were markedly more likely to exceed the RDA (54.2 per cent) while urban households clustered closer to the recommended level. Pulses and other vegetables were the food groups nearest the recommended intake for the largest share of households indicating that the vegetarian-protein and vegetable base of the Chhattisgarhi diet remains comparatively well preserved.

Taken together, the rural–urban gap for most food groups is one of degree rather than kind. Both strata under-consume eggs, meat, fish, green leafy vegetables, milk and fruit, and for none of these four does the rural–urban difference reach significance (all $p > 0.24$). Rural and urban households diverge in a statistically confirmed way only for cereals and pulses where rural over-consumption is stronger.

This profile aligns closely with the wider evidence on Indian diets and adds district-level texture to it. Benchmarking government school adolescents in Lucknow against the ICMR 2024 standard Tiwari, Srivastava, Tiwari and Gupta (2024) [11] found protein intake below the recommended level and micronutrient intake deficient even as fat intake ran high, mirroring the eggs/meat/fish and green-leafy-vegetable deficits recorded here. A community assessment of household kitchens in rural Haryana by Goel, Silan, Jha and Yadav (2023) [4] similarly analysed both the quantity and quality of food prepared and called for wider access to nutrient-dense, affordable foods. Using the same never/daily/weekly/occasionally food-frequency logic across two rounds of the NFHS, Jain, Sharma, Kim and Subramanian (2023) [7] showed that non-consumption of dairy, pulses, dark green leafy vegetables, fruit, eggs and flesh foods remained most prevalent among the poorest and least-educated adults which fits the affordability-driven pattern seen in the present study. The mechanism behind the observed shortfall is best understood as a price-and-access phenomenon flesh foods, dairy and fruit are the costliest sources of nutrition per rupee so households facing seasonal or informal incomes ration them first which is consistent with the national estimate that 42.9 per cent of Indians cannot afford a healthy diet (FAO *et al.*, 2025) [3]. Cereal over-consumption in rural areas in turn reflects both the cereal-centred food culture of the region and the role of subsidised grain through the Public Distribution System which lowers the relative price of staples. The practical implication is direct interventions targeting protein, green-vegetable, dairy and fruit deficits can be designed district-wide whereas cereal- and pulse-portion moderation should be weighted more heavily towards rural households.

Table 4: Distribution of households by quantity of food consumed relative to the ICMR-NIN RDA, with chi-square test of independence

Food group (RDA)	Status	Rural	%	Urban	%	Total	χ^2	p
Cereals (250 g)	Less than recommended	4	6.7	3	5.0	7	11.32	0.004*
	About recommended	10	16.7	27	45.0	37		
	More than recommended	46	76.7	30	50.0	76		
Pulses (85 g)	Less than recommended	2	3.4	6	10.0	8	10.01	0.007*
	About recommended	25	42.4	38	63.3	63		
	More than recommended	32	54.2	16	26.7	48		
Milk & dairy (300 ml)	Less than recommended	19	32.2	21	35.0	40	1.13	0.569
	About recommended	29	49.2	32	53.3	61		

	More than recommended	11	18.6	7	11.7	18		
Green leafy veg. (100 g)	Less than recommended	28	46.7	30	50.0	58	0.15	0.930
	About recommended	27	45.0	25	41.7	52		
	More than recommended	5	8.3	5	8.3	10		
Other vegetables (300 g)	Less than recommended	9	15.3	4	6.8	13	2.20	0.332
	About recommended	42	71.2	47	79.7	89		
	More than recommended	8	13.6	8	13.6	16		
Fruits (100 g)	Less than recommended	22	37.3	16	27.1	38	2.79	0.247
	About recommended	28	47.5	37	62.7	65		
	More than recommended	9	15.3	6	10.2	15		
Eggs / meat / fish (40 g)	Less than recommended	39	66.1	35	59.3	74	0.58	0.748
	About recommended	15	25.4	18	30.5	33		
	More than recommended	5	8.5	6	10.2	11		
Edible oil / fat (25 g)	Less than recommended	9	15.3	13	21.7	22	1.24	0.538
	About recommended	17	28.8	19	31.7	36		
	More than recommended	33	55.9	28	46.7	61		

Source: Primary data. df = 2 for all food groups. * significant at the 5 per cent level. Valid responses range from 118 to 120 across food groups owing to a small number of non-responses. The recommended benchmark quantity for each food group is shown in parentheses in the first column.

The significance of the rural–urban differences across all eight food groups is summarised in Table 5.

Table 5: Summary of chi-square test results for RDA status by area (rural vs urban)

Food group (RDA)	χ^2 value	df	p-value	Significant at 5%?	Result
Cereals (250 g)	11.322	2	0.0035	Yes	Significant
Pulses (85 g)	10.008	2	0.0067	Yes	Significant
Milk & dairy (300 ml)	1.128	2	0.5689	No	Not significant
Green leafy vegetables (100 g)	0.146	2	0.9297	No	Not significant
Other vegetables (300 g)	2.204	2	0.3322	No	Not significant
Fruits (100 g)	2.794	2	0.2474	No	Not significant
Eggs / meat / fish (40 g)	0.580	2	0.7483	No	Not significant
Edible oil / fat (25 g)	1.240	2	0.5380	No	Not significant

Source: Primary data. Significance tested at the 5 per cent level; df = 2 for all food groups.

Self-perceived dietary adequacy and nutrient awareness

A striking mismatch emerged between what households ate and what they believed they ate. Just over half the sample (51.7 per cent) considered their diet nutritionally adequate even though most under-consumed animal protein and nearly half under-consumed green leafy vegetables. This mismatch was sharper in rural areas where 38.3 per cent were 'not sure' whether their diet was adequate against 25.0 per cent in urban areas. Awareness of specific gaps was low overall 80.0 per cent of rural and 63.3 per cent of urban respondents could not name any nutrient they felt was lacking. Where a nutrient was named urban respondents were nearly nine times more likely than rural respondents to identify iron (15.0 vs 1.7 per cent) which is notable given that iron-deficiency anaemia is a documented public-health concern in Chhattisgarh. Awareness of a specific deficiency thus appears to be an urban-skewed phenomenon even where the deficiency itself is common to both areas (Table 6).

This low awareness echoes both an industry survey which found that a majority of urban Indian adults do not regularly include high-protein foods such as eggs, lentils, milk or fish and that most could not correctly state the recommended daily protein intake (LocalCircles and Country Delight, 2026) [8], and earlier national evidence from the PRODIGY consumer survey in which around nine in ten adults consumed inadequate protein and the vast majority were unaware of their daily requirement (Mahajan, 2015) [9]. Read against the anaemia burden reported for Chhattisgarh women in NFHS-5 (IIPS and MoHFW, 2021) [6], the near-invisibility

of iron as a perceived deficiency among rural respondents is a concern because households are unlikely to correct a deficiency they do not recognise. Encouragingly dietary diversification has been shown to reduce anaemia among women of childbearing age in rural India (Rao, Joshi, Bhide, Puranik and Asawari, 2013) [10], which strengthens the case for improving access to iron-rich green leafy vegetables and flesh foods alongside targeted nutrition education.

Table 6: Self-perceived nutritional adequacy of the current diet and nutrients perceived to be lacking (n = 120)

Indicator	Category	Rural	%	Urban	%	Total
Diet adequate?	Yes	28	46.7	34	56.7	62
	Not sure	23	38.3	15	25.0	38
	No	9	15.0	11	18.3	20
Nutrient perceived lacking	Not aware / don't know	48	80.0	38	63.3	86
	Vitamins	7	11.7	8	13.3	15
	Protein	4	6.7	5	8.3	9
	Iron	1	1.7	9	15.0	10

Source: Primary data.

Awareness of a balanced diet

Awareness of what constitutes a balanced diet was markedly lower among rural respondents at 36.7 per cent against 57.6 per cent in urban areas a gap of nearly 21 percentage points. The same divide appeared in behaviour 61.7 per cent of rural respondents reported never checking the nutritional value of food before consuming it, against 30.0 per cent of urban respondents. These results echo the educational gap

identified earlier and suggest that the rural nutritional gap is driven by a combination of restricted dietary access and lower nutrition literacy rather than access constraints alone. Affordability-focused interventions therefore need to be paired with awareness-building, particularly in rural areas (Table 7).

Table 7: Awareness of a balanced diet and habit of checking nutritional value before consumption (n = 120)

Indicator	Category	Rural	%	Urban	%	Total
Aware of a balanced diet	Yes	22	36.7	35	57.6	57
	No	38	63.3	25	42.4	63
Checks nutritional value	Always	6	10.0	16	26.7	22
	Sometimes	17	28.3	26	43.3	43
	Never	37	61.7	18	30.0	55

Source: Primary data.

Taken together the consumption and awareness results point to a rural nutritional gap driven by two forces acting in combination. The rural–urban awareness gap tracks the educational divide seen in the sample and limits households' ability to rebalance their diet even where some substitution is affordable. The policy reading is therefore twofold. Because the deficits in protein, green vegetables, dairy and fruit are shared across both strata and are not statistically confirmed as rural-specific, affordability and awareness measures for these food groups are best designed district-wide rather than aimed only at villages, whereas the two food groups with statistically significant rural–urban differences, cereals and pulses call for portion-moderation and diversification messaging concentrated in rural areas, where over-consumption relative to the RDA is strongest. As no directly comparable district-level study using the revised 2024 benchmark was available these findings provide new evidence within the Raipur context.

Conclusion

This assessment of 120 rural and urban households in Raipur district shows that the nutritional gap against the ICMR-NIN Recommended Dietary Allowances is fundamentally one of dietary quality rather than quantity. Cereal energy is adequate or in excess for the large majority of households while the sharpest deficits fall in the protective and protein-rich groups 62.7 per cent of households consumed eggs, meat or fish below the benchmark and 48.3 per cent consumed green leafy vegetables below it with milk and fruit also short for roughly a third. These four deficits are shared almost equally by rural and urban households and for none of them does the rural–urban difference reach statistical significance. Rural and urban households diverge in a confirmed way only in their tendency to over-consume cereals and pulses both significant at the 1 per cent level with rural households more skewed towards excess. A parallel gap runs between behaviour and perception just over half the sample believed their diet adequate most could not name a nutrient they lacked and rural respondents showed weaker balanced-diet awareness and weaker label-checking habits than urban respondents. The nutritional problem in Raipur is thus better described as a district-wide imbalance in diet composition compounded in rural areas by lower nutrition literacy than as a simple rural deficiency. Correcting it calls for measures that improve the affordability of protein and micronutrient-dense foods across

the district while simultaneously raising diet-quality awareness with cereal and pulse moderation targeted more specifically at rural households.

References

1. Census of India. District census handbook, Raipur, Chhattisgarh. New Delhi: Office of the Registrar General and Census Commissioner, Government of India; 2011.
2. Food and Agriculture Organization, International Fund for Agricultural Development, United Nations Children's Fund, World Food Programme, World Health Organization. The state of food security and nutrition in the world 2024. Rome: FAO; 2024.
3. Food and Agriculture Organization, International Fund for Agricultural Development, United Nations Children's Fund, World Food Programme, World Health Organization. The state of food security and nutrition in the world 2025. Rome: FAO; 2025.
4. Goel T, Silan VK, Jha SK, Yadav P. Quantitative and qualitative analysis of food consumption in the household kitchen of rural Haryana: A community-based cross-sectional study. *Journal of Clinical and Diagnostic Research*. 2023;17(8):LC05-LC09. doi:10.7860/JCDR/2023/63400.18288.
5. Indian Council of Medical Research–National Institute of Nutrition. Dietary guidelines for Indians. Hyderabad: ICMR-National Institute of Nutrition; 2024.
6. International Institute for Population Sciences, Ministry of Health and Family Welfare. National Family Health Survey (NFHS-5), 2019–21: India report. Mumbai: International Institute for Population Sciences; 2021.
7. Jain A, Sharma S, Kim R, Subramanian SV. Food deprivation among adults in India: An analysis of specific food categories, 2016–2021. *eClinicalMedicine*. 2023;66:102313. doi:10.1016/j.eclinm.2023.102313.
8. LocalCircles, Country Delight. India's protein gap: A national survey of urban India's protein awareness and consumption. New Delhi: LocalCircles; 2026.
9. Mahajan MA. Protein consumption in the diet of adult Indians: A general consumer survey (PRODIGY). Mumbai: Indian Dietetic Association; 2015.
10. Rao S, Joshi S, Bhide P, Puranik B, Asawari K. Dietary diversification for prevention of anaemia among women of childbearing age from rural India. *Public Health Nutrition*. 2014;17(4):939-947. doi:10.1017/S1368980013001006.
11. Tiwari P, Srivastava JK, Tiwari V, Gupta M. Nutritional status and dietary pattern of government school-going adolescents of Lucknow city with reference to recommended dietary allowances–ICMR 2024, India. *Clinical Epidemiology and Global Health*. 2024;29:101757. doi:10.1016/j.cegh.2024.101757.
12. Willett W, Rockström J, Loken B, Springmann M, Lang T, Vermeulen S, *et al*. Food in the Anthropocene: The EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet*. 2019;393(10170):447-492. doi:10.1016/S0140-6736(18)31788-4.
13. World Health Organization. Anaemia. Geneva: World Health Organization; 2023. <https://www.who.int/news-room/fact-sheets/detail/anaemia>.