RESEARCH PAPER

Household dietary diversity- A tool to assess food and nutritional security among rural farm families of Bidar district, Kalyana-Karnataka

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Abstract: As a base to assess food and nutrition security, the household dietary diversity, food consumption score, demographic profile and socioeconomic status of rural farm families of Bidar district of Kalyana Karnataka region was studied during the year 2023-24. A total of 100 farm families residing in two villages from each taluk of Humnabad and Chitguppa were interviewed through quessionaire. The male population was higher (54-56%) as compared to females (44-46%) in Humnabad and Chitguppa taluk, respectively. Majority of the population in Humnabad (34%) and Chitguppa (40%) taluks were adults. Only 24-26 per cent of respondents had completed diploma/PUC in Humnabad and Chitguppa respectively. Agriculture was their main occupation. And majority belonged to nuclear family. The farm families with low dietary diversity scores were more prevalent in Chitguppa taluk (78%) compared to Humnabad taluk (50%). The mean differences between both taluks were found to be significant ($p \leq 0.01$). A significant association between household dietary diversity score and socio-economic status of the families of Humnabad ($p \leq 0.05$) and Chitguppa ($p \leq 0.01$) was noted. An acceptable food consumption score was evident in both the taluks of Humnabad (66%) and Chitguppa (68%) as well as its association with socio-economic status was found significant in Humnabad ($p \leq 0.05$) and Chitguppa ($p \leq 0.01$) taluks of Bidar.

Key words: Demographic profile, Food consumption score Socioeconomic status, Food security, Household dietary diversity score, Nutritional security

Introduction

Food security is access to enough nutritious food for a healthy life by all people at any given period of time. In India, ensuring food security is challenging due to its large population, poverty and malnutrition (Kaur, 2025). Bidar stands as one of the Karnataka's ancient districts and agriculture has been the backbone of the Indian economy for centuries, providing sustenance and livelihood to millions of people across the country (Anon., 2025). A large part of the land is under dry land cultivation. The district is drought prone and therefore, the livelihood is uncertain. The existing education and health institutions lack basic facilities..The district's agricultural landscape predominantly yields various crops for consumption, including green gram, bengal gram, black gram, paddy, groundnut, wheat, red gram, sugarcane and chillies. (Malge, 2023).

Dietary diversity is a measure of household access to food and is an indicator of household food security. It is simple count of food groups consumed over a certain reference period using household dietary diversity score (HDDS) & food consumption score (FCS).

In Karnataka, deprivation due to poverty and malnutrition are major challenges in at least 10 districts namely Haveri, Yadgir, Kalaburgi, Raichur, Koppal, Ballari, Bidar, Gadag, Bagalkot and Vijaypura, as outlined by the Karnataka Human Development Report (2022). The districts where nutrition is a concern are Kalaburagi, Raichur, Yadgiri, Koppal, Ballari, Bidar and Gadag (Anon., 2023). The demographic factors influence the socio- economic status of families mainly on their monthly income and savings (Kulkarni and Srinivas, 2020). Additionally demographic and socio-economic status factors play a significant role on dietary diversity and food consumption of the rural population apart from affecting food and nutritional security. Hence, the present study was undertaken with the objective to study the demographic profile, socio-economic status and its association with household dietary diversity and food consumption score which will further help in assessing the food and nutritional security at household level.

Material and methods

A well-developed pre tested questionnaire was used to collect the demographic profile, socio-economic status (SES) by Aggarwal *et al.,* 2005), household dietary diversity score and food consumption scores of farm families of Bidar district. Four villages were randomly selected within Humnabad (Kathalli and Borampalli) and Chitguppa (Shamtabad and Maadgol) taluks. A total of 100 rural farm families,50 each from two taluks were selected and interviewed.

Data on household dietary diversity was collected using 24-hour recall method. Food consumed outside the home that were not prepared in the home were not included. HDDS were obtained from 12 food groups The HDDS were calculated by adding the number of each food group consumed by the families, which varied between 0 to 12 (Anon., 2006). To assess the change in food security of farm families, HDDS were compared with the level of dietary diversity suggested by Cordero-Ahiman

et al. (2017). The three levels *viz*. low (1-6 food groups), medium (7-8 food groups) and high (9-12 food groups) dietary diversity were categorized.

The information on frequency of household consumption of food items for number of days over the past week was obtained. Food items were then grouped into eight specific food groups and the consumption frequencies of the eight groups were summed. Any frequency values over seven were capped at seven. The value obtained for each food group is multiplied by a standard weight varying from 0.5 to 4.0. The sum of the weighted scores yielded FCS (Doris *et al*., 2009).

Statistical analysis

Mean, per cent, chi square and correlation were used to interpret data using excel and SPSS (2024).

Results and discussion

It was observed that the male (45.01%) population in Humnabad and Chitguppa taluks was higher {Table 1}as compared to females (45.25%). Majority of the population in Humnabad (35.45%) and Chitguppa (42.24%) taluks belonged to age group of 26-45 years (24.3 %) with predominance of diploma/PUC. Main occupation of the people in the study area was agriculture as highest number of people (41.66 and 33.78%) was engaged in this profession.Mainly nuclear family system prevailed in the study area. Chitguppa had higher number of nuclear families (88.00%) as compared to 76.00 per cent in Humnabad. The area was mainly dominated by the OBCs with 30.00 per cent OBCs each in Humnabad and Chitguppa. Pasare *et al* (2022) also reported that majority of farmers at Bidar district of Karnataka State belonged to middle age group and backward category owning nuclear family. Agriculture was the sole occupation reported among these.

The socioeconomic status of farm families of Humnabad and Chitguppataluks of Bidar is given in Fig 1. Of the total population, majority belonged to upper middle (46-60) and lower middle (31-45) socio economic categories in both taluks of Humnabad (46%, 22%) and Chitguppa (48%, 46%). Jamanal *et al* (2020) also observed that majority of farmers at Belgavi, Dharwad, Haveri and Vijayapura districts belonged to middle income groups. In Chitguppa, 6 per cent of the population belonged to the category of high socio-economic scores.The mean differences of the socio-economic status of rural farm families (Table 2) between the taluks were found to be significant (p≤0.01).The socio-economic profile of dairy farmers of Yadgir
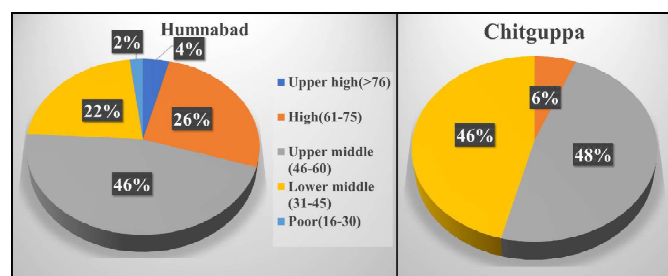
Table 1. Demographic profile of rural farm families of Humnabad and Chitguppa taluks of Bidar   N=100

Sl. No	Characteristics	Humnabad (n=50)		Chitguppa (n=50)	
		F	%	F	%
I	Gender				
1	Male	138	54.98	127	54.74
2	Female	113	45.01	105	45.25
II	Age(yrs.)				
1	1-3	2	0.79	2	0.86
2	4-6	2	0.79	8	3.44
3	7-12	16	6.37	14	6.03
4	13-18	23	9.16	31	13.36
5	19-25	35	13.94	27	11.63
6	26-45	89	35.45	98	42.24
7	46-60	61	24.3	36	15.51
8	>60	23	9.16	16	6.98
III	Education				
1	Illiterate	62	24.70	47	20.20
2	Primary	41	16.33	36	15.51
3	High school	32	12.74	49	21.12
4	Diploma/PUC	66	26.29	58	25.00
5	Degree	48	19.12	42	18.10
6	Masters	02	0.79	-	-
IV	Occupation				
1	Agriculture	100	41.66	75	33.78
2	Private	09	3.75	4	1.80
3	Government	01	0.41	2	0.90
4	House wife	45	18.75	37	16.66
5	Student	68	28.33	81	36.48
6	Agri +animal husbandry	17	7.08	23	10.36
V	Type of family				
1	Joint	12	24	6	12
2	Nuclear	38	76	44	88
VI	Caste				
1	General	13	26	12	24
2	Other backward classes	15	30	15	30
3	Scheduled caste	12	24	11	22
4	Scheduled tribe	10	20	12	24

Table 2. Mean score of socio-economic status of rural farm families of Humnabad and Chitguppa taluks of Bidar

	Humnabad (n=50 farm families)	Chitguppa (n=50 farm families)
Mean±SD	53.68±10.62	46.70±7.78
't' value	3.74**	

**- significant (p<0.01)

district of Kalyana Karnataka region revealed that majority of the farmers (63.00%) belonged to middle age group, with nuclear family and OBC category. Majority of farmers had agriculture as main occupation with dairying as secondary occupation (Kumar *et al* ., 2020).

The household dietary diversity scores (Table 3a) in Humnabad and Chitguppa taluk of Bidar indicate that 4 per cent of the families in Humnabad taluk had good dietary diversity scores of indicating they had intake of household dietary diversity and food consumption score food thus

Fig 1. Socio economic status of farm families in Bidar

provides food and nutritional security. Humnabad taluk (46%) excellent with medium dietary diversity scores compared to Chitguppa taluk (22%). Low dietary diversity scores are more

prevalent in Chitguppa taluk (78%) compared to Humnabad taluk (50%). The mean differences between both taluks are found to be significant at ($p \leq 0.01$) (Table 3b). The significant association between HDDS and SES are noted in Humnabad ($p \leq 0.05$) and Chitguppa ($p \leq 0.01$) as noted in Table 3c. A greater number of farm families had low dietary diversity score in both the taluks. Similar results were recorded by Corderio *et al*.(2012) Sahu *et al*.(2017)and Ghosh *et al*.(2018). This may be due to the fact that most of the production was sold by farm families and the availability of food crops was less. The consumption of egg, poultry and fruits also decreased. Moderate positive correlation, indicates that higher socioeconomic scores are associated with more diverse diets which leads to better food and nutritional security. HDDS and SES indicate a positive correlation ($r = 0.356, 0.320$) in both taluks and results were statistically significant ($p \leq 0.01$). As SES increased, HDDS tends to improve.

Most of the population had an acceptable food consumption score (FCS) in both the taluks of Humnabad (66%) and Chitguppa (68%) which is mentioned in Table 4a. None of the families had the poor food consumption scores. In Humnabad (34%) and Chitguppa (32%) taluks, families had border line FCS. The mean scores of food consumption scores were found

Table 3a. Household dietary diversity of rural farm familiesof Humnabad and Chitguppa taluks of Bidar   N=100

Sl. No	Household dietary diversity scores of farm families	Humnabad (n=50) F	%	Chitguppa (n=50) F	%
1	Good dietary diversity (9-12 food groups)	2	4	-	-
2	Medium dietary diversity (7-8 food groups)	23	46	11	22
3	Low dietary diversity (1-6 food groups)	25	50	39	78

\# Reference- Cordero-Ahiman *et al*. (2017), F- Frequency, %- Per cent

Table 3b. Means of household dietary diversity of rural farm families of Humnabad and Chitguppa taluks of Bidar   N=100

	Humnabad (n=50)	Chitguppa (n=50)
Mean$\pm$ SD	7.12$\pm$1.27	6.36$\pm$0.92
't' value	3.42**	

**- significant ($p \leq 0.01$)

Table 3c. Association between household dietary diversity and socio-economic status of rural farm families of Humnabad and Chitguppa taluks of Bidar   N=100

Sl. No.	Socio economic status	Humnabad(n=50) Good	Medium	Low	Total	X^2	Chitguppa(n=50) Good	Medium	High	Total	X^2
1.	Upper high (>76)	1(50.00)	-	1(50.00)	2(100.00)	18.63*	-	-	-	-	14.25**
2.	High (61-75)	0(0.00)	10(76.92)	3(23.08)	13(100.00)		1(33.33)	-	2(66.66)	3(100.00)	
3.	Upper middle (46-60)	1(4.34)	8(34.78)	14(60.86)	23(100.00)		1(4.16)	9(37.5)	14(58.33)	24(100.00)	
4.	Lower middle (31-45)	1(9.09)	2(18.18)	8(72.72)	11(100.00)		-	2(8.69)	21(91.30)	23(100.00)	
5.	Poor (16-30)	-	1(100.00)	-	1(100.00)		-	-	-	-	

*- significant ($p \leq 0.05$), **- significant ($p \leq 0.01$), Figures in parenthesis indicate per cent values

Table 4a. Food consumption of rural farm families of Humnabad and Chitguppa taluks of Bidar   N=100

Sl.No.	Food consumption scores of \ farm families	Humnabad (n=50) F	%	Chitguppa (n=50) F	%
1	Poor (0-21)	-	-	-	-
2	Borderline (21.5-35)	17	34	16	32
3	Acceptable (>35)	33	66	34	68

\# Reference- Coates *et al*. (2007), F- Frequency, %- Per cent

Table 4b. Means of food consumption scores of rural farm familiesof Humnabad and Chitguppa taluks of Bidar   N=100

	Humnabad (n=50)	Chitguppa(n=50)
Mean$\pm$ SD	63.07$\pm$22.46	62.10$\pm$23.58
't' value	0.21[NS]	

[NS]-non-significant

Table 4c. Association between food consumption and socio-economic status of rural farm families of Humnabad and Chitguppa taluks of Bidar   N=100

Sl. No.	Socio economic status	Humnabad(n=50) Poor	Borderline	Acceptable	Total	X^2	Chitguppa(n=50) Poor	Borderline	Acceptable	Total	X^2
1.	Upper high (>76)	-	-	2(100.00)	2(100.00)	10.08*	-	-	-	-	13.07**
2.	High (61-75)	-	1(7.69)	12(92.31)	13(100.00)		-	-	3(100.00)	3(100.00)	
3.	Upper middle (46-60)	-	8(34.78)	15(65.22)	23(100.00)		-	4(16.66)	20(83.34)	24(100.00)	
4.	Lower middle (31-45)	-	7(63.63)	4(36.36)	11(100.00)		-	15(65.21)	8(34.79)	23(100.00)	
5.	Poor (16-30)	-	-	1(100.00)	1(100.00)		-	-	-	-	

*- significant ($p<0.05$)   **- significant ($p \leq 0.01$), Figures in parenthesis indicate per cent values

Table 5. Relationship between socio economic status and food and nutritional security indicators of rural farm families in Humnabad and Chitguppa taluks of Bidar   N=100

Sl. No.	Food and nutritional security indicators	Socioeconomic status ('r' value)	
		Humnabad	Chitguppa
1.	Household dietary diversity score	0.356*	0.320*
2.	Food consumption score	0.181	0.358*

to be non-significant. Table 4c reveals the association between food consumption scores and socio-economic status in the Humnabad and Chitguppa taluks of Bidar, which was found significant in Humnabad (p≤0.05) and Chitguppa(p≤0.01). The positive correlation indicates that farm families with higher SES tend to have better food consumption scores, reflecting more diverse and nutritionally adequate diets. Ghosh *et al.* (2018) in Bangladesh reported poor FCS for the children. This may be due to the fact that majority of participants came from low-income group. More critical investigation reveals that family income had the most significant influence on food habit and nutritional status of the primary school children.

Table 5. shows the relationship of various food and nutritional security indicators with socioeconomic status in Humnabad and Chitguppa. The household dietary diversity an indicator of food and nutrition security showed positive correlation (p≤0.05) with socioeconomic status indicating that as socio economic status increases, dietary diversity also increased ensurinf food and nutrition security. Babatunde *et al* (2007) also found that factors like education, farm size, farming experience and household income positively correlated with food security. Climate adaption can also assists sustainable growth and development (Kaur *et al.*,2021).

Conclusion

The study revealed notable differences in gender distribution, age composition, educational attainment and livelihood patterns. Mild food insecurity existed among farm families within taluks which can be attributed to limited availability of diverse food groups, elders skipping meals to ensure children have enough to eat and a preference for less expensive foods. Additionally, the consumption of vegetables, fruits and animal products were found to be low. Higher SES typically leads to greater dietary diversity. Policies aimed at improving SES can have a positive impact on dietary diversity and thereby enhance food security apart from climate change adaptation.

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