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ASSESSMENT OF EATING HABITS AND DIETARY CONSUMPTION OF VISUALLY IMPAIRED FEMALES AGED 18 TO 25 YEARS

[*1]Lally Hanna Luke and [2]Dhanalakshmi C.

[*1]Professor, Department of Clinical Nutrition, MMM College of Health Sciences, Chennai.
[2]Post Graduate Student, Department of Clinical Nutrition, MMM College of Health Sciences, Chennai.

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***Corresponding Author**
Lally Hanna Luke
Professor, Department of Clinical Nutrition, MMM College of Health Sciences, Chennai.

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ABSTRACT

Background: Nutrition plays a critical role in overall health and is particularly important in visually impaired individuals who face unique challenges in food access, selection, and preparation. This study aimed to assess the eating habits, dietary consumption, and nutritional status of visually impaired females aged 18 to 25 years. **Methods:** A cross-sectional survey was conducted among 40 visually impaired females from Queen Mary's College and Lotus Welfare Blind Home, Chennai. Data were collected using structured questionnaires, anthropometric measurements, 24-hour dietary recall, and a food frequency questionnaire. Nutrient intake was compared with Recommended Dietary Allowances (RDA). **Results:** The mean age of participants was 20.2 ± 2.1 years. Sixty percent were underweight, while 30% had normal BMI. Dietary intake revealed significant deficits in energy (−911 kcal), protein (−29 g), iron (−24.5 mg), and vitamin A (−690 µg) compared to RDA. Most participants (92.5%) followed a non-vegetarian diet, but intake of greens, fruits, and milk products was inadequate. Sensory evaluation showed preference for spicy and fried foods, with limited dietary diversity. **Conclusion:** Visually impaired females are at high risk of under nutrition and micronutrient deficiencies, influenced by dependency on caregivers and restricted food choices. Tailored nutrition education and institutional dietary support are urgently needed to address these gaps.

KEYWORDS: Visual impairment, dietary habits, nutritional intake, sensory evaluation, young women.

INTRODUCTION

Vision, one of the five primary human senses, plays a critical role in integrating individuals with their environment. In recent years, the relationship between nutrition and vision has gained increasing attention, with evidence highlighting the role of nutrients, phytochemicals, and dietary patterns in maintaining visual acuity, reducing oxidative stress, and modulating inflammation. Nutrition not only supports the prevention of ocular diseases but also contributes to overall visual performance.

Globally, over one billion people experience some form of vision impairment, with the World Health Organization (WHO) estimating 285 million individuals affected, including 39 million who are blind. Vision impairment significantly reduces quality of life, leading to higher rates of unemployment, depression, and anxiety. In response, global initiatives such as WHO's *Vision 2020: The Right to Sight* and the *Universal Eye Health: Global Action Plan 2014–2019* have sought to reduce preventable blindness and improve access to comprehensive eye care.

Beyond eye health, visual impairment is increasingly recognized as a determinant of nutritional status. Visually impaired individuals often face barriers to food access, meal preparation, and independent eating, which predisposes them to both undernutrition and obesity. A systematic review by Jones and Bartlett reported high prevalence of malnutrition in this population, independent of age, sex, or socioeconomic status. Despite this, no specific dietary recommendations exist for visually impaired individuals, raising important questions about whether their nutrient needs are adequately met.

Physical activity, closely linked with nutritional status, is also compromised in the visually impaired due to environmental barriers, lack of adaptive resources, and psychosocial challenges. However, the interplay between nutrition, physical activity, and sensory adaptation in this group remains poorly understood. Furthermore, the reliance on other senses—taste, smell, and touch—may influence food choices and dietary behaviors, potentially shaping overall nutritional outcomes.

This study aims to investigate the association between physical activity and nutritional status among visually impaired individuals, with particular focus on dietary habits, barriers to healthy living, and the compensatory role of non-visual senses. By addressing these factors, the research seeks to inform targeted interventions that promote healthier lifestyles and enhance the well-being of people with visual impairments.

METHODOLOGY

This study employed a cross-sectional survey design to investigate nutritional status, eating behaviours, and dietary intake patterns. A total of 40 college-going females with visual impairment, aged between 18 and 25 years, were recruited from Queen Mary's College, Chennai, and the Lotus Welfare Blind Home, Chennai. Participants were selected through convenience sampling based on accessibility and willingness to participate. Inclusion criteria comprised females diagnosed with congenital blindness, acquired blindness, or total visual impairment, while individuals outside the specified age group or without visual impairment were excluded. The study was conducted over a period of three months, including one month of data collection and subsequent time for literature review, analysis, and reporting.

Data collection was carried out through structured, face-to-face interviews using a pre-tested questionnaire. Information was gathered on demographic details (age, education, family income, and household composition), anthropometric measurements, physical activity, lifestyle, dietary habits, taste perception, food frequency, and dietary recall. Anthropometric parameters included height, weight, body mass index (BMI), waist and hip circumference, and waist-to-hip ratio, measured according to WHO guidelines.

Dietary behaviors and food preferences were recorded using a validated food frequency questionnaire (50 items across 11 food groups, with focus on iron- and vitamin A–rich foods) and a 24-hour dietary recall to estimate macro- and micronutrient intake, which was compared against Recommended Dietary Allowances (RDA). Sensory evaluation of taste was performed using four standard test foods (sweet, sour, salty, and bitter), and responses were recorded using a structured tool adapted from Carepatron.

The collected data were coded, tabulated, and manually graded before statistical analysis. Descriptive and inferential statistics were employed to evaluate nutritional status, identify dietary patterns, and explore associations between eating behaviours, physical activity, and health risks.

RESULTS AND DISCUSSION

Anthropometric characteristics of visually impaired females (18–25 years, n=40)

Table -1

Parameter	Mean ± SD	Classification / Range	Distribution (%)
Height (cm)	152.58 ± 9.09	–	–
Weight (kg)	44.48 ± 12.99	–	–
BMI (kg/m²)	19.07 ± –	Underweight (<18.5)	60
		Normal (18.5–24.9)	30
		Overweight (25–29.9)	5
		Obese (≥30)	5
Waist circumference (cm)	28.93 ± 4.57	<80 (normal, WHO)	100
Hip circumference (cm)	34.88 ± 4.65	85–95 (normal, WHO)	–
Waist-to-hip ratio	0.83 ± 0.05	<0.80 (low risk)	Majority ≥0.80

The mean height and weight of the study participants were 152.58 ± 9.09 cm and 44.48 ± 12.99 kg, respectively, indicating overall lower body mass compared with general female populations of the same age group. The mean BMI was 19.07 kg/m². More than half of the participants (60%) were underweight, while 30% had normal BMI values. Only a small proportion (5% each) were overweight or obese.

With respect to central adiposity, the mean waist circumference (28.93 ± 4.57 cm) and hip circumference (34.88 ± 4.65 cm) were markedly below WHO reference ranges, reflecting the undernourished profile of the majority of participants. The mean waist-to-hip ratio was 0.83 ± 0.05, with most individuals falling at or above the 0.80 cut-off, suggesting a borderline shift towards moderate risk of metabolic complications despite overall low body mass.

The findings highlight a predominance of undernutrition among visually impaired females aged 18–25 years. With 60% categorized as underweight and a mean BMI close to the lower end of the normal range, the results underscore the vulnerability of this population to nutritional deficiencies. According to the World Health Organization (WHO, 2010)**,** underweight remains a significant public health concern among young women in low- and middle-income countries, contributing to impaired immunity, reduced work capacity, and higher risk of chronic disease later in life.

Comparable results have been reported in Indian studies. Khadka et al. (2012**)** observed high prevalence of

malnutrition among visually impaired adolescents, attributing it to barriers in food access, meal preparation, and lack of nutrition education. Similarly, Sahni et al. (2019) highlighted that visually impaired individuals face compounded risks of undernutrition due to socioeconomic disadvantages and environmental restrictions in food availability.

Although central obesity was not evident in this cohort, the mean waist-to-hip ratio (0.83) suggests that even underweight individuals may exhibit an unfavorable fat distribution. Evidence from Misra et al. (2011) on Indian populations shows that metabolic risk can occur at lower BMI cut-offs, with higher central fat deposition despite low overall body weight. This aligns with the present findings, where undernourished individuals still demonstrated borderline WHR values.

The coexistence of underweight, overweight, and obesity within the same group also reflects the double burden of malnutrition, a growing issue in India as highlighted by the National Family Health Survey (NFHS-5, 2021)**.** While the majority were underweight, the presence of overweight and obese individuals within the same cohort reflects nutritional transition trends, where poor diet quality and limited physical activity contribute to diverse health risks.

Taken together, these results emphasize the need for tailored nutritional interventions for visually impaired populations. Such interventions should address both undernutrition through improved food access and dietary diversity, while simultaneously preventing the onset of central obesity and related metabolic risks. Inclusive nutrition education programs adapted to the needs of visually impaired individuals could play a critical role in improving long-term health outcomes.

Distribution of Taste Sensation among Visually Impaired Females (N = 40)
Table 2

Taste	Heavy n (%)	Mild n (%)	Low n (%)	*p*-value
Sweet	12 (30.0)	16 (40.0)	12 (30.0)	0.180
Salt	11 (27.5)	29 (72.5)	0 (0.0)	0.503
Bitter	28 (70.0)	10 (25.0)	2 (5.0)	0.809
Sour	12 (30.0)	22 (55.0)	6 (15.0)	0.771

As shown in Table2, taste preferences varied across the participants. Sweet taste was reported as heavy by 30%, mild by 40%, and low by 30% of respondents (p = 0.180). Salt taste showed 72.5% mild preference, 27.5% heavy, and no low preference (p = 0.503). Bitter taste elicited a heavy response in 70% of participants, while 25% reported mild and 5% low preference (p = 0.809). Sour taste was preferred heavily by 30%, mildly by 55%, and at a low level by 15% (p = 0.771). The non-significant p-values indicate that while variations exist in taste preferences, no statistically significant differences were observed.

Distribution of sensory evaluation on food behavior among visually impaired females Table 3

Sensory Behavior	1	2	3	4	5	% (1)	% (2)	% (3)	% (4)	% (5)
Avoid certain taste	9	11	4	2	14	22.5	27.5	10.0	5.0	35.0
Eat only certain taste	3	2	4	1	30	7.5	5.0	10.0	2.5	75.0
Limits salt	8	2	23	4	3	20.0	5.0	57.5	10.0	7.5
Picky eating regarding food texture	11	3	1	3	22	27.5	7.5	2.5	7.5	55.0
Strong preference for certain taste	2	4	10	5	19	5.0	10.0	25.0	12.5	47.5
Craves certain food	1	9	8	6	16	2.5	22.5	20.0	15.0	40.0
Spicy foods and strong taste	9	9	5	0	17	22.5	22.5	12.5	0.0	42.5
No sense of smell	0	0	1	1	38	0.0	0.0	2.5	2.5	95.0
Like certain plain foods	7	2	0	1	30	17.5	5.0	0.0	2.5	75.0
Will not eat hot/very cold foods	3	1	1	0	35	7.5	2.5	2.5	0.0	87.5

The taste sensation analysis revealed that bitter taste had the strongest preference, with 70% reporting heavy preference, followed by mild preference for salt (72.5%) and sour (55%). Sweet preference was evenly distributed across heavy (30%), mild (40%), and low (30%). None of the P-values indicated significant variation across the sample, suggesting no strong statistical differences in taste preferences among the visually impaired group.

Regarding food-related sensory behaviors, 75% of participants reported eating only certain tastes**,** while 57.5% limited salt intake**.** Picky eating related to texture was common (55%)**,** and 47.5% had strong preference for specific tastes**.** Additionally, 40% reported craving certain foods and 42.5% preferred spicy or strong-tasting foods. Interestingly, 95% retained a sense of smell**,** and 75% preferred plain foods, while a majority (87.5%) avoided hot or very cold foods.

The findings suggest that visually impaired females exhibit **d**istinct taste sensitivities and food behaviors that may influence dietary intake and nutrition. The

predominance of bitter taste preference aligns with earlier studies highlighting heightened sensitivity to certain taste modalities in individuals with sensory impairments (Drewnowski et al., 1999).

The high prevalence of selective eating and preference for plain foods suggests possible food neophobia or sensory-driven eating restrictions, which have been documented in populations with altered sensory perception (Cermak & Curtin, 2010). Moreover, the tendency to limit salt intake **(57.5%)** may reflect increased health awareness, but could also indicate altered taste thresholds that affect flavor perception.

Avoidance of extreme temperatures (87.5%) is consistent with reports that individuals with visual impairment rely more heavily on tactile and oral cues for food safety and comfort (Kostyra et al., 2017). These eating patterns may increase the risk of nutrient deficiencies or imbalanced diets, especially given the previously observed high rates of under nutrition in this group (WHO, 2021).

Distribution of Macro- and Micronutrient Deficits among Visually Impaired Females (N = 40)
Table 4

Nutrient	Mean Intake	RDA	Deficit (Mean Difference)	Deficit N (%)	Not Deficit N (%)	*p*-value
Energy (kcal)	688.69	1660	911.31	40 (100.0)	0 (0.0)	0.001*
Protein (g)	17.03	46	28.97	40 (100.0)	0 (0.0)	0.001*
Carbohydrate (g)	92.76	200	107.24	39 (97.5)	1 (2.5)	0.001*
Fat (g)	27.92	20	+7.92	14 (35.0)	26 (65.0)	0.05
Iron (mg)	4.46	29	24.54	40 (100.0)	0 (0.0)	0.001*
Vitamin A (µg)	149.51	840	690.49	40 (100.0)	0 (0.0)	0.001*

The table 4 represents the analysis of nutrient intake among visually impaired females revealed significant deficiencies across multiple macro- and micronutrients when compared to the RDA The mean energy intake was 688.69 kcal, reflecting a deficit of 911.31 kcal compared to the RDA of 1660 kcal ($p < 0.001$). Protein intake was also markedly lower, with a mean of 17.03 g**,** falling short by 28.97 g ($p < 0.001$). Similarly, carbohydrate intake averaged 92.76 g**,** indicating a deficit of 107.24 g ($p < 0.001$).

Micronutrient intake revealed particularly severe gaps. Iron intake averaged only 4.46 mg, far below the RDA of 29 mg, with 100% of participants deficient**.** Vitamin A intake was critically low at 149.51 µg compared to the RDA of 840 µg, corresponding to a deficit of 690.49 µg ($p < 0.001$).

Fat intake, in contrast, was slightly above the RDA, with a mean of 27.92 g against the RDA of 20 g. Interestingly, only 35% of participants reported fat intake below the RDA, while the majority (65%) met or exceeded the requirement.

When nutrient adequacy was analyzed categorically (deficit vs. not deficit), all 40 participants (100%) were deficient in energy, protein, iron, and vitamin A, while 97.5% were deficient in carbohydrate intake. Fat intake was the only nutrient where a significant proportion (65%) met the RDA.

The findings clearly demonstrate that visually impaired females in this study face substantial nutritional inadequacies, particularly in energy, protein, iron, and vitamin A intake. Such deficiencies are likely to compromise overall health, immunity, and cognitive function, and may further exacerbate the challenges associated with visual impairment.

The prevalence of 100% deficiency in energy, protein, iron, and vitamin A intake is alarming and points toward systemic dietary insufficiencies. Similar results were reported by Montero et al. **(2005)** in visually impaired Spanish children, where low intake of protein, iron, and vitamin A was prevalent, highlighting the global nature of this issue. In India, studies by Toteja et al. (2006) and NNMB surveys (2017) have also documented widespread micronutrient deficiencies, particularly iron-deficiency anemia and vitamin A deficiency among vulnerable groups, aligning with the present findings.

The adequate fat intake among most participants could reflect reliance on easily accessible, affordable, and energy-dense foods such as oils, fried snacks, and processed items, which may provide calories but lack essential vitamins and minerals. This dietary imbalance, with excess fat and deficient protective micronutrients, may predispose the participants to both undernutrition and long-term risks of non-communicable diseases.

CONCLUSION

The study demonstrated that visually impaired young women face profound nutritional challenges characterized by widespread under nutrition, inadequate dietary intake, and distinct sensory-driven eating behaviors. More than half of the participants were underweight, and almost all exhibited significant deficits in energy, protein, iron, and vitamin A intake when compared with recommended dietary allowances. These findings emphasize the vulnerability of this group to nutritional deficiencies that can compromise immunity, cognitive capacity, and long-term health. At the same

time, the presence of both underweight and overweight individuals reflects a double burden of malnutrition, which mirrors broader nutritional transitions currently observed in India. Sensory evaluations revealed selective eating habits, preference for plain or spicy foods, and avoidance of extreme food temperatures, suggesting that reliance on non-visual senses plays a considerable role in shaping dietary choices. Collectively, these factors highlight the urgent need for targeted interventions to address both the dietary inadequacies and behavioral dimensions of eating among the visually impaired.

To improve the nutritional well-being of this population, strategies must extend beyond generic dietary advice and instead adopt tailored, inclusive approaches. Nutrition education programs should be made accessible through formats such as audio, Braille, and tactile resources, while also involving caregivers and institutional staff who play a key role in food provision. Ensuring dietary diversification with increased access to fruits, vegetables, dairy products, and fortified staples is essential to reduce micronutrient gaps, particularly iron and vitamin A. Institutions such as colleges and welfare homes should prioritize the provision of nutrient-dense meals that are both affordable and culturally appropriate. Moreover, interventions must recognize the influence of sensory perceptions on food behaviors, promoting adaptive cooking skills and confidence in independent meal preparation. At a broader level, integrating visually impaired populations into national nutrition initiatives such as POSHAN Abhiyaan and Anemia Mukt Bharat will ensure that their unique needs are addressed within public health policy. Future research with larger cohorts and longitudinal designs will be valuable in evaluating the long-term effects of such interventions and in advancing inclusive nutritional strategies.

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Conflict of interest

No conflict of interest was declared by the authors.

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