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Nutritional status and challenges faced by visually impaired school children

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Abstract

Visual impairment in children refers to a significant reduction in vision that cannot be corrected with standard glasses, contact lenses, medication or surgery, adversely impacting a child's ability to learn, communicate and perform daily activities. This includes a range of vision problems, from mild vision loss to complete blindness and can result from various conditions such as congenital abnormalities, diseases, injuries or infections affecting the eyes or the visual pathways to the brain. This study aims to assess the nutritional status and challenges among visually impaired children. The study was conducted in four districts Tamil Nadu. A total of 140 visually impaired were involved in the study. A well-structured interview schedule was used and face to face interview was conducted to collect the data. The study involved 140 children, majority (50.7 percent) of them belonged to 14 to 17 years of age group. Most of the children (55.7 percent) were having a normal body mass index. Around 85.71 percent of them identified their visual impairment during their birth. The result shows that the average intake of the children was deficit in all the nutrients when compared to the recommended dietary allowance. The results highlighted that there is a significant association in activities carried out between boys and girls. Majority of the visually impaired children face challenges in carrying out their academic activities. Adequate nutrition is important to overcome the nutritional deficiencies and other health conditions. Vitamin A deficiency causes various eye related health problems. Poor nutrition intake may adversely affect the cognitive function, concentration and learning abilities of the children. Addressing the nutritional deficiencies through targeted intervention is essential in enhancing the overall well-being of the visually impaired children.

Keywords: Visual Impairment, Nutritional assessment, challenges, school children, health interventions.

Introduction

Blindness and visual impairment in children have a negative impact on their learning, mental growth, and development, affecting not only the child but also the entire family, community, and country. Childhood blindness is the second highest burden of blindness in the world population. Children with visual impairment have restrictions in engaging with their surroundings because they cannot see the facial expressions of parents and teachers, cannot recognize social behaviors and cannot able to see the presence of others until a sound is heard. Low eyesight has psychological effects, which make children to become confused, afraid, nervous and sad[1].

In childhood, blindness can happen because of different reasons like problems with parts of the eye or certain health issues. Some common causes are complications like measles, infection in the eyes, vitamin A deficiency or using harmful medicines. Retinopathy of prematurity is the sixth most common cause of childhood blindness. Its screening and treatment improve both the functional and structural outcomes of the children who are at risk[2].

Visual impairment is a major problem that causes huge difficulty for millions of children worldwide. It affects their physical, cognitive, emotional and social growth. Among these children who are enrolled in educational institutions have specific challenges to achieve good physical and mental health. The term "visual impairment" refers to a range of disorders from mild visual restrictions to complete blindness each creating a specific barrier to child's overall health and quality of life[3].

Refractive error is one of the most common optical conditions that affects people of all age groups. According to the WHO (2021) data, refractive error becomes the top and second leading cause of vision impairment accounting for 43 percent of all vision impairments[4]. Uncorrected refractive errors led to vision impairment in 101.2 million and blindness in 6.8 million individuals[5].

Children with visual impairments face unique challenges that can impact various aspects of their lives, including their nutritional status. Adequate nutrition is essential for the growth, development and overall health of all children, but for those with visual impairments, achieving optimal nutrition can be particularly challenging due to factors such as limited food choices, feeding difficulties and lack of nutritional education. Assessing the nutritional status and challenges among visually impaired school children is crucial for understanding the unique dietary needs and obstacles faced by them[6].

Food is essential for maintaining good health and for both preventing and curing diseases. The human body needs nutrients for growth and development[7]. A balanced diet and nutritional supplements can prevent or slow down the progression of vision disorders. A balanced diet is necessary for the human body to maintain physical and mental health[8].

Food insecurity among individuals with visual impairments may have negative effects on their health[9]. According to Merle et al. several factors contribute to the primary cause of vision impairment such as poor dietary intake and physical inactivity. A balanced diet and sufficient nutrient intake help maintain a healthy lifestyle[10]. Children must learn reading and writing skills to improve their knowledge. However, students with visual impairment experience many challenges in learning these skills. They read more slowly than the normal sighted children[11].

Orientation and mobility is one of the main components of learning. Teachers, who have received specialized training in teaching orientation and mobility should train the visually impaired children. Students need to learn about themselves and the environment in which they move towards the surrounding.

The study was carried out to understand the nutritional status of the visually impaired children, it is important because they face many challenges due to their vision impairment which may lead to nutritional deficiencies that create an impact on their growth and development.

Materials and Methods

The study on "Nutritional Status and Challenges faced by the Visually Impaired School Children" was carried out by selecting four districts of Tamil Nadu and the data was collected from the visually impaired school children using a well-structured interview schedule.

Selection of Area and Respondents: The study was carried out in four districts of Tamil Nadu such as Coimbatore, Chennai, Trichy and Bargur. The data was collected from 140 visually impaired school children who include 85 boys and 55 girls. The Institutional Human Ethics Committee of Avinashilingam University grants approval for the research. The approval number for the study is AUW/IHEC/23-24/FSMD/XMT-039 dated on 15-03-2024.

Collection of Data: The interview schedule was framed with questions to collect data regarding the demographic profile of the children, educational status of their parents, socioeconomic status of the children, anthropometric measurements and assessment of nutritional status, challenges they faced and about their academic performance. Data was collected from the 140 visually impaired children. Demographic profile includes age, gender, family type. Socioeconomic status was identified using Modified Kuppuswamy Scale[12] Their nutritional status was analyzed using 24 hour dietary recall, food preferences and using food frequency questionnaire. A set of questions was framed regarding their challenges they face in daily life. Academic performance of the visually impaired children was done by analyzing their active participation in classroom, grades they score, materials used and strategies they follow.

Statistical Analysis of Data: The collected information was consolidated using MS Excel. Percentages were calculated for each variable and statistically compared using SPSS software.

Results and Discussion

A total of 140 visually impaired school children were chosen for the study. Majority (50.7 percent) of the children are in the age group between 14 to 17 years, out of which 31.4 percent were boys and 19.28 percent were girls. About 39.28 percent of the children are under the age group between 10 to 13 years of which 31.4 percent were boys and 19.29 percent were girls. Only 10 percent of the children belonged to 18 to 20 years of age of which 7.8 percent were boys and 2.14 percent were girls (Table-1).

The highest percentage of children belonged to the upper lower class (IV) which was 63.57 percent, more number of girls 39.28 percent came under the upper lower class when compared to boys 24.28 percent. Out of 140 children, 27.85 percent of them lie in the lower middle (III) class out of which 13.57 percent were boys and 14.28 percent were girls. Only 3.57 percent of them belonged to the upper middle (II) class and the least percentage of the children belonged to the lower class (V) in that 0.71 percent were boys and 4.28 percent were girls, none of the children belong to the upper class (I) (Table-2).

Table-1: Age wise distribution of the visually impaired school children.

Age (years)	Boys		Girls		Total (N=140)	
	N	%	N	%	N	%
10-13	30	21.4	25	17.8	55	39.28
14-17	44	31.4	27	19.28	71	50.7
18-20	11	7.8	3	2.14	14	10

The children who have a normal body mass index was (55.7 percent), out of which 30 percent were boys and 36 percent were girls. Children who fall under the overweight category was 30 percent of which 18.57 percent of the boys were overweight when compared to girls (11.42 percent) and 9.28 percent of them were in obese category from which 8.57 percent were boys and only one percent were girls. Among 140 children only five percent of them were underweight from that 3.57 percent were boys and 1.42 percent were girls (Table-3).

About 85.71 percent of the children became visually impaired during their birth out of which 35 percent were boys and 50.71 percent were girls. Out of 140 children surveyed, 9.28 percent stated that they identified their impairment between 1 to 5 years of age. Around 6.42 percent of the girls became visually impaired during 1 to 5 years, followed by boys 2.85 percent. 3.57 percent of the children became visually impaired between 5 to 10 years of age out of which 0.71 were boys and 2.85 percent were girls. Only 1.42 percent of the girls recognized their vision impairment when they were between 10 to 12 years old (Table-4).

The result infers that a significantly higher proportion of visually impaired boys follow a non-vegetarian diet compared to girls. Out of 140 children interviewed, majority of them prefer a non-vegetarian diet (97.12 percent) from which 58.57 percent of them were boys and 38.57 percent were girls. Only 2.85 percent of the children were vegetarians of which 2.14 percent were boys and 0.71 percent were girls (Table-5).

Table-2: Socioeconomic class of the visually impaired school children.

Socioeconomic Class	Boys		Girls		Total	
	N	%	N	%	N	%
Lower (V)	1	0.714	6	4.28	7	5
Upper Lower (IV)	34	24.28	55	39.28	89	63.57
Lower Middle (III)	19	13.57	20	14.28	39	27.85
Upper Middle (II)	0	0	5	3.57	5	3.57

Table-3: Body mass index of the visually impaired school children.

Body Mass Index Range	Z – Score Percentile*	Boys		Girls		Total	
		N	%	N	%	N	%
Underweight	>3	5	3.57	2	1.42	7	5
Normal	3 – 50	42	30	36	25.71	78	55.7
Overweight	50 – 23	26	18.57	16	11.42	42	30
Obesity	23 – 27	12	8.57	1	0.71	13	9.28

*Indian Academy of Pediatrics guidelines (2015).

Table-4: Onset of visual impairment by visually impaired school children.

Age (years)	Boys		Girls		Total	
	N	%	N	%	N	%
During birth	49	35	71	50.71	120	85.71
1-5 years	4	2.85	9	6.42	13	9.28
5-10 years	1	0.71	4	2.85	5	3.57
10-12 years	0	0	2	1.42	2	1.42

Majority of children accounting for 42.14 percent of them prefer snack items. None of the girls prefer healthy foods, whereas only 2.85 percent of the boys like to eat healthy foods. Boys have a higher preference for junk foods which is 22.85 percent when compared to girls (12.14 percent). Boys also show a slightly higher preference for snack items 24.28%, compared to girls 17.85%. Around 19.28 percent of them prefer to eat sweets out of which 10 percent of them were boys and 27 percent of them were girls. Out of 140 children, one boy stated that he likes to eat spicy foods (Table-6).

The above results highlight if there is any association between boys and girls in carrying out different kinds of activities. There is less than one percent level of association between boys and girls in doing activities such as watching television and there is a five percent level of association between boys and girls in activities such as enjoying scenery and choosing cloths. There is no association between boys and girls in carrying out other activities such as trying small repair tasks, managing foods on a plate, getting around outdoors, usage of steps, playing outdoor games and playing indoor games (Table-7).

Table-5: Diet pattern of visually impaired school children.

Diet Pattern	Boys		Girls		Total	
	N	%	N	%	N	%
Vegetarian	3	2.14	1	0.71	4	2.85
Non-Vegetarian	82	58.57	54	38.57	136	97.14

Table-6: Food preferences of the selected visually impaired school children.

Food Preferences	Boys		Girls		Total	
	N	%	N	%	N	%
Healthy foods	4	2.85	0	0	4	2.85
Junk foods	32	22.85	17	12.14	49	35
Snack items	34	24.28	25	17.85	59	42.14
Sweets	14	10	13	9.28	27	19.28
Others	1	0.71	0	0	1	0.71

Table-7: Activities carried out by the visually impaired school children.

Type of Activities	Very easy	Moderately difficult	Very difficult	Stopped due to vision	N/A	Chi-square (χ^2)	P value
Watching television	12	69	32	9	18	12.698	0.013**
Trying small repair task	0	9	5	22	104	7.319	0.062
Managing foods on plate	116	24	0	0	0	0.430	0.512
Getting around outdoors	30	95	13	0	2	1.325	0.723
Enjoying scenery	1	6	20	75	38	13.888	0.016*
Usage of steps/stairs	118	17	3	2	0	3.597	0.308
Playing outdoor games	29	105	4	0	2	7.132	0.068
Playing indoor games	31	92	15	0	2	2.672	0.445
Choosing cloths	107	26	4	0	3	7.589	0.055*

Out of 140 children, 85.71 percent of them stated that they face more difficulties while doing homework's of which 52.14 percent were boys and 33.57 percent of them were girls. Around 5.71 percent of the children felt difficulties in managing their day to day activities. Only 2.14 percent of them stated that they have difficulty while eating food. Two percent of the boys stated that they face difficulties while moving from one place to another place (Table-8).

Table-8: Challenges faced by the visually impaired school children.

Types of Challenges Faced	Boys		Girls		Total	
	N	%	N	%	N	%
Difficulty in doing day to day activities	7	5	1	0.71	8	5.71
Difficulty while having food	1	0.72	2	1.42	3	2.14
Difficulty in doing homework's	73	52.14	47	33.57	120	85.71
Moving from one place to another place	2	1.42	0	0	2	1.42

Table-9: Mean nutrient intake of the visually impaired school children.

Nutrients	Boys				Girls				Boys				Girls			
	10 - 12 Years								13 - 15 Years							
	RDA	Mean±SD	±	t value	RDA	Mean ±SD	±	t value	RDA	Mean±SD	±	t value	RDA	Mean±SD	±	t value
Energy (kcal)	2220	1000±164.4	±1220	-0.2	2060	1046±132.77	±1014	0.002	2860	1019±176.44	±1841	-0.004	2400	1095±90.12	±1305	-0.051
Protein (g)	32	27±4.5	±5	0.01	33	25±2.97	±8	-0.043	45	27±6.24	±18	0.328	43	28±3.17	±15	-1.645
Fat (g)	25	22.07±7.38	±2	0.035	24	17±3.36	±8	0.278	25	20±5.37	±5	-0.56	25	22±5.58	±3	-0.01
Fiber (g)	33	11.7±3.21	±21	-0.26	30	12±1.14	±18	-2.45	43	11.44±2.3	±32	-0.022	36	13±2.04	±23	-2.009
Calcium (mg)	850	276.5±291.14	±573	0	850	147±63.46	±703	-0.057	1000	227±235.5	±773	-0.026	1000	163±64.94	±837	-0.012
Iron (mg)	16	15.98±4.64	±1	0.002	28	25±14.23	±4	-112	22	15±8.03	±7	-0.268	30	18±8.05	±12	0.094
Vitamin A (mg)	770	357±131.26	±412	3.689	790	300±130.13	±490	8.815	930	247±169.6	±638	-0.028	890	483±145.09	±417	0.392
Thiamine (mg)	1.5	0.35±0 .14	±1.15	0.013	1.4	0.210±0.25	±1.19	0.068	1.9	0.27±0.13	±1.63	0.402	1.6	0.249±0.075	±1.35	0.733
Riboflavin (mg)	2.1	0.52±0.20	±1.57	0.002	1.9	0.74±0.43	±1.16	0.056	2.7	0.47±0.24	±2.23	0.229	2.2	0.563±0.24	±1.63	0.015
Niacin (mg)	15	4.35±1.04	±10.65	0.03	14	4.17±0.46	±9.83	0.035	19	4.11±0.96	±14.889	0.044	16	4.12±0.54	±11.8	0.077
Folic acid ~g	220	37.83±18.45	±182.18	0.001	225	33.99±7.62	±191	0.002	285	35.83±19.28	±249	0.003	245	41.94±11.52	±213	0.004
Vitamin C (mg)	55	10.80±8.58	±44	0.002	50	5.45±2.26	±45	0.008	70	9.12±9.29	±683	0.004	65	5.69±3.80	±69	0.014

The result shows that the Recommended Dietary Allowance (RDA) and the average nutrient intake of the selected visually impaired children were compared. Their average nutrient intake was very much deficit when compared to their recommended dietary allowance. Vitamin A is an essential nutrient for children's growth and development, particularly for maintaining healthy vision. Children with visual impairment require adequate nutrition to enhance their growth and development (Table-9).

Conclusion

The prevalence of visual impairment among children poses significant challenges globally. Prolonged vitamin-A deficiency

causes various eye related health problems. Adequate nutrition intake is very much important to overcome the nutritional deficiencies and other health conditions. Poor nutritional intake may adversely affect the cognitive function, concentration and learning abilities of the children which leads to poor academic performance. Thus, addressing nutritional deficiencies through targeted intervention is essential for enhancing academic performance and overall educational outcomes among visually impaired children. Early intervention programs, including orientation and mobility, access to assistive technologies and specialized educational resources, are important to facilitate the academic success and to overcome the challenges faced by the visually impaired children

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