

ORIGINAL RESEARCH

Spectrum of behavioural problems and its relation with nutritional and endocrinal issues among adolescent population**¹Dr. Astha Agarwal, ²Dr. Richa Yadav, ³Dr. Navratan Kumar Gupta**¹Associate Professor, ²Junior Resident, Subharti Medical College Meerut, Uttar Pradesh, India³Associate Professor, LLRM Medical College, Meerut, Uttar Pradesh, India**Corresponding Author:**Dr. Navratan Kumar Gupta
Associate Professor, LLRM Medical College, Meerut, Uttar Pradesh, India

Received: 03 May, 2023

Accepted: 23 May, 2023

Abstract**Aim:** To study prevalence and spectrum of behavioural problems in adolescents attending paediatrics OPD and IPD tertiary care Hospital.**Material and Methods:** This observational descriptive study conducted at tertiary care hospital. Seventy three adolescents were enrolled after taking informed consent from parents of all children and children in case of age above 18 years. First of all Binet Kamat Test (BKT) was administered by trained psychologists for IQ assessment to rule out Intellectual Disability. Blood Samples were drawn after taking all aseptic precautions and was sent for nutritional deficiency and endocrinal evaluation with testing for complete blood count, serum vitamin B12, serum folate levels and TSH levels.**Results:** A higher prevalence of the behavioural problem and nutritional disorder including the anemia, Vitamin B12, folic acid, BMI, and thyroid disease among the adolescents. The presence of somatic problem (31.4%) and the anxiety problem (28.6%) was the most common pattern among the behavioural problems.**Conclusion:** A higher prevalence of the behavioural problem and nutritional disorder including the anemia, Vitamin B12, folic acid, BMI, and thyroid disease among the adolescents. The presence of somatic problem (31.4%) and the anxiety problem (28.6%) was the most common pattern among the behavioural problems.**Keywords:** Adolescent, Behavioural Problem, BMI, Nutrition, Thyroid disorder.**Introduction**

Adolescents are young people aged between 10 to 19 years. They constitute more than 1.2 billion worldwide and about 21% (243 billion) of Indian population.¹ They undergo tremendous changes in physical, intellectual and emotional domains. The common problems of adolescent groups are Nutritional issues, Reproductive and sexual health problems, psychosocial problems and substance abuse.² We can categorize the health needs of adolescents broadly into three categories physical, psychological and social. Among these **psychosocial problems** are one of the most neglected issues among adolescent. Mortality and morbidity due to these disorders has increased in recent years.³

Aim: To study prevalence and spectrum of behavioural problems in adolescents attending paediatrics OPD and IPD tertiary care Hospital.

Objectives

1. To assess the spectrum of behavioural problems in adolescents attending tertiary care centre.
2. To assess the correlation between nutritional deficiency, endocrinal problems and behavioural problems in adolescents.

Material & Method

- Design & Setting:** This observational descriptive study conducted at department of paediatrics, Subharti Medical College, Meerut for the duration of Sept 2019 to March 2021.
- Inclusion criteria:** All adolescents (11 to 19 years) with or without behavioural concerns attending Paediatrics OPD and IPD.
- Exclusion criteria:** All the participants with hemodynamic instability, intellectual disability, cerebral palsy, neurological disorders, seizure disorders, chronic illness and previously diagnosed endocrine disorders were excluded from the study.
- Methodology:** Seventy three adolescents were enrolled after taking informed consent from parents of all children and children in case of age above 18 years. First of all Binet Kamat Test (BKT) was administered by trained psychologists for IQ assessment to rule out Intellectual Disability. Blood Samples were drawn after taking all aseptic precautions and was sent for nutritional deficiency and endocrinal evaluation with testing for complete blood count, serum vitamin B12, serum folate levels and TSH levels. Child Behaviour Checklist (CBCL) was used by paediatric resident for behavioural assessments. Data was hence collected and analysed. The Intelligence Quotient (IQ) was computed by the ratio of MA over CA multiplied by 100 Child Behaviour Checklist (CBCL; Achenbach & Edelbrock, 1983) by child psychologist.

Statistical analysis

All the patients data was entered in excel sheet operating on windows 10. All the data was analysed using the SPSS v21, with p-value of <0.05 as statistically significant.

Results

Total of 73 patients were included in the present study fulfilling the inclusion criteria. The mean age of the children's was 14 ± 2.0 yrs, with 41 boys and 32 girls.

		Frequency	Percent
Age Group	10-13yrs	32	43.8
	14-17yrs	41	56.2
GENDER	Female	32	43.8
	Male	41	56.2
Birth Order	1	13	17.8
	2	21	28.8

	3	28	38.4
	4	11	15.1
BMI in kg/m²	Normal 18.5 - 24.5	42	57.5
	Overweight > 25 - 29.9	21	28.8
	Underweight <18.5	10	13.7
	Total	73	100.0
Siblings	2	33	45.2
	3	18	24.7
	4	6	8.2
	5	11	15.1
	6	5	6.8
	Total	73	100.0
Domicile	Rural	13	17.8
	Urban	60	82.2
Type Of Family	Joint	31	42.5
	Nuclear	20	27.4
	Three General Family	22	30.1
	Total	73	100.0
Socioeconomic Status	Lower Middle	43	58.9
	Upper Lower	29	39.7
	Upper Middle	1	1.4
	Total	73	100.0

Table 2: Showing the mean values of study variables					
	N	Minimum	Maximum	Mean	Std. Deviation
IQ	73	82.00	112.00	94.09	5.31
Hemoglobin in gm/dL	73	8.70	16.00	12.85	1.45
Vitamin B12 in pg/mL	73	58.00	534.00	286.17	138.37
TSH in mIU/L	73	.10	8.00	2.68	1.90
Folic acid in ng/ml	73	3.40	46.00	24.39	14.68

Table 3: Showing the presence of anemia among the participants			
		Frequency	Percent
Hemoglobin in gm%	Mild 10 to 12	20	27.4
	Moderate 8 to 10	2	2.7
	Normal 12 to 16	51	69.9
Vitamin B12	Deficient	21	28.8
	NORMAL	52	71.2
Folic Acid	Deficient	22	30.1
	Normal	51	69.9
TSH	Hyperthyroidism	02	2.7
	Hypothyroidism	24	32.9
	Normal	47	64.4
IQ	Above average 110 to 119	1	1.4

	Below average 80 to 89	26	35.6
	Normal 90 to 109	46	63.0

Table 4: Showing the distribution of scholastic concern among the participants

		Frequency	Percent
Scholastic Concern	No	48	65.8
	Yes	25	34.2
	Total	73	100.0
Interpersonal Relationship Concern	No	68	93.2
	Yes	5	6.8
	Total	73	100.0
Behavioural Concern	No	54	73.9
	Yes	19	26.1
	Total	73	100.0
Behavioural Problem	No	52	71.2
	Yes	21	28.8
	Total	73	100.0

Table 5: Pearson's correlation between behavioural problem with hemoglobin, vitamin B12, TSH, folic acid among patients

		Behavioural problem
Hemoglobin in gm/dL	r	-.284 [*]
	Sig	.015
Vitamin B12 in pg/mL	r	-.593 ^{**}
	Sig	.000
TSH in mIU/L	r	-.023
	Sig	.845
Folic acid in ng/ml	r	-.525 ^{**}
	Sig	.000

Table 6: Comparison of behavioural problem with hemoglobin, vitamin B12, TSH and folic acid using chi-square test

		Behavioural problem				Chi-square (p-value)
		No		Yes		
		N	%	N	%	
Hemoglobin	Mild	8	15.4%	12	57.1%	20.104 (0.001)**
	Moderate	0	0.0%	2	9.5%	
	Normal	44	84.6%	7	33.3%	
Vitamin B12	Deficient	5	9.6%	16	76.2%	32.355 (0.001)**
	Normal	47	90.4%	5	23.8%	
TSH	Hyperthyroidism	1	1.9%	1	4.8%	0.924 (0.630)
	Hypothyroidism	16	30.8%	8	38.1%	
	Normal	35	67.3%	12	57.1%	
Folic Acid	Deficient	5	9.6%	17	81.0%	36.156

	Normal	47	90.4%	4	19.0%	(0.001) **
Behavioural concern	No	42	77.8%	12	22.2%	4.337
	Yes	10	52.6%	9	47.4%	(0.037)*

Table 7: Comparison of behavioural problem with BMI, Hemoglobin, vitamin B12, THS and folic acid using t-test

	Behavioural problem				t-test p-value
	No		Yes		
	Mean	SD	Mean	SD	
BMI in Kg/M ²	22.77	2.53	20.80	3.73	0.01*
Hemoglobin in gm/dL	13.12	1.22	12.21	1.78	0.01*
Vitamin B12 in pg/mL	337.98	108.03	157.90	122.14	0.001**
TSH in mIU/L	2.71	1.82	2.61	2.15	0.845
Folic acid in ng/ml	29.26	11.86	12.33	14.27	0.001**

Table 8: Showing the behavioural problems among the children

		Frequency	Percent
Anxiety problem	Borderline	7	9.6
	Clinical	2	2.7
	Normal	1	1.4
Somatic problems	Borderline	9	12.3
	Clinical	1	1.4
	Normal	1	1.4
Attention deficit problem	Borderline	3	4.1
	Clinical	2	2.7
	Normal	1	1.4
Opponent problem	Borderline	1	1.4
	Clinical	1	1.4
	Normal	1	1.4
Conduct problem	Borderline	2	2.7
	Normal	1	1.4
Affective problem	Borderline	2	2.7

Table 9: Showing the behavioural problems among the children

Anxiety problem	10	28.6
Somatic problems	11	31.4
Attention deficit problem	6	17.1
Opponent problem	3	8.6
Conduct problem	3	8.6
Affective problem	2	5.7

Discussion

This observational descriptive study conducted at tertiary care center of western UP. All the adolescents aged between 11 to 19yrs of age with or without behavioural concerns. The vitamin B12 deficiency was found to be present in 28.8% of the children. The thyroid disorder was found in 35.6% of children, among them 32.9% were with presence of hypothyroidism and 2.7% with hyperthyroidism. Folic acid deficiency was present in 30.1% of the children. There were 11.6% of children and adolescents with ID, who were anaemic (boy <13 g/dl, girl <12 g/dl) in the study.⁽⁴⁾ The IQ of children in the present study was in normal range of 90-109 in 63%, followed with 35.6% in below average 80-89 and 1.4% with above average 110 to 119. Study by Lin JD et al⁴, found 11.6% children with intellectual disability with presence of anemia. The logistic analysis model revealed gender and age were variables with significant prediction capacity of anemia occurrence among participants. They concluded that, the anemia prevalence among the children with ID is a mild public health problem. Optimizing nutrition during foetal and early postnatal life is a golden opportunity to impact neurodevelopment and brain function across the lifespan.^{5,6} The scholastic concern was present in 46.6% and 53.4% with no concern. Scholastic concern among children on comparison with the anemia, it was found that there is higher incidence of scholastic concern in children with anemia of mild and moderate compared to the normal haemoglobin.($p < 0.001$) On comparison of with the BMI of children, children with underweight had a significant higher incidence of scholastic concern in them compared to the children in the normal BMI and overweight.($p < 0.001$) In study by Shree A et al., showed statistically significant association between nutritional status and scholastic performance which concludes that increase in the nutritional status of children in turn increases the academic achievement.⁽⁵⁾ The interpersonal relationship concern was seen in 6.8% and 93.2% with no concern. In study by Murakami K et al⁷, found a high level of relationship quality with subsequent reductions in internalizing and externalizing problems as well as reduction in impairment in social reciprocity and also the repetitive behaviours. The behavioural concern was present in 26.1% of children and 73.9% had no concern. We found, among the total of 21 children with behavioural problem in them, among them children with behavioural concern found to have the behavioural problem was seen in 9 (47.4%) children. ($p < 0.05$) Behavioural problem among children on comparison with the anemia, it was found that there is higher incidence behavioural problem in children with anemia of moderate (9.5%) and mild (57.1%) compared to the normal haemoglobin (33.3%)($p < 0.001$). The presence of somatic problem (31.4%) and the anxiety problem (28.6%) was the most common pattern among the behavioural problems in present study. In similar to present study, prevalence of mental health conditions from ages 6 to 14 years was 4.0% for depression, 7.0% for anxiety, 5.5% for conduct disorder, 7.1% for ADHD, and 5.4% for multiple conditions. The study concluded that more than 40% of the children enter the school with relative vulnerabilities in social emotional functioning that are linked with early onset mental health conditions.^{8,9} Factors that increased the risk of having the emotional and behavioural problem were the poor parenting and relationship with adolescent, more negative life events experiences, older age, pressure of studies, living in rural area and lower parental expectations. They concluded that, the behavioural and emotional problems among the adolescents was lower level compared to those reported in other countries.¹⁰

Conclusion

A higher prevalence of the behavioural problem and nutritional disorder including the anemia, Vitamin B12, folic acid, BMI, and thyroid disease among the adolescents. The presence of somatic problem (31.4%) and the anxiety problem (28.6%) was the most common pattern among the behavioural problems. The findings suggest the importance of these as an important screening test among the adolescents, including the parents and guardian counselling.

References

1. Andrews G, Henderson S, Hall W. Prevalence, comorbidity, disability and service utilisation. Overview of the Australian National Mental Health Survey. *Br J Psychiatry*. 2001;178:145–53.
2. Graber EG. *Adolescent Development*. USA; 2019.
3. Lawrence R, Appleton GJ, Sim L. *Adolescent Health Services: Missing Opportunities*. [Internet]. Washington DC; 2009. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK215414/>
4. Lin J-D, Lin P-Y, Lin L-P, Hsu S-W, Loh C-H, Yen C-F, et al. Prevalence and associated risk factors of anemia in children and adolescents with intellectual disabilities. *Res Dev Disabil*. 2010;31(1):25–32.
5. Shree A, Murthy N. Impact of malnutrition on scholastic performance among school children in Mysuru. *Clin Epidemiol Glob Heal*. 2021 May 1;11:100780.
6. Georgieff MK, Ramel SE, Cusick SE. Nutritional influences on brain development. *Acta Paediatr*. 2018/03/22. 2018;107(8):1310–21.
7. Murakami K, Miyake Y, Sasaki S, Tanaka K, Arakawa M. Dietary folate, riboflavin, vitamin B-6, and vitamin B-12 and depressive symptoms in early adolescence: the Ryukyus Child Health Study. *Psychosom Med*. 2010;72(8):763–8.
8. Smith LE, Greenberg JS, Seltzer MM, Hong J. Symptoms and behavior problems of adolescents and adults with autism: effects of mother-child relationship quality, warmth, and praise. *Am J Ment Retard*. 2008;113(5):387–402.
9. Thomson KC, Richardson CG, Gadermann AM, Emerson SD, Shoveller J, Guhn M. Association of Childhood Social-Emotional Functioning Profiles at School Entry With Early-Onset Mental Health Conditions. *JAMA Netw Open*. 2019;2(1):e186694.
10. Wang J-N, Liu L, Wang L. Prevalence and associated factors of emotional and behavioural problems in Chinese school adolescents: a cross-sectional survey. *Child Care Health Dev*. 2014;40(3):319–26.