

## Psychological and behavioral assessment in children with treated hypothyroidism using developmental psychopathology checklist scale

Poonam Singh<sup>1</sup>, Falguni Chaudhari<sup>2</sup>, Ujjwala Deshpande<sup>3</sup>, Maulik Saliya<sup>4</sup>

From<sup>1</sup> Additional Professor, <sup>2</sup>Tutor, <sup>3</sup>Child Psychologist, Department of Pediatrics, Surat Municipal Institute of Medical Education and Research Medical College, Surat, Gujarat, India, <sup>4</sup>Private Paediatric Practitioner, Surat, Gujarat, India

**Correspondence to:** Dr. Falguni Chaudhari, D-1/2, New AP Quarters, New Civil Hospital Campus, Majura Gate, Surat – 395 001, Gujarat, India. E-mail: drfals@gmail.com

Received – 31 May 2018

Initial Review – 23 June 2018

Accepted – 20 July 2018

### ABSTRACT

**Objectives:** The objectives of the study were to assess psychological and behavioral problems in treated hypothyroid children with euthyroid status, with the help of developmental psychopathology checklist (DPCL). **Materials and Methods:** This was an observational comparative study done in pediatric endocrinology clinic in a medical college over 6 months. 20 consecutive hypothyroid patients between 5 and 15 years with euthyroid status were compared to 20 controls for psychosocial problems using DPCL scale. The DPCL scale identifies the following clusters of abnormal developmental history, developmental problems/disorders, emotional disorders, attention deficit hyperactivity, childhood psychosis, learning disorder, somatic problems, conduct disorder, autism, and obsessive-compulsive neurosis. **Results:** All cases had at least 1 cluster affected. The most common clusters affected were emotional disorders in 85% cases, abnormal developmental history in 80%, developmental problems in 75%, attention deficit hyperactivity (ADHD) in 70% cases, and learning disorders in 70% cases. Among males, the common problems were abnormal developmental history (86%), developmental problems (86%), ADHD (86%), emotional disorder (86%), and learning disorder (71.43%). In females, problems noted were an emotional disorder (84%), abnormal developmental history (86%), developmental problems (69%), learning disorder (69%), and ADHD (61%). This difference in cluster affection in males and females was not statistically significant. Single domain affection was found in 10% of patients, but more than 5 domain affections were seen in 60% of patients, and this was highly significant. **Conclusion:** Even with the euthyroid state in hypothyroidism, psycho-behavioral problems are common in children.

**Key words:** Behavioral problems, Developmental psychopathology checklist, Hypothyroidism

Childhood psychological problems considered “the new morbidity,” 30 years ago has become widely acknowledged as one of the most common chronic conditions of children and adolescence [1,2]. Pediatricians have always been the first resource for parents who are worried about their children’s behavior problem. With increasing awareness and the availability of the resources, the primary care providers assume an even greater “gatekeeping” responsibility to identify, manage, and refer children with emotional and/or behavioral disorder [3]. Primary hypothyroidism occurs due to the deficient functioning of the thyroid gland, and it is the most common thyroid disorder in children and adolescent. Both congenital and acquired forms of primary hypothyroidism are common [4].

Hypothyroidism being a chronic disorder requiring prolonged therapy is likely to be associated with behavioral problems [5]. Developmental psychopathology checklist (DPCL) has been used to study the psychological and behavioral problems in childhood chronic illness such as nephrotic syndrome and thalassemia [6]. This study was done using this specific scale to assess the psychological and behavioral problems that need to be addressed in children of hypothyroidism with euthyroid status.

### METHODOLOGY

This observational comparative study was conducted in the endocrinology clinic of the pediatric department of a tertiary care hospital and medical college over a period of 6 months. Sampling technique used was purposive sampling. All consecutive patients between 5 and 15 years, on treatment for hypothyroidism attending the endocrine clinic, were included in the study, provided they fulfilled our inclusion criteria. Hypothyroid patients on thyroxine treatment in a euthyroid state, who could understand local dialect and were willing to participate in the study, were taken as cases. Normal reference ranges of thyroid levels were thyroid-stimulating hormone - 0.4–5  $\mu$ U/ml, thyroxine - 5–12  $\mu$ U/ml, and T<sub>3</sub> 70–190 nanogram/dl [4].

Children with any other chronic medical or surgical illness were excluded from the study. A standard Indian Council for Medical Research form was used to obtain informed consent from the children’s parents or legal guardians [7]. Wherever possible, depending on the child’s capabilities, we obtained assent from the child as well. Ethical clearance from the institutional committee was taken. 20 controls were taken from our routine pediatrics

outpatient department based patients and were age and gender matched. The behavioral profile of the children was assessed using the DPCL, a reliable and valid instrument for assessing psychopathology in Indian children in clinical settings [8]. This tool was developed at the National Institute of Mental Health and Neurosciences, Bengaluru by Kapur and colleagues in 1994. This scale has been validated in children <16 years [8].

The DPCL is based on a dimensional rather than a categorical approach. The DPCL scale identifies the following clusters of developmental problems: Developmental disorders, emotional disorders, attention deficit hyperactivity (ADHD), hyperkinesia, childhood psychosis, learning disorder, somatic problems, conduct disorder, autism, and obsessive-compulsive neurosis. There are prescribed scores for each cluster depending on the symptoms, and if the score is greater than the cutoff, then that cluster is diagnosed [8]. After obtaining informed consent, an interview was sought of the children and their parents by a trained clinical child psychologist, and the DPCL was administered to assess the presence of behavioral problems in both cases and controls.

The clinical psychologist was blind to the children's clinical and sociodemographic status. The treating paediatrician was blind to psychological testing recorded the socio-demographic and clinical details. These were documented in standard case record forms. To assess the socioeconomic status of the Kuppaswamy

scale was used. This instrument has been used in various studies in India and has good reliability and validity [9] IQ test done by MISC for case and control groups by a clinical psychologist under standard condition [10].

The data were analyzed using Epi Info software version 6.0 for calculating the Fisher's exact test and Chi-square test to compare the prevalence of behavioral abnormalities in cases and the control group.

## RESULTS

The behavioral profiles of 20 patients of hypothyroidism were compared with those of 20 age and sex-matched controls. In this study, the mean duration of hypothyroidism in participants was 21.2 months, before initiation of treatment, and duration of euthyroid state was 34.05 months. The mean age, gender, and socioeconomic class were in cases and controls were comparable (Table 1). Of 20 cases, only 1 patient (5%) had normal IQ as compared to 14 children (70%) in the control group. Moderate to severe mental retardation was found in 20% cases, and it was not seen in any of the control children.

In our study, the most common problem was emotional disorder seen in 17 cases (85%). Other problems identified in cases were ADHD and learning disability. None of the cases had obsessive-compulsive disorder, autism, and hyperkinesia (Table 2).

Abnormal developmental history, developmental Problems, ADHD, and emotional disorders were common clusters affected in males (86% each). In females, the common clusters affected were an emotional disorder (84%), abnormal developmental history (76%), learning disorder, and developmental problems (69%) followed by ADHD (61%). Males were more affected in all domains except conduct disorder; however, the difference was not statistically significant (Table 3).

All cases (100%) had at least one domain affected. 60% of cases had more than 5 domains of affection (Table 4). Control group did not have any domain affected.

## DISCUSSION

Our study showed that the psychological problems (using DPCL scale) were more common in treated hypothyroid children as compared to the age-matched controls. Our study reveals that 100% of cases had at least one domain affected. Any chronic

**Table 1: Demographic profile of the study population**

Parameters	Case (%)	Control (%)	p value
Age			
Mean age (years)	8.3	8.3	1.0
5–10	9 (45)	9 (45)	
11–15	6 (30)	6 (30)	
16–18	5 (25)	5 (25)	
Gender			
Male	7 (35)	7 (35)	0.1099
Female	13 (65)	13 (65)	
Socioeconomic class			
Upper	2 (10)	0	0.084
Upper Middle	1 (5)	6 (30)	
Lower middle	10 (50)	6 (30)	
Upper lower	7 (35)	8 (40)	
Lower	0	0	

**Table 2: Psychological problems in cases and controls**

Sr. No.	Clusters	Cases (n=20) (%)	Controls (n=20) (%)	OR
1	Abnormal developmental history	16 (80)	0	*OR<1
2	Developmental problems	15 (75)	0	
3	Emotional disorder	17 (85)	0	
4	Attention deficit hyperactivity disorder	14 (70)	0	
5	Learning disorder	14 (70)	0	
6	Childhood psychoses	11 (55)	0	
7	Somatization	7 (35)	0	
8	Conduct disorder	3 (15)	0	

OR: Odds ratio

**Table 3: Psychological problems in male and female (cases)**

Sr. No.	Clusters	Males (n=7) (35%)	Females (n=13) (65%)	p value	Relative risk
1	Abnormal developmental history	6 (86)	10 (76)	0.6477	1.5
2	Developmental problems	6 (86)	9 (69)	0.7866	2.0
3	Attention deficit hyperactivity disorder	6 (86)	8 (61)	0.2739	0.75
4	Conduct disorder	1 (14.3)	2 (15)	0.5546	0.5
5	Learning disorder	5 (71.43)	9 (69)	0.6824	0.6
6	Emotional disorder	6 (86)	11 (84)	0.5546	0.54
7	Somatization	4 (57.14)	3 (23.08)	0.3038	1.3
8	Childhood psychoses	4 (57.14)	7 (53.85)	0.7415	0.57

**Table 4: Cluster frequency affection in cases**

Clusters	Cases (n=20) (%)
1	2 (10)
2-3	3 (15)
4-5	3 (15)
>5	12 (60)

illness is associated with the burden of psychosocial stress, something that is both brought on and aggravated by physical pain or disability. This is particularly true of illnesses that affect children, because of their innate vulnerability and the high emotional stakes involved for parents and other caregivers. It is, therefore, natural to assume that behavior problems will be commoner in children with chronic disease.

Studies addressing this issue have confirmed that behavioral problems such as neurosis, ADHD, misconduct in school, and adjustment problems are twice as common in children with chronic disease as in healthy children of the same age [11]. In the absence of adequate psychosocial intervention, many chronically ill children remain outside the scope of formal education, something that, in turn, increases their isolation and misery. Ambiguous and uncertain conditions in a superficially normal-appearing child pose problems in adaptation [12]. Many of these stressors are present in children with hypothyroidism. Chronic illness has been associated with mental health problems. Behavioral problems have been seen in about 2.4% patients of serious disorders [13]. Chronically ill children are bullied more often and have more emotional problems as stated in a study by Westbom *et al.* [14].

In some common chronic childhood diseases like nephrotic syndrome, behavioral disturbances were noted in 68% of patients and hyperkinesia in 32% in children using DPCL scale [15]. Children with congenital hypothyroidism had developmental behavior problems more commonly than normal population. Several studies have suggested that an early (pre- and neonatal) hormonal deficit (endogenous and/or exogenous) may influence the psychological development of subjects with CH, and they may have behavioral problems reflecting anxiety, social withdrawal, and poor concentration [16,17]. In another study, it was found that adolescents with treated congenital hypothyroidism had psychological issues such as aggressiveness, anxiety/depression, thought problems, and attention problems [18].

Our study showed that psychological problems (using DPCL

scale) are more common in treated euthyroid children as compared to age-matched controls. Among different domains affected in our study emotional disorder was seen in 85% cases, abnormal developmental history in 80%, developmental problems in 75%, ADHD in 70%, and learning disorder in 70% cases. None of these domains were affected in the control group. Majority of the cases (60%) had more than 5 domains affected. Single domain affection was seen only in 10% patients among cases.

## CONCLUSION

Treated hypothyroid patients have significant psychological and behavioral problems. They can easily be picked up using this simple DPCL scale. Appropriate therapy for these problems needs to be addressed in addition to their thyroid medications.

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*Funding: None; Conflict of Interest: None Stated.*

**How to cite this article:** Singh P, Chaudhari F, Deshpande U, Saliya M. Psychological and behavioral assessment in children with treated hypothyroidism using developmental psychopathology checklist scale. *Indian J Child Health*. 2018; 5(7):488-491.