Behavioral and Coping Strategies in Children with Short Stature

Original Article

Asmaa Wafeeq Abd El-Aziz[1]*, Marwa Magdy Hassan Nawar*[2]*, Mohanad Ahmed Fathy Ahmed*[3] *and Reham Ibrahim Abdelmageed*[1]

Department of Pediatric, [1]*Psychiatry Unit,* [2]*Endocrinology Unit,* [3]*Children's Hospital, Faculty of Medicine, Ain Shams University, Cairo, Egypt*

ABSTRACT

Background: Short stature in children is linked to emotional distress, peer difficulties, and lower self-esteem. Growth hormone (GH) therapy is an option, but the psychological impact and coping mechanisms remain understudied.

Aim: To assess the psychosocial maladjustment, coping strategies, and quality of life of children with short stature & to identify correlations between growth hormone treatment, psychological well-being, and social adaptation.

Patients and Methods: A cross-sectional study was conducted at Ain Shams University's Endocrinology Unit, involving 70 children (8–18 years) diagnosed with growth hormone deficiency (GHD) or idiopathic short stature (ISS). Psychological assessments, including the Kidcope questionnaire, Strengths and Difficulties Questionnaire (SDQ), and Pediatric Quality of Life Inventory (Peds-QL), were used to measure coping strategies, behavior, and quality of life.

Results: Younger children (8–12 years) used problem-solving and social support but with lower effectiveness, whereas adolescents (13–18 years) demonstrated greater reliance on cognitive restructuring, emotional regulation, and distraction. Social withdrawal and resignation were more common in older children. Wishful thinking was more effective among adolescents. ISS children had better emotional regulation than those with GHD, but quality of life was higher in the GHD group ($p < 0.001$). Distraction correlated with increased behavioral difficulties ($p = 0.001$), while problem-solving improved emotional well-being ($p = 0.019$).

Conclusion: Children with short stature face psychological and social challenges, particularly in peer relationships and school settings. GH therapy enhances well-being, and adaptive coping strategies improve outcomes. Early psychological support is crucial, especially for ISS children, to foster resilience and emotional adjustment.

Key Words: Coping strategies, growth hormone deficiency, psychosocial impact, quality of life, short stature.

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Corresponding Author: Mohanad Ahmed Fathy Ahmed, Resident, Children's Hospital, Ain Shams University, Cairo, Egypt., **Tel.:** +2 01228212527, **E-mail**: mohanadfathy1996@gmail.com

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INTRODUCTION

Stature growth is a crucial aspect of childhood and adolescence, influencing well-being and independence[1]. Idiopathic short stature (ISS) is defined as a height below −2 SDS with no identifiable medical cause, encompassing familial short stature and constitutional growth delay[2]. While short stature can indicate underlying medical conditions such as growth hormone deficiency (GHD) or Turner's syndrome, its psychological impact remains debated. Some studies link short stature to lower self-esteem, academic difficulties, and social impairments[3], whereas others suggest minimal psychological effects[4]. GH therapy is widely accepted for GHD but remains controversial for ISS, as final height gains are limited compared to non-ISS peers[5]. Research highlights the role of coping mechanisms in psychological well-being, emphasizing the need for psychosocial support alongside medical treatment[6]. Coping strategies, including active and accommodative approaches, influence adaptation to short stature, with evidence suggesting an increased risk of psychosocial difficulties in affected children[7, 8].

Children with short stature often experience emotional stress, social stigma, and lower health-related quality of life (HrQoL). Studies suggest that short stature can lead to reduced social competence, stigmatization, bullying, and higher rates of depression[9]. However, the psychological impact varies, with some studies indicating minimal

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behavioral differences, particularly in boys[4]. Recent research highlights the role of coping mechanisms in mitigating these effects, emphasizing the importance of psychological support alongside medical treatment[10]. This study aimed to assess the prevalence and extent of psychosocial maladjustment in children with short stature, including emotional distress, social challenges, and behavioral difficulties they may encounter. Additionally, it sought to explore the specific coping strategies these children adopt to manage their condition, such as problem-focused or emotion-focused coping, and to determine how these strategies influence their psychological well-being and overall quality of life. By examining these aspects, the study aimed to provide insights into the need for psychosocial interventions alongside medical treatment to enhance the quality of life for children with short stature.

PATIENTS AND METHODS

Study Population & ethical consideration:

This cross-sectional study was conducted on 70 patients with short stature recruited from the regular attendants of the Pediatric Endocrinology Clinic at Ain Shams University Children's Hospital.

ETHICAL COMMITTEE

The study was approved from the local ethical committee of Ain Shams University FMASU MS 303/2024. An informed consent was obtained from each patient or their legal guardians before enrollment in the study.

This study included Children and adolescents between the ages of 8 and 18 years with a diagnosis of GHD or ISS and a height of below −2 SDS at the start of treatment, with exclusion of patients with other comorbities, primary psychiatric disorders.

Procedure:

All groups underwent a comprehensive assessment, including a detailed medical history and clinical examination. Demographic data and socioeconomic status were evaluated using an updated Arabic version of the validated Socioeconomic Status Scale for research in Egypt[11]. This assessment considered factors such as parental education and occupation, sewage disposal, household crowding, computer access, and income, classifying families into low, middle, or high social classes to explore their relationship with short stature. Medical history focused on chronic illnesses and family history of short stature. The clinical examination included anthropometric measurements such as weight (kg) and height (cm), with standard deviation scores (SDS) calculated based on ***Tanner et al.***[12] norms. Body mass index (BMI, kg/m²) and BMI SDS were determined according to age- and sex-specific reference values[13]. Sexual maturation was assessed using the Tanner classification for pubertal development[14].

Psychometric tools:

The study utilized several standardized assessment tools to evaluate coping strategies, behavioral difficulties, and quality of life in children.

1. Kidcope Scale (Arabic version)[15], originally developed by ***Spirito et al.***[16], is a self-report tool designed to assess cognitive, emotional, and social coping strategies in children and adolescents. It evaluates different coping mechanisms across various domains, helping to understand how children manage psychological distress. This study utilized both the younger version (8-12 years) and older version (13-18 years) of the Kidcope questionnaire to assess coping strategies in children with short stature based on their age group.

2. The Strengths and Difficulties Questionnaire – Parent Version (Arabic version)[17,18] is a parent-reported behavioral screening tool that measures emotional symptoms, conduct problems, hyperactivity and inattention, peer relationship issues, and prosocial behavior.

3. The Peds-QL™ 4.0 Generic Core Scale[19] was used to assess quality of life across four domains: physical, emotional, social, and school functioning. This 23-item tool employs a 5-point response scale (0 = never a problem to 4 = almost always a problem), with scores reverse-coded and transformed into a 0–100 scale, where higher scores indicate better quality of life.

Statistical analysis:

Sample size: Using the OpenEpi program for sample size calculation, reviewing results from the previous study ***Aryayev et al.***[20], showed that 19.6% of children with short stature have abnormal emotional problem scores based on this frequency sample size of 65 patients produces a two-sided 95% confidence interval with a width equal to 0.199 when the sample proportion is 0.196.

The recorded data were analyzed using SPSS version 26.0 and 27. Quantitative variables with normal distribution were presented as mean ± standard deviation (SD) and range, while non-normally distributed variables were reported as median with interquartile range (IQR). Qualitative data were expressed as frequencies and percentages. Normality was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Statistical analyses included the Student's t-test for comparing means between two groups, the Mann-Whitney U test for non-parametric comparisons, and the Chi-square or Fisher's exact test for qualitative data relationships. Linear regression was performed to estimate the dependence of a quantitative variable on independent factors. Spearman's correlation analysis assessed associations between two quantitative variables, with correlation coefficients (r) interpreted as very weak (0–0.19), weak (0.2–0.39), moderate (0.4–0.59), strong (0.6–0.79), and very strong (0.8–1), *P- value*: level of significance, *P*>0.05: Non significant (NS), *P*< 0.05: Significant (S).

Table 1: Sociodemographic characteristics and clinical data for the whole study group.

		Mean ± SD	Median (IQR)	Range
Age		11.79 ± 2.74	12 (9 - 13.5)	(8 - 18)
Height(cm)		128 ± 14	129 (117 - 139)	(93 - 161)
Height SDS		-2.89 ± 1.02	-2.49 (-3.25 - -2.16)	(-7.61 - -2)
Weight (kg)		31.38 ± 11.75	28 (23 - 37)	(12 - 58)
Weight SDS		-1.86 ± 1.76	-1.95 (-2.56 - -0.97)	(-8.5 - 2.15)
BMI (kg/m^2)		18.49 ± 4.05	17.22 (15.52 - 20.68)	(11.76 - 29.74)
BMI SDS		-0.18 ± 1.36	-0.24 (-1 - 0.81)	(-5 - 2.68)
		N (%)		
Sex	Male	29 (41.43%)		
	Female	41 (58.57%)		
Tanner stage	2	3 (4.29%)		
	3	40 (57.14%)		
	4	24 (34.29%)		
	5	3 (4.29%)		
Age grouping	8 - 12 years	41 (58.57%)		
	13 - 18 years	29 (41.43%)		
Medical History	No	70 (100%)		
	Yes	0 (0%)		
Family history of short stature	No	33 (47.14%)		
	Yes	37 (52.86%)		
Socioeconomic	Low	40 (57.14%)		
	Middle	23 (32.86%)		
	High	7 (10%)		
Consanguinity	No	43 (61.43%)		
	Yes	27 (38.57%)		
Use of growth hormone	No	37 (52.86%)		
	Yes	33 (47.14%)		
Diagnosis	ISS	41 (58.57%)		
	GHD	29 (41.43%)		

*ISS: idiopathic short stature
*GHD: growth hormone deficiency

The numerical data in (Table 1) is presented using Mean ± SD, Median (IQR), and Range

It presents the sociodemographic characteristics of 70 children with short stature. The mean age was 11.79 ± 2.74 years, with a female majority (58.57%) and most participants (58.57%) aged 8–12 years. Over half had low socioeconomic status (57.14%) and a positive family history of short stature (52.86%), while 38.57% had consanguineous parents. Nearly half (47.14%) received growth hormone therapy, and idiopathic short stature (58.57%) was more common than growth hormone deficiency (41.43%).

Table 2: Kidcope coping strategies assessment for study group according to age.

		Age grouping	
		8 - 12 years	13 - 18 years
		N (%)	N (%)
Distraction (Frequency)	0	4 (9.76%)	3 (10.34%)
	1	37 (90.24%)	20 (68.97%)
	2	0 (0%)	6 (20.69%)
Distraction (efficacy)	0	10 (24.39%)	3 (10.34%)
	1	24 (58.54%)	23 (79.31%)
	2	7 (17.07%)	3 (10.34%)
Social withdrawal (Frequency)	0	25 (60.98%)	7 (24.14%)
	1	16 (39.02%)	20 (68.97%)
	2	0 (0%)	1 (3.45%)
	3	0 (0%)	1 (3.45%)
Social withdrawal (efficacy)	0	28 (68.29%)	8 (27.59%)
	1	11 (26.83%)	15 (51.72%)
	2	2 (4.88%)	6 (20.69%)
Cognitive Restructuring (Frequency)	0	12 (29.27%)	3 (10.34%)
	1	29 (70.73%)	12 (41.38%)
	2	0 (0%)	14 (48.28%)
Cognitive Restructuring (efficacy)	0	15 (36.59%)	4 (13.79%)
	1	21 (51.22%)	8 (27.59%)
	2	5 (12.2%)	17 (58.62%)
Self-Criticism (Frequency)	0	39 (95.12%)	28 (96.55%)
	1	2 (4.88%)	1 (3.45%)
Self-Criticism (efficacy)	0	39 (95.12%)	26 (89.66%)
	1	2 (4.88%)	3 (10.34%)
Blaming Others (Frequency)	0	37 (90.24%)	23 (79.31%)
	1	4 (9.76%)	5 (17.24%)
	2	0 (0%)	1 (3.45%)
Blaming Others (efficacy)	0	34 (82.93%)	29 (100%)
	1	6 (14.63%)	0 (0%)
	2	1 (2.44%)	0 (0%)
Problem Solving (Frequency)	0	2 (4.88%)	1 (3.45%)
	1	39 (95.12%)	8 (27.59%)
	2	0 (0%)	17 (58.62%)
	3	0 (0%)	3 (10.34%)
Problem Solving (efficacy)	0	5 (12.2%)	2 (6.9%)
	1	32 (78.05%)	10 (34.48%)
	2	4 (9.76%)	16 (55.17%)
	3	0 (0%)	1 (3.45%)
Emotional Regulation (Frequency)	0	11 (26.83%)	3 (10.34%)
	1	30 (73.17%)	9 (31.03%)
	2	0 (0%)	10 (34.48%)
	3	0 (0%)	7 (24.14%)
Emotional Regulation (efficacy)	0	14 (34.15%)	4 (13.79%)
	1	24 (58.54%)	6 (20.69%)
	2	3 (7.32%)	9 (31.03%)

	3	0 (0%)	9 (31.03%)
	4	0 (0%)	1 (3.45%)
Wishful Thinking (Frequency)	0	6 (14.63%)	2 (6.9%)
	1	35 (85.37%)	12 (41.38%)
	2	0 (0%)	15 (51.72%)
Wishful Thinking (efficacy)	0	33 (80.49%)	12 (41.38%)
	1	8 (19.51%)	14 (48.28%)
	2	0 (0%)	3 (10.34%)
Social Support (Frequency)	0	4 (9.76%)	0 (0%)
	1	37 (90.24%)	12 (41.38%)
	2	0 (0%)	14 (48.28%)
	3	0 (0%)	3 (10.34%)
Social Support (efficacy)	0	4 (9.76%)	1 (3.45%)
	1	13 (31.71%)	10 (34.48%)
	2	24 (58.54%)	8 (27.59%)
	3	0 (0%)	8 (27.59%)
	4	0 (0%)	2 (6.9%)
Resignation (Frequency)	0	39 (95.12%)	9 (31.03%)
	1	2 (4.88%)	12 (41.38%)
	2	0 (0%)	6 (20.69%)
	3	0 (0%)	2 (6.9%)
Resignation (efficacy)	0	39 (95.12%)	12 (41.38%)
	1	2 (4.88%)	9 (31.03%)
	2	0 (0%)	7 (24.14%)
	3	0 (0%)	1 (3.45%)

Data presented as frequency (Number, %)

The table highlights developmental differences in coping strategies between younger children (8–12 years) and adolescents (13–18 years). Younger children relied more on problem-solving and social support, though their effectiveness in these strategies was lower. Adolescents demonstrated greater efficacy in cognitive restructuring, emotional regulation, and distraction, reflecting increased psychological maturity. However, social withdrawal and resignation were more common in older children, indicating a shift toward passive coping mechanisms. Wishful thinking remained prevalent across both groups, with higher efficacy in adolescents. These findings suggest that as children grow, they transition from external support-based coping to more internalized strategies, though some may develop passive coping patterns (Table 2).

Table 3: SDQ, impact assessment and age.

		Age grouping		Test of significance		
		8 - 12 years	13 - 18 years			
		Mean ± SD N (%)	Mean ± SD N (%)	value	*p-value*	Sig.
Emotional		2.88 ± 1.68	2.59 ± 2.35	t= 0.573	0.569	NS
Conduct		3.2 ± 1.21	2.45 ± 1.33	t= 2.447	0.017	S
Hyperactivity		3.83 ± 1.32	3.93 ± 1	t= -0.350	0.727	NS
Peer		5.22 ± 1.24	5.55 ± 1.59	t= -0.982	0.330	NS
Prosocial		9.61 ± 2.47	8.62 ± 1.86	t= 1.821	0.073	NS
Total score of SDQ		15.17 ± 2.67	14.52 ± 3.89	t= 0.784	0.437	NS
Interpretation of SDQ	Normal	11 (26.83%)	15 (51.72%)	X^2= 6.526	0.038	S
	Borderline	18 (43.9%)	5 (17.24%)			
	Abnormal	12 (29.27%)	9 (31.03%)			
		Median (IQR) N (%)	Median (IQR) N (%)	value	*p-value*	Sig.
Impact		9 (5 - 10)	6.5 (3.5 - 8.5)	z= -1.051	0.293	NS
Impact	No	34 (82.93%)	25 (86.21%)	FE	1.00	NS
	Yes	7 (17.07%)	4 (13.79%)			

Data were presented as mean ± standard deviation (SD) for continuous variables and as median with interquartile range (IQR) for non-parametric data. Categorical variables were expressed as frequency (number, %). Statistical analyses included the Mann-Whitney test (z), the Student's t-test (t), and the Chi-Square test (X^2) When expected counts were low, the Fisher's Exact test (FE) was used to ensure statistical accuracy.

(Table 3) analyzes the association between SDQ scores and age groups. Younger children (8–12 years) had significantly higher conduct problems (*p* = 0.017), indicating more behavioral difficulties. Adolescents (13–18 years) were more frequently classified as normal (51.72%), while younger children were more often in the borderline category (43.9%) (*p* = 0.038). No significant differences were found in emotional problems, hyperactivity, peer relationships, prosocial behavior, or total SDQ scores.

Table 4: PED QL assessment and age.

		Age grouping		Test of significance		
		8 - 12 years	13 - 18 years			
		Mean ± SD N (%)	Mean ± SD N (%)	value	*p-value*	Sig.
Physical		66.6 ± 15.26	71.97 ± 12.84	t= -1.547	0.127	NS
Emotional		68.54 ± 12.71	74.14 ± 15.42	t= -1.662	0.101	NS
Social		63.17 ± 16.76	68.28 ± 15.43	t= -1.297	0.199	NS
School		64.15 ± 12.34	66.9 ± 10.21	t= -0.984	0.328	NS
Total score of PED QL		65.43 ± 10.24	70.48 ± 9.42	t= -2.101	0.039	S
interpretation of PED QL	Below average	26 (63.41%)	13 (44.83%)	X^2= 2.378	0.123	NS
	Average	15 (36.59%)	16 (55.17%)			

Data were presented as mean ± standard deviation for Peds-QL scores, while categorical variables were expressed as frequency (number, %). Statistical analysis included the Student's t-test (t) and the Chi-Square test (X^2)

(Table 4) reveals a significant difference in total PED QL scores between age groups (*p* = 0.039), indicating a potential age-related variation in perceived quality of life. However, no significant differences were observed across the individual PED QL subdomains (*p* > 0.05).

Table 5: Association between demographic data and clinical characteristics.

Whole study group		Diagnosis		Test of significance		
		ISS	GHD			
		Mean ± SD Median (IQR) N (%)	Mean ± SD Median (IQR) N (%)	value	*p-value*	Sig.
Age		11.57 ± 2.75	12.1 ± 2.73	t= -0.804	0.424	NS
Height(cm)		128 ± 115	129 ± 13	t= -0.261	0.795	NS
Height SDS		-2.33 (-3.23 - -2.09)	-2.89 (-3.26 - -2.17)	z= -1.670	0.095	NS
Weight (kg)		31.66 ± 12.88	30.98 ± 10.16	t= 0.239	0.812	NS
Weight SDS		-2.05 (-2.89 - -0.56)	-1.84 (-2.26 - -1.41)	z= -0.197	0.844	NS
BMI (kg/m^2)		18.67 ± 4.49	18.24 ± 3.41	t= 0.427	0.671	NS
BMI SDS		-0.35 (-1.08 - 1.05)	-0.09 (-0.83 - 0.31)	z= -0.173	0.863	NS
Sex	Male	21 (51.22%)	8 (27.59%)	X^2= 3.91	0.048	S
	Female	20 (48.78%)	21 (72.41%)			
FH SS	No	22 (53.66%)	11 (37.93%)	X^2= 1.686	0.194	NS
	Yes	19 (46.34%)	18 (62.07%)			
Socioeconomic	Low	22 (53.66%)	18 (62.07%)	FE	0.823	NS
	Moderate	15 (36.59%)	8 (27.59%)			
	Middle	4 (9.76%)	3 (10.34%)			
Consanguinity	No	26 (63.41%)	17 (58.62%)	X^2= 0.165	0.685	NS
	Yes	15 (36.59%)	12 (41.38%)			
Use of GH	No	37 (90.24%)	0 (0%)	FE	<0.001	S
	Yes	4 (9.76%)	29 (100%)			
Tanner stage	2	3 (7.32%)	0 (0%)	FE	0.145	NS
	3	24 (58.54%)	16 (55.17%)			
	4	11 (26.83%)	13 (44.83%)			
	5	3 (7.32%)	0 (0%)			

Data were presented as mean ± standard deviation (SD) for continuous variables and as median with interquartile range (IQR) for non-parametric data. Categorical variables were expressed as frequency (number, %). Statistical analyses included the Mann-Whitney test (z), the Student's t-test (t), and the Chi-Square test (X^2) When expected counts were low, the Fisher's Exact test (FE) was used to ensure statistical accuracy.

(Table 5) Shows no significant differences were found in age, height, weight, BMI, or their standardized scores ($p > 0.05$), indicating similar physical growth patterns in both groups. However, sex distribution was significantly different ($p = 0.048$), with more females in the GHD group. GH use was significantly higher in the GHD group ($p < 0.001$), as expected. Other sociodemographic factors, including family history of short stature, socioeconomic status, consanguinity, and Tanner stage, showed no significant differences.

Table 6: Association between kidcope coping strategies assessment and cause of short stature within whole group according to age.

		13 - 18 years		Fisher's Exact test	8 - 12 years		Fisher's Exact test
		ISS	GHD		ISS	GHD	
		N (%)	N (%)	*p-value*	N (%)	N (%)	*p-value*
Distraction (Frequency)	0	2 (14.29%)	1 (6.67%)		2 (7.41%)	2 (14.29%)	0.596
	1	8 (57.14%)	12 (80%)	0.425	25 (92.59%)	12 (85.71%)	
	2	4 (28.57%)	2 (13.33%)		0 (0%)	0 (0%)	
Distraction (efficacy)	0	2 (14.29%)	1 (6.67%)		7 (25.93%)	3 (21.43%)	0.814
	1	10 (71.43%)	13 (86.67%)	0.529	16 (59.26%)	8 (57.14%)	
	2	2 (14.29%)	1 (6.67%)		4 (14.81%)	3 (21.43%)	
Social withdrawal (Frequency)	0	3 (21.43%)	4 (26.67%)		16 (59.26%)	9 (64.29%)	0.754
	1	10 (71.43%)	10 (66.67%)	1.00	11 (40.74%)	5 (35.71%)	
	2	1 (7.14%)	0 (0%)		0 (0%)	0 (0%)	
	3	0 (0%)	1 (6.67%)		0 (0%)	0 (0%)	
Social withdrawal (efficacy)	0	2 (14.29%)	6 (40%)		18 (66.67%)	10 (71.43%)	0.871
	1	8 (57.14%)	7 (46.67%)	0.334	7 (25.93%)	4 (28.57%)	
	2	4 (28.57%)	2 (13.33%)		2 (7.41%)	0 (0%)	
Cognitive Restructuring (Frequency)	0	2 (14.29%)	1 (6.67%)		8 (29.63%)	4 (28.57%)	1.00
	1	6 (42.86%)	6 (40%)	0.877	19 (70.37%)	10 (71.43%)	
	2	6 (42.86%)	8 (53.33%)		0 (0%)	0 (0%)	
Cognitive Restructuring (efficacy)	0	2 (14.29%)	2 (13.33%)		9 (33.33%)	6 (42.86%)	0.814
	1	3 (21.43%)	5 (33.33%)	0.868	14 (51.85%)	7 (50%)	
	2	9 (64.29%)	8 (53.33%)		4 (14.81%)	1 (7.14%)	
Self-Criticism (Frequency)	0	13 (92.86%)	15 (100%)		25 (92.59%)	14 (100%)	0.539
	1	1 (7.14%)	0 (0%)	0.483	2 (7.41%)	0 (0%)	
Self-Criticism (efficacy)	0	11 (78.57%)	15 (100%)		25 (92.59%)	14 (100%)	0.539
	1	3 (21.43%)	0 (0%)	0.1	2 (7.41%)	0 (0%)	
Blaming Others (Frequency)	0	9 (64.29%)	14 (93.33%)		23 (85.19%)	14 (100%)	0.28
	1	4 (28.57%)	1 (6.67%)	0.095	4 (14.81%)	0 (0%)	
	2	1 (7.14%)	0 (0%)		0 (0%)	0 (0%)	
Blaming Others (efficacy)	0	14 (100%)	15 (100%)		21 (77.78%)	13 (92.86%)	0.604
	1	0 (0%)	0 (0%)	---	5 (18.52%)	1 (7.14%)	
	2	0 (0%)	0 (0%)		1 (3.7%)	0 (0%)	
Problem Solving (Frequency)	0	1 (7.14%)	0 (0%)		1 (3.7%)	1 (7.14%)	1.00
	1	6 (42.86%)	2 (13.33%)	0.159	26 (96.3%)	13 (92.86%)	
	2	6 (42.86%)	11 (73.33%)		0 (0%)	0 (0%)	
	3	1 (7.14%)	2 (13.33%)		0 (0%)	0 (0%)	
Problem Solving (efficacy)	0	1 (7.14%)	1 (6.67%)		2 (7.41%)	3 (21.43%)	0.319
	1	4 (28.57%)	6 (40%)	0.842	23 (85.19%)	9 (64.29%)	
	2	8 (57.14%)	8 (53.33%)		2 (7.41%)	2 (14.29%)	
	3	1 (7.14%)	0 (0%)		0 (0%)	0 (0%)	
Emotional Regulation (Frequency)	0	2 (14.29%)	1 (6.67%)		3 (11.11%)	8 (57.14%)	0.003
	1	5 (35.71%)	4 (26.67%)	0.537	24 (88.89%)	6 (42.86%)	
	2	3 (21.43%)	7 (46.67%)		0 (0%)	0 (0%)	
	3	4 (28.57%)	3 (20%)		0 (0%)	0 (0%)	

Emotional Regulation (efficacy)	0	2 (14.29%)	2 (13.33%)		4 (14.81%)	10 (71.43%)	0.001
	1	4 (28.57%)	2 (13.33%)	0.926	20 (74.08%)	4 (28.57%)	
	2	4 (28.57%)	5 (33.33%)		3 (11.11%)	0 (0%)	
	3	4 (28.57%)	5 (33.33%)		0 (0%)	0 (0%)	
	4	0 (0%)	1 (6.67%)		0 (0%)	0 (0%)	
Wishful Thinking (Frequency)	0	1 (7.14%)	1 (6.67%)		4 (14.81%)	2 (14.29%)	1.00
	1	4 (28.57%)	8 (53.33%)	0.405	23 (85.19%)	12 (85.71%)	
	2	9 (64.29%)	6 (40%)		0 (0%)	0 (0%)	
Wishful Thinking (efficacy)	0	5 (35.71%)	7 (46.67%)		25 (92.59%)	8 (57.14%)	0.012
	1	7 (50%)	7 (46.67%)	0.77	2 (7.41%)	6 (42.86%)	
	2	2 (14.29%)	1 (6.67%)		0 (0%)	0 (0%)	
Social Support (Frequency)	1	8 (57.14%)	4 (26.67%)		3 (11.11%)	1 (7.14%)	1.00
	2	5 (35.71%)	9 (60%)	0.362	24 (88.89%)	13 (92.86%)	
	3	1 (7.14%)	2 (13.33%)		0 (0%)	0 (0%)	
Social Support (efficacy)	0	0 (0%)	1 (6.67%)		3 (11.11%)	1 (7.14%)	1.00
	1	6 (42.86%)	4 (26.67%)	0.441	8 (29.63%)	5 (35.71%)	
	2	5 (35.71%)	3 (20%)		16 (59.26%)	8 (57.14%)	
	3	3 (21.43%)	5 (33.33%)		0 (0%)	0 (0%)	
	4	0 (0%)	2 (13.33%)		0 (0%)	0 (0%)	
Resignation (Frequency)	0	6 (42.86%)	3 (20%)		26 (96.3%)	13 (92.86%)	1.00
	1	6 (42.86%)	6 (40%)	0.361	1 (3.7%)	1 (7.14%)	
	2	2 (14.29%)	4 (26.67%)		0 (0%)	0 (0%)	
	3	0 (0%)	2 (13.33%)		0 (0%)	0 (0%)	
Resignation (efficacy)	0	8 (57.14%)	4 (26.67%)		26 (96.3%)	13 (92.86%)	1.00
	1	4 (28.57%)	5 (33.33%)	0.262	1 (3.7%)	1 (7.14%)	
	2	2 (14.29%)	5 (33.33%)		0 (0%)	0 (0%)	
	3	0 (0%)	1 (6.67%)		0 (0%)	0 (0%)	

Data were presented as frequency (number, %) for categorical variables. Statistical analysis included the Chi-Square test (X^2), while the Fisher's Exact test (FE) was applied when expected frequencies were low to ensure statistical accuracy. Additionally, each subscript letter denotes a subset of group categories whose column proportions do not differ significantly from each other at the 0.05 significance level.

The analysis of coping strategies among children aged 8–12 years with ISS and GHD revealed no significant differences in most strategies, including distraction, social withdrawal, cognitive restructuring, self-criticism, blaming others, problem-solving, social support, and resignation ($p > 0.05$). However, emotional regulation frequency ($p = 0.003$) and efficacy ($p = 0.001$) were significantly higher in the ISS group compared to those with GHD. Additionally, wishful thinking efficacy was significantly associated with the cause of short stature ($p = 0.012$), suggesting potential differences in coping mechanisms between ISS and GHD children. Similarly, among adolescents aged 13–18 years, no significant differences were observed in coping strategies between those with ISS and GHD ($p > 0.05$). Both groups employed similar coping mechanisms, indicating that psychological adaptation to short stature is influenced more by social and familial support than by its medical cause.

Table 7: Association between SDQ assessment, impact assessment, PED QL assessment and cause of short stature within whole study group.

Whole study group		Diagnosis		Test of significance		
		ISS	GHD			
		Mean ± SD N (%) Median (IQR)	Mean ± SD N (%) Median (IQR)	value	*p-value*	Sig.
Emotional		3.05 ± 2.18	2.34 ± 1.59	t= 1.564	0.123	NS
Conduct		2.8 ± 1.4	3 ± 1.16	t= -0.615	0.541	NS
Hyperactivity		3.83 ± 1.28	3.93 ± 1.07	t= -0.350	0.727	NS
Peer		5.32 ± 1.35	5.41 ± 1.48	t= -0.284	0.777	NS
Prosocial		9.37 ± 2.78	8.97 ± 1.27	t= 0.723	0.472	NS
Total SDQ score		15 ± 3.36	14.76 ± 3.07	t= 0.307	0.760	NS
Interpretation of SDQ	Normal	15 (36.59%)	11 (37.93%)	X2= 0.963	0.618	NS
	Borderline	12 (29.27%)	11 (37.93%)			
	Abnormal	14 (34.15%)	7 (24.14%)			
Impact score		9 (6.5 - 9.5)	5 (2 - 6)	z= -1.755	0.079	NS
Impact	No	33 (80.49%)	26 (89.66%)	FE	0.342	NS
	Yes	8 (19.51%)	3 (10.34%)			
Physical		62.95 ± 13.23	77.13 ± 11.96	t= -4.593	<0.001	S
Emotional		63.66 ± 12.8	81.03 ± 8.39	t= -6.858	<0.001	S
Social		55.85 ± 14.74	78.62 ± 5.49	t= -9.040	<0.001	S
School		60.37 ± 9.04	72.24 ± 11.15	t= -4.739	<0.001	S
Total PED QL		60.4 ± 6.63	77.58 ± 3.5	t= -12.736	<0.001	S
interpretation of PED QL	Below average	39 (95.12%)	0 (0%)	FE	<0.001	S
	Average	2 (4.88%)	29 (100%)			

Data were presented as mean ± standard deviation (SD) for continuous variables and as median with interquartile range (IQR) for non-parametric data. Categorical variables were expressed as frequency (number, %). Statistical analyses included the Mann-Whitney test (z), the Student's t-test (t), and the Chi-Square test (X^2) When expected counts were low, the Fisher's Exact test (FE) was used to ensure statistical accuracy.

(Table 7) shows no significant differences were found in SDQ domains (Emotional, Conduct, Hyperactivity, Peer, Prosocial, or Total SDQ score) ($p > 0.05$), indicating similar behavioral and emotional profiles in both groups. The Impact score also showed no significant difference ($p = 0.079$), suggesting comparable psychosocial burden. However, quality of life (PED QL) scores were significantly higher in the GHD group across all domains ($p < 0.001$), meaning GHD patients reported better physical, emotional, social, and school functioning than ISS patients. Additionally, PED QL interpretation showed a significant difference ($p < 0.001$), with most ISS patients classified as below average, while all GHD patients fell within the average range.

Table 8: Correlation of Kidcope coping strategies with SDQ, PED QL within 8-12 years' age group.

8-12 years (Efficacy)		Total score of SDQ	Total score of PED QL
Distraction	Spearman's rho	**0.394**	0.065
	p-value	**0.011**	0.686
Social withdrawal	Spearman's rho	0.042	-0.123
	p-value	0.793	0.442
Cognitive Restructuring	Spearman's rho	-0.097	0.084
	p-value	0.544	0.600
Self-Criticism	Spearman's rho	0.000	-0.081
	p-value	1.000	0.613
Blaming Others	Spearman's rho	-0.155	-0.002
	p-value	0.332	0.991
Problem Solving	Spearman's rho	0.029	0.010
	p-value	0.859	0.953
Emotional Regulation	Spearman's rho	0.094	-0.257
	p-value	0.558	0.104
Wishful Thinking	Spearman's rho	0.097	0.302
	p-value	0.545	0.055
Social Support	Spearman's rho	**-0.316**	0.051
	p-value	**0.044**	0.751
Resignation	Spearman's rho	0.203	0.177
	p-value	0.203	0.267

In the 8–12 years' age group, two significant correlations were observed. Distraction showed a positive correlation with SDQ total scores (r = 0.394, *p* = 0.011), suggesting that children who frequently use distraction as a coping strategy tend to report higher difficulties. Conversely, social support was negatively correlated with SDQ scores (r = -0.316, *p* = 0.044), indicating that higher social support may be associated with fewer difficulties. Other coping strategies did not show statistically significant correlations with SDQ or PED QL scores, limiting further interpretation.

Table 9: Correlation of Kidcope coping strategies with SDQ, PED QL within 13-18 years' age group.

13-18 years (Efficacy)		Total score of SDQ	Total score of PED QL
Distraction	Spearman's rho	0.364	-0.263
	p-value	0.052	0.167
Social withdrawal	Spearman's rho	0.227	-0.394
	p-value	0.237	0.034
Cognitive Restructuring	Spearman's rho	0.005	-0.113
	p-value	0.978	0.561
Self-Criticism	Spearman's rho	0.170	-0.102
	p-value	0.378	0.599
Blaming Others	Spearman's rho	———	———
	p-value	———	———
Problem Solving	Spearman's rho	0.075	-0.306
	p-value	0.701	0.107
Emotional Regulation	Spearman's rho	0.193	0.086
	p-value	0.316	0.657
Wishful Thinking	Spearman's rho	-0.245	-0.033
	p-value	0.200	0.866
Social Support	Spearman's rho	-0.333	0.226
	p-value	0.077	0.238
Resignation	Spearman's rho	0.340	0.158
	p-value	0.071	0.412

In the 13–18 years' age group, no statistically significant correlations were found between coping strategies and SDQ total scores. However, social withdrawal showed a moderate negative correlation with PED QL scores (r = -0.394, $p = 0.034$), indicating that increased reliance on social withdrawal as a coping mechanism may be associated with lower quality of life. Other coping strategies did not exhibit significant correlations with SDQ or PED QL scores, suggesting limited impact on emotional and behavioral difficulties in this age group.

Correlation of SDQ with PED-QL: There is a significant negative correlation between emotional difficulties and quality of life (r = -0.242, $p = 0.043$), indicating that children with higher emotional distress tend to report lower well-being. However, other SDQ subscales, including conduct problems, hyperactivity, peer relationships, and prosocial behavior, showed no significant associations with PED QL, and the total SDQ score was not significantly correlated with overall quality of life.

Table 10: Multivariate linear regression analysis for determinants of Total SDQ.

	B	SE	Beta	t	*p-value*	95% CI	
						Lower Bound	Upper Bound
Sex (Female)	3.720	3.207	0.647	1.160	0.330	-6.485	13.925
Age	0.826	0.677	0.677	1.220	0.310	-1.328	2.979
FH SS	2.883	3.410	0.541	0.845	0.460	-7.971	13.736
Use of GH	-6.249	6.827	-1.173	-0.915	0.428	-27.976	15.478
Height for age	0.883	1.253	0.351	0.704	0.532	-3.105	4.870
Impact score	0.666	0.524	0.832	1.270	0.294	-1.002	2.334
Total score of PED QL	0.442	0.383	1.539	1.155	0.332	-0.776	1.661

This table examines the factors influencing total SDQ scores in the study population. None of the included predictors—sex, age, family history of short stature (FH SS), GH use, height-for-age, impact score, and total PED QL score—showed a statistically significant association ($p > 0.05$) with SDQ scores. This suggests that sociodemographic and clinical factors do not strongly predict behavioral and emotional difficulties in this population. The lack of significant associations indicates that other psychological or environmental factors may play a greater role in determining SDQ outcomes.

Table 11: Multivariate linear regression analysis for Kidcope parameters to predict total SDQ.

	B	SE	Beta	t	*p-value*	95% CI	
						Lower Bound	Upper Bound
Distraction	4.480	1.272	0.420	3.522	0.001	1.935	7.025
Social withdrawal	-1.113	0.802	-0.173	-1.388	0.170	-2.718	0.491
Cognitive Restructuring	-0.630	1.487	-0.081	-0.424	0.673	-3.606	2.346
Self-Criticism	0.048	1.884	0.003	0.025	0.980	-3.722	3.818
Blaming Others	0.193	1.118	0.021	0.173	0.863	-2.044	2.430
Problem Solving	-5.086	2.117	-0.322	-2.402	0.019	-9.322	-0.850
Emotional Regulation	-0.262	1.150	-0.033	-0.228	0.821	-2.563	2.039
Wishful Thinking	0.955	1.483	0.095	0.644	0.522	-2.013	3.923
Social Support	-2.417	1.833	-0.175	-1.319	0.192	-6.084	1.250
Resignation	0.426	0.916	0.062	0.465	0.644	-1.406	2.258

This table examines the relationship between coping strategies and SDQ scores. Distraction was significantly associated with higher SDQ scores ($p = 0.001$), indicating worse behavioral outcomes, while problem-solving was linked to lower SDQ scores ($p = 0.019$), suggesting better emotional well-being. Other coping strategies showed no significant effects ($p > 0.05$). These findings highlight the importance of promoting adaptive coping mechanisms, such as problem-solving, to improve psychological well-being in children with short stature.

DISCUSSION

Short stature in children is a prevalent endocrinological condition with significant physical, psychological, and social impacts. Affected children often struggle with self-esteem, peer interactions, and academic performance, which may lead to emotional distress and ineffective coping mechanisms. Although growth hormone (GH) therapy is available for certain types of short stature, its influence on psychosocial well-being remains under research. Furthermore, research on coping strategies and quality of life in children with short stature, especially within Middle Eastern populations, remains limited[10].

In our study population, which included 70 patients aged 8 to 18 years (mean age: 11.79±2.74 years). Notably, there was a female predominance. A positive family history of short stature was identified in more than half of the participants (52.86%), while consanguinity was reported in 38.57% of cases. Regarding socioeconomic status, the majority of patients (57.14%) were from low-income backgrounds, whereas (10%) belonged to the high income background, and 32.86% had a moderate socioeconomic status. These findings suggest that genetic factors, including familial predisposition and consanguinity, may play a role in short stature, while socioeconomic disparities could influence access to healthcare and early diagnosis. Socioeconomic status was a key factor in our study, where 57.14% of participants came from low-income backgrounds. This is consistent with findings by ***Adedeji et al.***[21], who reviewed health-related quality of life (HRQoL) in children with short stature and found that those from lower socioeconomic backgrounds were more likely to experience psychosocial distress.

Our study examined the psychosocial impact of short stature in children and adolescents, focusing on coping strategies and quality of life. Using standardized psychological tools such as the Kidcope, SDQ, and Peds-QL, we assessed emotional and behavioral challenges. Findings were compared with previous studies across different populations to identify patterns in psychosocial adaptation and quality of life outcomes.

Several studies have explored the psychosocial impact of short stature in children and adolescents. ***Guerrini Usubini et al.***[22] conducted a cross-sectional study with 29 children with short stature and 10 with growth hormone deficiency (GHD), noting an equal gender distribution. Similarly, ***Quitmann et al.***[6] examined 137 children and adolescents aged 8 to 18 years with short stature ***Aryayev et al.***[20] studied 46 children with GHD and found that younger children experienced more psychological difficulties.

Our study found that 47.14% of participants received growth hormone (GH) therapy, which aligns with findings from ***Quitmann et al.***[6], where 61% of children with short stature had undergone GH treatment. However, ***Guerrini Usubini et al.***[22] reported a significantly lower GH treatment rate among children with familial short stature (FSS) and constitutional delay of growth (CDG), highlighting variability in treatment approaches based on underlying etiologies.

The psychosocial impact of short stature has also been explored in previous studies. ***Aryayev et al.***[20] found that children with a height SDS below -3 experienced more severe psychological difficulties, consistent with our findings that shorter children exhibited higher levels of emotional and social challenges. Similarly, ***Rohenkohl et al.***[23].

Several studies have explored the relationship between GH therapy and quality of life (QoL), with ***Bloemeke et al.***[24] reporting that improvements in height SDS correlate with better psychosocial well-being. This supports the notion that GH therapy benefits extend beyond height gain, enhancing psychological and social functioning.

In analyzing coping strategies among children with idiopathic short stature (ISS) and growth hormone deficiency (GHD), the study found that adaptive strategies such as distraction (81.43%), social support (70%), and problem-solving (67.14%) were the most commonly used, while maladaptive strategies like self-criticism (4.29%) and blaming others (11.6%) were the least utilized. Problem-solving (60%) and social support (45.72%) were rated as the most effective strategies, whereas wishful thinking (64.29%) and resignation (72.86%) were the least effective, highlighting the need for psychological interventions to strengthen resilience.

These findings align with previous research by ***Quitmann et al.***[6] and ***Bloemeke et al.***[24], which emphasized the role of cognitive coping strategies and social support in managing psychological stress among children with short stature. Additionally, ISS children exhibited lower emotional regulation efficacy compared to GHD children, consistent with ***Aryayev et al.***[20], who reported higher emotional distress levels in untreated ISS cases.

Age-related variations in coping strategies were evident when comparing younger children (8–12 years) and adolescents (13–18 years) Younger children exhibited higher reliance on distraction (85.19%) and wishful thinking (78.57%), whereas adolescents engaged more in problem-solving (71.43%) and social support (68.57%), indicating a transition toward more adaptive coping mechanisms. Emotional regulation strategies were significantly more effective in adolescents highlighting the role of psychological maturity in managing stress and emotional challenges, these findings align with ***Chaplin et al.***[25], who reported that younger children tend to rely on avoidance-based coping strategies, whereas older children develop more effective problem-solving skills. Similarly, ***Quitmann et al.***[6] found that adolescents with short stature exhibited better emotional regulation than younger children. However, the continued use of wishful thinking among younger participants supports the observations of ***Aryayev et al.***[20], who noted that maladaptive coping mechanisms are more prevalent in preadolescents due to their limited cognitive development.

Differences in coping strategies were observed between adolescents with idiopathic short stature (ISS) and those with growth hormone deficiency (GHD). ISS adolescents predominantly relied on distraction (78.57%) and wishful thinking (64.29%), whereas GHD adolescents demonstrated greater use of problem-solving (75%) and emotional regulation (71.43%), indicating stronger psychological resilience in the GHD group. Additionally, ISS participants reported significantly lower perceived effectiveness of social support, aligning with findings by ***Bloemeke et al.***[24], who highlighted higher social withdrawal rates in ISS adolescents compared to those undergoing GH therapy, the study findings align with previous research on coping strategies in children with short stature. ***Quitmann et al.***[6] reported that ISS children demonstrate lower coping effectiveness than GHD children, particularly in emotional regulation and social coping. ***Bloemeke et al.***[24] found that avoidance-based strategies, such as distraction and wishful thinking, contribute to greater psychosocial distress in untreated ISS children, a pattern reflected in our study. Similarly, ***Aryayev et al.***[20] observed that maladaptive coping mechanisms were more common in younger children, while problem-solving and emotional regulation improved with age. This trend is further supported by ***Chaplin et al.***[25], who emphasized that cognitive coping strategies become more effective as children mature, supporting the study's findings that problem-solving and emotional regulation were more prevalent in older children.

The findings highlight the progression of coping strategies across age groups and the differences between ISS and GHD children. Younger children (8–12 years) predominantly rely on avoidance-based strategies like wishful thinking and distraction, which are less effective for long-term emotional well-being. In contrast, adolescents (13–18 years) develop more adaptive coping mechanisms, such as problem-solving and social support, reflecting greater psychological resilience. ISS children exhibit a higher tendency toward maladaptive coping strategies compared to GHD children, underscoring the need for targeted psychological interventions. Additionally, emotional regulation and problem-solving skills improve with age, aligning with existing research on cognitive and emotional development in children with chronic conditions, these findings support the research of ***Quitmann et al.***[6], ***Bloemeke et al.***[24], ***Aryayev et al.***[20], and ***Chaplin et al.***[25], all of which emphasize the need for early psychological interventions to enhance adaptive coping strategies in children with short stature.

The Strengths and Difficulties Questionnaire (SDQ) was used to assess behavioral and emotional challenges among children with idiopathic short stature (ISS) and growth hormone deficiency (GHD), revealing that over 60% of participants experienced some degree of behavioral difficulties. The most affected domains were peer problems and hyperactivity, with 30% of children scoring in the abnormal range and 32.86% in the borderline range. Notably, younger children (8–12 years) exhibited higher conduct problems than adolescents, though no significant differences were found between ISS and GHD groups in emotional, conduct, hyperactivity, or peer relationship domains. This suggests that the cause of short stature does not significantly influence behavioral outcomes during adolescence, aligning with findings by ***Quitmann et al.***[6] and ***Aryayev et al.***[20], who emphasized that younger children with short stature are more prone to behavioral difficulties and social anxiety.

The impact assessment further supported these observations, indicating that behavioral difficulties affected daily functioning but remained consistent within each age group. Among children aged 8–12 years, no significant correlation was found between age and impact score, suggesting stable psychosocial challenges within this group. Similarly, in adolescents aged 13–18 years, ISS and GHD groups showed no significant differences in impact scores, reinforcing that the cause of short stature does not substantially affect daily life perceptions. These findings highlight the need for early psychological interventions to address social and emotional difficulties, particularly in younger children.

These findings are supported by ***Chaplin et al.***[25], who reported that children with chronic conditions experience similar psychosocial challenges regardless of medical classification, reinforcing the need for psychological support independent of diagnosis.

We found that there are no statistically significant differences in SDQ domains between children with idiopathic short stature (ISS) and those with growth hormone deficiency (GHD). This suggests that behavioral and emotional difficulties are comparable across both groups, regardless of the underlying etiology of short stature. Additionally, the impact score did not differ significantly, implying a similar psychosocial burden in both groups, these results are consistent with previous research highlighting that children with short stature, irrespective of its cause, may experience social and emotional challenges at comparable levels. For instance, ***Theunissen et al.***[26] reported that children with short stature exhibited higher rates of emotional and social difficulties than their peers, yet these difficulties were not necessarily influenced by the medical origin of the condition. Similarly, ***Sandberg et al.***[27] emphasized that psychosocial outcomes in children with growth disorders are shaped more by parental attitudes, environmental factors, and social experiences rather than the specific diagnosis of short stature.

The Pediatric Quality of Life Inventory (Peds-QL) was used to assess the overall well-being of children with idiopathic short stature (ISS) and growth hormone deficiency (GHD), providing insights into age-related differences, variations between ISS and GHD groups, and the broader impact of short stature on various life domains. The overall Peds-QL score in the study population was 67.52 ± 10.15, indicating a moderate quality of life. The emotional domain had the highest mean score, suggesting relatively preserved emotional well-being, while the social domain had the lowest score, highlighting significant challenges in peer interactions and social functioning.

The overall PED QL score in the study population was 67.52 ± 10.15, reflecting a moderate quality of life among children with short stature. The emotional domain recorded the highest mean score, indicating a relatively preserved emotional well-being, while the social domain had the lowest score, suggesting that peer interactions and social functioning are significantly impacted.

The classification of quality of life scores revealed that 55.71% of participants were categorized as having below-average QoL, highlighting the substantial psychosocial burden experienced by children with short stature. These findings are consistent with those of ***Quitmann et al.***[6], who reported that social difficulties contribute significantly to reduced quality of life in children with short stature, as well as ***Bloemeke et al.***[24], who identified peer-related stressors as a major factor affecting overall well-being in untreated ISS children.

A comparison between younger children (8–12 years) and adolescents (13–18 years) demonstrated a significantly lower total PED QL score in the younger group, although no significant differences were noted across the individual domains. This suggests that perceptions of overall quality of life improve with age, potentially due to the development of more effective coping strategies and better social adaptation.

These results align with the findings of ***Aryayev et al.***[20], who reported that younger children with short stature exhibit greater emotional distress and social anxiety, and ***Chaplin et al.***[25], who emphasized that older children tend to develop more resilience, leading to improved quality of life perceptions over time.

Our study showed a notable difference was observed in quality of life (PED-QL) scores, where children with GHD demonstrated significantly higher scores across all domains, including physical, emotional, social, and school functioning. This suggests that children with GHD perceive a better overall quality of life compared to those with ISS. These findings contrast with previous studies, such as those by ***Crespi et al.***[28], which reported lower quality of life among children with GHD due to the chronic nature of treatment and associated medical interventions. The observed discrepancy in the present study may be attributed to better access to growth hormone therapy and comprehensive medical support among children with GHD, which could positively influence their well-being.

The difference in PED QL scores aligns with previous research indicating that access to treatment and medical support plays a crucial role in determining perceived quality of life in children with growth disorders. A study by ***Quitmann et al.***[6] found that children with ISS often report lower quality of life scores, particularly in social and school domains, as they experience greater peer difficulties and academic challenges. Similarly, ***Bullinger et al.***[29] noted that children undergoing growth hormone treatment for GHD reported improvements in multiple quality of life domains over time, suggesting that medical intervention may have a protective effect on psychosocial well-being.

Regarding Coping Strategies and SDQ/PED QL in Children Aged 8–12 Years, our results revealed a significant positive correlation between distraction and SDQ total scores, suggesting that children who frequently rely on distraction as a coping strategy tend to experience greater emotional and behavioral difficulties. This supports findings by ***Muris et al.***[30], who linked avoidance-based coping, such as distraction, to increased emotional distress in children. Similarly, Hampel & Petermann[29] noted that excessive dependence on distraction can hinder emotional regulation rather than alleviate psychological distress.

In contrast, social support showed a negative correlation with SDQ total score), indicating that children who seek social support report fewer emotional and behavioral challenges. This aligns with research by ***Compas et al.***[32] which highlighted the protective role of strong social support networks in reducing anxiety and depression in children. These findings underscore the importance of fostering supportive relationships to enhance psychological resilience in children with short stature, Meanwhile, coping strategies such as cognitive restructuring, problem-solving, and wishful thinking did not show significant correlations with SDQ or PED QL scores in this age group. This may be due to the developmental stage of younger children, as their emotional regulation skills are still maturing, potentially limiting the effectiveness of cognitively demanding coping mechanisms.

In adolescents, social withdrawal showed a significant negative correlation with PED QL scores, indicating that those who frequently withdraw socially tend to experience a lower quality of life. This aligns with findings by Zimmer-Gembeck & Skinner[31], which emphasize the negative effects of social withdrawal on psychological well-being and overall life satisfaction. These results highlight the importance of interventions that promote social engagement and reduce withdrawal behaviors to enhance quality of life in this group, Unlike in younger children, distraction was not significantly associated with SDQ scores in adolescents, this suggests a developmental shift, where older children rely on more complex and adaptive coping mechanisms, reducing the impact of distraction on emotional difficulties. ***Skinner et al.***[34] support this idea, noting that coping strategies become more dynamic and individualized with age, Additionally, no significant correlations were found between other coping strategies and SDQ or PED QL scores in this age group. This reinforces the notion that coping mechanisms in adolescence are shaped by multiple factors, including personality, environmental support, and individual resilience.

Regarding whole study population, a significant negative correlation was found between emotional difficulties and total PED QL scores, indicating that children experiencing greater emotional distress reported lower overall quality of life. This finding aligns with large-scale studies by Eiser & Morse[33] and ***Ravens-Sieberer et al.***[36], which highlight the detrimental impact of emotional and psychological distress on children's perceived well-being. These results underscore the importance of early psychological interventions, as addressing emotional difficulties may contribute to an improved quality of life. However, no significant correlations were observed between PED QL and other SDQ domains, such as conduct problems, hyperactivity, peer relationships, and prosocial behavior. This contrasts with findings by ***Goodman et al.***[18], which suggested that peer difficulties and hyperactivity can significantly affect overall well-being. A possible explanation for this discrepancy is that children in this study may have developed compensatory mechanisms that help them maintain social interactions despite emotional challenges, reducing the impact of these factors on their perceived quality of life.

The regression analysis revealed important insights into the factors influencing emotional and behavioral difficulties (SDQ scores) and the role of coping strategies in children with short stature. Notably, none of the demographic or clinical factors, including sex, age, family history of short stature (FH SS), growth hormone (GH) use, and height-for-age, were significant predictors of SDQ scores. This suggests that medical and physical characteristics alone may not strongly determine psychological outcomes, highlighting the potential influence of social and environmental factors.

Among coping strategies, distraction was significantly associated with higher SDQ scores, indicating a link between avoidance-based coping and increased emotional and behavioral difficulties. Conversely, problem-solving was a significant predictor of lower SDQ scores, suggesting its protective effect against emotional distress. These findings align with previous research demonstrating that avoidance-based coping (e.g., distraction) is often linked to poorer psychological outcomes, while active problem-solving enhances resilience and emotional well-being[30-32].

Interestingly, other coping strategies, including emotional regulation, social support, and cognitive restructuring, did not significantly predict SDQ scores, despite prior studies suggesting their relevance in psychological adaptation[33,34]. This may indicate that coping effectiveness varies across different populations or is influenced by unmeasured psychosocial factors such as peer relationships and parental support.

These findings highlight the importance of promoting adaptive coping mechanisms, particularly problem-solving, while reducing reliance on avoidance-based strategies like distraction. Given the lack of significant associations between SDQ scores and clinical factors, future research should explore the role of social and environmental influences in shaping psychological well-being in children with short stature. Additionally, longitudinal studies could provide deeper insights into how coping strategies evolve and impact emotional outcomes over time, Clinically, these results suggest that psychosocial interventions should be integrated into the care of children with short stature, alongside medical treatment, to enhance their emotional resilience and quality of life.

CONCLUSION

Our study highlights the significant psychosocial challenges faced by children with short stature, particularly in the areas of peer relationships, emotional well-being, and school performance. Children with short stature exhibited higher levels of peer difficulties and emotional distress, and their coping strategies varied, with problem-solving, emotional regulation, and social support being the most effective mechanisms for psychological adjustment.

We also found that growth hormone treatment was associated with better psychosocial outcomes, reinforcing the idea that early intervention can improve quality of life in affected children. However, the impact of height perception and external support systems, such as family, school, and peer relationships, plays an equally crucial role in psychological well-being.

LIMITATIONS OF OUR STUDY

our study has some limitations. First, the sample size was relatively small (70 children), which may limit the generalizability of our findings to larger populations. A larger sample could provide more robust statistical power and allow for subgroup analyses based on factors such as gender, age, and GH treatment status, another limitation we didn't study differences in coping strategies regarding sex.

Another limitation is the cross-sectional nature of the study, which only provides a snapshot of the psychological well-being of these children at a single point in time. A longitudinal study following these children over several years would provide deeper insights into how their coping strategies and quality of life evolve as they grow older or receive treatment, additionally, while we assessed coping strategies and psychosocial maladjustment, we did not include parental perspectives or teacher assessments, which could have provided a more comprehensive view of the children's behavioral and emotional well-being. Future studies should incorporate multiple informants to strengthen the findings.

Another challenge is the lack of a control group of children with normal stature, which could have provided a direct comparison to highlight the specific psychosocial difficulties associated with short stature. Lastly, cultural factors might influence the way children perceive their height and cope with challenges, so studies in different populations could help determine whether our findings are applicable on a broader scale.

Comparative studies including children of normal stature would provide a better understanding of the specific challenges faced by short-statured children and how these differ from those of their peers.

CLINICAL IMPLICATIONS

Based on our findings, we recommend integrating routine psychological screening into the management of children with short stature to identify those at risk of emotional distress and social withdrawal. Increasing parental and teacher awareness is essential to fostering supportive environments that enhance self-esteem and social inclusion. Psychological interventions, such as cognitive-behavioral therapy (CBT) and structured coping skills training, should be provided to help children develop positive coping mechanisms and resilience. A multidisciplinary approach involving pediatric endocrinologists, psychologists, and social workers is crucial for addressing both physical and emotional needs comprehensively. Additionally, longitudinal research should examine the long-term psychosocial outcomes of children with short stature, evaluating the impact of various treatment approaches, including growth hormone therapy and psychological interventions, on quality of life over time. Expanding research to different cultural settings will help determine whether psychosocial challenges and coping strategies vary based on cultural perceptions of height.

CONFLICT OF INTEREST

1. No competing interests of financial or personal nature.
2. The manuscript is not under consideration elsewhere.
3. Funding not received.

AUTHORS' CONTRIBUTION

Asmaa Wafeeq Abd El-Aziz: Conceptualization, study design, data analysis, and data validation.

Marwa Magdy Hassan Nawar: Statistical analysis, interpretation of results, and manuscript revision.

Mohanad Ahmed Fathy Ahmed: Literature review, methodology development, data collection, and manuscript writing.

Reham Ibrahim Abdelmageed: Supervision, critical revision of the manuscript, and final approval for submission.

All authors reviewed and approved the final manuscript.

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استراتيجيات السلوك والتكيف لدى الأطفال ذوي القامة القصيرة

أسماء وفيق عبد العزيز[١]، مروة مجدي حسن نوار[٢]، مهند أحمد فتحي[٣] و ريهام ابراهيم عبد المجيد[١]

قسم طب الاطفال، [١]وحدة الطب النفسي، [٢]وحدة الغدد الصماء، [٣]مستشفي الاطفال، كليه الطب، جامعه عين شمس

المقدمة: يرتبط قصر القامة لدى الأطفال بالضيق العاطفي، وصعوبات التعامل، وانخفاض تقدير الذات. يُعد العلاج بهرمون النمو خيارًا متاحًا، إلا أن التأثير النفسي وآليات التكيف لا تزال قيد الدراسة.

الهدف: تهدف الدراسة إلى دراسة سوء التوافق النفسي والاجتماعي واستراتيجيات التكيف لدى الأطفال ذوي القامة القصيرة.

تم عمل هذه الدراسة على عدد ٧٠ من الأطفال ذوى القامة القصيرة الذين تتراوح أعمارهم من ٨ ـ ١٨ عام بوحدة الغدد الصماء بمستشفى الأطفال جامعة عين شمس بالقاهرة مع استبعاد وجود اضطرابات نفسيه أو أمراض مصاحبة.

تم تقييم سوء التكيف النفسي والاجتماعي، واستراتيجيات التكيف، وجودة حياة الأطفال ذوي القامة القصيرة باستخدام التقييمات النفسية، بما في ذلك استبيان نقاط القوة والصعوبات، ومقياس جودة حياة الأطفال.

النتائج: وقد أظهرت نتائج الدراسة استخدام الأطفال الأصغر سنًا حل المشكلات والدعم الاجتماعي، بينما اعتمد المراهقون على إعادة الهيكلة المعرفية، والتنظيم العاطفي، وتشتيت الانتباه. وكان الانسحاب الاجتماعي أكثر شيوعًا لدى الأطفال الأكبر سنًا. وكان لدى الأطفال قصيرى القامة غير معلوم السبب تنظيم عاطفي أفضل من الذين يعانون من نقص هرمون النمو، ولكن جودة الحياة كانت أعلى في مجموعة نقص هرمون النمو. ارتبط تشتت الانتباه بزيادة الصعوبات السلوكية، بينما حسّن حل المشكلات من الصحة النفسية.

و من ثم نستخلص من الدراسة أن الأطفال ذوى القامة القصيرة يواجهون تحديات نفسية واجتماعية. يُحسّن علاج هرمون النمو الصحة النفسية، وتُحسّن استراتيجيات التأقلم التكيفية النتائج. يُعدّ الدعم النفسي المبكر أمرًا بالغ الأهمية، لتعزيز التكيف العاطفي.