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Psychopathology, health-related quality-of-life and parental attitudes in pediatric asthma

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ABSTRACT

Objective: Considering that unknown psychopathology might play a role in the management of pediatric asthma, this study examines how self-esteem and psychosocial family environment (child-raising attitudes and parental coping strategies) influence the physical and psychosocial well-being of these children. Hence, this paper aims to predict psychosocial factors influencing health-related quality-of-life (HRQL) in children with asthma without a documented history of mental illness. *Methods:* 32 patients with asthma and 32 controls aged 8–18 years were included in the study. All participants were largely middle-income, Caucasian school-aged children. The child-raising attitudes examined were: dependency, egalitarianism/democratic attitude, rejection of the homemaking role, marital conflict, and strictness/authoritarianism. The parental coping strategies were; social support seeking, problem-solving attitude and avoidance. *Results:* Psychiatric comorbidity was present in 72% of asthma patients and 22% of the controls. The most common mental illness identified was generalized anxiety disorder; 32% vs 13%, respectively. Dependency was the only parental child-raising attitude that differed significantly between groups (47 ± 8 vs 41 ± 11, respectively. $p = 0.035$). There was a negative correlation between the PARI dependency subscale and the total HRQL score according to the parents ($r_p = -0.39$, $p = 0.027$). The most influential factors connected with the total HRQL score in asthma were Rosenberg self-esteem scale score, presence of psychopathology and dependency according to the child. *Conclusions:* Simple ways to overcome emotional dependency and fortify self-esteem (exercises promoting self-awareness, opportunities cultivating decision-making, and a considerable freedom-of-choice to experience consequences) worth recommending to parents of children with asthma. Patients with suspected mental illness must be referred for psychiatric evaluations.

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Introduction

Asthma is a chronic disease, manifesting symptoms such as reversible airflow obstruction, airway hyperresponsiveness and chronic airway inflammation, all of which lead to wheezing and breathlessness [1]. Fourteen percent of the world's children experience asthma symptoms while in particular it is predominantly children approaching adolescence (ages 10–14) who suffer from the major burden of disease [2]. Pathophysiology of asthma includes a wide variety of factors such as genetic predisposition, obesity, gender, environmental allergies, infections, occupational sensitizers, socioeconomic status, smoking, air pollution and nutrition [2,3]. Although, not significantly altering quality of life [4,5], cigarette smoking, no matter active or passive, was found to be correlated with higher prevalence of pediatric asthma [6]. Thus, caregiver smoking habits, even parental norms about the acceptability of smoking by, has been considered influential in the management [7]. A randomized control trial examining the effect of an antismoking socialization intervention, consisting of activities designed to increase communication between mother and child, resulted in reduced incidence of pediatric asthma [8].

Just like any other somatic disease resulting in stressful events, evaluation of stress-related psychological functioning in asthma has long been considered controversial [9]. While it is recognized that emotional stress can trigger asthma, the possible psychological barriers that have a negative impact on

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treatment adherence may lead to a direct association between asthma and behavioral factors [10]. Nevertheless, studies investigating psychopathology in asthmatic patients show that anxiety and depression are common in asthma despite limitations including small sample size, sampling biases, and questionable methods of confirming the diagnosis [10,11]. However, this association is not a direct causal link, as it disappears after controlling the fixed confounding factors like childhood adversity (including family socio-economic disadvantage, family instability and conflict, child abuse exposure and parental adjustment problems) and some familial factors increasing susceptibility to asthma and depressive/anxiety disorders (whose effects were captured by the fixed effects regression model and possibly include common genetic, social and individual processes) in patients younger than 21 [12]. Conceivably, the influence of parental child raising attitudes could explain some of this captured familial factors. To the best of our knowledge there is no study in the English medical literature specifically investigating the relationship between quality of life and parental child raising attitudes in asthmatic patients. For this reason, the main purpose of this study is to provide a deeper insight into individual self-esteem trajectory of the children and their family environment; and to predict psychosocial factors influencing HRQL in children with asthma without a known history of any psychiatric illness.

Methods

The study was a cohort study conducted at the pediatric allergy outpatient clinic of a tertiary referral hospital in a metropolitan city of Turkey. Patients aged 8–18 presented to the clinic between September 2014 and May 2015 were included in the study. The rationale behind selecting this age group is to exclude illiterate participants. A representative convenience sampling was used for recruitment and 32 asthma patients and 32 healthy volunteers were included. Only the patients followed up with asthma diagnosis for at least one year were recruited for the asthma group. Children with documented history of mental illness or any other chronic disease were excluded from the study. The rationale behind this exclusion was to eliminate the confounding psychosocial background effects of additional diseases. The subjects in the asthma and control groups were similar in terms of age, gender and education level.

Structured psychiatric interviews were conducted with the participants in order to identify mental disorders. A validated tool was used for this purpose: schedule for affective disorders and Schizophrenia for school-age children-present and lifetime version (K-SADS-PL). Both groups of children were invited to complete the Rosenberg self-esteem scale (RSES) and the pediatric quality of life inventory (PedsQL) child-self report (CSR). The parental attitude research instrument (PARI), the coping strategy indicator (CSI) and the PedsQL parent-proxy report (PPR) were given to the parents of children in both groups. All children and parents were assessed by a child and adolescent psychiatrist. Subjects who were in the control group were assessed through a preliminary interview for eligibility. The criteria for daily internet heavy use (>4 h) was adopted from the study of Ko et al. [13] who explain the neurobiological addiction mechanism in advanced players of a specific internet game. Sports habit of participants represented weekly participation in organized sports.

The study was approved by the institutional ethics committee.

Instruments used

1. K-SADS-PL: This test is a semi-structured interview form used to detect psychopathologies in children and adolescents [14]. Each interview was conducted by a child and adolescent psychiatrist and the diagnoses were reviewed according to the DSM-V criteria.
2. PedsQL: It is a scale to measure the HRQL of children and adolescents [15]. Scoring is made in three fields: Report total score (RTS), psychosocial health score (PsHS) and physical health score (PhHS).
3. PARI: This scale was developed by Shaffer and Bell [16] to assess child-raising attitudes of parents. PARI evaluates five different dimensions: dependency, egalitarianism and democratic attitude, rejection of the homemaking role, marital conflict and strictness and authoritarianism.
4. CSI: It was developed by Amirkhan [17]. This scale consisting of 33 items is divided into three sub-groups of 11 items: problem-solving attitude, social support seeking and avoidance. The higher scores on each scale indicates the greater use of the specified strategy.
5. Rosenberg self-esteem scale: It is the most widely used Likert-type measure in social science research. This scale was developed by Morris

Rosenberg in 1965 [18]. In this study, only the self-esteem subtest of the first 10 questions was used. A higher sum score indicates lower self-esteem.

Statistical assessment

For sample size selection, a study comparing the PedsQL scores between asthma and healthy groups was analyzed and average total scores of PedsQL (PPR) for healthy and asthma groups were taken for calculations; respectively, 85.49 (SD = 13.50) and 75.57 (SD = 13.76) [15]. Therefore, a minimum sample size of 58 (29 in each group) was calculated on the basis of a hypothesis that would yield results sensitive enough to reveal a similar difference between the study arms (1:1 enrollment) while the alpha level for rejecting the null hypothesis was set to 0.05.

Statistical evaluations were performed using the SPSS (Statistical Package for Social Sciences) for Windows 20.0 program. Categorical data were compared with the chi-square test and presented as frequencies and/or percentage. Normally distributed data were presented as mean and standard deviation and non-normally distributed continuous data were presented as median and interquartile range (IQR). The Shapiro–Wilk test was used to determine the normal distribution of continuous variables. Depending on the test assumptions Student *t*-test or Mann–Whitney *U*-test was performed. For correlation analysis, Pearson and Spearman correlation analysis were used respectively for parametric and nonparametric data. Multivariable linear regression analysis was conducted. The limit for statistical significance was accepted as $p < 0.05$.

Results

All of the participants were Caucasian school-aged children. The majority of them were living in middle-income households. Sociodemographic characteristics of study participants are presented in Table 1. The mean age was 12.4 ± 3.1 in the asthmatic group and 12.4 ± 3.0 in the control group. Parents of children with asthma were younger, had lower levels of educational background and smoking was more prevalent among them (81% in the asthma group, 56% in the control; $p = 0.031$). Patients in the asthmatic group had more frequent upper respiratory tract infections (URTI) (66% vs 31%; $p = 0.006$) and they were less active in sports (%28 vs %63; $p = 0.006$). The rate of daily internet heavy-use (>4 h) was 81% in the asthma group versus 41% in the control ($p = 0.001$).

The groups were compared according to the presence of mental illness using the K-SADS-PL; and 72% of the asthma group and 22% of the control group had new-diagnosis mental illnesses ($p < 0.001$). In the children with asthma, 12 cases had generalized anxiety disorder (32%), five cases (13%) had depression, five cases (13%) had post-traumatic stress disorder, five cases (13%) had social phobia, four cases (10%) had attention deficit hyperactivity disorder, three cases (8%) had obsessive-compulsive disorder, two cases (5%) had tic disorder, one case (3%) had articulation problem and one case had (3%) nocturnal enuresis. The prevalence of mental illness in the control patients was 22%. Four cases had generalized anxiety disorder (13%), three cases (9%) had post-traumatic stress disorder, one case (3%) had social phobia and one case (3%) had obsessive–compulsive disorder.

Scores revealed after using the tools to examine psychosocial factors are presented in Table 2. When the groups were compared according to the results of the PARI tool, only the dependency scores were significantly different between the groups (47 ± 8 vs 41 ± 11, respectively for the asthma and the control groups; $p = 0.035$). No significant difference was found between the groups in the strategy of coping examined with the CSI tool, nor in the individual self-esteem trajectory examined with the RSES tool.

All components of PedsQL except the physical health score (PPR) were significantly higher in the control group than in the asthma group (Table 3). There was a negative correlation between the PARI dependency subscale and the total HRQL score according to the parents ($r_p = -0.39$, $p = 0.027$). Although self-esteem profiles were comparable between groups, RSES and PedsQL (CSR) scores of children with asthma demonstrated a significant correlation between low self-esteem and decreased total score of HRQL ($r_p = -0.45$, $p = 0.01$). Complete bivariate correlation analysis of how psychosocial factors were influencing quality of life indices are presented in Table 4.

Considering the diverse psychosocial factors that may influence the HRQL in asthma, a stepwise multivariable linear regression analysis was conducted to identify the most important ones associated with the total HRQL scores (dependent variable). The independent variables included in the regression analysis were significantly different variables of sociodemographic characteristics (age and education of parents, URTIs, parental smoking, sports habit and internet

Table 1. Sociodemographic characteristics of study participants.

Variable	Control	Asthma	*p*
Age, mean (±SD)	12.4 (±2.9)	12.5 (±3.1)	0.901
Gender, % (*n*)			0.802
Male	50 (16)	53 (17)	
Female	50 (16)	47 (15)	
Duration of education, median years (IQR)	6.5 (3.3-8.0)	7.0 (4.0–9.0)	0.409
Maternal age, median (IQR)	38.0 (36.3-45.0)	34.0 (32.3–40.0)	**0.026**
Paternal age, mean (±SD)	44.0 (±6.8)	40.3 (±5.3)	**0.016**
Place of birth, % (*n*)			0.641
Village or town	9 (3)	6 (2)	
District or city	91 (29)	94 (30)	
School success, % (*n*)			0.209
Low	0 (0)	6 (2)	
Medium	19 (6)	28 (9)	
High	81 (26)	66 (21)	
The number of siblings, % (*n*)			0.133
None	3 (1)	19 (6)	
One	69 (22)	59 (19)	
Multiple	28 (9)	22 (7)	
Education level of father, % (*n*)			**0.035**
Secondary or lower	22 (7)	47 (15)	
High school or higher	78 (25)	53 (17)	
Father with a mental illness, % (*n*)			0.719
Positive	12.5 (4)	16 (5)	
Negative	87.5 (28)	84 (27)	
Education level of mother, % (*n*)			**<0.001**
Secondary or lower	31 (10)	78 (25)	
High school or higher	69 (22)	22 (7)	
Mother with a mental illness, % (*n*)			0.396
Positive	22 (7)	31 (10)	
Negative	78 (25)	69 (22)	
Economic status of the family, % (*n*)			0.364
Low	3 (1)	13 (4)	
Medium	84 (27)	78 (25)	
High	13 (4)	9 (3)	
Past history of any chronic illness, % (*n*)			0.391
Positive	6 (2)	13 (4)	
Negative	94 (30)	88 (28)	
History of frequent upper respiratory tract infections, % (*n*)			**0.006**
Positive	31 (10)	66 (21)	
Negative	69 (22)	34 (11)	
History of any illness during pregnancy, % (*n*)			0.545
Positive	19 (6)	25 (8)	
Negative	81 (26)	75 (24)	
History of seizure, % (*n*)			0.302
Positive	3 (1)	9 (3)	
Negative	97 (31)	91 (29)	
Parental smoking, % (*n*)			**0.031**
Positive	56 (18)	81 (26)	
Negative	44 (14)	19 (6)	
Sports habit, % (*n*)			**0.006**
Positive	63 (20)	28 (9)	
Negative	38 (12)	72 (23)	

Bold values represents $p < 0.05$.

Table 2. Tools used to examine psychosocial factors.

		Control group		Asthma group		*p*
Parental attitude research instrument	Dependency, mean (±SD)	41	(±11)	47	(±8)	**0.035**
	Egalitarianism and democratic attitudes, median (IQR)	30	(27–32)	27	(25–30)	0.055
	Rejection of the homemaking role, median (IQR)	26	(22–32)	26	(22–30)	0.936
	Marital conflict, median (IQR)	13	(10–19)	15	(13–17)	0.266
	Strictness and authoritarianism, median (IQR)	32	(26–45)	37	(34–44)	0.107
Coping strategy indicator	Social support seeking, mean (±SD)	23	(±4)	22	(±4)	0.394
	Problem-solving attitude, median (IQR)	29	(26–32)	28	(26–30)	0.425
	Avoidance, mean (±SD)	21	(±4)	22	(±3)	0.134
Rosenberg self-esteem scale, mean (±SD)		1.0	(±0.7)	1.2	(±0.6)	0.264

SD: standard deviation; IQR: interquartile range.
Bold values represents $p < 0.05$.

heavy-use), all five dimensions (child-raising attitudes) of PARI, three sub-groups of CSI, RSES score and K-SADS-PL detection of any psychopathology (binary categoric variable). All requested variables were included in the analysis and the most influential factors related to the HRQL in asthma were RSES score,

presence of psychopathology and "dependency subscale" of PARI for CSR (Table 5); and "rejection of the homemaking role" and "avoidance" sub-group of CSI for PPR (Table 6). None of the requested variables were related to the HRQL (CSR) in the control group; however, presence of psychopathology and "strictness and authoritarianism" were related to HRQL (PPR) (Table 7).

Table 3. Pediatric quality-of-life inventory.

	Control group	Asthma group	*p*
PRTS, mean (±SD)	77 (±12)	68 (±18)	**0.017**
PRPhHS, median (IQR)	78 (63–88)	69 (53–87)	0.114
PRPsHS, mean (±SD)	78 (±12)	68 (±17)	**0.013**
CRTS, mean (±SD)	77 (±12)	66 (±15)	**0.002**
CRPhHS, median (IQR)	78 (69–84)	64 (56–78)	**0.002**
CRPsHS, mean (±SD)	77 (±13)	66 (±18)	**0.008**

PRTS: Parent-proxy report total score; PRPhHS: Parent-proxy report physical health score; PRPsHS: Parent-proxy report psychosocial health score; CRTS: Child-self report total score; CRPhHS: Child-self report physical health score; CRPsHS: Child-self report psychosocial health score.
Bold values represents $p < 0.05$.

Discussion

Genetic and environmental factors are known to play a significant role in the pathophysiology of asthma starting from the initial manifestation of clinical symptoms to the aggravation of the current situation. One of the risk factors for asthma is parental smoking [6–8]. In our study, the rate of parental smoking was 81% in the asthmatic group and 53% in the control group. Smoking and subsequent oxidative stress may affect nuclear cofactors in glucocorticoid (GC) receptors or cause nuclear translocation [19,20]. This may lead to severe GC resistance and increased oxidative stress.

Table 4. Bivariate correlation analysis between psychosocial factors and health-related quality-of-life components.

			PRTS	PRPhHS	PRPsHS	CRTS	CRPhHS	CRPsHS
Parental attitude research instrument	Dependency	A	**−0.39***	−0.49**	**−0.29**	**0.21**	0.20	**0.22**
		C	**0.23**	0.23	**0.15**	**0.06**	0.08	**0.04**
	Egalitarianism and democratic attitudes	A	0.34	0.30	0.36*	0.27	0.11	0.32
		C	−0.12	−0.11	−0.10	0.14	0.22	0.09
	Rejection of the homemaking role	A	−0.61**	−0.63**	−0.51**	0.07	0.15	0.03
		C	0.00	0.14	−0.16	0.26	0.10	0.27
	Marital conflict	A	−0.42*	−0.47**	−0.33	0.11	0.08	0.14
		C	−0.02	0.08	−0.14	−0.003	−0.11	0.04
	Strictness and authoritarianism	A	−0.42*	−0.49**	−0.30	0.16	0.10	0.15
		C	0.18	0.27	0.06	0.12	0.11	0.12
Coping strategy indicator	Social support seeking	A	**−0.23**	−0.47**	**−0.32**	**−0.36***	0.08	**−0.37***
		C	**0.32**	0.18	**−0.08**	**−0.03**	−0.004	**−0.05**
	Problem-solving attitude	A	−0.42*	−0.49**	−0.30	0.16	0.10	0.15
		C	0.05	−0.08	0.12	−0.13	−0.02	−0.11
	Avoidance	A	**−0.34**	−0.03	**−0.36***	**−0.38***	−0.32	**−0.40***
		C	**0.16**	−0.09	**0.21**	**−0.07**	0.07	**−0.13**
Rosenberg self-esteem scale		A	**−0.23**	−0.06	**−0.29**	**−0.45****	−0.52**	**−0.36***
		C	**−0.07**	0.13	**−0.22**	**−0.24**	−0.03	**−0.25**

A: Asthma group; C: Control group; PRTS: Parent-proxy report total score; PRPhHS: Parent-proxy report physical health score; PRPsHS: Parent-proxy report psychosocial health score; CRTS: Child-self report total score; CRPhHS: Child-self report physical health score; CRPsHS: Child-self report psychosocial health score.
Bolded values represent Pearson correlation coefficient, others represent correlation coefficient of Spearman.
*Correlation is significant at the 0.05 level.
**Correlation is significant at the 0.01 level.

Table 5. Multivariable linear regression analysis with the HRQL (parent-proxy report) total score as a dependent variable in patients with asthma.

Model	Regressors	*B*	SE	Beta	*t*	Significance
2	Rejection of the homemaking role	−1.212	0.352	−0.507	−3.444	0.002
	Avoidance	−1.900	0.827	−0.338	−2.296	0.029
	ANOVA: $F = 8.571$; df(total) = 31; $p = 0.001$; adjusted R-square = 0.328					

Abbreviations: HRQL: health-related quality-of-life; SE: standard error; ANOVA: analysis of variance.

Table 6. Multivariable linear regression analysis with the HRQL (child-self report) total score as a dependent variable in patients with asthma.

Model	Regressors	*B*	SE	Beta	*t*	Significance
3	RSES score	−13.477	3.615	−0.556	−3.728	0.001
	Presence of psychopathology	−11.076	4.804	−0.336	−2.306	0.029
	Dependency	0.603	0.267	0.335	2.254	0.032
	ANOVA: $F = 6.564$; df(total) = 31; $p = 0.002$; adjusted R-square = 0.350					

Abbreviations: HRQL: health-related quality-of-life; RSES: Rosenberg self-esteem scale; SE: standard error; ANOVA: analysis of variance.

Table 7. Multivariable linear regression analysis with the HRQL (parent-proxy report) total score as a dependent variable in the control group.

Model	Regressors	*B*	SE	Beta	*t*	Significance
2	Presence of psychopathology	−16.777	4.385	−0.599	−3.826	0.001
	Strictness and authoritarianism	0.270	0.118	−0.358	−2.285	0.030
	ANOVA: $F = 7.999$; df(total) = 31; $p = 0.002$; adjusted R-square = 0.311					

Abbreviations: HRQL: health-related quality-of-life; RSES: Rosenberg self-esteem scale; SE: standard error; ANOVA: analysis of variance.

Another risk factor is URTI. It is the primary inducing factor for asthma exacerbation and responsible for 43% of all episodes [21]. The rate of positive history for URTIs in our study was significantly higher in the asthma group (66%) than the control (31%) ($p = 0.006$).

In our study, we compared the groups as regards their family PedsQL scores and found that all components but the physical health score (PPR) were lower in children with asthma. Many authors prefer the Pediatric Asthma Quality of Life Questionnaire when analyzing quality of life in asthma [22–24]. Specifically justifying indeed as this tool is, we cannot afford to just get over-focused so as to lose the larger perspective – influence of psychosocial factors in all participants, not only the ones with asthma. Thus, we preferred to use PedsQL instead and our results revealed that presence of psychopathology was one of the predictive factors for worse HRQOL outcome in both groups; according to CSR in the asthma group and PPR in the control.

Asthma can lead to psychiatric disorders by affecting the quality-of-life of patients due to its chronic nature [25]. The prevalence of psychopathology in the asthmatic group ranges from 11% to 85% [26–29]. It was 72% in our study. It is also known that chronic diseases pose a risk in terms of psychopathology. In our study, generalized anxiety disorder was present in 32% of the patients in the asthma group. In a literature review by Katon et al. [29], it was reported that anxiety was present in approximately 1/3 of asthmatic children and adolescents, which varied from 6% to 24% in adults. As the anxiety level increases in a patient, the severity of the existing respiratory problem increases. It is an undeniable fact that anxiety can cause hyperventilation or increased dyspnea. The main fear experienced in all respiratory diseases is the sensation of anxiety due to the fear of death. Therefore, an increase in anxiety, hyperventilation and dyspnea in asthmatic patients creates a vicious cycle. A high-trait anxious person feels the symptoms of dyspnea more profoundly than a lower trait-anxious person and thus the need for medication soars up. When these psychosocial problems of asthmatic patients are combined with biological causes, anxiety disorders are more likely to develop in these patients [30,31].

Perhaps most intriguing in this study was the finding that, stronger emotional dependency was more common in the asthma group and it was associated with a worse HRQL outcome according to parents. However, multivariable analysis showed that it was one of the most influential factors connected with the total HRQL (CSR) score, but in an opposite sense; it was a predictive factor for a better outcome. We believe this is a common misperception among dependent children. They probably have an intense desire to feel protected. Other influential factors shown in the same multivariable analysis were RSES score and the presence of psychopathology. Both were reasonable negative predictive factors (Table 6).

Hopelessly, parent–child relationships are more or less dysfunctional in the setting of a chronic illness like asthma. In particular, these children are usually subject to implicitly or explicitly expressed overprotective parenting, also known as helicopter parenting. Empirical evidence suggests that children of helicopter parents are more likely to exhibit neurotic tendencies in unfamiliar social settings, to depend on others for support and validation, and to lack the confidence and skills to cope with trivial and major life problems [32].

In order to overcome emotional dependency and fortify self-esteem, it is worthwhile to recommend simple behavioral mitigation for children with asthma – exercises promoting self-awareness, opportunities cultivating decision-making, and a considerable freedom of choice to experience consequences. By changing the focus of parental attachment to self-embracement, child may empathize with the family and even acknowledge reciprocal vulnerability. Thus, a behavioral child and family therapy addressing the issues of dependency and self-esteem might build more ladders of clinical success in the management of asthma.

Another interesting finding in the study was in the bivariate correlation matrix of children with asthma. While, the PARI scores were exerting the greatest influence over HRQL in CSR, CSI scores had more influence over HRQL in PPR. A reasonable inference

to be drawn from this asymmetric interaction could be that there is a point of view difference between the parents and the children with asthma. While child raising attitudes are more decisive for HRQL according to the parents, children predominantly appreciate the coping styles of their parents. In other words, how problems are solved by their parents is more accountable to these children than how their parents usually behave. This result is probably another reflection of their emotional dependency. Similarly, in the multivariable analysis of PPR in the asthma group, we see that the parent's rejection of the homemaking role and greater use of avoidance as a coping strategy are negative predictive factors for worse HRQL outcome. These results suggest a sense of preoccupation with the homemaking role in the parents of children with asthma. It is very likely that they do not expect much help from their kids in this regard, as they possibly pledge themselves to refrain from avoidance. Such an anti-avoidance insight nourishes their helicopter parenting. On the other hand, the strictness and authoritarianism got more credit in the control group HRQL (PPR). This distinction between the groups leads to the assumption that, setting healthy boundaries might help to overcome helicopter parenting and improve HRQL in children with asthma. Another critical distinction between the groups as regards predictive factors was the presence of psychopathology. While this factor was associated with a worse outcome in the control group, it did not get credit in the asthma group for HRQL (PPR). Unfortunately, this factor was considerably underestimated by the parents of children with asthma.

Although excluded in stepwise multivariate regression models, sports habit was considerably lower in the asthma group (28%) than the control (%63) ($p = 0.006$). This was possibly another hint for helicopter parenting. Current systematic reviews investigating physical training for asthma suggest that patients with stable asthma should be encouraged to participate in regular exercise training, without fear of symptom exacerbation [33]. Thus, parents should be provided with the information that, asthma is not a barrier to sport participation.

Not using a scale for internet addiction and severity of asthma was a limitation in the study. Sample size was small to investigate the influence of newly diagnosed mental illnesses specifically. Besides, inequal distribution of these psychopathologies between the study groups was a confounding factor and excluding the participants with a known history of psychiatric illness created a selection bias. Blocked randomization without excluding such participants could be a practical solution for future studies.

Conclusions

It is important to remember that a high index of diagnostic suspicion for comorbid psychiatric disorders is essential in children with asthma as this issue is probably underestimated by their parents. On the other hand, since these children are more or less exposed to helicopter parenting; it is worthwhile to recommend simple ways to overcome emotional dependency and fortify self-esteem – exercises promoting self-awareness, opportunities cultivating decision-making, and a considerable freedom of choice to experience consequences. Even a behavioral family intervention addressing the issue of dependency and self-esteem may be beneficial.

Disclosure statement

No potential conflict of interest was reported by the authors.

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