

Psychopathology, Psychological Stress and Life Satisfaction Among Sample of Female Adolescents with Bronchial Asthma

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ABSTRACT

Introduction:	Asthma is a chronic respiratory disease characterized by air way obstruction, air way inflammation and bronchial hyper-responsiveness, it can be a disabling and life-threatening disease and can as well result in variable restrictions in the physical, emotional and social aspects of the patient's life. Asthma morbidity and mortality have increased in recent years, particularly among children and teenagers.
Aim of the Study:	To examine the difference in psychological stress, psychopathology and life satisfaction between female adolescents with asthma and healthy controls and to test whether life satisfaction is associated with psychopathology in female asthmatic adolescents.
Subjects and Methods:	The sample consists of 40 female asthmatic adolescents aged (13-17 years) and 40 healthy controls matched for age, education and socioeconomic standard. The researchers used the following tools: Beck depression inventory (BDI), symptom check list (SCL-90R), psychological stress and life satisfaction scale.
Results:	Revealed that there are statistically significant differences between asthmatic adolescents and healthy controls on BDI, SCL-90R and psychological stress in favor of asthmatic adolescents and on life satisfaction in favor of healthy controls. Life satisfaction correlates negatively with depressive symptoms, interpersonal sensitivity, as well as school, emotional, social and family stresses.
Conclusion:	Asthmatic adolescents are more likely to experience depression, psychopathology, distress and poor life satisfaction than those without asthma.

Key words: Bronchial asthma, life satisfaction, depression, psychological stress.

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INTRODUCTION

Asthma is a chronic respiratory disease characterized by air way obstruction, air way inflammation and bronchial hyper-responsiveness¹, it can vary from a very mild disorder to a disabling and life-threatening disease² and can as well result in variable restrictions in the physical, emotional and social aspects of the patient's life³.

Asthma is the most common chronic illness of childhood with a prevalence of 7-10%. It is also among the four most common chronic disorders in adult populations with a prevalence of 5%⁴. Asthma morbidity and mortality have increased in recent years, particularly among children and teenagers⁵.

Numerous patients' characteristics influences asthma outcomes, including age, gender, psychosocial factors,

psychiatric disorders, ethnicity, decreasing exposure to tobacco smoke, regular use of inhaled anti-inflammatories, provision of a written care plan⁴ and low socioeconomic status (SES)⁵⁻¹⁴.

Many epidemiological, case-control studies, as well as meta-analyses found that children with asthma are more likely to experience global psychological distress⁵ and psychological difficulties than healthy children¹⁰⁻¹¹. They also have increased likelihood to exhibit greater anxiety levels^{5,15-17}, anxiety disorders¹⁷⁻²², fears²³, separation anxiety, over anxious disorder^{22,24}, simple phobia²⁴, panic attacks²⁵⁻²⁸, trait anxiety^{29,30}, state anxiety³¹, depressive symptoms^{5,22,30,32}, mood disorders³³, depressive disorders^{19-21,28} and internalizing behavior problems^{34,35}.

Also, a direct relation between asthma in children and parental anxiety²⁷ and impaired quality of life (QOL)³⁶ was reported.

In contrast to the vast majority of studies, some studies found no increase in psychological difficulty^{37,38}, anxiety³⁹, parent-child relationship problems³⁸, or psychological dysfunction^{40,41} in a large group of asthmatic children and their families. This discrepancy will be discussed later.

The direction of relation between psychological distress, psychopathology and asthma is not yet clear; some studies suggest that stress and psychopathology contributed in induction or exacerbation of asthma attacks. An experimental study showed that asthmatics and controls differed on overall airway resistance in response to stress⁴². Also the highest incidence of asthma in youngest subjects occur when they are just beginning to develop self-awareness and to interact with familial environment. Such factors as parental attitudes toward asthma and dysfunctional familial interactions could intensify asthma attacks⁴³. A Longitudinal study suggests that psychological risk factors are significant predictors of later expression of asthma in genetically at-risk children. The combination of parenting risk and stress appeared to affect asthma onset in a multiplicative manner⁴⁴.

On the other hand, another large birth cohort follow up study found that children (5 years old) with symptoms of asthma are at the greatest risk of developing internalizing symptoms in adolescence³⁴.

QOL can be defined as the satisfaction felt by individual with various areas of his/her life³⁶. Besides being bothered by the symptoms themselves, many asthmatic patients have problems with physical activities and their everyday life that may be limited by exposure to allergens and other environment stimuli such as tobacco smoke⁴⁵. Asthma particularly in its severe forms is known to affect the QOL of affected children and their families. The frequency and severity of attacks, hospital admission, secondary effects of treatments, absences from school, limitation of sport and other activities, fatigue and sleeping problem directly affect QOL⁴⁶.

Children with asthma who scored higher on a measure of psychological distress had more hospitalizations, more days of wheezing, lower functional status⁴⁷ and poor asthma treatment outcome²⁸ than those scored lower on distress. Also increased risk for asthma exacerbations and increased care utilization among psychiatric patients was reported in comparison with the non psychiatric patients with severe asthma⁴⁸. In addition, youth with asthma and co-morbid depressive disorders have significantly higher health care utilization and costs⁴⁹.

Many authors reported association between worse asthma control^{35,36,50} and asthma-related QOL^{36,50} on one hand and behavioral problems, depressive disorders and anxiety disorders on the other hand.

QOL of children with asthma was clearly associated with the presence or absence of psychological problems, especially emotional problems³⁶, anxiety, depression^{50,51}, family stress and dissatisfaction with family functioning⁵². Negative life change and high illness severity among asthmatic children were predictive of less optimal psychological adjustment¹¹. Also patterns of mother-child relatedness (secure vs. insecure) may mediate the relationship between functional status and depressive symptoms⁵³.

We hypothesize that:

There are differences between female asthmatic and non-asthmatic adolescents in psychopathology and in life satisfaction.

There is correlation between life satisfaction and psychopathology and psychological stress among female asthmatic adolescents.

AIM OF THE STUDY

There for the present study aims to:

1. Study the differences between female asthmatic adolescents and non asthmatic adolescents on the following dimensions: depression, somatization, obsessive compulsive, interpersonal sensitivity, anxiety, hostility, phobic anxiety, paranoia and psychoticism measured by Beck depression inventory (BID) and SCL-90R.
2. To find differences between female asthmatic adolescents and non asthmatic adolescents on psychological stress (family, financial, emotional, social, health and personal stress) measured by psychological stress scale.
3. Clarify the differences between female asthmatic adolescents and non asthmatic adolescents on life satisfaction measured by life satisfaction scale.
4. Test the correlation between Life satisfaction and both of psychopathology and psychological stress in female asthmatic adolescents.

SUBJECTS AND METHODS

Our study is a cross sectional and a case control study. The study group consisted of 40 female adolescent with bronchial asthma who were undergoing regular checkups at the allergy and pulmonology clinic, Saudi airlines hospital, Jeddah, Saudi Arabia. Recruitment criteria included physician diagnosis of asthma, age between 13 and 17 years (mean 15.65, SD 0.73). Exclusion criteria included diagnosis of comorbid medical illness, mental retardation, epilepsy, pervasive developmental disorder and language, or communication disorders. Controls were 40 healthy, non asthmatic female adolescents, recruited randomly from Manarat Schools in Jeddah, matching patients regarding age (mean 15.75, SD 0.74 years), education and socioeconomic standard.

The following psychological instruments were chosen for this study:

Beck Depression Inventory (BDI)⁵⁴: was translated into Arabic⁵⁵. It consisted of 21 items (each item consists of 4 statements) measuring the characteristics, attitudes and symptoms of depression. BDI has been validated and used for longer than 40 years as a measure of depression in a lot of studies in Egypt, Saudi Arabia and other Arabic countries including different age groups from adolescence to old age^{54,55}.

Symptom Check List (SCL-90R)(56): was translated into Arabic, standardized and validated on Egyptian samples⁵⁶. It is a 90 item check assessing psychological symptomatology. SCL-90R is a widely used instrument consisting of 9 symptoms dimensions; somatization, obsessive compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism. Participants were instructed to indicate how much distress each item on the SCL-90 R had caused on a 5 point scale ranging from 0 (not at all) to 4 (extremely).

Psychological Stress scale⁵⁷: consists of 70 items measuring 7 dimensions of psychological stress (family - financial - study – social– emotional – health and personal). Participants were asked to answer all statements giving frank and accurate estimation on a 4 point scale ranging from 3 (extremely) to 0 (not at all). The scale was standardized on an Egyptian and Saudi samples and has high reliability and validity.

Life Satisfaction Scale⁵⁸: consists of 30 statements measuring life satisfaction. Participants were asked to answer all statements by giving frank and accurate estimates on a 5 point scale ranging from 4 (extremely) to 0 (not at all). The scale was standardized on an Egyptian samples and has high reliability and validity⁶⁴.

The reliability of all above scales have been tested on our hall sample by using split half method, internal consistency alpha values were consistently high for all scales. The alpha values were as following: 0.90 for BDI, 0.90 for psychological stress scale, 0.89 for life satisfaction scale and for SCL-90R. The alpha values were: 0.75 for somatization, obsessive compulsive 0.73, interpersonal sensitivity 0.65, depression 0.85, anxiety 0.90, hostility 0.76, phobic anxiety 0.85, paranoid ideation 0.65 and psychoticism 0.70.

Procedures:

Study took place within the period from the beginning of April 2009 to the end of June 2009. Firstly researchers took approval from the Research and ethics committees in the hospital and Education Authorities. Adolescents meeting recruitment criteria were (57 families of subject adolescents and 63 families of controls) were asked to participate in the study. Forty out of each agreed to participate in the study after explaining to them the aims and methods of the study and gave informed consent. Scales were presented by the researchers individually to all healthy controls at break time and to asthmatic adolescents at the time of their regular schedule clinic appointments. Instructions for each questionnaire were explained to the adolescent by the investigator. The investigator remained in the room to answer questions that arouse and to ensure that adolescent completed the questionnaires independently. All patients were assessed on a day on which they were not suffering from an asthma attack. All subjects and controls were subjected to BDI, SCL-90R, Psychological Stress scale and Life Satisfaction Scale.

Analyses:

The results are expressed as means and standard deviations. The analyses were performed by using SPSS-PC. For quantitative variables, group means were compared by using Student's t test. The significance threshold was set at $p=0.05$, confidence interval 95%. Correlations (two-tailed) were calculated by using Pearson's coefficients.

RESULTS

1. Comparison between case and control groups on psychopathology scales, psychological stress and life satisfaction:

The T test comparison between means of asthmatic and non asthmatic adolescents on the psychometric scales (table 1) shows that there are statistically significant differences between asthmatic adolescents and healthy controls on:

1. BDI scores in favor of asthmatic adolescents.
2. All dimensions of SCL-90R scales in favor of asthmatic adolescents.
3. All dimensions Psychological Stress scale in favor of asthmatic adolescents.
4. Life satisfaction scale in favor of healthy controls.

Table 1: T test comparison between the means of asthmatic and non asthmatic adolescents on the psychometric scales.

Scales		Asthmatic		Non Asthmatic		Mean difference [95% CI]	T	P value
		M	SD	M	SD			
BDI		20.30	3.42	5.95	1.48	13.80 [12.46-15.14]	24.33***	0.000
SCL-90 R	Somatization	17.95	3.25	5.15	1.77	12.63 [11.26- 14.01]	21.81***	0.000
	Obsession	16.17	3.68	3.50	2.00	12.17 [10.64- 13.70]	19.11***	0.000
	Interpersonal Sensitivity	18.92	3.35	7.71	1.54	10.80 [09.46- 12.14]	19.59***	0.000
	Depression	21.32	3.31	7.70	1.88	13.80 [12.36- 15.24]	22.59***	0.000
	Anxiety	17.70	2.82	5.57	1.50	12.43 [11.24- 13.63]	23.99***	0.000
	Hostility	9.25	2.64	3.92	2.15	5.73 [4.46-7.01]	09.96***	0.000
	Phobic Anxiety	11.45	2.76	4.25	1.54	7.67 [6.42- 8.91]	14.37***	0.000
	Paranoia	8.25	1.48	3.00	1.50	5.20 [4.41- 5.99]	15.74***	0.000
	Psychoticism	8.07	1.78	2.20	1.63	5.90 [4.97- 6.83]	15.32***	0.000
Psychological stress scale	Family Stress	5.75	1.19	4.45	1.15	1.17 [0.55- 1.78]	04.57***	0.000
	Financial Stress	5.87	1.36	4.20	1.59	1.57 [0.88- 2.26]	06.07***	0.000
	School Stress	11.42	1.29	8.45	.90	2.77 [2.17- 3.36]	11.89***	0.000
	Social Stress	12.22	1.31	7.85	.80	4.27 [3.71- 4.82]	18.00***	0.000
	Emotional Stress	12.27	0.78	7.52	1.64	4.67 [4.00- 5.33]	16.45***	0.000
	Personal Stress	12.70	0.82	7.75	1.56	4.93 [4.30- 5.57]	17.70***	0.000
	Health Stress	9.95	1.28	2.70	.79	7.13 [6.60- 7.66]	30.47***	0.000
Life Satisfaction scale		64.42	8.68	95.62	7.19	29.37 [33.53- 25.20]	17.49***	0.000

BDI beck depression inventory, SCL-90R: symptom chick lest 90 revised, CI: confidence interval, *** P ≤0.001

- Correlation between life satisfaction and both of psychopathology and stress among female asthmatic adolescents:

Scores of both psychopathology scales (BDI, SCL-90R) and psychological stress scale correlates negatively with all dimensions of Life satisfaction scale in female asthmatic adolescents (table 2).

Table 2: Coefficient correlation between life satisfaction and the other variables in female asthmatic adolescents.

Scales		Psychopathological scales		Life satisfaction scales	P value
		Mean	SD	r	
Psychological stress	BDI	20.30	3.42	-0.85***	0.000
	School Stress	11.42	1.29	-0.57**	0.002
	Emotional Stress	12.27	0.78	-0.47**	0.008
	Social Stress	12.22	1.31	-0.46**	0.010
	Family Stress	5.75	1.19	-0.43*	0.026
	Financial Stress	5.87	1.36	-0.26	0.156
	Health Stress	9.95	1.28	-0.24	0.202
	Personal Stress	12.70	0.82	0.08	0.665
SCL-90R	Somatization	17.95	3.25	0.05	0.813
	Obsessive Compulsive	16.17	3.68	-0.06	0.555
Life Satisfaction scale	Interpersonal Sensitivity	18.92	3.35	-0.36*	0.037
	Depression	21.32	3.31	-0.160	0.399
	Anxiety	17.70	2.82	-0.14	0.660
	Hostility	9.25	2.64	-0.19	0.261
	Phobic Anxiety	11.45	2.76	0.29	0.067
	Paranoia	8.25	1.48	-0.01	0.808
	Psychoticism	8.07	1.78	-0.20	0.295

* ≤ 0.05, ** ≤ 0.01, *** ≤ 0.001

DISCUSSION

In this study, female adolescents with asthma had significantly higher scores on measures of psychopathology (BDI, SCL-90R) than a matched sample of adolescents without asthma; these measures included depression, anxiety, somatization, obsession, interpersonal sensitivity, hostility, phobia, paranoid ideation and psychoticism.

Our results are consistent with those of previous studies which have shown an increased rate of co-morbid depressive, anxiety and internalizing disorders among asthmatic children and adolescents^{15-22,28-35}; We have shown an extended array of psychopathology which included obsessions, interpersonal sensitivity, somatization, phobia, hostility, psychoticism and paranoid ideation. However, we cannot deny that our results are inconsistent with those who found no increase in psychological difficulty^{37,38}, anxiety³⁹, parent-child relationship problems³⁸, or psychological dysfunction^{40,41} in asthmatic children and their families. Explanation for these different results are because participation in the childhood asthma management program (CAMP) is limited to children with mild to moderate asthma³⁷. These findings cannot be generalized to children with severe asthma. Also some "protective" factors and secure family relationships, external social support and the perception of minimal illness impact were together most strongly associated with the child's emotional and behavioral strength, whereas disease-related measures were not.

Significant differences between asthmatic adolescents and healthy controls on scores of psychological stress scale (which represents different types of stresses, adolescents could be exposed to, involving family, financial, social, emotional, school, personal and health stresses) was in favor of asthmatic adolescents. These results are consistent with those who found an increased incidence of familial stresses and school problems among asthmatic children¹⁸ and those who found association between negative family emotional climate and triggering of asthma and disease severity among asthmatic children⁵⁹, as well as those who found association between psychological stresses and onset of asthma^{43,44}, severity of illness¹¹, induced breathlessness^{60,61} and decreased airway and lung functioning^{42,61}.

To date, the reason for the relationship between internalizing behavior and lung disease in childhood is uncertain, although some possible mechanisms underlying the association have been examined; First: Some evidence from clinical studies suggests that asthma and its management may trigger greater anxiety among asthmatic children⁶², this is supported by findings which suggest that children who develop greater control and better management of asthma symptoms are less likely to show behavior problems⁶³, Second: increased psychological distress, among children with asthma is due to the intermittent, unpredictable and reversible nature of asthma symptoms; these characteristics contribute to variable expectations and significant uncertainty about the illness and therefore may precipitate adjustment problems⁶⁴. This is

in line with the studies which demonstrated that perceived uncertainty/unpredictability is reliably associated with emotional difficulties in individuals across multiple chronic medical conditions⁶⁵. These findings suggest that asthma may exacerbate behavior problems and that difficulties in managing children with asthma may be indirectly associated with these behavior problems⁶⁶.

On the other hand experimental evidences suggest that various emotions and types of stress have a different effect on respiratory resistance among asthmatic and non asthmatic children⁶⁷. This is supported by finding which suggests that parental psychiatric disorders and/or marital conflict adversely affect the psychological development of a child and his/her ability to cope with asthma and related medical compliance⁶⁶. Seen from this perspective "emotional stresses" may play a role in the causal pathway to the development of asthma or the worsening of its symptoms in childhood. So, a complex interactive relationship appears to exist among emotions, life stresses and lung disease⁶⁸. In one direction some authors found that asthma symptoms contribute to psychological distress and reciprocally others found increased distress potentially exacerbate asthma symptoms⁵. More comprehensively, longitudinal studies may be needed to verify the direction of that relation.

Our results revealed significant differences between asthmatic adolescents and healthy controls on scores of life satisfaction scale in favor of healthy controls. This is consistent with previous studies which found asthma particularly in its severe forms is known to affect QOL of affected children and their families^{46,69} and with those who proposed some explanations for this relation as the frequency and severity of attacks, hospital admission, secondary effects of treatments, absences from school, limitation of sport and other activities, fatigue and problem sleeping directly affect QOL⁴⁶.

Our results also revealed a negative correlation between life satisfaction and both psychopathology and psychological stress scores. Specifically life satisfaction correlated negatively with depression, family stress, school stress, social stress, emotional stress and interpersonal sensitivity in female asthmatic adolescents. These results are consistent with previous studies which found that anxiety and depression contributed significant effect to asthma-specific QOL^{50,51} and those found that QOL of children with asthma was clearly associated with the presence or absence of psychological problems and emotional disorders in the patients³⁶ and also with studies that found an association between health related QOL and family functioning among asthmatic school children⁵²; as well as those who found lower SES, negative life change and high illness severity to be predictive of less optimal psychological adjustment¹¹. However our results pointed to some specific stresses like social and school stresses, as well as interpersonal sensitivity.

On one hand, children having bad QOL because of severe asthma may have psychological problems. In addition, psychological problems may influence QOL and its

assessment. However, young patients with psychological problems are more vulnerable to stress caused by asthma and are more likely to judge their QOL to be poor. Although, the clinical severity of asthma should play a direct role in the objective assessment of QOL, behavioral and emotional problems may also affect its subjective estimation^{36,70}.

Our findings should be considered in light of several limitations. First: Recruitment biases, all of our adolescents were female outpatients undergoing regular checkups in a specialist hospital and were well informed concerning treatment. Patients who are less well informed and followed up less regularly might have more frequent and severe attacks and a greater degree of impairment of life satisfaction, psychopathological symptoms and stress. Similarly, hospitalized patients and patients living in specialist centers may present different characteristics. Male patients may have a different degree of stress, psychopathology and life satisfaction impairment and may have a different pattern of correlation between them. Therefore, our patients were not representative of all asthmatics and our results concern only female adolescents with persistent, well-followed asthma.

Second, only self-administered questionnaires were used, life satisfaction, stress and psychopathology were evaluated from the same source, although use of both child and parent questionnaires may reduce the bias. Also the use of a standardized diagnostic interview to characterize mental disorders involved in this association between psychopathology and life satisfaction would be an independent source for evaluation and could provide interesting results by identifying the disorders most frequently concerned.

Third, we did not control our findings to disease related variables, like severity, duration and symptom control, but physician diagnosed case selection still one of our strengths. In addition, searching for protective and vulnerability factors were beyond the scope of the present study, nonetheless, it is important to be studied and thoroughly investigated.

Forth, the outcome measures did not assess mediating or moderating variables that could help us understand the mechanisms through which asthma causes psychological distress (mediators), or factors that strengthen or weaken asthma distress relationship (moderators). Nor we can determine the direction of causality. It is unclear from our findings whether asthma acts as stressor that increases risk of psychological distress, or whether greater psychological distress exacerbates asthma symptoms. Longitudinal studies could confirm any causal relationship between overall handicap due to asthma and the presence of psychopathological problems.

Despite these limitations we believe that this study has several methodological strengths. First: by matching subjects on age, gender, education level and SES, we were able to minimize the probability that an uncontrolled variable accounted for the observed differences between asthmatics

and controls, although matching cannot insure that all third variables are controlled. Second: by choosing physician diagnosed and well followed cases, we were able to avoid the bias resulting from dependency on parent or adolescent information about asthma cases, although this sample cannot represent subgroups of asthmatic adolescents who are less regularly followed up, or not receiving proper medical care.

Additionally, this study's results indicate that health care providers should be aware that asthma may be a major contributor to levels of psychopathology and distress. Therefore, screening adolescents with asthma on regular bases for psychological distress would increase the likelihood that those experiencing distress are identified and provided with the appropriate medical and psychological services. Patients reporting poor QOL could benefit from systematic evaluation and psychological support. By recognizing and treating psychopathology distress, we can minimize the potential interference of psychological symptoms with asthma care and health utilization.

CONCLUSION

These findings hold important implications for mental and physical health of adolescents with asthma. Clearly adolescents with asthma in this sample are more likely to experience depression, psychopathology, distress and poor life satisfaction than those without asthma. Our findings confirm the value of assessing psychopathology, stress and QOL of young asthmatic patients. Indeed, this relationship between asthma, life satisfaction, stress and psychopathology suggests that preventive psychological measures would be valuable.

Finally, we can say increased awareness for the need to assess and effectively treat psychiatric symptoms in youth with asthma may reduce the functional burden associated with asthma.

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