THE IMPORTANCE OF ASSESING PSYCHOSOCIAL FUNCTIONS OF ASTHMATIC PATIENTS AND THEIR FAMILIES AS A COMPREHENSIVE ASTHMA CONTROL ASSESSMENT: A CASE CONTROL STUDY IN IRAN

Ghaempanah Z[1], Fazlollahi M.R[1], Movahedi M[2], Noorbala AA[3], Kazemnejad A[4], Pourpak Z[1], Moin M[1]

1 Immunology Asthma and Allergy Research Institute, Tehran University of Medical Sciences, Tehran, Iran
2 Department of Immunology Asthma and Allergy, Children Hospital Medical Center, Tehran University of Medical Sciences, Tehran, Iran
3 Department of Psychosomatic Disease, Imam Khomeini Hospital, Tehran University of Medical Sciences, Tehran, Iran
4 Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran

Correspondence:
Mohammad Reza Fazlollahi
Immunology, Asthma and Allergy Research Institute, Tehran University of Medical Sciences
Tehran, IR. Iran
Postal Code: 1419733151
P.O. Box: 14185-863
Email: fazlollahi@sina.tums.ac.ir

ABSTRACT

The present study was conducted to compare the physical and psychosocial functions of asthmatic patients presenting at different levels of asthma control to that of healthy children in Iran. The aim was to determine if a correlation could be made between the two thus suggesting that the level of asthma control can be used as an indirect indicator for the level of psychosocial impact. A case-control study involving 160 asthmatic children aged between 8 to 12 years-old, in comparison to an age-sex matched healthy control group was thus conducted.

The result demonstrates that asthmatic children are more likely to have emotional dysfunction associated with their disease. This in turn resulted in significantly negative effects on the parents' daily working activities. The PedsQL scale which categorizes asthmatic children into three levels of asthma (controlled, partly-controlled and uncontrolled asthma) demonstrated significant differences in their Physical Function scale scores ($p<0.05$). However, no significant correlation between asthma control to Emotional, Social and School Functioning levels were found.

In conclusion, the present study suggests that asthma not only impairs the Physical and Emotional functions of asthmatic children, but also affects their parents' daily working activity. Tightening asthma control did not appear to improve the social functioning levels of these children although it does result in improved physical function. Therefore the level of asthma cannot be used as an indicator of heightened psychosocial impact. However, the authors of this paper would warrant that treating physicians should consider incorporating the psychosocial aspect of asthmatic children and their families in their treatment plan rather than aiming for only asthma control since this appears to be an important aspect of patient care.

Keywords: *asthma control level, children, family function, physical function, psychosocial function*

Introduction

Asthma is a chronic inflammatory disorder involving the airway that results in difficulty in breathing and in severe case even death. In several studies, it has been shown that asthma affects a large number of children resulting in many secondary effects, which have included poor growth and retarded personal development (1). This condition has also been shown to be a major contributor of school absenteeism and hospitalisation (2). In Iran, collective data suggests that the prevalence of asthma has been increasing since the early 1990s across all ages, sex and racial groups (3, 4). Earlier studies have somewhat indicated that asthma may have an effect on the psychosocial and physical functions of children with asthma as well, although the

exact relationship has never been demonstrated (5, 6). Children with asthma are exposed to a number of indirect health risk of which internalising behaviours seems to be of major concern more recently. These have included signs of depression, anxiety, dependency, somatisation, and social isolation (6). There is also evidenced that asthmatic children are more likely to have low score of self-esteem than that of healthy individuals (7). On the other hand, families with asthmatic children are also affected since they have other responsibilities that need to be cared for. This in turn causes emotional and physical distresses that may result in social isolation, and in many instances lead to loss in social opportunities (8). Despite numerous studies demonstrating that asthmatic children and their families are subjected to psychosocial assault, treatment for this condition has been generally limited to reducing physical symptoms only. So much so that there is even a classification that defines asthma control, but not its psychosocial impact. One of the more famous is the Global Initiative for Asthma guideline classified which defines asthma control levels as controlled, partly controlled or uncontrolled. In the absence of physical symptoms asthmatic patients are considered as having well-controlled asthma (9). With limited resources especially in country like Iran, it may not be prudent to have every child and their family to undergo psychosocial therapy and management, and therefore a simpler approach to identifying these problems would be required. This is with the aim to be able to ensure that those in need would be given preference. We hypothesized that the increase the severity of the symptoms, or in other words the control of the disease, is strongly related to the level of psychosocial impact. Thus the present study was conducted to assess psychosocial functions of asthmatic children based on asthma control level and thereby suggesting that if a correlation exists, the severity of asthma can be used as an indirect indicator of psychosocial impact.

Method

Participants

The study is a case-control study, questionnaire-based survey among 80 asthmatic children and 80 healthy children as control ranged in age from 8 to 12 year-old. The sample size calculations were made based on power of 95%, confidence 95% and the results of a Dutch Study (10). Asthmatic children enrolled in this study was referred to the Immunology Asthma and Allergy Research Institute in Tehran between December 2011 to June 2012.. These children were diagnosed at least 2 years prior to the study (mean 2.5 years). Using GINA, asthma level of patients was classified as “well controlled” ,“partly controlled” and “uncontrolled” by an asthma specialist.(9)

For the control group, healthy children who had never diagnosed with asthma or other respiratory problem were selected randomly from local schools. The age, gender, and socioeconomic status of this group were matched to those in the asthmatic group.

Children were excluded from the study if they had psychiatric disorders, chronic medical illness (e.g., diabetes, congenital anomalies, obesity, cystic fibrosis), as well as neurological disorders, physical or intellectual disability, based on parent reports.

Instrument

PedsQL™4.0 Generic Core Scale:

The PedsQL™4.0 Generic Core Scale is an instrument with 23 items containing four subscales: Physical Functioning (8 items), Emotional Functioning (5 items), Social Functioning (5 items) and School Functioning (5 items). Likert response scale with five categories was used which are 0 for never a problem to 4 for almost always a problem and items were transformed to a 0-100 score (11). Three summary scores can be calculated: a Physical Health score (8 items), a Psychosocial Health score (15 items), and a Total Core score (23 items) (12). This questionnaire was previously translated and validated in Iran (13, 14).

PedsQL™Family Information Form

The PedsQL™ Family Information Form was developed by James W.Varni et al and completed by parents and contains general socio-demographic information including the child’s date of birth, gender, disease history, disease severity and the parent’s marital status, education, occupation and the impact of child’s health on parents daily works (11). The final questions of this form (in the past 30 days, has your child’s health interfered with your daily routine/ability to concentrate at work) defined as the affects of child health status on housekeeper and employed parent’s daily works.

Ethics

This study was approved by Research and Ethics Committee at Immunology Asthma and Allergy Research Institute (IAARI), Tehran University of Medical Sciences. Informed consent was obtained for all participates (Patient and controls).

Statistics

The data was analysed using the SPSS statistical software. Basic descriptive statistics (mean, standard deviation) were examined for all individual items and scales. The means comparisons of scales for PedsQL in asthmatic and healthy groups were performed using the independent samples of *t*-test. One-way analysis variance (ANOVA) and Tukey

Post Hoc Tests were used to assess differences on PedsQL dimensions among the various asthmatic groups. *P* value (p<0.05) relate to differences /associations between all existing scales.

Result

There were 160 asthmatics and healthy children enrolled in this study with girls (51.4%) outnumbering boys marginally. Their mean age was 9.09 yr (range= 8-12). Sixty-three percent of the patients had well-controlled asthma, 20.7% had partly controlled asthma and 13.4% had uncontrolled asthma. In this study 86.7% of mothers answered to questionnaires. The results of Family Information Form questionnaires imply that the asthma disease has significantly impact on their parentss work and daily activities (p<0.001) (table 1).

Table 1: Comparison of Demographic Characteristics between asthmatic and healthy children and their mothers

	No. of children (%)	
	Asthmatic children (n=80)	**Healthy children (n=80)**
Characteristics of children		
Age (years) Mean(SD)	9.07(3.12)	9.12(3.51)
Gender		
Boys (%)	41(51.4)	41(51.4)
Girls (%)	39 (48.6)	39(48.6)
Characteristics of parents	9(11.2)	8(10)
Father (%)	71(88.7)	72(90)
Mother (%)		
Parent's education		
<Middle school	18(22.5)	10(12.5)
High school	45(56.2)	48(60)
>University	17(21.25)	22(27.5)
Employment status		
Full or part time	12(15)	14(17.5)
Not employed	68(85)	66(82.5)
Impact of child health status on parents daily work Mean(SD)	62.80(32.45)	98.19(18.07)[a]
Asthma status		
Well controlled(%)	52(63.4)	-
Partly controlled(%)	17(20.7)	-
Uncontrolled(%)	11(13.4)	-

[a] Analysis of *t*-test , *P* value=0.001

Basic descriptive information and mean score of PedsQL scales is presented in table 2. The total score in healthy children is 79.69 whilst in asthmatic children it is 56.78. Lowest scores in asthmatic children and highest scores in healthy children were reported in our Emotional Functioning scale. Our study showed that, Emotional Functioning scores in the asthma group were significantly lower than those in the healthy group (p<0/001). However, we found that the comparisons in the Physical, Social, and School Functioning between the asthmatic and healthy children demonstrated no statistically significance (table 2). Our results also suggest that Physical Functioning was significantly better in well-controlled asthma group (p<0.001); however no association between asthma control level to Emotional, Social and School Functioning was found (table 3).

Table 2: Mean and standard deviation for PedsQL scales in asthmatic and healthy group

scales	**Asthmatic children Mean (SD)**	**Healthy children Mean (SD)**	***P* value**
Physical Functioning	77.36 (27.35)	83.33 (22.91)	.169
Emotional Functioning	20.41 (31.59)	89.99 (21.48)	.001
Social Functioning	65.39 (17.13)	81.32 (15.80)	.092
School Functioning	66.77 (22.36)	78.02 (19.81)	.137
Psychosocial Health	64.90 (11.02)	82.57 (13.53)	.164
Total score	56.78 (10.97)	79.69 (11.33)	.655

Table 3: The comparisons of PedsQL mean scores in three asthma subgroups

Scales	**Well control[a] Mean (SD)**	**Partly control[b] Mean (SD)**	**Uncontrolled[c] Mean (SD)**	**P value*.**
Physical Functioning	84.61 (19.82)	57.51 (33.84)	73.73 (33.43)	.001
Emotional Functioning	69.87(19.46)	65.68 (24.09)	53.78 (29.19)	.081
Social Functioning	65.74(17.43)	65.80(16.84)	63.06(17.55)	.885
School Functioning	43.38(18.74)	49.63(14.90)	42.04(11.21)	.391
Psychosocial Health	66.24(10.80)	64.32(11.87)	59.49(9.86)	.163
Total score	58.20(10.02)	52.10(13.35)	57.32(10.26)	.220

*The mean difference is significant at the .05 level. a,b (p=0.001), a,c (p=0.404), b,c (p=0.230)

Discussion

The present study had three key findings. First, children with asthma are more prone to have impaired Emotional Functioning states when compared to healthy children.

Similar findings were observed in previous studies (15, 16, 17). Blackman also reported that children with asthma had significantly higher incidence of associated behavioural problems (18). There is significant evidence that suggests childhood asthma may be associated with not only functional effects, but also negative psychosocial changes which in turn, have wide-ranging effects on all aspects of the patient's life (19). Asthmatic children have been reported to show a variety of characteristics: depression, anxiety, lack of self-esteem, dependency, immaturity and latent aggression (20, 21). Gordon et al found that stress, as a factor related to childhood asthma; mediate its effect through the asthmatic children in their psychophysical functions (22).

Second key finding in our study was that the child's health status dramatically impacts the parents' daily works and activities. Our result shows that the asthma as a disease in children can affect parents' functions as well. They cannot develop their personal needs effectively and deal with the limitations of their working hours, since most of their time is spent providing care for their sick children. These findings are compatible with the study Hein Raat (10) showing that the families' psychological elements and performance are related to the increase in responsibility. Wolf et al showed that the parents' psychological statement predicts the asthmatic attacks among their sick children (23). In more severe cases, Sinta perry had shown that in several cases mothers of children with asthma are prone to depression, which in turn rapidly promotes the need for more intensive care for their asthmatic children (24).

Third main finding in our study is that there is no significant difference between psychosocial scales among three asthmatic groups (well controlled, partly controlled, uncontrolled). This suggests that the asthma as a chronic disease regardless of the level of control not only impairs the child's physical functions but also affects psychosocial functions of the child. This is despite having their asthma under control. A systematic review of 14 studies by Everhart et al showed that asthma severity is significantly related to child Quality of Life in nine of these studies (25). In contrast, five of fourteen studies as Annett at al did not find significant relationship between asthma severity and child's QOL (26). It is indeed interesting to note that the parent's behaviours of asthmatic children appears different to that of healthy ones. Asthma brings about considerable changes in family behaviour approach insofar as the asthma control levels had no influence over them. Asthma causes irreversible affects in terms of the psychosocial manners on child, which despite seeing improvement in symptoms; they do function as similar to that of healthy children. It is therefore not wrong to suggest that asthma has long-term effects on children which not only affect their physical state of but that of their state of mind. What is worrisome is that specialist are more likely to provide medical treatments to overcome physical limitation while psychosocial dysfunctions caused by the disease remains to be at large.

In conclusion, asthma disease causes some limitations on the functions of asthmatic children and their family as compared to healthy individuals. Clinically, the current study suggests that not only asthma and allergy specialists treat physical disease symptoms, but they should consider the psychosocial functions of asthmatic children and their parents. Although our study does not indicate that the level of asthma control can be used as an indirect indicator of psychosocial impact, it does demonstrate that all asthmatic children are significantly affected psychosocially. In many cases, psychologists in health care team could improve the psychosocial functions of asthmatic child as well as their medical treatment. We suggest that psychosocial assessment should be considered as part of the assessment to provide better level of asthma control since this appears to be an integral part of treating chronic asthma in children, regardless whether they are well controlled or not.

Acknowledgement

This study was supported by Immunology, Asthma and Allergy Research Institute, Tehran University of Medical Sciences. We are grateful to the children, their parents, and the staff members for their participation in this study.

References

1. Smyth RL. Asthma: a major pediatric health issue. *Respiratory research* 2002; 3:3-7.
2. Merikallio V.J, Mustalahti K, Remes S.T, Valovirta E.J, Kaila M. Comparison of quality of life between asthmatic and healthy school children. *Pediatric allergy immunology* 2005; 16:332-340.
3. Entezari A, Mehrabi Y, Varesvazirian M, Pourpak Z, Moin M. A systematic review of recent asthma symptom surveys in Iranian children. *Chronic respiratory disease* 2009; 6:109-114.
4. Tazesh B, Shaabani A, Fazlollahi MR, Entezari A, Dashti R, Zahra Pourpak, Mostafa Moin. Prevalence of asthma symptoms and smoking behavior among 20 - 44 years old adults in Tehran: A telephone survey. *Health.* 2013; 5(3):469-474.
5. Geraldine H, Sandra P, Shirley M. The lived experience of fathers who have children with asthma: a phenomenological study. *Journal of pediatric nursing*. 2008; 23(5):372-385.
6. Schalowitz M, Mijanovich T, Berry C, Clark Kauffman E, Quinn K. A community based study of mental health, life stressors, social support, and children's asthma. *Pediatrics.* 2006; 117(5):940-948.
7. Bowling A. Measurement Disease: A Review of Disease-specific Quality of Life Measurement Scales. 2nd ed. Buckingham: Open University Press; 2001.
8. Hokenberry MJ. Wongs nursing care of infants and children. 7th ed. Philadelphia: Mosby. 2003; 907-908.
9. Global Initiative for Asthma (GINA). Global strategy for asthma management and prevention (NIH Publication 02-3659). 2008 .[www.ginasthma.org]

10. Hein R, Botterweck AM, Landgraf JM, Hoogeveen WC & Essink-Bot ML. Reliability and validity of the short form of the child health questionnaire for parents (CHQ-PF28) in large random school based and general population samples. *Journal of Epidemiology Community Health* 2005; 59:75-82.
11. Varni JW, Seid M, Kurtin PS. The PedsQL 4.0: reliability and validity of the Pediatric Quality of Life Inventory Version 4.0 Generic Core scales in healthy patient populations. *Med Care* 2001; 39:800–812.
12. Varni JW, Seid M, Rode CA. The PedsQL™ 4.0: Measurement model for the pediatric quality of life inventory. *Med Care* 1999; 37:126-139.
13. Amiri P, M Ardekani E, Jalali-Farahani S, Hosseinpanah F, Varni JW, Ghofranipour F, Montazeri A, Azizi F:Reliability and validity of the Iranian version of the Pediatric Quality of Life Inventory™4.0 Generic Core Scales in adolescents. *Quality of Life Research* 2010; 19(10):1501-1508.
14. Jafari P, Ghanizadeh A, Akhondzadeh S, Mohammadi MR:Health-related quality of life of Iranian children with attention deficit/hyperactivity disorder. *Quality of Life Research.* 2011; 20(1):31-36.
15. Sawyer MG, Spurrier N. Whaites L, Kennedy D, Martin AJ & Baghurst P. The relationship between asthma severity, family functioning and the health-related quality of life of children with asthma. *Quality of life research* 2001; 9:1105-1115.
16. Ulla N, Nordholm L, Andersson B & Fasth A. Health-related quality of life in children diagnosed with asthma, diabetes, juvenile chronic arthritis or short stature. *Acta Padiatrica* 2006; 95:450-456.
17. Johansen S.E. School functioning of children with asthma: a study of the elementary and middle school years. University of south Florida. 2004.
18. Blackman J and Gurka M. Developmental and behavioral comorbidities of asthma in children. *Journal of development and behavioral pediatrics.* 2007; 28(2);92-99.
19. Ritz T, Kullowatz A. Effects of emotion and stress on lung function in health and asthma. *Curr Respir Med Rev* 2005; 1:209-218.
20. Galil N. Depression and asthma in children. *Curr Opin Pediatr*. 2000; 12(4):331-335.
21. Di Marco F, Santus P & Centanni S. Anxiety and depression in asthma. *Curr Opin Pulm Med.* 2011; 17(1):39-44.
22. Gordon R, Bloomberg G.R, Edith Chen. The relationship of psychological stress with childhood asthma. *Immunol Allergy Clin* 2005; 25:83-105.
23. Wolf JM, Gregory EM, Edith C. Parent psychological states predict changes in inflammatory markers in children with asthma and healthy children. *Brain, Behavior, and Immunity*. 2008; 22:433–441.
24. Perry CD. Does treating maternal depression improve child health management? The case of pediatric asthma. *J Health Econ* 2008; 27:157–173.
25. Everhart RS, Fiese BH. Asthma severity and child quality of life in pediatric asthma: a systematic review. *Patient education and counseling* 2009; 75:162-168.
26. Annett RD, Bender BG, Lapidus J, DuHamel TR, Lincoln A. Predicting children's quality of life in an asthma clinical trial: what do children's reports tell us? *Journal of Pediatrics* 2001; 139:854–861.