Asthma and family interaction

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SUMMARY Patterns of family interaction were compared in the families of 22 children with chronic asthma, 30 children with diabetes mellitus, and six healthy children. The groups were similar in terms of age (range 4–14 years and mean 10.2 years). Peak expiratory flow and signs of allergy were correlated with family interaction in the subjects with asthma. The following significant findings were made. Family interaction was more disturbed in asthma compared with both the diabetic and the healthy groups. In most of the disturbed families interaction patterns were rigid and enmeshed, but a few showed chaotic and disengaged patterns. There was a negative correlation between peak expiratory flow and disturbed cohesion in non-steroid dependent cases. The severely ill children with asthma living in families with a normal cohesion score had higher IgE concentrations than children living in disturbed families. It is concluded that family interaction should be considered to be an important dimension in the investigation of severe childhood asthma.

Bronchial asthma is multifactorial and the relative importance of emotional factors in its pathogenesis has long been discussed. According to the current understanding the labile bronchial tract is viewed as the physiological substrate on which different precipitating factors exert their influence. The relative importance of allergy, infection, exercise, environment, and emotional factors must therefore be examined in each child.¹

Traditional psychosomatic research on asthma is strongly dominated by psychoanalytic theory. Empirical investigations of these theories, however, are contradictory. In children with severe asthma psychological disturbances have been shown to be more common than in the normal population but not more common than among children who suffer from other chronic physical disorders.²

Parental attitudes that reflect exaggerated concern in protecting the child's health³ and overdependency on medical support⁴ are common in cases of severe asthma. Although understandable in chronic illness, these represent maladjustments that block development of autonomy in the child and facilitate the expression of dependent needs and affects in somatic complaints.

If the causes of these relationship patterns are considered the onset of severe illness can be regarded as a traumatic crisis in which some children get stuck in the process of adjusting properly to a

new way of living.⁵ A lack of social contacts and relationships has also been found to be contributory⁶ and the active efforts of paediatricians to prevent illness—that is, dietary regimens during pregnancy, prenatal screening—can cause the parents to focus too much attention on health problems.⁷

During the last few decades increasing interest in family treatment and research concerning family dynamics has yielded theories about specific interactional patterns and structure in families with psychosomatic children: enmeshment, rigidity, overprotection, poor conflict resolution, and involvement of the sick child in parental conflicts.⁸ As far as childhood asthma is concerned these relationship patterns are thought to be present in the most severe 5–10% of cases⁴ and positive results from treatment have been found.⁹ Some empirical support for this theory has been reported.¹⁰ Communication in families with severely ill children with asthma (but not in mild and moderately ill cases) has also been shown to be disturbed.¹¹ The validity of the family diagnostic tools used in the first study, however, are characterised as unknown by the authors themselves,¹⁰ and the findings of communication disturbances have no theoretical connection with the 'psychosomatic family' model.⁸

An interesting theory of family function is that of Olson *et al.*¹² They have synthesised basic concepts

that recur in the writings of different groups of family researchers/therapists into a 'Circumplex model of marital and family systems'. According to the model, all families can be placed along two dimensions, cohesion and adaptability. In the centre of the model are the 'balanced', functional families. Their degree of 'cohesion' is characterised by an equilibrium between intimacy and autonomy that permits family members to give and receive nurture and support but also to develop independently. Their degree of 'adaptability' is characterised by a balance between stability and ability to change. There is a combination of clear roles and rules of behaviour with a capacity to change during stress and according to developmental needs. Towards the periphery of the model are the 'extreme' and disturbed ('dysfunctional') family types. At one extreme their 'cohesion' is 'enmeshed', which is characterised by overinvolvement and overprotection, thereby giving little room for development of independence and autonomy. At the other extreme is the 'disengaged' family system where there is not enough involvement between the members. Each one feels lonely and neglected and the level of nurture and support is low.

The extreme positions on the dimension of 'adaptability' are 'rigidity' and 'chaos'. The rigid family has fixed rules for behaviour, roles, and modes of conflict resolution. These do not change when a new situation calls for innovation in coping. The system has thus a low capacity to deal with stress and ordinary change. The chaotic family, on the other hand, has not developed enough routine for everyday situations. The duties and privileges belonging to each family member are diffuse and transient. Such lack of structure is energy consuming and interferes with coping.

The aims of the present study were to investigate family interaction in families of children with severe bronchial asthma and compare them with families of children with diabetes mellitus and families of healthy children. We used a family diagnostic instrument that has been tested for validity and reliability. The relation between clinical symptoms, as assessed by peak expiratory flow and signs and symptoms of allergy, and family interaction was also studied.

Patients and methods

Asthma groups. The children were selected by the paediatric allergist (N-IMK), based on clinical information of the somatic aspects of their asthma disease in their records, from roughly 600 cases with asthma who attend the paediatric outpatient department of the University Hospital, Linköping, every

year. Selection was based on the functional impact of the disease—that is, the number of days or nights a year with a decrease in activity or sleep due to asthma. For participation the children had to be living in complete families.

Group 1

This group comprised the 14 most severe, chronic cases of asthma attending the clinic. They all had asthma grade D (early onset, severe non-remittent asthma) according to the criteria of McNichol and Williams.³ Two families refused to participate in the study, so that 12 families were investigated.

Group 2

This group comprised 11 children attending the clinic with a previous history of asthma grade D, but who had improved and now had asthma grade C (continuous but episodic asthma³) for at least a year. One of these families refused to participate in the study, leaving 10 families who were investigated.

The 22 children in the two groups were similar regarding allergic symptoms (18 were considered allergic and 14 had atopic manifestations other than asthma). No child had any other serious disease. They all used bronchodilators and 21 also used sodium cromoglycate. Eight of the 12 children in group 1 inhaled steroids compared with two of the 10 in group 2. Despite a large amount of medication, the cases who were taking steroids had somewhat higher disease activity and more symptoms and functional reduction due to asthma.

Groups 1 and 2 thus indicated only children who had, or had previously had, severe asthma. The children did not have any psychiatric disturbances according to the clinical judgment of the paediatrician (who had known the children for several years) and had not attended the child psychiatric department.

Control groups.

Group 3

This group comprised 30 children with early onset diabetes. The children constituted all children in that age group who had been diagnosed as having diabetes for at least two years and were seen regularly at the paediatric outpatient department. These children were known (from another study) to have a similar distribution of different levels of behavioural disturbances as a normal group—that is, about 15% had psychological problems as revealed in an interview with the mother. They were considered to be a normal group of chronically sick children as far as psychological problems were concerned.¹³

Group 4

This group comprised six families who were asked to participate in this study to validate a test of family function. The children in this group were somatically healthy and had neither psychosomatic nor psychiatric disorders.

The groups were similar in terms of age (range 4–14 years and mean 10.2 years), sex, and number of siblings (in each group there was one family with a single child). Duration of disease was also similar in groups 1–3 (range 2–12 years and mean 7.2 years). Socioeconomic factors were comparable in the groups with asthma and diabetes, but in the normal group all families were upper middle class (Table 1).

Procedures. To obtain interactional material to rate, we followed the methods used by Minuchin *et al.*⁸ They recommend standardised tasks that contain decision making, cooperation, and handling of conflict and differences. In this study the tasks consisted of planning a meal, furnishing a model flat, and discussing a recent conflict and aspects of family life that different family members liked and disliked. The families were given a brief outline of the procedure: they were told that the aim of the study was to investigate family function in chronic childhood disease but were not informed of our working hypothesis. Permission for videorecording was obtained in accordance with the human research ethics committee of the University of Linköping.

The interaction tasks were presented to the family by a test instructor who then left the family to solve the issues on their own. The test instructor did not take part in the ratings. All families performed the family tasks once at entry to the study. All task performances were videotaped. The task perform-

ance situation and the videorecording obviously put stress on the family and was thus not an 'everyday' situation. It is in the reaction to a stressful situation, however, that the capacity to function adequately would really show. The stress in the test situation could thus be regarded as a simulation of other types of stress the family would meet at home.¹⁵ Only families with two parents (biological or remarried) were investigated.

A clinical rating scale, as modified by Cederblad *et al.*,¹⁶ was used. The instrument consisted of five variables on each subscale. In each variable there were operational definitions for low, midrange, and high scores.

On *adaptability* the variables were:

(1) Assertiveness (rigid (r)=always similar individual patterns; balanced (b)=individuals free to shift patterns; chaotic (c)=rapid, unpredictable changes).

(2) Discipline and control (r=dictatorial; b=mutually respected; c=laissez-faire).

(3) Consequences (r=strict and unavoidable; b=age appropriate; c=inconsequent).

(4) Rules (r=strict and unflexible; b=distinct; c=indistinct).

(5) Focus (r=gets stuck into details; b=focused attention; c=cannot keep focus).

On *Cohesion* the variables were:

(1) Emotional expression (disengaged (d)=low emotional responses; balanced (b)=adequate emotional responses; enmeshed (e)=overwhelming closeness).

(2) Attention (d=low; b=age appropriate; e=constant and intense).

(3) Support (d=lack of; b=given and taken; e=overprotection).

(4) Self reliance (d=too much independence; b=independence supported/accepted; e=independence actively discouraged).

(5) Decision making (d=individual; b=individual and family; e=no individual decisions allowed).

The clinical rating scale has been shown to differentiate well between families of healthy children and families of children who have child psychiatric symptoms¹⁶ and also to be able to predict metabolic balance in adolescents with diabetes mellitus.¹³

The raters were experienced family therapists working in two pairs. They received at least 20 hours of training on the rating scales before rating the videotapes. The ratings were performed independently and without knowledge about which group each family belonged to. The time needed for rating each family was one to two hours. In the studies mentioned above^{17 18} interrater reliability was measured to 0.69–0.74 on both adaptability and

Table 1 Data on the families in the different groups

	Group				
	1 (Grade D asthma)	2 (Grade C asthma)	1+2	3 (Diabetes)	4 (Healthy)
No	12	10	22	30	6
Sex (M:F)	9:3	7:3	16:6	13:17	4:2
Age (years):					
Range	7–14	6–14	6–14	10–14	4–14
Mean	10.0	9.9	10.0	12.4	9.8
Duration of disease (years):					
Range	3–11	4–11	3–11	2–12	–
Mean	7.3	8.0	7.5	6.2	–
Social group*:					
Upper	2	2	4	6	3
Middle	7	4	11	10	3
Lower	3	4	7	14	0

*According to Swedish National Statistics (1985).¹⁴

Fig.1 Family interaction ratings (adaptability and cohesion) for the four groups. (a) Groups 1 (grade D asthma) (●) and 2 (grade C asthma) (□); (b) group 3 (diabetes); and (c) group 4 (healthy). Hatched areas represent balanced ratings.

cohesion (Spearman's rank correlation coefficient).¹⁷ Intraclass correlations (balanced versus disturbed) were measured to 0.56–1.0 on adaptability and 0.60–0.94 on cohesion. Pooled intraclass correlation was 0.69 on adaptability and 0.79 on cohesion (Cohen's κ).¹⁸

The asthma symptoms and reduction of function due to asthma were evaluated by a paediatric allergist for an observation period of three and half years and peak expiratory flow was measured with Wright's peak flowmeter. The best of three recordings was recorded and the predicted flow for body height calculated. Serum IgE was determined with Phadebas IgE PRIST. The existence of allergy was determined without knowledge of the present grade of asthma severity. Skin prick test (Pharmalgen) and radioallergosorbent tests (Phadebas RAST) were performed to food, animals, pollen, house dust mite, and moulds.

In the comparisons between the original groups, as well as in the comparison of signs and symptoms of allergy to family interaction, low and high rating scores were combined and called 'disturbed' scores, while the midrange (non-disturbed) scores were called 'balanced'. As both low and high scores were considered to be indications of disturbed family interaction the absolute value of the deviation from the median of the rating instrument was computed for the analysis of the relation between family interaction and peak expiratory flow. In this analysis the flow scores were correlated with the absolute value of the deviation from the median in the adaptability and cohesion scores.

Statistical methods. For comparisons between groups the Fisher exact probability test (one tailed) was used. For measures of correlation the Spearman rank correlation coefficient was used. As our hypothesis indicated the predicted direction of differences one tailed tests were considered appropriate.¹⁷

Results

In the groups with asthma 12 of the 22 families were disturbed in the adaptability dimension and 13 in the cohesion dimension. In the group with diabetes nine of the 30 families were disturbed in the adaptability dimension and six in the cohesion dimension. The difference was significant ($p < 0.01$) in the cohesion dimension but not in the adaptability dimension (Fig. 1 (a), (b), Table 2).

Ten of the disturbed families of children with asthma showed rigid and 12 enmeshed patterns, and only two presented chaotic and disengaged interaction (Fig. 1 (a)).

Table 2 Group comparisons for adaptability and cohesion

Group	Adaptability		Cohesion	
	Extreme	Balanced	Extreme	Balanced
1 (Grade D asthma)	7	5	8	4
2 (Grade C asthma)	5	5	5	5
1+2	12	10	13	9
3 (Diabetes)	9	21	6	24
4 (Healthy)	0	6	1	5

Adaptability: groups 1+2 v 3, $p<0.1$; groups 3 v 4, not significant; groups 1 v 2, not significant.

Cohesion: groups 1+2 v 3, $p<0.01$; groups 3 v 4, not significant; groups 1 v 2, not significant.

There was no significant difference in family interaction between the group with diabetes compared with the normal group of healthy children who were selected based on absence of psychiatric symptoms (Fig. 1 (b), (c), and Table 1).

A further analysis of the groups with asthma showed a few significant results, but in several comparisons the findings were not significant.

There was no significant difference in family interaction between group 1 (children with grade D asthma) and group 2 (children with grade C asthma) (Fig. 1 (a), Table 2).

There was a negative correlation between peak expiratory flow and disturbed cohesion (Spearman's $r=-0.58$, $p<0.05$) (Fig. 2) in the non-steroid cases. No significant relation was found between the flow and family interaction in the steroid cases. Mean

Fig. 2 Family cohesion and peak expiratory flow in the children.

Fig. 3 Family cohesion and IgE concentrations in the children.

flow scores were similar (85% of predicted) in the steroid and the non-steroid groups.

In group 1 the children living in families who were balanced in the cohesion dimension all had IgE concentrations above 500 kU/l. In contrast the children in six of the eight families with extreme cohesion had IgE concentration lower than 500 kU/l. This difference was significant ($p<0.05$) (Fig. 3). There was no difference between the groups with low and high IgE concentrations for age.

No such relation was found regarding the adaptability dimension and IgE. The signs of allergy showed no significant correlation with family interaction. In group 2 no clear relation was found between family interaction and IgE or between family interaction and signs of allergy.

Interrater reliability was 0.74 on both adaptability and cohesion measured with Spearman's r and 0.66 on adaptability and 0.94 on cohesion measured with Cohen's κ .

Discussion

We have shown that family interaction in the families of children with severe asthma was disturbed compared with other families with a severely, chronically sick child (diabetes). Interaction in the families of children with diabetes, on the other hand, did not differ from interaction in the families of healthy children. Families who had a child with diabetes were chosen as a control group because this disease puts tremendous demands on the family's

capacity to adjust and function. If the disturbed family interaction in the families of children with asthma was a result of the chronic disease then the findings would have been similar in the families of children with diabetes. Furthermore, if the disturbed patterns were due to the disease, family interaction in group 2 (where the children's asthma had improved) should have been less disturbed compared with group 1 (where the children still had severe symptoms). Whether family interaction has any aetiological connection to bronchial asthma cannot be concluded from this study, but we are planning a prospective study to investigate this hypothesis further.

The families of non-steroid dependent children with asthma were extremely enmeshed and rigid. This was not so clear, however, in the steroid dependent cases. Some of these families were enmeshed, but others were disengaged and the adaptability scores were rather high—that is, more toward the chaotic extreme. The findings of Wirsching and Stierlin seem to be similar to ours—that is, a smaller proportion of the families were considered to be chaotic and disengaged.¹⁹

Airway resistance is easily influenced by suggestion and stress.²⁰ The negative influence on peak expiratory flow caused by disturbed family interaction cases indicates the importance of family relations in the management of the disease. The fact that no such connection was found in the steroid dependent cases can probably be explained by the strong medication, which may have masked any psychological influence.

The finding that IgE concentrations in children with severe asthma were higher in the children living in balanced families was interesting. This could be interpreted as supporting the opinion that psychogenic factors are more important in cases of 'intrinsic' asthma.²¹

As the children with asthma were selected only with regard to the clinical severity of their disease the families must be considered to be a representative sample of families of children with severe chronic asthma. The children were similar with regard to age, sex, and duration of disease.

Three of the 58 selected cases refused to participate in the study. These children (two in group 1 and one in group 2) did not differ from the others in their respective groups with regard to severity of disease.

The rating instrument has not yet been completely developed and the stability of the test is somewhat uncertain. The results up to now, however, show good validity and interrater reliability and correspond well with clinical assessment.¹⁶

The results of this study support the hypothesis that disturbed family interaction is common in the

families of children with severe, chronic, bronchial asthma and make it probable that the disturbed relationship patterns contribute to the severity of the disease in these cases.

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