

Does having an asthmatic sibling affect the quality of life in children?

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Chronic illness in a family member leads to deterioration of quality of life in other members of that family. We aimed to investigate the influence of having an asthmatic sibling on a child's quality of life (QoL). We enrolled 2-12 year aged healthy children with an asthmatic sibling in the study group and healthy children with a healthy sibling in the control group of this cross-sectional study. Sociodemographic characteristics of children and disease severity characteristics of asthmatic siblings were recorded. All parents filled in Turkish generic PedsQL™ short form appropriate for the child's age group. Study and control groups had 114 children each. Total PedsQL™ scores were not significantly different in any of the age groups ($p=0.23$, $p=0.13$, $p=0.11$ respectively). Emotional PedsQL™ sub-scores in children with an asthmatic sibling were significantly worse (83.0 ± 16.5 vs 91.6 ± 10.9 in the 2-4 year age group, 72.0 ± 17.8 vs 92.2 ± 11.6 in the 5-7 year age group, 73.7 ± 24.1 vs 88.7 ± 14.8 in the 8-12 year age group respectively, $p\leq 0.002$ for all). Similarly, psychosocial sub-score was significantly lower in the 2-4 and 5-7-year-olds but not the 8-12 year old groups ($p=0.01$, $p=0.01$, $p=0.08$ respectively). In conclusion, healthy children with asthmatic siblings have significantly lower emotional QoL and this needs to be investigated for other chronic diseases in further research.

Key words: asthma, sibling, quality of life, PedsQL™.

Chronic diseases in children lead to a deterioration in quality of life (QoL) and psychosocial well-being not only of patients themselves but also of their caregivers¹⁻³. Severity of this deterioration is associated with many different sociocultural and economic factors as well as social support³. Many previous studies have assessed the influence of child's chronic disease on QoL and psychosocial well-being of parents and caregivers and demonstrated impairment in many aspects such as sleep, social functioning, daily activities, vitality, positive emotions, and depressive emotions⁴⁻⁸. Similar psychosocial outcomes have been observed in siblings of children with a chronic disease and they were reported to have higher anxiety and depression as well as lower cognitive development and peer activities⁹. The change in the family dynamics with the diagnosis of a chronic

disease in a child has impact on the healthy siblings of the ill child as well as the other family members. Moreover, this change in QoL is reported to be underestimated by the parents¹⁰. Increased behavioral and emotional symptoms in healthy siblings of chronically ill children were associated with worse quality of life⁹. The influence of diseases which interfere with daily functioning and which require daily treatment were more prominent^{8,11}. Parental care of the sick child and the way they treat his/her sibling may influence the psychosocial status and quality of life of the sibling. It has been demonstrated that rehabilitation programs for these siblings as well as the whole family members lead to better psychosocial and quality of life outcomes, emphasizing the need for routine assessment of the healthy siblings of children with chronic diseases for psychosocial well-being⁹.

Since previous meta-analysis has demonstrated that illnesses that affect daily functioning resulted in negative effects on psychological functioning of siblings compared to diseases that do not effect daily functioning and since mild asthma has minimal influences on daily functioning we aimed to investigate the influence of mild asthma on the sibling's quality of life. Quality of life includes many different aspects such as physical, social and psychological; thus we aimed to obtain a larger view by evaluation of the QoL. Influence of mild persistent asthma on the sibling' QoL has not been studied in previous research, to our knowledge. Mild persistent asthma despite the chronicity of nature and daily requirement of treatment interferes less with daily activities of the patients when compared to chronic diseases like cancer. However, it is one of the most common chronic health problems among children^{12,13}. The high prevalence of the disease as well as the above stated differences from many other chronic diseases necessitates individual research. Moreover, despite the milder nature of disease compared to the diseases investigated in previous research, parental attitude to the ill child and daily treatment requirement in a child may interfere with QoL in the sibling.

Therefore, in this study, we aimed to investigate the influence of having an asthmatic sibling on different aspects of a child's quality of life.

Material and Methods

This is a cross sectional study comparing QoL in healthy children with asthmatic and healthy siblings. The study was approved by the Institutional Review Board of Celal Bayar University (No: 2011-211) and we obtained written informed consent from the parents of the children enrolled.

Study population

We initially enrolled 150 healthy children without any chronic diseases that have asthmatic siblings to the study group; 50 children were enrolled for each of the 2-4, 5-7 and 8-12 year old groups. Control group composed of 151 healthy children without any chronic disease who presented to General Pediatrics outpatient department of the same university for healthy child follow up and who have healthy siblings; 51 in the 2-4 year age

group and 50 in the other two age groups. All children were enrolled in the order of presentation to the respective department. The matching was done by enrolling the patient group first and control group after that.

The children in the two groups were enrolled considering the age range of the questionnaires. There are three different questionnaires for 2-4 years, 5-7 years and 8-12 years old children. Cases and controls were enrolled consecutively upon presentation to the department, matching according to these three age range. However, when enrollment was finished and mean ages were calculated, there was a difference between case and control groups because cases were nearer to the lower limit of the range and controls were closer to the upper limit of the range. Therefore, asthma and control groups were matched one to one and the final number of subjects in the asthma and control groups decreased to 114 each: 36 children in the 2-4 year old, 40 in the 5-7 year old and 38 in the 8-12 year old groups each.

Exclusion criteria for both groups were; the presence of a chronic disease in another immediate family member, presence of an additional chronic illnesses besides asthma in the child and refusing to participate in the study.

Data acquisition

Sociodemographic characteristics such as age of the healthy child enrolled, age of the healthy or asthmatic sibling, parent education and occupation were recorded. Disease characteristics of the sibling with asthma such as age at diagnosis of asthma, number of asthma exacerbations and presentations to the hospital besides routine control during the previous three months period were recorded. All parents filled in the PedsQL™ Short Form 15 appropriate for the age of the child.

PedsQL™ questionnaire

PedsQL™ Short Form 15 is a generic QoL questionnaire filled in by the parents that evaluates physical and psychosocial aspects of QoL in children¹⁴. There are three different forms for children aged 2-4, 5-7 and 8-12 years old. Validity and reliability of the questionnaires adapted to Turkish has been demonstrated¹⁵. The questionnaire is composed of 15 items; 5 items for physical functioning, 4 items

for emotional functioning, 3 items for social functioning and 3 items for school functioning. Physical functioning items compose physical health summary subscale and the rest compose the psychosocial health summary subscale.

The items are answered on a Likert based scale that include “never”, “almost never”, “sometimes”, “often” and “almost always” scored 0 to 4 respectively. For scoring purposes the responses are recoded as 100-75-50-25 and 0. The total score and subscale scores are calculated by taking the mean value of the

scores for each of the item composing that subscale. Higher scores indicate better QoL.

Statistical analysis

SPSS 15.0 computer program (IL) was used for the statistical analysis of data. Data were normally distributed thus are expressed as mean (standard deviation). Continuous variables such as age and PedsQL™ scores were compared with student’s t test first Statistical significance was defined as a p value <0.05. Correlation analysis was carried out using Pearson correlation analysis.

Table I. Sociodemographic Characteristics of the Study Population.

	Asthmatic sibling group	Healthy sibling group	p
Sibling age†			
2-4 years age group	3.3 (0.8)	3,3 (0.8)	1,00*
5-7 years age group	6.1 (0.9)	6.1 (0.9)	1.00*
8-12 years age group	9.6 (1.2)	9.6 (1.2)	1.00*
Age†			
2-4 years age group	6.5 (2.1)	4.8 (1.9)	0.001*
5-7 years age group	6.9 (3.2)	5.3 (2.6)	0.02*
8-12 years age group	7.0 (2.9)	5.4 (2.1)	0.007*
Age at diagnosis of asthma in sibling†			
2-4 years age group	3.4 (1.8)	-	-
5-7 years age group	4.2 (3.1)	-	-
8-12 years age group	3.9 (2.8)	-	-
Unscheduled hospital admissions for asthma in last 3 months†			
2-4 years age group	0.5 (0.8)	-	-
5-7 years age group	0.6 (0.7)	-	-
8-12 years age group	0.3 (0.8)	-	-
Number of asthma exacerbations in last 3 months†			
2-4 years age group	0.5 (0.7)	-	-
5-7 years age group	0.6 (0.7)	-	-
8-12 years age group	0.2 (0.5)	-	-
Mother education ‡			
2-4 years age group	36.1	44.4	0.47**
5-7 years age group	32.5	30.0	0.81**
8-12 years age group	23.7	36.8	0.21**
Father education ‡			
2-4 years age group	47.2	63.9	0.16**
5-7 years age group	32.5	45.0	0.25**
8-12 years age group	39.5	34.2	0.63**

†Mean(standard deviation)

‡high school or above graduate (%)

*Student’s t test

**Chi square test

Results

Sociodemographic Characteristics

Mean ages at diagnosis of asthma in asthmatic siblings were 3.4±1.8 years in 2-4 age group and 4.2±3.1 and 3.9±2.8 years in 5-7 and 8-12 age groups respectively. Mean number of asthma exacerbations during the previous three months were 0.5±0.7, 0.6±0.3 and 0.2±0.5 respectively (Table I).

Mother and father education was not significantly different in children with asthmatic and healthy siblings (p>0.05 for all) (Table I).

Comparison of the quality of life scores of the groups

When children with asthmatic and healthy siblings were compared, physical, social or

school subscale scores were not significantly different. Similarly, totals PedsQL™ scores were not significantly different between children with asthmatic or healthy siblings in the 2-4, 5-7 and 8-12 years' age groups (p=0.21, p=0.13, p=0.11 respectively) (Table II).

Mean emotional functioning sub-score in children with an asthmatic sibling was 83.0±16.5 compared to 91.6±10.9 in children with a healthy sibling in the 2-4-year age group (p=0.01). Similarly, in 5-7 and 8-12 years old groups, mean emotional sub-score of children with an asthmatic sibling were 72.0±17.8 and 73.7±24.1 while those of the ones with a healthy sibling were 92.2±11.6 and 88.7±14.8 (p<0.001 and p=0.002 respectively) (Table II) (Fig. 1).

Table II. Mean PedsQL™ Scores in the Study Groups^a.

	Asthmatic sibling group	Healthy sibling group	p ^b
PedsQL™ total score			
2-4 years age group	88.7 (12.1)	92.1 (10.7)	0.21
5-7 years age group	85.2 (9.3)	89.2 (10.6)	0.13
8-12 years age group	86.4 (12.9)	90.9 (11.3)	0.11
PedsQL™ physical functioning score			
2-4 years age group	96.6 (10.9)	92.8 (12.3)	0.17
5-7 years age group	94.0 (10.9)	91.3 (10.8)	0.26
8-12 years age group	91.2 (14.2)	93.3 (9.7)	0.45
PedsQL™ emotional functioning score			
2-4 years age group	83.0 (16.5)	91.6 (10.9)	0.01
5-7 years age group	72.0 (17.8)	92.2 (11.6)	<0.001
8-12 years age group	73.7 (24.1)	88.7 (14.8)	0.002
PedsQL™ social functioning score			
2-4 years age group	90.3 (17.9)	91.2 (11.8)	0.79
5-7 years age group	85.0 (19.6)	89.1 (12.1)	0.28
8-12 years age group	92.8 (14.1)	90.6 (14.5)	0.51
PedsQL™ school functioning score			
2-4 years age group	96.4 (9.4)	90.2 (13.8)	0.31
5-7 years age group	90.9 (15.3)	88.9 (12.2)	0.58
8-12 years age group	89.0 (15.9)	90.1 (15.5)	0.76
PedsQL™ psychosocial health summary			
2-4 years age group	83.0 (16.4)	91.6 (10.9)	0.01
5-7 years age group	81.2 (12.3)	89.2 (10.5)	0.01
8-12 years age group	84.0 (14.8)	89.7 (13.4)	0.08

^aMean(standard deviation)

^bStudent's t test

Correlation of asthma severity parameters and quality of life scores in siblings

Among the siblings in the 2-4 years old age group, neither the physical ($r=0.03$ $p=0.86$), emotional ($r=-0.13$ $p=0.44$), social ($r=0.18$ $p=0.30$), school ($r=0.36$ $p=0.42$) domain scores nor the total QoL score ($r=-0.004$ $p=0.98$) was correlated with age at asthma diagnosis. Similarly, there was no correlation of any of the QoL scores with the number of emergency visits or asthma exacerbations ($r<0.26$ and $p>0.05$ for all).

Among the siblings in the 5-7 years old age group, total QoL score was not correlated with age at asthma diagnosis, number of emergency visits and number of asthma exacerbations

($r=0.08$ $p=0.67$, $r=0.05$ $p=0.76$, $r=0.05$ $p=0.76$ respectively). Moreover, none of the QoL domain scores in these siblings were correlated with asthma severity parameters listed.

Similar results were obtained for the siblings in the 8-12 years old group and total QoL score was not correlated with age at asthma diagnosis, number of emergency visits and number of asthma exacerbations ($r=0.31$ $p=0.06$, $r=0.06$ $p=0.74$, $r=0.04$ $p=0.82$ respectively).

Discussion

The results of our study suggested that emotional domain of quality of life is lower in siblings of asthmatic children compared to children with healthy siblings. On the other hand, physical, social or school domains of QoL are not different from those in the siblings of healthy children. Moreover, none of the QoL scores in the siblings were correlated with asthma control parameters.

Chronic diseases in children impact not only the patients themselves but also their families including parents and siblings^{4-6,8,16-19}. Despite the fact that both chronic disease in the child and impaired QoL and psychosocial status of parent influences QoL in the sibling negatively, this area is not studied as extensively in asthma. However, it is reported that siblings of children with chronic diseases experience higher psychological especially internalizing problems as well as impaired cognitive development¹⁸. This is in accordance with our findings that showed lower emotional quality of life in siblings of children with asthma. There are many possible explanations such as feelings of neglect and less attention in the sibling due to the various medical needs of the asthmatic child⁸. We have not assessed behavior problems in our study however a previous study reported that in siblings of chronically ill children, emotional problems are associated with decreased psychological, family, physical and total QoL¹⁸. Moreover, the authors demonstrated that these problems decreased with family rehabilitation¹⁷. Chronic illnesses reported in this study were mostly cystic fibrosis, congenital heart disease and cancer; therefore, it may be an important future research area for siblings of children with asthma.

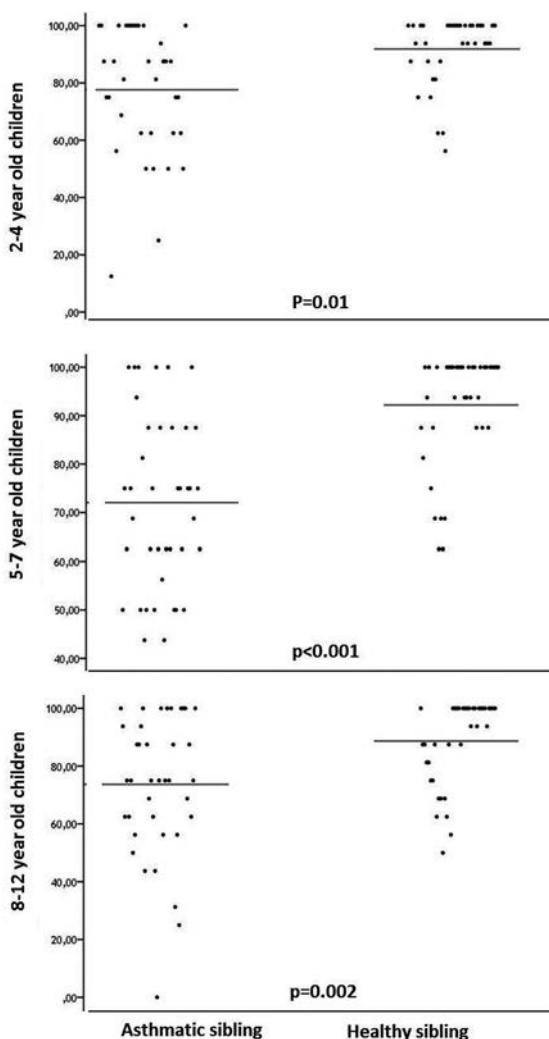


Fig. 1. Comparison of emotional subscore of PedsQL™ in children with an asthmatic and healthy sibling.

In a study that assessed quality of life in siblings of children with cancer demonstrated that, motor and cognitive skills as well as negative and positive emotions domains of QoL were impaired partially showing concordance with our results¹⁶. The difference between the physical QoL results may be attributed to the use of different QoL scales since they used TNO-AZL children's QoL questionnaire and also to the difference in nature of cancer and asthma. However, despite these differences emotional QoL seems to be impaired in both studies.

Previous research that assessed psychosocial outcome in family members of children with sickle cell disease is strongly associated with emergency visits¹⁹. However, we have not found a significant association between emergency visit and QoL in healthy siblings of children with asthma. This difference in results might be attributed to difference in diseases and difference in outcome parameters which was QoL in our study whereas psychological problems in the reference study¹⁹. We would have expected a significant correlation of clinical parameters and emotional QoL since that domain of QoL was significantly lower in siblings of asthmatic children. However, our results did not show such correlation. This might be attributed to the fact that children enrolled did not have severe asthma findings. Moreover, as reported by the authors, family functioning is an important mediator of psychological outcome in healthy siblings of children with sickle cell disease and we have not assessed family functioning in our population; this might have also led to differences in results.

The major limitation of our study was the parent reported nature of the PedsQL™ Short Form 15 questionnaire, because it is well known that parental report of QoL might not agree with the child's own report. Parental reports were reported to be more negative than children's reports⁸. This limitation existed for children in both healthy and asthmatic groups however parents of asthmatic children might have a more negative view of their situation due to the awareness of their condition. Therefore, this limitation must be considered when drawing conclusions from our results. Another limitation, this study enrolled siblings of children who presented to a tertiary care center

which might have reduced the generalizability of results. Finally, asthma control of the sibling assessed by asthma control test might have added information to the disease severity level.

In conclusion, emotional aspect of QoL in siblings of children with asthma is significantly reduced however physical or social aspects of QoL do not seem to be influenced much. The reduction in emotional QoL is not correlated with disease severity therefore might pose a problem even in siblings of children with controlled asthma. Therefore, vulnerability of these children needs to be considered in general pediatric practice and families need to be informed.

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