Quality of Life in Childhood Migraines: Clinical Impact and Comparison to Other Chronic Illnesses

Scott W. Powers, PhD§; Susana R. Patton, PhD*; Kevin A. Hommel, PhD*; and Andrew D. Hershey, MD, PhD‡§

ABSTRACT. Objective. Despite the high prevalence of headaches in youths, quality of life (QOL) has not been well examined. We examined QOL in a clinical sample of children with headaches and compared it with children with other chronic diseases.

Methods. A survey study was conducted of 572 consecutive patients (mean age, 11.4 ± 3.6 years) who presented with headaches to a children's headache center. Children and parents completed the Pediatric Quality of Life Inventory, Version 4.0 and a standardized headache assessment. Results were compared with established norms for healthy and chronically ill children.

Results. Most patients (99%) had a clinical diagnosis of migraine: 85% met the International Headache Society migraine criteria, and 40% had chronic daily headaches. Total Pediatric Quality of Life Inventory, Version 4.0 score was lower for the entire group (73.1 ± 14.4) compared with healthy norms (83.0 ± 14.8) and lowest for children with chronic daily headaches (70.5 ± 15.5). The impact on QOL of children with migraine was similar to that of children with arthritis and cancer.

Conclusions. QOL of children with headaches is significantly affected by their health condition. The impact of headaches on QOL is similar to that found for other chronic illness conditions, with impairments in school and emotional functioning being the most prominent. Pediatrics 2003;112:e1–e5. URL: http://www.pediatrics.org/cgi/content/full/112/1/e1; pediatric, adolescents, headache, disability, headache treatment, migraine.

ABBREVIATIONS. IHS, International Headache Society; QOL, quality of life; PedsQL 4.0, Pediatric Quality of Life Inventory, Version 4.0; CDH, chronic daily headache.

Headaches in children and adolescents are a common problem.1 The majority of children who experience recurrent headaches have migraines. Prevalence estimates indicate that up to 10.6% of children ages 5 to 15 years2 and 28% of migraineurs experience headaches in children and adolescents. Migraines have historically been diagnosed using clinical impression.7,8 Despite the high prevalence of headaches in youths, quality of life (QOL) has not been well examined. We examined QOL in a clinical sample of children with headaches and compared it with children with other chronic diseases.

Methods. A survey study was conducted of 572 consecutive patients (mean age, 11.4 ± 3.6 years) who presented with headaches to a children's headache center. Children and parents completed the Pediatric Quality of Life Inventory, Version 4.0 and a standardized headache assessment. Results were compared with established norms for healthy and chronically ill children.

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subjects. Adolescents (n = 159) with headaches reported worse psychological functioning, more physical symptoms, a poorer functioning status, and less satisfaction with life and health than healthy adolescents. No research has examined the QOL of young children with headaches or evaluated the impact of headaches on QOL in comparison with other chronic illness conditions. Advances in pharmacological and biobehavioral treatments for headache over the last several years make the assessment of QOL in children essential. The present study reports on the QOL of a large clinical sample of children with headaches. Also, QOL in children with headaches is compared with data for a number of other pediatric disorders, including arthritis and cancer.

METHODS

Subjects

Children were referred by their primary care physician to the Headache Center at Cincinnati Children’s Hospital Medical Center. For the children between the ages of 5 and 18 years, data were collected from both children and parents. For the children between 2 and 4 years old, data were collected from the parents only. Families completed a detailed questionnaire describing features of their child’s headaches and general health as well as the age-appropriate version of the PedsQL 4.0 at the child’s initial appointment. These data were reviewed with families during their clinic visit to ensure accuracy and to assist in headache diagnosis and treatment. Clinical diagnoses and a diagnosis using the IHS criteria were obtained on the basis of medical history and neurologic examination. Families who attend the Headache Center agreed for information collected during clinical care to be used for research purposes and were informed that all data are presented as group findings with no individual identifiers. A generally uniform and effective multidisciplinary treatment program is provided by the Headache Center. The normative comparison group (N = 730) included healthy children who were assessed either in physicians’ offices during well-child checks or by telephone and whose parents did not report the presence of a chronic health condition. The comparison group of children with cancer (N = 339) included individuals with acute lymphocytic leukemia (50%), brain tumor (7%), non-Hodgkin’s lymphoma (6%), Hodgkin’s lymphoma (3%), Wilm’s tumor (3%), and other cancers (28%). The comparison group of children with rheumatologic disease (N = 271) included individuals with juvenile rheumatoid arthritis (30%), systemic lupus erythematosus (8%), juvenile fibromyalgia (13%), spondyloarthropathy (11%), and other rheumatic diseases (38%).

PedsQL 4.0 Scores

Table 1 presents means and standard deviations for each subscale of the PedsQL 4.0 for children with clinical migraine, IHS migraine, and CDH compared with the healthy children population scores for all ages. Internal consistency reliability coefficients are presented for the headache samples only. Parallel descriptive data are presented for parent-report scales in Table 2 along with internal consistency reliability data for the headache samples.

Comparisons With Healthy Children

One sample t test found that children with migraine headaches reported lower QOL than children in the healthy comparison sample (PedsQL 4.0 Total Score) (t(1,554) = −16.15, P < .01). Parent report of QOL for children in the headache group was also significantly lower than parent report in the healthy sample (PedsQL 4.0 Total Score) (t(1,567) = −23.89, P < .01).
Bivariate correlation analyses were conducted to examine the relationship between parent and child responses on the PedsQL 4.0 for the Total Score and the 5 summary/subscale scores. All correlations were statistically significant ($P < .01$) and ranged from 0.62 to 0.75. Parent-report and child self-report correlations were in the medium to large effect size range.34

**Comparisons With Children With Chronic Illness**

The present sample of headache patients demonstrated PedsQL 4.0 scores that were similar to other chronic disease groups.29,30 According to child self-report data, statistical comparisons of QOL for children with headaches and children with rheumatoid conditions or cancer found no differences in total QOL scores. Differences were found when comparing children on subscale scores ($P < 0.002$). Children with headaches reported higher physical functioning and higher social functioning than children with rheumatoid conditions or cancer. They reported lower school functioning and emotional functioning than children with rheumatoid conditions or cancer. For parent report data, no differences were found when total QOL scores were compared. Differences were observed for individual subscale scores ($P < 0.002$). Similar to child self-report, parents of children with headaches reported higher physical functioning and higher social functioning than parents of children with rheumatoid conditions or cancer. Parents of children with headaches reported lower school functioning and emotional functioning when compared with parents of children with rheumatoid disease. However, there were no differences in these subscale scores when parents of children with headaches were compared with parents of children with cancer. Figures 1 and 2 present data across these 3

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### TABLE 1. PedsQL 4.0 Child Self-Report (All Ages)

<table>
<thead>
<tr>
<th></th>
<th>Healthy ($n = 730$)</th>
<th>Headache ($n = 572$)</th>
<th>IHS ($n = 486$)</th>
<th>CDH ($n = 230$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total score</td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
</tr>
<tr>
<td></td>
<td>83.0 ± 14.8</td>
<td>73.1 ± 14.4</td>
<td>73.0 ± 14.1</td>
<td>70.5 ± 15.5</td>
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<tr>
<td>Physical Health</td>
<td>84.4 ± 17.3</td>
<td>76.2 ± 17.9</td>
<td>76.2 ± 17.6</td>
<td>72.0 ± 19.3</td>
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<td>Psychosocial Health</td>
<td>82.4 ± 15.5</td>
<td>71.5 ± 15.4</td>
<td>73.1 ± 15.3</td>
<td>69.6 ± 16.5</td>
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<tr>
<td>Emotional Functioning</td>
<td>80.9 ± 19.6</td>
<td>67.3 ± 20.1</td>
<td>67.2 ± 20.3</td>
<td>64.3 ± 20.9</td>
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<td>Social Functioning</td>
<td>87.4 ± 17.2</td>
<td>83.2 ± 17.6</td>
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<td>83.5 ± 18.5</td>
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<tr>
<td>School Functioning</td>
<td>78.6 ± 20.5</td>
<td>63.9 ± 20.5</td>
<td>63.4 ± 20.1</td>
<td>60.9 ± 21.5</td>
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</tbody>
</table>

SD indicates standard deviation.

* The child self-report scale met the minimum reliability standard of $0.70^{24}$ for group comparisons across subscales for all ages.

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### TABLE 2. PedsQL 4.0 Parent Report (All Ages)

<table>
<thead>
<tr>
<th></th>
<th>Healthy ($n = 730$)</th>
<th>Headache ($n = 572$)</th>
<th>IHS ($n = 486$)</th>
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<td>Total score</td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
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<tr>
<td></td>
<td>87.6 ± 12.3</td>
<td>73.2 ± 14.4</td>
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<td>Physical Health</td>
<td>89.3 ± 16.3</td>
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<td>76.3 ± 17.1</td>
<td>73.2 ± 18.8</td>
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<tr>
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<td>82.4 ± 15.5</td>
<td>71.3 ± 15.6</td>
<td>71.1 ± 15.6</td>
<td>68.9 ± 17.1</td>
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<tr>
<td>Emotional Functioning</td>
<td>82.6 ± 17.5</td>
<td>66.3 ± 20.1</td>
<td>66.2 ± 20.2</td>
<td>62.6 ± 21.0</td>
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<tr>
<td>Social Functioning</td>
<td>91.6 ± 14.2</td>
<td>82.6 ± 18.1</td>
<td>82.6 ± 18.3</td>
<td>82.0 ± 19.7</td>
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<tr>
<td>School Functioning</td>
<td>85.5 ± 17.6</td>
<td>64.8 ± 20.6</td>
<td>64.4 ± 20.3</td>
<td>62.2 ± 21.4</td>
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</tbody>
</table>

* The parent-report scale met the minimum reliability standard of $0.70^{24}$ for group comparisons across subscales for all ages.

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Fig 1. PedsQL 4.0 child self-report scores across disease groups. Data presented for healthy children, children with headaches, and children with rheumatoid diseases and cancer. The full range of the PedsQL 4.0 is 0 to 100. This figure uses a more limited range for presentation.
children's QOL is an emerging area of research with potential relationships to treatment effectiveness and families' satisfaction with their care. Previous research investigating QOL in children with headaches has used standardized self-report measures that evaluate the impact of recurrent headaches on children's psychological functioning or a disease-specific measure of QOL. The use of standardized self-report measures can evaluate symptoms that are related to QOL but cannot offer an estimate of the impact of recurrent headaches on other important areas of functioning (e.g., school, social activities). Disease-specific QOL measures preclude the ability to compare children's QOL scores across chronic illness conditions, which limits the scope of these studies. The PedsQL 4.0 offers a practical measure of QOL, which can be administered in a busy clinic setting and offers the opportunity to compare QOL across disease conditions.

Findings of this study demonstrate that the PedsQL 4.0 can be an effective measure of QOL for children with migraine, a common yet understudied disorder of childhood. This measure demonstrates adequate internal consistency and interrater reliability between parents and children. We found that children's QOL is adversely affected in all areas of functioning when compared with norms for healthy children. Specific areas of functional impairment were noted on the Psychosocial Health Factor Score and the School Functioning subscale. Comparisons made within the headache sample found that children with CDH reported the greatest impairment compared with healthy norms. Notable areas of impairment included the School Functioning subscale, Emotional Functioning subscale, and Physical Health Factor Score. Children who met IHS criteria for migraine also reported impaired QOL with specific deficits noted in the common areas of School Functioning, Emotional Functioning, and the Psychosocial Health Factor Score. Children's QOL scores were comparable between children who met a clinical diagnosis of migraine versus those who also met IHS criteria.

The PedsQL 4.0 scores of children with migraine were compared with scores obtained from children with other chronic illness conditions. To date, there are no specific studies that specifically compare the QOL of children who have headaches with children who have other chronic health conditions. However, previous research with adults with migraine found them to report more impairment on measures of pain, role disability, and social functioning than adults with hypertension, osteoarthritis, and type 2 diabetes. We found that children with migraines reported a similar pattern of disability as children with rheumatoid disease or cancer. When compared statistically, children with migraine self-reported more impairment in School Functioning and Emotional Functioning than children in the other chronic illness groups. Because of the unpredictable nature of migraine headaches, families must react to headache episodes with little advanced preparation. Without advance warning, it is difficult to "plan" for school absences by collecting classroom lessons or homework assignments in advance. On returning to school, children with headaches may spend a significant amount of time completing old assignments while learning new material. This burden may contribute to parents' and children's perception of greater impairment in school functioning. Their emotional functioning may also suffer if migraines are perceived as unpredictable and severe. These comparisons help to provide a context for understanding the impact of headaches on children's QOL and suggest that children with migraines can experience comparable or more severe impairment as children with other serious chronic illness conditions.

Although the current sample is representative of the population of children seen at the Cincinnati Children's Headache Center and the Cincinnati metropolitan area, additional research is needed with other samples to determine the generalizability of these findings. It will be important to evaluate other variables such as the type of health care facility, geographical location, family ethnicity, and other demographic characteristics. QOL was measured by both self-report and parent report, showing agreement across sources. However, self- and other report methods are vulnerable to subject bias, and objective measures of the impact of headaches on children's
daily life should be added in future investigations. Although the PedsQL 4.0 provides a valid and practical means of evaluating QOL in children and families within a busy clinic setting, it does not provide a complete assessment of the many specific psychosocial variables that may compose the QOL construct; variables such as family functioning, depression, and social support would be better assessed through multiple measures. This study suggests that future investigation of QOL in children with headaches could help to optimize evaluation and management of this common health problem. Such investigation should incorporate general measures of QOL and disease-specific measures (eg, Pediatric Migraine Disability Assessment [PedMIDAS]), as this combination approach to the assessment of QOL is becoming the standard for the field.13,29,30

CONCLUSIONS

Headaches are common in children and adolescents. This report validates the use of PedsQL 4.0 in migraine patients who are aged 2 to 18. It further demonstrates that headaches in children and adolescents affect QOL at levels equivalent to or greater than other chronic illnesses of childhood—illnesses that are often considered more severe and debilitating than "having headaches." Pediatricians often see children with headaches. Knowing that the headaches can significantly affect QOL could lead to better headache evaluation and management for this very common condition of childhood.

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REFERENCES

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