

Health-Related Quality of Life of Chronic Headache Patients Is Predicted by the Emotional Component of Their Pain

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Questions to be answered by this study were: (1) what is the health-related quality of life (HRQL) of migraine and tension headache patients who consult their general practitioner, and (2) what are the unique contributions of the perceptual and emotional components of headaches to the HRQL. The Nottingham Health Profile (NHP) was used to measure the HRQL of patients with migraine (n=27), tension headache (n=25), both migraine and tension headache (n=17), and two reference groups. Perceptual components of the pain (intensity, frequency, and duration) were measured with a headache diary, while emotional components were measured with five visual analogue scales (for tension, depression, frustration, anger and fear). The NHP dimensions of pain, sleep, energy, and social isolation revealed that each headache patient group had a lower HROI. than the healthy reference group. There were no differences in HRQL between the headache groups. Regarding the second question: it was found that the greater the patient's emotional pain, the more problems he or she had with physical mobility and social isolation. Neither the type of headache nor the headache index were related to the HRQL of the patient. We recommend to increase the research efforts concerning tension headache and to measure the emotional component of pain in clinical trials.

Key words: tension headache, migraine, quality of life, general practice

Abbreviations: HRQL health-related quality of life, NHP Nottingham Health Profile

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Migraine patients can experience intense painful attacks with distressing symptoms, such as vomiting and visual and mental malfunctioning. It is, therefore, not surprising that migraine can have a major effect on the functioning of patients.¹ Several controlled studies found that migraine patients, in particular those with migraine with aura, had lower scores on tests of attention and memory.^{2,3} Jenkinson used the Nottingham Health Profile (NHP) and found more problems in the areas of energy, emotional reactions, sleep, social isolation, and pain.⁴ Osterhaus and Townsend reported that migraine patients had lower scores for role function, social function, pain, mental health, and energy than patients suffering from arthritis, gastrointestinal disorders, and diabetes.⁵ A recent study investigated the effect of migraine on health-related quality of life (HRQL) with four valid instruments.⁶ The HRQL of migraineurs appeared to be significantly impaired in comparison with the control group. However, effect size estimators revealed that the size of the differences were small to medium. The authors concluded that migraine had a moderately deleterious effect on the life of the patients, which was independent of comorbid depression.

It is salient that research into the effects of chronic headaches has mainly focussed on migraine. However, the psychosocial and role functioning of patients with tension headaches might also be impaired because of the repeated and often continuous character of their headaches.⁷ The HRQL of these patients has scarcely been investigated. One recent study found that tension headache patients had poorer social functioning and mental health than patients with migraine.⁸

So far, the headache patients studied with respect to their HRQL have been recruited from specialized headache clinics,^{4,8} the general population,⁶ or recruitment was unspecified.⁵ Such patients are probably not representative of the population of patients who consult their general practitioners (GP) for the headaches. Since in the Dutch health care systems a GP is the first medical advisor, the patients who consult their GP are the main category of help-seeking headache sufferers. The first aim of the present study was to evaluate their HRQL.

According to Loeser, pain consists of four components: the nociception, the perception of

the pain, the emotional experience of the pain, and the pain behavior. The more chronic the pain, the more dominant the emotional and behavior components are.⁹

Given the chronicity of migraine and tension headache, we expect, therefore, that the perceptual aspects of pain, such as its intensity, duration, and frequency will be less important determinants of how badly the patient's life is affected, than the pains' emotional aspects such as anxiety, frustration, and depressive feelings. So far, the relative contribution of both pain aspects to the HRQL of the patient is unknown. This topic, therefore, formed also the focus of our investigation.

Summarizing, we had two research questions: (1) what is the HRQL of migraine and tension headache patients who consult their general practitioner for these complaints, and (2) what are the unique contributions of the perceptual and emotional components of headaches to the HRQL of the patients?

PATIENTS AND METHODS

Patients.—Patients were recruited from the files of two general practitioners in two towns with a population of about 80 000 (Delft and Schiedam) in the Netherlands. Inclusion criteria were: diagnosed in the previous 2 years under International Classification of Primary Care¹⁰ (ICPC)-code NO1 (other headaches), N89 (migraine), and NO2 (tension headache); ability to read the Dutch language; and aged between 18 and 60 years. The 147 patients who fulfilled the criteria were invited to participate; 84 (57%) of them consented. In the next step, these patients were diagnosed according to the IHS criteria,¹¹ which resulted in three diagnostic groups: 27 migraine patients, 25 tension headache patients, and 17 patients with both migraine and tension headache. Due to small sample sizes, no differentiation could be made between migraine with and without aura or between episodic and chronic tension headaches. Age and sex did not differ significantly between the three diagnostic groups.

As 83% of the patients were women and their mean age 39.1 (SD=13.3) years of age, the 36 healthy female subjects aged between 20 and 50 years were selected from the Dutch Nottingham Health Profile norm groups.¹²

Measurement.—Patients received written instructions, the instruments, and an addressed envelope for their responses. The following instruments were employed:

- A *Headache Diary* was used for measuring the perceptual aspects of the headaches. Patients were asked to record the intensity (ranging from 0 [absent] to 5 [very severe]) and duration (in hours) of their headaches four times a day (at breakfast, lunch, dinner, and bedtime). The diary had to be kept for 3 weeks, as this is considered to be a sufficient period for recording both migraine and tension headaches.¹³
- Five *Emotional Visual Analogue Scales (VASs)* (ranging from 0 to 10) for recording how the patients generally felt while in pain.¹⁴ Tension, depression, frustration, anger, and fear were measured.
- *The Nottingham Health Profile (NHP)* for measuring the HRQL. This is a self-report questionnaire with 38 statements divided in six areas of health (Energy, Pain, Emotional Reactions, Sleep, Social Isolation, and Physical Mobility).¹⁵ The authorized validated Dutch version was used.¹²

Patients were instructed to record the VASs and complete the questionnaires after each period recorded in the diary and at a time when they felt at ease.

Data Analysis.—For each patient, the attack frequency, average intensity per attack, average duration of an attack, and the headache index (the product of multiplication of the three latter measures) was calculated on basis of the diary. The measures were extrapolated to a 4-week period for comparison reasons. An "emotional pain" score was calculated as the sum of the scores on the five visual analogue scales.

The means and 95% confidence intervals for these perceptual and emotional measures were obtained for each of the three headache groups. The alpha of the tests was set at .05.

To address the first question, ANOVAs were carried out on each of the NHP dimensions with the variable "group" (five levels, consisting of the three headache and the two reference groups) as independent variables. Type-1 error was kept at .05 using the sequential Bonferroni test.¹⁶ For the second question, regression analyses were performed within the headache patients with the NHP scores, entering "diagnosis" (migraine, tension headache, and migraine plus tension headache), the headache index, and the emotional pain score as predictors.

RESULTS

Mean headache parameters, VAS scores, and 95% confidence intervals are presented in Table 1. The tension headache patients had significantly more frequent headaches than patients with migraine. Those with migraine plus tension headache had a higher intensity of pain than those with tension headache. Regarding emotional pain, patients with migraine plus tension headache reported more tension and frustration than those with tension headaches. Both migraine plus tension headache and migraine patients had significantly higher sum scores for emotional pain than tension headache patients.

Table 2 presents the mean NHP scores for the patients and diagnostic groups.

Significant group effects were found in the ANOVAs on the following NHP dimensions: Pain ($F(3,102) = 3.58, F=.016$), Social Isolation ($F(3,102) = 4.18, P=.008$), Sleep ($F(3,102) = 4.07, P=.009$), and Energy ($F(3,102) = 3.86, P=.012$). These effects remained significant after application of the sequential Bonferroni test. Separate *t*-tests showed that each headache group had significantly more problems on these NHP dimensions than the healthy reference group. No significant differences were present between the three groups of headache patients.

Regression analyses with the diagnosis, headache index, and emotional pain as predictors, revealed significant effects on social isolation ($F(3,54) = 3.23, P<.05, R^2=.15$) and physical mobility ($F(3,54) = 3.47, F<.025, R^2=.16$). Inspection

Table 1.—Mean Headache Parameters and Emotional Pain Scores With Confidence Intervals (CI) for the Three Headache Patient Groups

	Migraine n=27	Tension Headache n=25	Migraine and Tension Headache n=17
Headache			
Frequency*	13.5 (10.7–16.3) ^a	18.0 (13.7–22.2) ^b	15.7 (11.3–20.1)
Duration (hours per attack)	7.26 (3.90–8.62)	7.14 (4.70–9.58)	7.40 (5.64–9.16)
Intensity	2.23 (2.01–2.44)	2.16 (1.89–2.43) ^a	2.46 (2.19–2.72) ^b
Headache index	241 (164–318)	333 (161–504)	294 (185–402)
Emotional pain			
Tension	4.93 (3.70–6.15)	4.04 (2.78–5.29) ^a	5.75 (4.16–7.34) ^b
Depression	5.41 (4.40–6.41)	4.27 (2.96–5.58)	4.83 (3.50–6.15)
Frustration	4.19 (3.12–5.25)	3.31 (2.27–4.34) ^a	5.06 (3.61–6.51) ^b
Anger	4.37 (3.14–5.60)	4.08 (2.83–5.33)	5.06 (3.60–6.52)
Fear	3.55 (2.18–4.93)	2.35 (1.31–3.38)	2.89 (1.46–4.30)
Total emotional pain	22.4 (18.2–26.7) ^b	18.0 (13.9–22.2) ^a	23.6 (18.4–29.0) ^b

*Extrapolated to 4 weeks.

Groups indicated with superscript "b" have significantly higher values than those with superscript "a."

Table 2.—Nottingham Health Profile (NHP) Scores of Headache and Reference Groups

NHP Dimensions	Migraine (n=27)	Tension Headache (n=25)	Migraine and Tension Headache (n=17)	Healthy References (n=36)
Pain	6.1 ± 12.3 ^b	11.7 ± 22.9 ^b	5.9 ± 13.4 ^b	0.0 ± 0.0 ^a
Social Isolation	15.9 ± 15.0 ^b	11.3 ± 19.0 ^b	20.7 ± 22.0 ^b	4.4 ± 15.2 ^a
Sleep	30.4 ± 25.0 ^b	17.7 ± 27.3 ^b	20.0 ± 28.3 ^b	8.9 ± 18.8 ^a
Emotional Reactions	10.4 ± 16.0	4.6 ± 14.2	4.7 ± 13.3	7.7 ± 26.2
Physical Mobility	6.2 ± 9.6	5.9 ± 11.4	8.3 ± 12.7	1.7 ± 5.3
Energy	31.1 ± 33.3 ^b	25.8 ± 33.2 ^b	35.6 ± 36.3 ^b	10.2 ± 21.1 ^a

NHP scores range from 0 (maximum health) to 100 (minimum health). Values given as means ± SD.

Groups indicated with the superscript "b" have significantly higher values than those with the superscript "a."

of the regression coefficients showed no contribution of diagnosis or headache index; emotional pain was the only significant predictor ($P < .005$). The higher this pain component, the more problems regarding these life dimensions. No significant effects were found in the analyses on the other NHP scores.

COMMENTS

The answer to our first question is that patients with migraine, tension headache, or both, who consult the GP for their complaints, demonstrated a lower HRQL than the healthy reference group, as revealed by the dimensions Pain, Sleep, Energy, and Social Isolation. However, there was no difference in the HRQL between the headache groups. Regarding the second question, it appeared that the greater the patient's emotional pain, the more problems he or she had with physical mobility and social isolation. The type of headache and the perceptual component of the headaches, as expressed in the headache index, were not related to the patient's HRQL.

Group Differences.—As was expected on the basis of the character of their headaches, tension headache patients had more frequent headaches than migraine patients and less headache intensity than the patients with both tension and migraine headaches. The difference in intensity between the migraine patients and the patients with tension headache was, however, not significant. Together with the low intensity, it is salient that the number of attacks of the migraine group was very high (almost one per 2 days). We ascribe this to the priming effect of a diary. Each headache experienced, migrainous or not migrainous, was noted by the patients. We sus-

pect that, although the IHS diagnosis of "migraine" (only) was received by this group, other headaches (due to illness, shortage of sleep, tension, etc) might also have determined the (low) headache intensity and (high) frequency scores in the diary. Therefore, we agree with Larsson (personal communication) that the format of a headache diary should allow the investigator to differentiate migraine from other headaches.

While the perceptual components of the pain as revealed by the headache index did not differ significantly between the types of pain, the emotions elicited by migraine appeared to be more intense than those elicited by tension headache. In particular, the group with both types of headache reported more tension and frustration during the attacks. The difference in the level of suffering between the headache groups did not manifest itself as a difference in the HRQL scores. Both a previous⁸ and the present investigation demonstrate that tension headache patients are at least equally impaired in their lives as migraine patients. A recent study on quality of life in adolescents also did not reveal differences between patients with migraine and patients with nonmigraine headaches.¹⁷ Possibly, the greater amount of suffering of the migraine patients while having an attack, is balanced against the more frequent suffering of the tension headache patients. Nevertheless, the clinical and scientific attention has so far been devoted to those with migraine. This can be illustrated by our recent literature search over the period 1984–1995 using Psychlit and Medline. Abstracts were selected which contained the words "migraine," and, respectively, "tension headache" or "muscle contraction headache." We found 2404 articles on migraine and 367 on tension headache or muscle contraction headache, a ratio of about 6:1. This relative lack of interest in the latter patients seems to be in contrast with the impairments they experience and suggests that more efforts need to be invested on behalf of them.

When we compared the present data to those of the other Dutch study on the quality of life of migraine patients,⁶ it was notable that our NHP scores for Energy and Social Isolation were generally higher. The probable reason for this difference is that our population consisted of patients who had consulted their GPs, while the subjects in the other study were from the general population.

Prediction of HRQL.—According to the criteria of Cohen,¹⁸ the amount of variance in HRQL that can be explained by the pain parameters: diagnosis, headache index, and emotional pain is high for two dimensions: social isolation (15%) and physical mobility (16%). Conforming with our expectations this can mainly be attributed to the emotional pain component; neither the headache diagnosis nor the headache index showed a significant independent association with the HRQL. The finding that emotional components of pain rather than perceptual ones are related to important life areas is in line with the findings that in clinical patients, emotional pain is generally greater than perceptual pain.¹⁴ This stands in contrast to experimental pain situations in which perceptual pain dominates. From our cross sectional design, it can not be inferred whether the emotional pain causes the social and mobility problems or vice versa. One may speculate that the patient feels, for instance, tense and frustrated because of the limitations in social and physical activity caused by the presence of a headache. On the other hand, such negative feelings might cause the patient to reduce his or her social and physical activities due to their demanding character. Possibly, the mere presence of pain or its type does not impede the patient's daily functioning. However, when the pain is experienced as intolerable, frustrating, and depressing, it can lead to a lack of motivation to do things, and, therefore to a reduction in quality of life. It might be possible to disentangle the effects of feelings and functioning in a future study with help of a diary and an indepth interview on basis of the diary, in order to keep track of the actual sequence of these two sets of variables. When such a study demonstrates emotional pain as a determinant, HRQL might be improved by treatment strategies such as cognitive behavioral therapy which focus on the frustrations and depressive feelings during the pain.

A methodological limitation of this study is that, due to the small sample size of our samples, the power of the test is modest. While this underlines the clinical significance of those effects which we found, other "real" differences between the groups might have been obscured and can only be detected with larger samples. A further problem is that the participating patients comprised only 57% of those invited. Although sex distribution and mean age of the responders and nonresponders did not differ significantly (83% vs 75% females and 36.6. vs 39.1 years of age, respectively), the lack of data on education and employment status does not allow a firm conclusion about the representativeness of the findings.

Therefore, recommendations can only be tentatively drawn from the answers to our questions. The first is that, since tension headache patients experience in many life areas a comparable burden from their illness as that of migraine patients, they deserve a higher position on the research and clinical agenda than they have at present. The second recommendation is that the emotional component of pain needs to be measured in clinical trials, in addition to the perceptual components, because it is the emotional pain component that is most strongly related to the severity of the affliction on the patient's life.

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REFERENCES

1. Stewart WF, Lipton RB. Societal impact of headache. In: Olesen J, Tfelt-Hansen P, Welch KMA, eds. *The Headaches*. New York: Raven Press; 1993:29–34.
2. Hooker WD, Raskin NH. Neuropsychologic alterations in classic and common migraine. *Arch Neurol*. 1986;43:709–712.
3. Zeitlin C, Oddy M. Cognitive impairment in patients with severe migraine. *Br J Clin Psychol*. 1984;23:27–35.
4. Jenkinson C. Health status and mood state in a migraine sample. *Int J Soc Psychiatry*. 1990;36:42–48.
5. Osterhaus JT, Townsend RJ. The quality of life of migraineurs: a cross sectional profile. *Cephalalgia*. 1991;11(suppl 11):103–104.
6. Essink-Bot ML, van Royen L, Krabbe PFM, Bonsel G.I, Rutten FFH. The impact of migraine on health status. *Headache*. 1995;35:200–206.
7. Rasmussen BK. Tension-type headache, cluster headache, and miscellaneous headaches. Epidemiology. In: Olesen J, Tfelt-Hansen P, Welch KMA, eds. *The Headaches*. New York: Raven Press; 1993:439–443.
8. Solomon GD, Skobieranda FG, Gragg LA. Does quality of life differ among headache diagnoses? Analysis using the medical outcomes study instrument. *Headache*. 1994;34:143–147.
9. Loeser JD. A definition of pain. *Univ Washington Med*. 1980;7:3–4.
10. Lamberts H, Wood M. *International Classification of Primary Care (ICPC)*. Oxford: Oxford University Press; 1987.
11. Headache Classification Committee of the International Headache Society. Classification and diagnostic criteria for headache disorders, cranial neuralgias and facial pain. *Cephalalgia*. 1988;8(suppl 7):1–96.
12. Erdman RA, Passchier J, Kooijman M, Stronks DL. The Dutch version of the Nottingham Health Profile: investigations of psychometric aspects. *Psychol Rep*. 1993;72:1027–1035.
13. Blanchard EB, Hillhouse J, Appelbaum KA, Jaccard J. What is an adequate length of baseline in research and clinical practice with chronic headache? *Biofeedback Self Regul*. 1987;12:323–329.
14. Price DD, Harkins SW. Psychophysical approaches to pain measurement and assessment. In: Turk DC, Meizack R, eds. *Handbook of Pain Assessment*. London: The Guildford Press; 1992:111–134.
15. Hunt SM, McEwen J, McKenna SP. *Measuring Health Status*. London: Croon Helm; 1986.
16. Holm S. A sequentially rejective multiple test-procedure. *Scand J Stat* 1979;6:65–70.
17. Langeveld JH, Koot HM, Loonen MCB, Hazebroek-Kampschreur AAJM, Passchier J. A quality of life instrument for adolescents with chronic headache. *Cephalalgia*. 1996. in press.
18. Cohen J. *Statistical Power for the Behavioral Sciences*. New York: Academic Press; 1969.