

## Research Article

# Influences on Stress Load in Young Girls with Chronic Headache

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## Abstract

The present study investigated influences of stress coping strategies and activity of HPA axis on stress load in young girls with chronic headache (migraine or tension-type). Anxiety and depression were also measured. These psychopathological characteristics significantly contributed to stress load, whereas the activity of HPA axis had no contribution. A lack of seeking social support and destructive stress coping were identified as possible influencing factors.

**Keywords:** Headache; Adolescents; Stress load; Stress coping; Anxiety; Depression

## Introduction

Chronic headache in children and adolescents is frequent. A meta-analysis of [1] was based on data of 50 studies, which were published worldwide and included 80,000 patients. Lifetime prevalence of chronic headache was 58.4%. For migraine in particular 7, 7% are reported, whereby the prevalence for girls is greater than for boys.

Stress load in daily life of adolescents with chronic headache is heightened, which has been shown in a study of [2] in 113 school girls.

The interrelationship between stress and headache in the long-term has been confirmed also by [3].

A very high stress load in university students with chronic headache was observed in a case-control study of [4]. When a high stress load was present in young college students, headache was significantly more present than other somatic complaints [5].

School absenteeism as an indicator of stress load has been found in adolescents with chronic headache by [6].

On the other hand stress coping of youth with chronic headache is characterized by widely inadequate strategies. This has been demonstrated in a study of [7] by using projective test methods.

A long-term study of [8] found a high comorbidity of headache and anxiety as well as depression.

This was supported by [9].

A third study by [10] presented the same results.

The empirical evidence suggests that girls with headache are suffering from more stress load and on the other hand are not able to cope adequately with stress. The present investigation is an attempt to confirm previous results. As an extension to previous data influences on stress load were investigated.

## Methods

All participants with headache were recruited in schools and had to fulfill ICHD-3 criteria for migraine or tension-type headache. The

control group was recruited on the University campus in Trier. Before participation, acute diseases were excluded by a medical doctor.

20% of the girls fulfilled the criteria for migraine, 70% criteria for tension-type headache, the rest could not be classified definitely.

Depression and anxiety of the children were measured by [12,13].

Stress load was assessed by the questionnaire for stress and stress coping for children and adolescents (SSKJ) [14].

The subscales comprise: 1) Vulnerability to stress; 2) Physical symptoms of stress such as headache, stomach ache or exhaustion. 3) Psychological symptoms of stress such as depressed mood and anxiety.

## Results

Comparison of mean values with MANOVA revealed  $F(3,145) = 9.4$   $p < 0.001$ . Girls with headache had physically as well as psychologically more stress load and were also more vulnerable against stress situations (Table 1 and 2).

Comparison of means with MANOVA revealed  $F(5,143) = 2.3$   $p < 0.05$ .

Excluding constructive coping stress coping was more inadequate

**Table 1:** Stress load for girls with chronic headache and controls.

	Controls	Chronic Headache
Physical stress load	7.3 ± 1.7	8.8 ± 2.4
Psychological stress load	18.0 ± 4.5	21.4 ± 5.4
Stress vulnerability	15.3 ± 2.5	16.2 ± 2.5

**Table 2:** Stress coping in girls with chronic headache and controls.

Stress coping	Controls	Chronic headache
Seeking social support	36.2 ± 7.8	34.1 ± 6.6
Problem solving	45.3 ± 7.4	44.8 ± 6.9
Destructive and anger	23.8 ± 7.5	26.1 ± 7.8
Passive avoidance	23.9 ± 6.1	25.2 ± 6.2
Constructive	27.1 ± 7.7	29.8 ± 8.8

**Table 3:** Anxiety and depression in girls with chronic headache and controls.

	Controls	Chronic headache
Anxiety	30.8 ± 5.7	35.3 ± 6.4
Depression	9.3 ± 4.9	12.1 ± 6.5

**Table 4:** Cortisol after awakening for girls with chronic headache and controls in nmol/ml.

Time of sample	Controls	Chronic headache
Awakening	8.2 ± 4.5	6.8 ± 3.5
30 minutes	9.8 ± 5.6	10.4 ± 6.3
45 minutes	8.3 ± 5.3	9.3 ± 6.0
60 minutes	6.6 ± 4.8	7.2 ± 5.0

in girls with chronic headache. This could mean that the girls have some positive resources to react in stress situations that should be further supported during treatment programs (Table 3).

Comparison of group means with MANOVA yielded  $F(2,146) = 10.9$   $p < 0.001$ . Girls with headache were significantly more anxious and depressed (Table 4).

Group means were analyzed by MANOVA for repeated measurement. A significant interaction cortisol by group was obtained  $F(3,145) = 4.6$   $p < 0.05$ . Excluding awakening the mean values for patients with headache were significantly higher.

Linear multiple regression was used to predict psychological stress load. The regression analyses included different forms of stress coping, and activity of HPA axis, measured as mean cortisol after awakening. In addition, anxiety and depression served as predictors.

#### Regression analysis 1

Dependent variable was psychological stress load according to SSKJ

Predictors were the coping strategy lack of seeking social support, mean cortisol 60 minutes after awakening and anxiety and depression.

The regression equation was significant with  $F(4,148) = 31.3$   $p < 0.001$  and an explained variance of 45%. Significant predictors were anxiety and depression.

#### Regression analysis 2

Dependent variable was psychological stress load according to SSKJ

Predictors were the coping strategy passive avoidance, mean cortisol 60 minutes after awakening and anxiety and depression.

The regression equation was significant with  $F(4,147) = 25.5$   $p < 0.001$  and an explained variance of 40%. Anxiety and depression were identified as significant predictors.

#### Regression analysis 3

Dependent variable was psychological stress load according to SSKJ

Predictors were the coping strategy lack of problem-solving, mean cortisol 60 minutes after awakening and anxiety and depression.

The regression equation was significant with  $F(4,148) = 31.5$

$p < 0.001$  and an explained variance of 45%. As significant predictors anxiety and depression were found.

#### Regression analysis 4

Dependent variable was psychological stress load according to SSKJ

Predictors were the coping strategy destructive coping, mean cortisol 60 minutes after awakening and anxiety and depression.

The regression equation was significant with  $F(4,147) = 27.0$   $p < 0.001$  and an explained variance of 42%. Significant predictors were found in anxiety and depression and destructive coping.

#### Regression analysis 5

Dependent variable was psychological stress load according to SSKJ

Predictors were the coping strategy constructive coping, mean cortisol 60 minutes after awakening and anxiety and depression.

The regression equation was significant with  $F(4,147) = 26.7$   $p < 0.001$  and an explained variance of 41%. Significant predictors were anxiety and depression and also the coping strategy.

## Discussion

Our results with respect to the significance of anxiety and depression have also been found by [9] and were integrated in a psychobiological model of chronic headache in adolescents.

A strong relationship of stress and headache in particular in adolescents is also reported by [10] and is well in accordance with our data.

Cortisol may be able to reduce pain sensitivity. As a consequence, girls with chronic headache may have a very early perception of the beginning of headache and therefore believe it to be very heavy, especially when they are anxious in addition [11].

A meaningful extension of previous findings is the results of the regression analyses. The data show clearly, that anxiety and depression are largely responsible for a high stress load in adolescent headache. Destructive coping or lack of seeking social support even reinforces the effect. HPA axis activity does not seem to play a significant role.

The findings have limitations. Sample size was small. Only girls were investigated, a generalization to boys is not possible, but girls are much more affected by headache. Some clinical implications are shortly outlined. The importance of stress and psychopathological features of youth with headache is a recommendation to pay special attention on both aspects in treatment programs that could be school-based or offered in a group format also including when necessary family members, whereas medication may have only restricted benefit.

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