

## Research Article

# Influences on Stress Load in Adolescents with Major Depression

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**\*Corresponding author:** Reinhold Laessle, University of Trier, Frauenstr 7, 54290 Trier, Germany**Received:** February 23, 2022; **Accepted:** March 18, 2022; **Published:** March 25, 2022**Abstract**

Based on former empirical studies and theoretical models the present study investigated, whether stress symptoms, stress coping and somatic complaints are different between depressed girls and healthy controls. 148 girls with a mean age of 15 years were studied twice with 6 months between the two assessments. 74 fulfilled DSM IV criteria for major depression at first assessment. Stress symptoms, stress coping and somatic complaints were measured with validated German questionnaires. Depressed girls showed more stress symptoms and a higher stress vulnerability. On the other hand, in stress coping depressed girls preferred destructive strategies and had a lack of useful behaviors such as problem solving or search for social support. Stress load was significantly influenced by the severity of somatic complaints and also by inadequate stress coping such as resignation, but not by hyperactivity of HPA axis.

**Keywords:** Stress; Depression; Stress coping; Somatic complaints; Girls; Cognitive model

## Introduction

Depression in children and adolescents is frequent.

In a representative sample from Germany lifetime prevalence for depression in youth of 21% was found [1].

In Middle East countries 57% of youth have been observed to be depressed [2].

A unique and consistent model for etiology and maintenance of depression in adolescents is not available at present. Therefore, we review empirically supported factors, that have been proposed by [3] as a basis for explaining depression in adolescents.

### Social factors

The risk to develop a psychiatric disorder in general is heightened for children from families with a low socioeconomic status. This has been already shown in a large epidemiological study by [4].

Children from families with a low income had a threefold greater probability to develop a depressive disorder. This has been confirmed in a study by [5].

### Factors related to the families of depressed children

The families are characterized by the lack of positive supporting interactions with parents. These may be extremely focusing on conflicts and therefore provoke anger and aggression in children. Such conditions are especially present, when a high degree of parental psychopathology could be identified [6].

### The significance of stress for the depressive disorder

A controlled study of [7] showed that psychosocial stressors reinforce the depression and are also more frequent as a consequence of depression.

This has been supported in a study of [8] by a longitudinal analysis.

### Inadequate stress coping

Destructive stress coping in adolescents diagnosed as depressed has been found in [9].

### Neuroendocrine findings

The severity of depressive symptoms is significantly correlated with cortisol levels during a laboratory stressor [10].

A long duration of depression leads to stress related hyperactivity of HPA axis [11].

A dysregulated feedback of cortisol secretion after stress is reported by [12]. Cortisol does not recover.

A lack of social support results in a hyperactivity of HPA axis. Not seeking social support then is responsible for the maintenance of depression as well as for hyperactivity of the HPA axis [13].

### Somatic complaints in depressed youth

In a twin study with 1300 families explained variance in depression by somatic complaints was 44%. [14]

Complaints which were in particular related to sleep have been observed in 38% in a sample of [15].

The empirical literature shows, that depression in adolescents is characterized by a high stress load but on the other hand by inadequate stress coping. In addition somatic complaints are frequent. In a longitudinal design the present study investigated differences in stress load, stress coping, and somatic complaints between depressed girls and controls. Differences in activity of HPA axis are also taken into account.

## Methods

All Patients were recruited from the Department of child and adolescent psychiatry in a general hospital in Trier and fulfilled DSM IV criteria for major depression which was proved by a structured

clinical interview.

A control group was recruited by advertisements in the local newspaper.

The study was approved by the ethical committee of the University of Trier (17.2.2010).

All participants were paid for participation.

Patients and controls were assessed twice with a time interval of 6 months between the two measurement points (Table 1).

There were no significant differences between patients and controls with respect to these characteristics.

**Questionnaires**

The severity of depression was assessed by the Depression Inventory for children and adolescents (DIKJ) [16].

**Coping strategies**

Reactions to stressful situations were obtained by the coping questionnaire for children and adolescents (SVF-KJ) [17]. The questionnaire measures reactions to stress, when a stress situation is imaged. It comprises strategies which reduce stress as well as strategies that enhance stress. 9 subscales are provided.

**Stress load**

Stress load was assessed by the questionnaire for stress and stress coping for children and adolescents (SSKJ) [18].

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.

All participants collected saliva samples after awakening to determine cortisol.

Somatic complaints were measured by the Giessen Complaint Questionnaire for children (GKB) [19]. It comprises the subscales exhaustion, stomach ache, pain in legs, circulatory problems, and complaints of a cold.

**Results**

The depressed girls had a mean value of 19.3 ± 7.5, the controls of 9.7 ± 6.4 on the Depression Scale (DIKJ).

As expected the mean for the depressed girls was significantly higher and indicates clinically significant depression according to norm-tables for this questionnaire.

Somatic complaints were obtained with the Giessen Complaint Questionnaire for children (GKB). It comprises the subscales exhaustion, stomach ache, pain in legs, Circulatory problems, and complaints of a cold. Internal consistency of the subscales is 80 [19] (Table 2).

**Table 1:** Description of the sample.

	Major Depression (n=74)	Controls (n=74)
Age (years)	15.7 ± 2.1	15.1 ± 2.4
High school (%)	66	81
Parents academic education %	4	10

**Table 2:** Mean values for stress load in patients and controls (M ± SD).

Scale of SSKJ	Controls	Major Depression
Stress vulnerability	15.5 ± 3.0	17.7 ± 2.8
Physical stress symptoms	10.1 ± 2.7	11.8 ± 3.0
Psychol. stress symptoms	21.9 ± 5.5	27.6 ± 5.1

**Table 3:** Mean values for stress coping strategies in patients and controls (M ± SD).

Scales of SVFKJ	Controls	Major Depression
Down playing	17.2 ± 5.4	14.9 ± 5.4
Distraction	11.2 ± 5.5	9.6 ± 5.0
Control of stress	23.2 ± 4.3	19.9 ± 5.9
Positive self instruction	22.5 ± 5.0	18.0 ± 6.7
Social suport	20.4 ± 4.9	18.1 ± 5.9
Passive avoidance	13.8 ± 6.3	19.0 ± 7.1
Rumination	17.9 ± 6.1	21.5 ± 7.0
Resignation	8.5 ± 5.8	13.7 ± 7.5
Aggression	11.7 ± 6.4	15.6 ± 6.9

**Table 4:** Depicts mean cortisol after awakening for the comparision groups (Mean ± SD) in nmol/ml.

Time of cortisol sample	Controls	Major Depression
Awakening	7,2 ± 3,8	6,7 ± 3,5
+ 30 minutes	10,4 ± 3,9	10,8 ± 4,4
+ 45 minutes	9,9 ± 3,9	11,3 ± 4,2
+ 60 minutes	8,9 ± 4,0	10,7 ± 4,3

**Table 5:** Somatic complaints for girls with depression and controls (M ± SD).

GKB-KJ scale	Controls	Major Depression
Exhaustion	8.7 ± 4.9	14.2 ± 5.4
Stomachache	7.1 ± 3.4	9.4 ± 4.0
Pain in legs	5.4 ± 3.9	8.7 ± 5.3
Circulatory problems	4.1 ± 3.5	8.0 ± 4.5
Complaints of a cold	10.4 ± 4.3	11.7 ± 4.5

The statistical analysis for comparison between depressed patients and controls with MANOVA for all three scales simultaneously was significant with F (3,144) = 16.2, p<0.001.

**The depressed girls had significantly higher mean values on all three scales**

They felt more stress load physically as well as psychologically and were more vulnerable to the perception of stress situations (Table 3).

The comparison of the means with a MANOVA for all 9 scales simultaneously yields F (9,138) = 4.4, p<0.001.

The coping strategies of the girls with depression were significantly more inadequate than those of the controls.

They avoid stress situations passively. If a stress situation was present, they ruminate extensively over the situation. Resignation and aggression are also possible, whereas a lack of constructive reactions such as the search for social support can be observed (Table 4).

Mean cortisol over time was analyzed by MANOVA for repeated

measurement. A significant interaction effect between cortisol over time and comparison group was found  $F(3,132) = 3.01, p < 0.04$ . Excluding awakening all means were higher for girls with major depression (Table 5).

The comparison of the mean values with MANOVA for all scales simultaneously yielded  $F(5,139) = 10.1, p < 0.001$ , depressed girls suffered significantly more by somatic complaints, in particular by exhaustion, pain in legs and circulatory problems.

Linear multiple regression analysis was used to identify effects of stress coping, cortisol after awakening, and somatic complaints on stress load after 6 months.

#### Regression analysis 1:

Dependent variable was psychological stress load according to SSKJ.

As predictors served the coping strategy rumination, and mean cortisol 60 minutes after awakening.

The regression equation was significant with  $F(2,138) = 6.4, p < 0.002$  and an explained variance of 7%. A significant predictor was rumination.

#### Regression analysis 2:

Dependent variable was psychological stress load according to SSKJ.

As predictors served the coping strategy passive avoidance and mean cortisol 60 minutes after awakening.

The regression equation was significant with  $F(2,138) = 6.6$  and an explained variance of 8%. A significant predictor was passive avoidance.

#### Regression analysis 3:

Dependent variable was psychological stress load

Predictors were somatic complaints according to GBB, the coping strategy resignation and mean cortisol 60 minutes after awakening.

The regression equation was significant with  $F(7,135) = 8.8, p < 0.001$  and an explained variance of 29%. Significant predictors were resignation, exhaustion and stomachache.

## Discussion

Female adolescents with depression reported a markedly higher stress load than their nondepressed counterparts. This was true for general vulnerability against stress, for psychological stress load and also for physiological signs of stress.

This is a confirmation of data which are known from former investigations.

In a study with standardized diaries in 15-year-old depressed children a heightened vulnerability to stressors such as family conflicts or school problems was a highly significant predictor for maintenance of depressive symptoms [22] and may also be interpreted as a risk factor for developing depression. A correlation between stress load and depression has been seen in a case-control study.

Inadequate stress coping is also figured in [23]. A high degree of

depression led to behavior such as denying stress, rumination, self blame, and resignation, but not to constructive tries to deal with stress such as problem-solving. 2 empirical findings is in line with our data on stress load in depressed adolescents.

An experimental investigation was performed by [21]. Depressed children and controls were exposed to different psychosocial stressors and cortisol changes were measured over time. The depressed children had significantly greater alterations of cortisol which persisted over time, indicating a continuing stress load on a biological level. Unfortunately, stress coping was not obtained, because the children were too young to provide an adequate self-report by questionnaire.

Another investigation in depressed adolescents found that a high response of cortisol after awakening indicated high stress load and predicted depression. The influence of stress coping remained unclear. [24]

The results of the regression analyses seem to be a meaningful extension of previous data insofar as a significant influence of somatic complaints and stress coping on stress load can be concluded. A high stress load and inadequate stress coping has been proposed to maintain depression in the long-term in adults by [20] already. Our results for adolescents can be integrated in this model which should take into account in particular the role of somatic complaints.

A treatment recommendation may be to diagnose somatic complaints carefully and probably take into account medication or family assessment.

The present study cannot be interpreted without limitations. The sample size was relatively small and only girls have been investigated. A generalization to boys at the moment is not possible. Also the age range was restricted to younger adolescents. Further it has to be considered that all information was based on self ratings and future investigation should take into account external evaluation.

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