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**Anxiety disorders in mothers and their children: Results from a  
prospective-longitudinal community study**

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## **Summary**

The relationship between DSM-IV anxiety disorders and their clinical characteristics in mothers and anxiety in offspring was examined in 933 mother-child pairs from a longitudinal community study. Offspring of mothers with anxiety disorders had an elevated risk of developing any anxiety disorder compared to offspring of mothers with no anxiety disorder. Increased child risk of anxiety was especially associated with maternal social phobia and generalized anxiety disorder as well as early onset, number of anxiety diagnoses, and degree of maternal impairment. These results suggest that type of maternal anxiety disorder and severity of manifestation contribute to mother-offspring aggregation of anxiety.

Declaration of interest: None

## INTRODUCTION

In a recent study we showed that clinical characteristics of Major Depressive Disorder aggregate in families (1). There are relatively few high-risk studies of anxiety disorders – especially when excluding panic disorder (for review: 2). Important but unanswered questions are whether the familial aggregation differs with respect to the type and clinical characteristics of anxiety {Biederman, 2005 949 /id}. The aim of the present study is to examine the familial aggregation of anxiety disorders in mothers and their children by differentiating various clinical characteristics as well as specific DSM-IV anxiety disorders in a community sample.

## METHOD

### Design, sample and assessment

Data presented are based on 933 mother-child pairs, a cohort of the Early Developmental Stages of Psychopathology (EDSP) Study, a longitudinal survey of a representative community sample. The offspring of this report were aged 14 to 17 years at baseline and followed up twice. In a separate parent survey their biological mothers were also interviewed. Anxiety disorders according to DSM-IV (4) were assessed. Details on design, methods and assessment have been reported previously (1;5;6).

Maternal diagnostic status refers to the lifetime status of DSM-IV anxiety disorders reported by the mother up to the date of the interview. For offspring, diagnostic information from baseline (lifetime status) and the 2 follow-ups (interval status) was considered. Clinical characteristics in mothers were defined as follows: (1) *impairment* in daily life during the

worst episode, comparing the answers “very much”/“a lot” with “not at all”/“somewhat”; (2) *early onset* before age 20, (3) *at least 2 anxiety disorders* based on the DSM-IV diagnostic criteria (lifetime) (for details: 1)

### **Statistical analyses**

Age-specific cumulative lifetime incidences were estimated with the Kaplan-Meier-method (7). Differences between curves with children of mothers without any anxiety disorder as a reference group were assessed with hazard ratios (HR) from the stratified Cox model for discrete time. The proportional hazards assumption was tested with Schoenfeld residuals. Multinomial logistic regressions with odds ratios (ORs) were used to estimate the associations between specific anxiety disorders in mothers and their children and between clinical characteristics of maternal anxiety and overall rates of offspring anxiety disorders (8). In all analyses, gender and age of offspring were controlled for. To examine possible gender heterogeneity in the ORs we additionally assessed interactions with gender of offspring (1;for details: 9).

## **RESULTS**

In the mothers, the prevalence rate of having any anxiety disorder was 27.4% and in offspring 33.0%. Mothers with and without anxiety differed with respect to current living situation (with partner: 76.5% vs. 83.8%) and educational level (higher education: 20.5% vs. 29.1%).

Figure 1 shows the cumulative probability for offspring of developing any type of anxiety disorder by maternal anxiety status. Hazard rates for the children of mothers with social phobia and generalized anxiety disorder and of mothers with any anxiety disorder

(HR=1.3;95%CI=1.1-1.7) were different from those of children of mothers with no anxiety disorder (NO ANX). In none of the analyses was the proportional hazards assumption violated, indicating that anxiety disorders do not begin earlier in children of mothers with a specific anxiety disorder compared to children of NO ANX mothers. Also, no interactions with gender of offspring were found. When additional analyses were conducted controlling for maternal comorbid anxiety disorders and sociodemographic variables the results remained robust.

In logistic regression analyses assessing associations between specific anxiety disorders in mothers and specific anxiety disorders in offspring, higher rates of panic disorder (7.4% vs. 1.3%, OR=5.0;95%CI=1.5-16.9) and phobia not otherwise specified (20.2% vs. 9.1%, OR=2.5;95%CI=1.1-5.5) in children of mothers with versus without generalized anxiety disorder were found. Also, an elevated risk for separation anxiety was demonstrated in children of mothers with versus without panic disorder (89.2% vs. 1.7%, OR=6.3;95%CI=1.2-33.5).

We examined whether degree of impairment, early onset, and number of anxiety disorders were associated with the rate of anxiety disorders in offspring. The data reveal that anxiety risk in offspring was associated only with ANX CHARAC + status (anxiety disorder and indicated clinical characteristic present) of the mother. While the rate of anxiety disorders in children of NO ANX mothers was 30.7%, the rates in the children of ANX CHARAC + mothers were for strong impairment 43.5% (OR=1.6,95%CI=1.02-2.6), for early onset 41.0% (OR=1.6, 95%CI=1.03-2.4), and for children of mothers with at least 2 anxiety disorders 45.6% (OR=1.9, 95%CI=1.1-3.2). The respective rates of offspring anxiety in the ANX CHARAC – groups (anxiety disorder present but not the indicated clinical characteristic) were for no maternal impairment 35.8% (OR=1.3,95%CI=0.8-1.9), for late onset 36.4%

(OR=1.2,95%CI=0.7-2.0) and for only one maternal anxiety disorder 35.6% (OR=1.2,95%CI=0.8-1.8). There were no differences between children of ANX CHARAC + and ANX CHARAC – mothers. There was also some indication for a dose-response relationship regarding the number of maternal characteristics and offspring anxiety risk (more detailed results available on request).

## DISCUSSION

We demonstrated that there was an elevated rate of anxiety disorders in children of mothers with as compared to children of mothers with no anxiety disorder, confirming and extending previous findings in the literature (e.g., 10;11). A special strength of the current study is that it differentiated specific anxiety disorders in the mothers. The results suggest that especially social phobia and generalized anxiety disorder increase offspring risk of developing anxiety disorders. This indicates that especially in these disorders a diathesis to anxiety in general may be transmitted. Regarding specific anxiety disorders in offspring, it is noteworthy that separation anxiety in children was only associated with maternal panic disorder (12). Thus it could be an early manifestation of panic disorder that is particularly observable in children with a familial vulnerability for panic disorder (13). However, from a longitudinal perspective Brückl *et al.* (14) report less pronounced results.

Another strength of this study is that clinical characteristics of anxiety could be examined with respect to their role in the familial aggregation of anxiety. To our knowledge, such analyses have only rarely been presented (3;15). Interestingly, offspring differing in maternal anxiety status did not differ in age of first onset of anxiety, possibly because particularly phobias develop relatively early in life, irrespective of family history.

Differentiating maternal anxiety additionally with respect to clinical characteristics, elevated rates of anxiety disorders in the children were observed only when the mother not only met the diagnostic criteria for anxiety disorders but also for the clinical characteristics. Thus, only those forms of maternal anxiety disorder that can be considered more severe are associated with an elevated rate of anxiety disorders in children. However, when interpreting the results it is important to consider that lifetime assessments were retrospective and that children had not exited the risk period for onset of all of the anxiety disorders.

In conclusion, our results suggest that maternal anxiety disorders are associated with anxiety disorders in offspring. Furthermore, the type of anxiety disorder (especially social phobia and generalized anxiety disorder) and the severity of anxiety manifestation appear to contribute to mother-offspring aggregation of anxiety.

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