Biological vulnerability to alcoholism in children of alcoholics
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Psychiatric disorders in children of treated alcoholics: the influence of gender, parental psychiatric co-morbidity and family history of alcoholism

ABSTRACT

The aim of the study is to describe the psychopathology present in the children of treatment seeking alcoholics (COA). In addition, the present study investigates whether gender, parental psychiatric co-morbidity, number of alcoholic parents, and family history of alcoholism, are related to psychopathology in COA. Our sample consisted of 60 COA (28 boys, 32 girls) aged 7 to 18, from 39 families. These families included 39 alcoholic index parents (16 mothers, 23 fathers) under treatment for their alcoholism, of whom 9 had spouses who were also alcoholics (1 mother, 8 fathers). DSM-III-R diagnoses were assessed in COA and in index parents. Among the 39 alcoholic index parents, 78% had at least one co-morbid DSM-III-R disorder, mainly affective and anxiety disorders. Among the COA, 50% had at least one DSM-III-R disorder mainly depression and anxiety disorders. Depression and anxiety disorders were over-represented in the daughters of alcoholic mothers, who were seven times more likely to have depression and anxiety disorders than other COA. As expected, the gender of the alcoholic parent exerted an influence on the psychopathology of COA. This, however only occurred in the daughters of alcoholic mothers. Unexpectedly, parental psychiatric co-morbidity, the number of alcoholic parents, and family history status did not predict psychopathology in COA.

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INTRODUCTION

Parental alcoholism is associated with both externalising psychopathology (conduct disorder, oppositional disorder, attention-deficit hyperactivity disorder, alcohol and substance abuse) (1-3), and internalising psychopathology (major depressive episodes, several anxiety disorders) in their offspring (3-5). The nature and the extend of these relationships seems to be dependent on the gender of the alcoholic parent, the gender of the COA, the presence of co-morbid psychopathology in the alcoholic parent, the number of alcoholic parents and the existence of a multigenerational family history of alcoholism.

With regard to the effects of gender, in a familial segregation study, it was found that alcoholism is only associated with panic disorder in the female relatives of probands selected for alcoholism and/or anxiety disorders (6). In a review, it was shown that the gender of offspring and alcoholic parent may influence the psychopathological outcome in the offspring (7). In offspring of alcoholic parents without co-morbid psychopathology, maternal alcoholism relates to affective disorders in boys, whereas paternal alcoholism relates to affective disorders in girls (8). However, a recent study reported higher internalising and depression scores in daughters from families with maternal alcoholism, as assessed from parental ratings, whereas in families with paternal alcoholism, sons had higher scores (9).

Parental gender is not the only factor that may influence affective disorders in COA, parental psychopathology also seems to exert an effect. More specifically, parental anxiety and depression increase anxiety and
depression in COA (2, 5, 6, 10, 11). Interestingly, the anxiety disorder itself may be a risk factor for alcoholism in adolescents. In a prospective follow-up study in college students, a reciprocal causal relationship was observed, over time, between alcohol dependence and anxiety disorders (12). In addition, the number of alcoholic parents, seems to be related to psychopathology in COA. This means that the presence of two alcoholic parents leads to more psychopathology in the COA, than does the presence of a single alcoholic parent (2, 3, 13).

Concerning the risk of alcoholism in COA, segregation studies in families with multigenerational alcoholism, have indicated that COA are at increased genetic risk of alcoholism. Independently of that, the risk is further increased by environmental effects stemming from the parents (14, 15). In adolescents treated for severe alcohol and drug related problems, a familial segregation study has shown that transmissible family factors (genetic and environmental factors that are transmitted from parents to children) account for 30-40% of the variance in antisocial behaviour, depressive symptoms and alcohol problems (16). The question arises whether psychopathology in children at risk of alcoholism is related to a positive family history of alcoholism (defined as the presence of a multigenerational rather than an unigenerational family history of alcoholism) or whether it is related to other parental effects (related to the number of alcoholic parents, their gender, and any parental psychiatric co-morbidity). Because low socio-economic status (SES) in parents is a well known risk factor for the presence of psychopathology in their offspring.
(17), the influence of SES on psychopathology in COA has also to be taken into account.

The current study has two aims. One is to describe any psychopathology present in male and female COA (using DSM-III-R diagnostic criteria) whose parents are seeking treatment for alcoholism. The other objective is to determine whether gender, parental psychiatric co-morbidity, the number of alcoholic parents and a positive family history of alcoholism are related to DSM-III-R psychopathology in COA.

METHODS

Recruitment of alcoholic parents
Treatment seeking alcoholic biological parents were recruited in addiction centres in the Amsterdam region in the period from December 1993 to January 1996. Of the 71 alcoholic parents who were in contact with their children (aged 7 to 18), 39 alcoholic index parents voluntarily participated in the current study. It was important to identify any differences between this group of 39 parents and other alcoholic parents of children aged 7 to 18 who were not participating in the current study. To this end, comparisons were made concerning gender, age and the occurrence of DSM-III-R alcohol dependence or abuse. The group of 32 non-participating parents consisted of 6 mothers (18%) and 26 fathers (82%) (mean age 41.7 ± 8.3, range 24-66). Five parents (15%) exhibited DSM-III-R alcohol abuse, and 24 parents (75%) exhibited alcohol dependence, based on the alcohol abuse module of The Composite International Diagnostic Interview (CIDI) (18). The group of 39 index parents consisted of 16 mothers (41%) and 23 fathers
(59%) (mean age of index parents 42.0 ± 5.9, range 24-60). Two parents (5%) exhibited DSM-III-R alcohol abuse (based on alcohol abuse module CIDI) and 34 parents (87%) exhibited alcohol dependence. No CIDI was available for three of the alcoholic index parents (1 mother, 2 fathers) in the current study (who had a total of four children). This was because one mother died before assessment could take place, one father was missed out and one father was too ill to participate. There were no significant differences in mean age, proportion of alcohol abuse and alcohol dependence between the two groups of parents. However, the group of index parents contained significantly more mothers than did the non-participating group of parents ($t = 2.46; p < 0.020$).

The current study comprised 39 index parents. Of this group, 29 parents were treated in an inpatient setting, while 10 parents received outpatient therapy for their alcoholism. The age of onset of the alcohol problems was 27.5 ± 8.2 (range 15-50) and the duration of alcohol problems was 14.6 ± 7.5 years.

**Recruitment of COA**

All the children ($n = 60$) of all 39 index parents participated voluntary. Each of these COA, therefore, had at least one alcoholic index parent who was being treated for alcoholism. Twelve COA (6 boys, 6 girls), had two biological alcoholic parents. Fifty-four COA were Caucasian, 6 COA belonged to an ethnic minority. The participating children were compared with the children, aged 7 to 18 ($n = 66$), of alcoholic parents who did not participate in the current study. No difference in mean age and gender was
found between the two groups of children. The age of the 60 participating COA (28 boys, 32 girls) ranged from 7-18 (mean age 12.0 ± 3.4).

Of the COA, 34 (57 %) had parents who were divorced. In this group, 32 COA lived with their mother (n = 18 having an alcoholic mother) and 2 COA lived with their father (both of whom were alcoholic). Two COA had left home and were living alone. The remaining 24 COA (40 %) lived in complete family units.

Comparisons were made between the group of COA from families with multigenerational alcoholism, including alcoholism in first and second degree biological relatives (COA-multi-group), and the group of COA with only first degree alcoholism (19), i.e. where alcoholism occurred only in first degree biological relatives but not in second degree biological relatives (COA-uni-group).

On the basis of a physical examination, no COA exhibited definite foetal alcohol effects, one COA had probable foetal alcohol effects, and three had possible foetal alcohol effects (20). One girl refused the physical examination. However, her non-alcoholic mother reported that she had not consumed alcohol regularly during pregnancy. Twelve alcoholic mothers of 17 COA reported that they had consumed alcohol during pregnancy (0.42 standard drinks/day ± 0.79, range 0.0-3.0). However, when the 4 COA with possible or probable foetal alcohol effects were compared with the other COA, no difference was found in the number of standard drinks their mothers reported consuming during pregnancy. Therefore, the 4 COA remained in the study population.
Measures

The Composite International Diagnostic Interview (CIDI) (18) was used to assess DSM-III-R diagnoses of alcoholism and psychiatric co-morbidity in the alcoholic index parents. The family history section of the EuropASI (21), validated in a Dutch alcoholic population (22) was used to assess alcoholism in first and second degree family members of the COA. Alcoholism in the spouses was further assessed according to DSM-III-R criteria. The incidence of DSM-III-R psychopathology in COA was investigated using a multiaxial approach to assessment. This was based on multiple sources of information, and on a process of integrating information from the child, the parent, the teacher and the clinician (23). All instruments, but the self-report substance-use questionnaire (24), were suitable for the age range of our study population. Information was obtained from the children using a Dutch adaptation (25) of the Semistructural Clinical Interview for Children and Adolescents (SCICA) (26). Information was obtained from the parents using the Diagnostic Interview Schedule for Children, Parent version (DISC-P) (27), in addition to the Child Behaviour Checklist (CBCL) (28, 29). CBCLs were drawn up for all 60 children. In 30 COA the CBCL was assessed purely on the basis of information from the alcoholic parent. The Teacher’s Report Form (TRF) (30) was used to collect information from the 88% of teachers who co-operated (n = 51 COA). No TRF was available for 2 COA because they had left school. A self-report substance-use questionnaire was used to assess current prevalence (use during the last four weeks) and lifetime prevalence of smoking, alcohol and drug use in the COA aged 10 and above (n = 41), as well as the lifetime
prevalence of drunkenness and gambling. Although confidentiality was assured, three boys aged 11 to 14 refused to fill out the substance-use questionnaire. A senior child psychiatrist (WBG) recorded the clinical history and carried out a physical examination. At least two sources of information had to corroborate before a DSM-III-R diagnosis in the COA was assessed, sources were parents, teacher and clinical interview.

Socio-economic status (SES) was based on the parents’ current employment status (31). Three levels of SES were used in the current study, the highest level related to the highest degree of employment of the two parents at the time of the study (32).

The study was approved by the Medical Ethical Committee of the Academic Medical Center in Amsterdam. Children aged 12 and above and parents gave their written, informed consent.

Statistics
In order to test the potential effect of the SES of COA, age of COA, gender of COA, gender of alcoholic index parent, presence of parental psychiatric co-morbidity, number of alcoholic parents and family history of alcoholism on the presence of any DSM-III-R diagnosis in COA, a series of group comparisons were performed using analysis of variance and student T-tests for continuous data (SES; age) and exact statistics ($X^2$) for categorical data. In case of significant differences between groups, separate analyses were performed for internalising (affective and anxiety disorders) and externalising (ADHD, CD, ODD) disorders. Logistic regression was applied to control for confounding of the relationship between COA and parent
characteristics and the presence of a DSM-III-R diagnosis in COA by SES of the index parent. Adjusted ORs are reported with a 95% CI. The 95% significance level was chosen to prevent type II errors in this relatively small explorative study.

RESULTS

The prevalence of parental co-morbid DSM-III-R psychopathology (mainly affective and anxiety disorders) in the COA was 78 % (n = 44), according to the CIDI (Table 1). The presence of at least one DSM-III-R diagnosis in COA was 50 % (mainly depression and anxiety disorders) (Table 2). Twenty-four COA (9 boys, 15 girls) had an internalising DSM-III-R diagnosis, and 7 COA (4 boys, 3 girls) had an externalising DSM-III-R diagnosis. For the COA with and without a DSM-III-R diagnosis, the values of SES and age, and the proportions of gender of the alcoholic index parent, psychiatric co-morbidity in the alcoholic index parent, two alcoholic parents, and multigenerational alcoholism are presented in table 3.

Table 1 shows that SES of the parents was significantly related to the presence of any DSM-III-R diagnosis in COA (t = 2.33; p < 0.030) with more DSM-III-R diagnoses in the COA from parents with low SES.

Table 1 also shows that the presence of a DMS-III-R diagnosis in COA was not related to age of COA, gender differences in COA or index parent, multigenerational alcohol problems in the family or to psychiatric co-morbidity in the index parent.

The presence of a DSM-III-R diagnosis in COA was significantly related to the number of alcoholic parents with two alcoholics parents being
more prevalent in those COA with compared to those without such a diagnosis ($X^2 = 4.27; p < 0.040$). However, this effect disappeared after controlling for SES.

Number of alcoholics parents was significantly associated with the presence of externalising DSM-III-R disorder ($X^2 = 3.59; p < 0.010$) but not with internalising disorder in COA. Again, the significant effect disappeared after controlling for SES of the index parent.

DSM-III-R disorders were significantly more prevalent in the daughters of alcoholic mothers than in other COA before controlling for SES ($X^2 = 3.89; p < 0.050$), but not after controlling for SES of the index parent. However, significantly higher prevalence rates of internalising DSM-III-R disorders were observed in the daughters of alcoholics mothers ($X^2 = 9.04; p < 0.001$) and this relationship remained significant after controlling for SES of the index parent (adjusted OR = 6.88; 95% CI = 4.85-8.91).
Table 1. DSM-III-R diagnoses in alcoholic index parents

<table>
<thead>
<tr>
<th>DSM-III-R Diagnosis</th>
<th>Fathers (n = 26 COA)</th>
<th>Mothers (n = 18 COA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug dependence</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Organic brain disorder</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>Major depression</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Bipolar disorder</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Dysthymia</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Generalised anxiety disorder</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Panic disorder with agoraphobia</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Social phobia</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Simple phobia</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Somatoform pain disorder</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Bulimia nervosa</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. DSM-III-R diagnoses in COA

<table>
<thead>
<tr>
<th>DSM-III-R Diagnosis</th>
<th>Boys (n = 14)</th>
<th>Girls (n = 16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannabis dependence</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Attention deficit hyperactivity disorder</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Oppositional conduct disorder</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Conduct disorder</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Major depression</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Dysthymia</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Overanxious disorder</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Separation anxiety disorder</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Generalised anxiety disorder</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Agoraphobia without panic disorder</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Social phobia</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Simple phobia</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Post traumatic stress disorder</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Habit disorder</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Bulimia nervosa</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Transient tic disorder</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Enuresis</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
Table 3. Sample characteristics, parental and COA variables for the presence of a DSM-III-R diagnosis in COA.

<table>
<thead>
<tr>
<th></th>
<th>COA DSM-III-R diagnosis present (n = 30)</th>
<th>COA DSM-III-R diagnosis absent (n = 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SES</strong> (mean, SD)</td>
<td>1.8, 0.80</td>
<td>2.3, 0.64</td>
</tr>
<tr>
<td><strong>Age COA</strong> (mean, SD)</td>
<td>11.3, 3.6</td>
<td>12.8, 3.2</td>
</tr>
<tr>
<td><strong>Gender COA</strong> (% girls, n)</td>
<td>53%, (n = 16)</td>
<td>47%, (n = 14)</td>
</tr>
<tr>
<td><strong>Gender alcoholic index parents</strong> (% mothers, n)</td>
<td>50%, (n = 15)</td>
<td>30%, (n = 9)</td>
</tr>
<tr>
<td><strong>Parental psychiatric co-morbidity</strong> (% present, n)</td>
<td>70%, (n = 21)</td>
<td>77%, (n = 23)</td>
</tr>
<tr>
<td><strong>Number alcoholic parents</strong> (% two, n)</td>
<td>30%, (n = 9)</td>
<td>10%, (n = 3)</td>
</tr>
<tr>
<td><strong>Family history</strong> (% multigen.)</td>
<td>77%, (n = 23)</td>
<td>53%, (n = 16)</td>
</tr>
</tbody>
</table>

Note: * p < 0.050, ** p < 0.030
DISCUSSION

The present study shows that daughters of alcoholic mothers are at increased risk of internalising psychopathology (i.e. depression and anxiety disorders) relative to the other COA in the study. This finding applies to a group of COA with a broad age range (7 to 18). It was obtained in a group of COA which has DSM-III-R diagnoses that mainly relate to depression and anxiety, and whose alcoholic parents mainly have a co-morbidity of depression and anxiety. In this sample, however, parental co-morbidity was found to have no influence on the incidence of DSM-III-R psychopathology in the COA. It can be concluded that any parental influence on psychopathology in the COA group studied may be largely explained by the effect of maternal alcoholism on daughters, rather than by the effect of parental co-morbid psychopathology. This is in agreement with the results of a familial aggregation study, that familial alcoholism was related to anxiety, particularly in female relatives (6).

The present finding is also in agreement with the report that in families with maternal alcoholism, daughters had higher internalising and depression CBCL scores than sons (9).

The current findings do not appear to corroborate the study in high and low risk children, aged 8-18, that found a cross-gender effect on affective disorders in COA, from alcoholic fathers to daughters, and from alcoholic mothers to sons (8). However, the alcoholic parents from the previous study (8) were screened to exclude psychiatric co-morbidity, whereas parents with psychiatric co-morbidity were not excluded from the current study. Although parental psychiatric co-morbidity did not have a
significant effect on the COA in the present study, it cannot be ruled out as a possible explanation for the differences in reported gender-effects between these two studies.

Unexpectedly, COA with two alcoholic parents (rather than just one) and a multigenerational family history of alcoholism showed no associated increase in psychopathology, after adjustment for the effect of SES. Our failure to find this expected association might be largely explained by the reported heterogeneity in co-morbid psychopathology within alcoholics and within COA samples (33, 34, 35), indicating that the possible association between the presence of psychopathology in COA and risk for the development of alcohol and drug dependence is not clear yet. The adjustments for SES reported in our results section were necessary because SES differences were significantly present in the family history of alcoholism, SES was lower in multigenerational than unigenerational alcoholism, as expected, SES was also lower when two alcoholic parents were present instead of one, and when mothers were alcoholic instead of fathers (data not shown).

The current study was subject to four main limitations. Firstly, the number of individuals (parents and their children) included in the study was quite small. The relatively small power may also explain why expected relationships were not found, however the study was able to detect a relationship between maternal alcoholism and increased internalising psychopathology in their daughters. Secondly, the parents included in this study were not representative of all alcoholic parents. This study focused on parents seeking help in mainly inpatient settings, a group with a high
incidence of psychiatric co-morbidity. Of particular significance is the fact that the group of participating parents included more mothers than the group of parents that did not participate. This restricts the generalisibility of our findings. Thirdly, in 30 COA, the CBCL was only assessed using the alcoholic parent who was seeking help. This may have weakened the reported sensitivity and specificity.

In conclusion, as was expected, the current study indicates that the daughters of alcoholic mothers are at an increased risk of internalising psychopathology, relative to other COA. Unexpectedly, no differences in psychopathology were found between COA with unigenerational family histories of alcoholism and those with multigenerational histories. Also, in the present study, neither having two alcoholic parents nor psychiatric co-morbidity in the alcoholic index parent produced increased psychopathology in COA.
REFERENCES


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