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# Minor depression in adolescence: Phenomenology and clinical correlates

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## 1. Introduction

Major depressive disorder (MDD) causes significant disturbance in emotional, social and academic functioning in adolescence. Prior epidemiologic studies show up to 25% lifetime prevalence of MDD by the end of adolescence (Kessler et al., 2001) and from 1% under age 12 to 17.4% at age 19 and older females (Glowinski et al., 2003). However, many depressed adolescents are left below the diagnostic threshold of MDD (Angold et al., 1999; Kessler and Walters 1998; Kessler et al., 1994). When symptoms are not of sufficient severity to fulfill the criteria for MDD, depression may be under-recognized as many adolescents present with vague complaints and relatively short episodic depressive symptoms (Lewinsohn et al., 1994; Keller et al., 1998). However, the diagnosis of minor depression, one of the residual categories of Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition-Text Revised (DSM-IV-TR, American Psychiatric Association) Depressive Disorder NOS could be considered for many of these adolescents.

The clinical significance of minor depression in adolescence has remained controversial, but a growing body of evidence supports the importance of this diagnosis. One of the previous studies, National Comorbidity Survey (NCS) reports a lifetime minor depression prevalence of 9.9 % in adolescents and an almost identical course and outcome as MDD (Kessler et al., 1994, 1997). Further, depressive symptoms may represent a potential risk factor for early adulthood mental disorders (Aalto-Setala et al., 2002) and predict an episode of MDD in adulthood (Pine et al., 1999). Recent study of Latino sample examining risk factors associating with depression in adolescents (González-Tejera et al., 2005) shows that minor depression may be strongly associated with functional impairment and psychosocial correlates of depression. Evidence from adult populations also suggests the clinical relevance of depressions

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subthreshold for a diagnosis of MDD and an increased lifetime prevalence of suicide attempts in adults with minor depression (Judd et al 1999, 2002, Pine et al., 1997).

Comorbidity of psychiatric disorders is particularly significant as comorbid individuals may be more seriously affected and be more likely to receive psychiatric services (Costello et al., 1996). Existing literature suggests a comorbid pattern of anxiety and depressive disorders (Axelson and Birmaher 2001; Essau, 2003), depression and conduct disorder (Ford et al., 2003) and oppositional defiant disorder and depression (Angold and Costello 1993). In a study conducted by Kessler & Walters (18), comorbidity was associated to both DSM-III-R major and minor depression. The Oregon Adolescent Depression Project found also comorbidities between subtreshold MDD, other psychiatric subthreshold and full syndrome conditions (Lewinsohn et al., 2004).

Previous literature on early-onset depressive disorders suggests them to be shorter in duration in epidemiologically representative samples than those reported in clinical samples (Kaminski et al., 2002, Keller et al., 1998Lewinsohn et al., 1994), recurrent and often associated with poor psychosocial and academic outcome (Birmaher et al., 1996). The diagnostic symptoms by gender and age have received little attention in adolescent population (Roberts et al., 1995). In the study of Rapaport et al (2002), minor depression in adults was characterized by mood and cognitive symptoms rather than classical neurovegetative symptoms.

In conclusion, further understanding of depressive disorders is essential for epidemiological and clinical purposes. The present study aimed to examine the phenomenology, epidemiology and clinical correlates such as suicidality, service use and comorbidity of adolescent depression. To extend and contribute to current limited literature of non-MDD depressive disorders in adolescents, we investigated minor depression, a category for depressions subthreshold for diagnosis of DSM-IV MDD.

## 2. Methods

### 2.1. Participants

The study was part of an ongoing longitudinal Finnish twin study (FinnTwin12) launched in 1994 to investigate developmental genetic epidemiology of health-related behaviors, especially use and abuse of alcohol (Rose et al., 2001). From 1994 to1997, all Finnish families with twins born in 1983-87 were identified from the Finland's Central Population Registry and included in the Finnish Twin Cohort (Kaprio et al., 2002). The study has a two-stage sampling design. The first-stage study includes questionnaire assessments of both twins and parents at baseline, starting with the initial family questionnaire (87% participation rate, 2,724 families) conducted the autumn of the year in which each twin cohort reached 11 years, with follow-up of cohorts at age 14 and 17.5. Nested in this epidemiological, population representative study lays an intensive assessment of a subsample of 1035 families, comprising about 40% of all twins, mostly selected at random (72.3%, 748 families). A small part of the subsample (27.3%, 287 families) is enriched with families with twins assumed to be at elevated familial risk for alcoholism risk. To achieve this, an 11-item lifetime version of the Malmö-modified Michigan Alcoholism Screening Test (mM-MAST, a self-report of one or both biological parents (Seppa et al., 1990) with two additional items to increase the predictive validity of the instrument as a screen for DSM-III-R/DSM-IV alcohol abuse and dependency diagnoses was created. The twins were assumed to be at risk for alcohol problems were the offspring of parents with elevated scores on the mM-MAST. Details about the sub-sample have been described earlier (Rose et al., 2001). In this subsample, both twins and parents were interviewed using the SSAGA (Semi-Structured Assessment for the Genetics of Alcoholism (Buzholz et al., 1994), a highly reliable instrument providing lifetime diagnoses for alcohol dependence, major depressive disorder, anxiety disorders, conduct disorder, oppositional defiant disorder (ODD),

attention-deficit-hyperactivity disorder (ADHD) and eating disorders. The participation rate was over 90%. The non-responders at each stage and a small number of twins whom we were not able to interview, were carefully assessed and no evidence for selection for family type, parental age, area of residence, type or sex of the twin or other systematic bias was found. All the interviewers had previous interview experience and were experienced professionals, Masters of Psychology and Health Care or registered nurses trained at Indiana University Medical School using standard COGA-interview training procedures (The Collaborative Study on the Genetics of Alcoholism, Edenberg, 2002). The interviews were highly age-standardized; the mean age at interviews was 14.19 years, with 75% of interviews completed by 14 years and 3 months of age and all interviews completed before the age of 15.The final sample consisted of 1854 interviewed boys (N=945, 51%) and girls(N=909, 49%).

### 2.2. Measures

All measures were derived from the semi-structured interview. Two exclusive lifetime diagnostic groups were defined for depressive disorders; DSM-IV major depressive disorder (MDD) and minor depression. The criteria for DSM-IV MDD were the presence of 5 or more depressive symptoms, one of them being depressed/irritable mood or anhedonia, all symptoms occurring nearly every day for at least two weeks and a significant impairment of functioning and exclusion of bereavement and symptoms attributed to the effects of medication or alcohol use. Among subjects who met all the other criteria for MDD except for the number of five symptoms required, minor depression was defined as presence of at least two but less than five symptoms of MDD, one of them being depressed/irritable mood or anhedonia nearly every day for at least 2 weeks and excluding adolescents with a previous history of DSM-IV MDD or dysthymia (defined as presence of depressed/irritable mood nearly every day over a year and a report of at least two additional symptoms). Bipolar disorder was not assessed in the interview, however; it is considered to be uncommon at this age. The other major types of disorders; generalized anxiety disorder (GAD), ADHD, ODD and conduct disorder, as well as alcohol abuse diagnoses, were assessed according to DSM-IV criteria without considering impairment. Deviant behaviors (smoking, illicit drug use) were each analyzed in multi-item sections in the same interview. Other depression-related variables; age of onset, duration of episodes, recurrence, psychosocial impairment, service use, medication and suicide plans, suicide attempts and the severity of attempt from scale 0 to 4 were derived from the 36-item depression section. All positive responses were asked to be explained in detail. Further details about the interview are available elsewhere (Kuperman et al., 2001).

### 2.3. Statistical Analysis

Descriptive frequencies, regression and pairwise analyses were generated with Stata Software (Version 8). Comparisons in subgroups, significant differences in means and distributions between diagnostic groups were tested with two-sample Wilcoxon rank-sum (Mann-Whitney) and Fisher's exact tests when appropriate. A probability level of $p<0.05$ (two-tailed) was considered statistically significant. Logistic regression was used to calculate female-male ratios and the odds ratios of comorbidity between depression and any of other disorders while adjusting for others. All individual analyses were adjusted for clustered sampling with STATA's cluster option to correct for the non-independence of observations within twin pairs.

## 3. Results

### 3.1. Lifetime diagnoses

In this community-based population, minor depression was much more common than major depression (12.0% vs. 2.3%). Detailed in table 1, lifetime prevalences of minor depression and DSM-IV major depressive disorder exhibit statistically significant gender difference with female having a twofold difference for minor depression and fourfold for MDD.

### 3.2. Phenomenology of minor depression and major depressive disorder

Minor depression was primarily characterized by depressed or irritable mood, sleeping difficulties and impaired concentration. Compared to subjects with MDD, youth with minor depression reported lower rates of feelings of worthlessness or excessive guilt, reduced or increased appetite, fatigue, and psychomotor agitation/retardation (table 2).

### 3.3. Age of onset & duration

The range of age of onset was from 5 to 14 years, with no significant differences between minor depression and major depressive disorder (Mann-Whitney $z=0.908$, $p=0.3639$). The duration of MDD (mean 11.07, median 8 weeks) was significantly longer than that of minor depression (mean 5.31, median 2 weeks, Mann-Whitney $z=-5.814$ $p<0.001$).

### 3.4. Recurrence

26.6% (57) with minor depression and 41.8 % (18) adolescents with MDD reported recurrent episodes of depressive symptomatology, ranging from 1 to 10 recurrences. 11.6% (5) of adolescents with MDD had a recurrent MDD while the others (13) had subthreshold symptoms. Three individuals reported these symptoms as due to alcohol, bereavement etc, and one individual due to both. Among subjects with minor depression concomitant factors accounted for 24.6% (14) of recurrent cases.

### 3.5. Service use

Utilization of mental health services was low, 6.8 % (15) of minor depression, and 32.6% (14) of adolescents with DSM-IV MDD had sought or been referred to professional care (treatment with medical doctor or other professionals). Forty per cent of depressive adolescents who had attempted suicide had no contact with mental health services. The received professional care was mostly outpatient treatment, as only two adolescents had been hospitalized. The use of antidepressants or other medication was rare (Table 3)

### 3.6. Suicidality

Table 3 shows that suicidal thoughts were reported by 31.8% (69) subjects with minor depression and 53.5% (23) subjects with MDD. 8.6% (19) subjects with minor depression and 27.9% (12) subjects with MDD had a suicide plan. 2.3 % (5) adolescents with minor depression and 11.6% (5) adolescents with MDD had attempted suicide. Most attempts were serious attempts of taking one's life and 60% of them led to a contact with medical professional. Suicidal ideation/attempts were more common among subjects with comorbid minor depression (Mann-Whitney $z=-2.340$ $p=0.019$) compared with those without comorbidity.

### 3.7. Comorbidity

30.6 % (68) with minor depression and 53.5% (23) of adolescents with DSM-IV MDD had at least one comorbid diagnosis. 21.7% (48) of minor depression and 30% (13) of MDD cases had one, 5.9% (13) and 14.0% (6) had two, 2.3% (5) and 2.3% (1) had three, 0.9% (2) and 4.7% (2) had four lifetime comorbid diagnoses plus depression. After adjusting the presence of other disorders, only associations between a lifetime diagnoses of minor depression and GAD, and minor depression and conduct disorder remained statistically significant (table 3).

At this early age, eating disorders, alcohol use disorders and illicit drug use were reported only by a few adolescents. However, a fifth (20.5%) of adolescents with minor depression and a third (32.6%) of adolescents with MDD reported daily smoking compared to 12.8% among non-depressed subjects. Daily smoking was more common among subjects with comorbid minor depression (Mann-Whitney -4.193 $p<0.001$).

## 4. Discussion

According to this data from a large, representative and age-standardized sample of Finnish twins, the majority of depressed youth fall below the threshold for MDD according the diagnostic criteria of DSM-IV classification. A large proportion of these depressed adolescents fulfilled the criteria for minor depression. Although clearly milder condition than MDD, minor depression was associated with marked suicidal thoughts, plans and attempts, recurrences and a high degree of comorbidity in particular with conduct disorder and generalized anxiety disorder.

Similar to population-based surveys in Britain (Ford et al., 2003) and in Puerto Rico (Canino et al., 2004), the prevalence of DSM-IV MDD was relatively low (2.32%). A potential explanation for the low rates of MDD using DSM-IV criteria is the inclusion of impairment criterion, which reduces prevalence estimates (Canino et al., 2004). The prevalence of minor depression was comparable with previous studies (Lewinsohn et al., 2004; Kessler and Walters 1998) and our findings from different culture add to credibility of these results. Extending previous findings, our study also reports significant gender difference in minor depression, different from most study samples. However, compared to present highly age-standardized study, most of these studies include younger, preadolescent children, for whom female dominance in depression is usually not established (Angold and Rutter, 1992).

Our results indicate that minor depression was primarily characterized by depressed or irritable mood, impaired concentration, sleeping difficulties and anhedonia. The low rates of classical neurovegetative symptoms in subjects with minor depression suggest that MD is different from MDD in that these symptoms are less frequent among subjects with minor depression, a finding similar to adults (Rapaport et al., 2002). As in previous research using DSM-III-R nosology, the duration of MDD (11 weeks) was generally shorter in this population-based sample than in clinical studies, as was the duration of minor depression (5 weeks). These findings, if replicated, suggest that even though symptoms may not be stable, they might be clinically relevant.

The very low prevalence of medication use is consistent with other reports of adolescent samples. However, the utilization of mental health services was observed with most severe cases (32% of MDD cases) but only 6.8% of minor depression cases in contrast with results reported by González-Tejera et al. (2005), suggesting higher prevalences of service use for minor depression than MDD. In our study, treatment was defined strictly professional, given by physician or other professional in mental health services. This may, together with cultural differences, partly explain the low prevalence. In this sample, presence of impairment, longer duration, or even serious suicide attempts did not lead to contact with health services, which represents a challenge for service planning.

The high prevalence of suicidality among depressed adolescents in this study is in agreement with previous findings of suicidality in adolescence (Pelkonen and Marttunen, 2003).The subjects with minor depression, especially with comorbid minor depression, also reported suicide plans and serious suicide attempts. Further assessment is needed in order to conclude, whether this is due to high comorbidity or related to depressive symptoms.

Although the strength of associations was weaker among subjects with minor depression than in those with MDD, both disorders were associated with a high rate of comorbidity, consistent with previous research (Angold and Costello, 1993). The present study found the associations between depression and conduct disorder and depression and anxiety, consistent with findings elsewhere (Axelson and Birmaher 1999, Essau, 2003, Ford et al., 2003).

The generalizability of our results must be interpreted in the context of the following limitations. First, our population consisted of twin individuals. Regarding adolescent depression, clear evidence for differences in rates of depression between twins and singletons has not been documented. A previous study of longitudinal samples of twins and singletons aged 8-17 found no differences between twins and singletons in their depression scale scores (Angold et al., 2002). In an earlier report of these same twins at the age of 12, depressive symptoms did differ in prevalence between them and 25 000 classmates (Pulkkinen et al., 2003). We report that the prevalence rates and clinical characteristics from this study of twins are consistent with those of other epidemiological studies (Lewinsohn et al., 1994, 2004, Ford et al., 2003) and depressive disorders among the twins are likely to be similar to those found in the nontwin population.

Second, due to the original design of our study a small part of the subsample was enriched for alcoholism risk, using a questionnaire screen completed by the twins' parents. Accordingly, the subsample is believed to have an increased liability for alcoholism and, perhaps, increased liability for depression. However, when formally assessed, the prevalence of MDD or minor depression did not differ among offspring of these parents compared to randomly selected participants. In addition, we have performed a series of model-fitting analyses to diverse phenotypes to test for potential bias introduced by the sample enrichment and did not find evidence that model-fitting results were systematically affected (Rose et al 2004).

Third, analyzed in a cross-sectional setting, no conclusions about long-term implications and causal relationships of other comorbid conditions with MDD could be made. As the twins of the present study age and follow-up data is obtained, future analyses will be directed toward analyzing the long-term outcome of these individuals.

### 4.1 Clinical implications

Our finding that suicidality and health-compromising behaviors such as daily smoking were particularly common among depressed youth with comorbid disorders suggests the need for careful assessment individuals with multiple disorders. It seems plausible to encourage careful screening of comorbidity also among youth with depressive symptoms, even if they are below the diagnostic threshold for MDD. Since comorbidity is a potential risk factor for suicide attempts and health-compromising behaviors, we suggest that in any depressive disorders associated with comorbidity, whether fulfilling the MDD threshold or not, interventions and referral from primary care providers to clinics should be considered.

The results underscore the importance careful assessment of youth with non-MDD depressions; instead of being mild conditions they seem to be associated with the same correlates as more serious depressions. Based on the current study, minor depression potentially represents a part of the spectrum of clinically meaningful depressive disorders in adolescence and should be considered for targeted interventions and preventive efforts in adolescence. To assist classification and consensus about disabling depressive symptoms, new categories in future revisions of the DSM-IV, such as minor depression, could be considered to describe children not fulfilling the criteria for major depression. Further studies of strategies for recognition, short- and long-term implications and public health significance of non-MDD depressions in adolescence are encouraged.

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**Table 1**

Lifetime prevalences of minor depression and major depressive disorder (MDD) in 14-year-old Finnish adolescents.

| Depressive disorder | N | % OR 95%CI | F:M OR 95%CI |
|---|---|---|---|
| Minor Depression | | | |
| total sample N=1854 | 222 | 12.0%(10.5-13.5) | 2.1(1.5-2.8)*** |
| girls (N=909) | 144 | 15.8%(13.5-18.2) | |
| boys(N=945) | 78 | 8.3%(6.5-10.0) | |
| Major depressive disorder | | | |
| total sample N=1854 | 43 | 2.3%(1.6-3.1) | 4.7(2.2-10.1)*** |
| girls (N=909) | 35 | 3.9%(2.6-5.1) | |
| boys (N=945) | 8 | 0.9%(0.3-1.4) | |

F=female, M=male, OR=Odds Ratio, CI=Confidence Interval,

*** p≤.001.

**Table 2**

Phenomenology of minor depression and major depressive disorder.

| | Minor depression | | | | | | DSM-IV Major depressive disorder (MDD) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Females | | Males | | All | | Females | | males | | all | |
| | N | % | N | % | N | % | N | % | N | % | N | % |
| Depressed/Irritable mood Anhedonia | 131 | 90.97 | 69 | 88.46 | 200 | 90.09 | 31 | 88.57 | 8 | 100.00 | 39 | 90.70 |
| | 58 | 40.28 | 36 | 46.15 | 94 | 42.34* | 27 | 77.14 | 6 | 75.00 | 33 | 76.74 |
| Appetite-related Symptoms | 61 | 42.36 | 18 | 23.08[1] | 78 | 35.59* | 24 | 68.57 | 5 | 62.50 | 29 | 67.44 |
| Fatigue | 59 | 40.97 | 33 | 42.31 | 92 | 41.44* | 25 | 71.43 | 6 | 75.00 | 31 | 72.09 |
| Sleeping difficulties | 110 | 76.39 | 55 | 70.51 | 165 | 74.32 | 31 | 88.57 | 7 | 87.50 | 38 | 88.37 |
| Worthless ness/Exessive guilt | 75 | 52.08 | 18 | 23.08[2] | 93 | 41.89* | 27 | 77.14 | 7 | 87.50 | 34 | 79.07 |
| Impaired concentration Suicidality | 89 | 61.81 | 53 | 67.95 | 142 | 63.96 | 34 | 97.14 | 7 | 87.50 | 41 | 95.35 |
| | 58 | 40.28 | 16 | 20.51[3] | 74 | 33.33 | 17 | 48.57 | 6 | 75.00 | 23 | 53.49 |
| Psychomotor agitation/Retardation | 45 | 31.25 | 27 | 34.62 | 72 | 32.43* | 21 | 60.00 | 7 | 87.50 | 28 | 65.12 |

* comparison MDD/Minor depression, Fisher's exact p<0.05

[1] Females to males OR 2.45 95%CI 1.32-4.55

[2] .. OR 3.62 95%CI 1.92-6.82

[3] .. OR 2.61 95%CI 1.38-4.95

**Table 3**

Multivariate logistic regression for suicidality, service use and comorbidity among adolescents with minor depression and major depressive disorder.

| | Minor Depression | | Major Depressive Disorder | |
|---|---|---|---|---|
| | % | OR (95% CI) | % | OR (95% CI) |
| Suicidality | | | | |
| Ideation | 31.8 | 27.5(15.8-48.0)*** | 53.5 | 14.3(6.3-32.1)*** |
| suicide plan | 8.6 | 7.6 (3.6-16.3)*** | 27.9 | 18.0(5.9-54.3)*** |
| suicide attempt | 2.3 | 3.8 (1.0-14.4)* | 11.6 | 12.3(1.8-81.2)** |
| Service use | | | | |
| doctor's appointment | 6.8 | 4.9(2.1-11.4)*** | 32.6 | 26.8(10.1-71.3)*** |
| antidepressant medication | 1.4 | 8.0(0.8-77.5) | 4.7 | 22.0(2.9-166.4)*** |
| Comorbidity | | | | |
| conduct disorder | 22.5 | 3.1(2.1-4.5)*** | 37.2 | 4.8(2.2-10-6)*** |
| GAD | 9.45 | 3.4(1.9-5.9)*** | 23.3 | 7.6(2.9-19.8)*** |
| ODD | 1.8 | 1.7(.4-7.6) | 11.6 | 7.0(1.3-38.2)* |
| ADHD | 0.9 | 2.2(.4-13.4) | 7.0 | 9.0(.96-83.8) |
| daily smoking | 20.5 | 1.7(1.1-2.6)*** | 32.6 | 3.1(1.7-5.9)*** |

OR=Odds Ratios, CI=Confidence Intervals. All models adjusted for sex, presence of otherdisorders and clustered sampling. GAD=generalized anxiety disorder, ODD=oppositional defiant disorder, ADHD=attention-deficit/hyperactivity disorder

* p≤.05,

** p≤.01,

*** p≤.001.