Major depressive episode and physical health in adolescents and young adults: results from a population-based interview survey

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Background: This paper aimed to investigate associations between major depressive episode (MDE) and chronic illness, disability, self-perceived health and number of sick-days among adolescents and young adults in the general population. Methods: The Finnish Health Care Survey 1996 was a cross-sectional nationwide epidemiological study. A random sample of 509 adolescents and 433 young adults was interviewed in 1996. DSM-III-R MDE during the past 12 months was defined using The University of Michigan Composite International Diagnostic Interview Short-Form algorithm. Data on physical health were gathered in the interview. Results: In multivariable logistic regression, chronic illness [odds ratio (OR) 1.78; 95% confidence interval (CI) 1.03, 3.05], poor self-rated health (OR 2.26; 95% CI 1.01, 5.07), more than three sick-days in the past 6 months (OR 1.72; 95% CI 1.02, 2.92) and respiratory allergies (OR 2.40; 95% CI 1.00, 5.75) were associated with MDE. Among 15- to 19-year-olds, disabling chronic illness was related to MDE (OR 2.59; 95% CI 1.06, 6.36), and thoughts of death were more prevalent in the presence of chronic illness among those with MDE [35.2% versus 65.7%; \(F(1,67) = 0.024\)]. Migraine was associated with MDE among young adults (OR 6.18; 95% CI 1.14, 30.8). Conclusions: Symptoms of depression should be investigated among adolescents with chronic illness or frequent sick-days. The degree of reported disability should be noted. Young people with both chronic illness and depressive symptoms should be assessed for thoughts of death and possible suicidality.

Keywords: adolescents, chronic illness, depression, self-perceived health, sick-days

Introduction

In adults, the combined impact of depression and chronic illness on disability is known to be considerable.1 Symptoms of depression are also reportedly associated with disabling illness among the young.2 However, such data have mostly been derived from clinical samples and studies relying on self-reported assessment of depressive symptoms, and relationships between adolescent major depressive disorder (MDD) diagnosis and measures of physical health have seldom been investigated in the general population. Studies including both adolescents and young adults are also scarce.3 Existing general population studies suggest that physical morbidity is more specifically related to adolescent MDD than to adolescent psychiatric disorders in general,4 and the link between MDD and chronic illness is suggested to be especially evident in the presence of functional impairment.4 The aim of this study was to analyse how chronic illness, related disability, number of sick-days and self-rated health are associated with characteristics of major depressive episode (MDE) in a population-based sample of adolescents (15–19 years) and young adults (20–24 years).

Methods

Participants and procedure

This study forms part of the 1996 Finnish Health Care Survey (FINHCS ‘96), an epidemiological population-based cross-sectional interview survey.5,6 In the one-stage household cluster sampling, index persons were first randomly selected and the members of their household thereby identified from the population registers. The participation rate of completed household interviews was 86% (3614 of 4200 households).6 All subjects gave informed formal verbal consent as required by the Personal Data File Act.

The basic target population of the present study consisted of non-institutionalised 15- to 19- and 20- to 24-year-old inhabitants of Finland in 1996. The selected households included 1357 15- to 24-year-olds, of whom 49 (3.6%) chose not to participate or could not be reached. Interview data were collected on 792 adolescents (401 males, 391 females) and 516 young adults (272 males, 244 females). Data on absent household members were collected by interviewing parents, legal guardians or spouse (proxy interview), but this excluded the diagnostic interview on MDE. The interviews were performed between 5 April and 21 June 1996.

Only subjects personally interviewed for the presence of MDE were included in the present study. The excluded proxy interviews conducted for 284 adolescents (35.8%) and 82 young adults (15.9%) \((P < 0.001)\) were more frequent for males than females among both adolescents \((n = 173 \text{ versus } 110; P < 0.001)\) and young adults \((n = 63 \text{ versus } 19; P < 0.001)\). No other differences in sociodemographics were found. The prevalence of chronic illness was independent of the interview status \((n = 217, 23.0\% \text{ in personal interviews } \text{versus } n = 85, 23.4\% \text{ in proxy interviews}; P = 0.889)\). The final sample including diagnostic data on MDE consisted of 509 adolescents (281 females, 228 males) and 433 young adults (224 females, 209 males). The study population is demographically representative of the general population of the corresponding age groups.7

Measures

Diagnostic interview for MDE. The data were collected by the ‘computer-assisted personal interviewing’ technique. The University of Michigan Composite International Diagnostic Interview.
Interview Short-Form (UM-CIDI-SF) was used to generate a probability diagnosis of Diagnostic and Statistical Manual of Mental Disorders, 3rd edition, revised (DSM-III-R) MDE during the preceding 12-month period. Professional non-clinician interviewers trained for the survey interviewed the study participants. UM-CIDI-SF is a modification of the Composite International Diagnostic Interview (CIDI), a structured diagnostic interview with reportedly good reliability and validity designed for use in general population surveys.\(^1\)

The diagnostic classification of full CIDI can be reproduced with moderate to excellent accuracy using the SF (sensitivity 89.6%, specificity 93.9%, total classification accuracy 93.2%).\(^2\)

Results from an external study comparing the accuracy of the UM-CIDI-SF with a structured clinical interview in a population of young adults show satisfactory specificity. The diagnosis of MDE was determined by the presence of depressed mood or anhedonia for at least 2 weeks and at most times of day, plus at least two additional symptoms of depression.\(^3\) To produce the UM-CIDI-SF a sample of CIDI respondents from the National Comorbidity Survey (NCS) was reinterviewed and the optimal set of items for the SF were thereby selected.\(^4\)

The diagnostic algorithm of the CIDI-SF includes all the diagnostic symptoms of the DSM-III-R MDE, with the exception of psychomotor retardation and agitation, resulting in a total symptom count of eight.\(^5\)

Health-related variables. The assessment of physical health was based on interview and preceded the diagnostic interview for MDE. Data on chronic medical conditions lasting at least 3 months were collected (‘any chronic illness’). Any diagnosis given by a physician was recorded, and an aggregated and dichotomized measure of ‘diagnosed chronic illness’ was formed (chronic illness with a diagnosis/no diagnosis or no chronic illness). The degree of disability was assessed and dichotomized (a lot, moderately, a little/no disability) and combined with data on chronic illness (‘disabling chronic illness’: chronic illness with disability/no disability or no chronic illness). Distinct categories were formed for the most common medical conditions with a diagnosis (respiratory allergies including asthma and hayfever or allergic rhinitis, other allergies, neurological disorders, musculoskeletal illness, metabolic diseases, dermatological disorders, etc.). Self-perceived health was rated and dichotomized (good, rather good/moderate, rather poor or poor). Data on number of days absent from school or work due to physical illness in 1996 (‘sick-days during the past 6 months’) were collected. Sociodemographics, as well as data on frequency of drunkenness (at least twice a month/once a month or less/never) and current smoking (currently smokes >10 cigarettes per day/occasional or no smoking) were included.

**Statistical procedures**

To adjust for differential participation rates, the data were weighted for region of residence, age group and sex. STATA software was used for data analyses taking into account the aforementioned weighting and household sampling.\(^6\) The associations between MDE (dependent variable) and measures of health (independent variables) were analysed with logistic regression. Individual illness categories were entered into analyses if they comprised five or more observations. Age- and sex-adjusted analyses for each independent variable were first performed for all subjects, and then separately for each age group. Independent variables that were significant in these analyses were then entered into the multivariable logistic regression model, controlling for selected confounding factors. Owing to high correlation between most health measures, the analyses were computed in separate models. Odds ratios (ORs) with a lower 95% confidence limit >1 were considered significant. Parametric (t-test) and non-parametric (Mann–Whitney U-test, \( \chi^2 \)-test) tests were applied when appropriate. The \( \chi^2 \)-test for independence was corrected for survey design, and converted to a F-statistic.\(^7\) P values ≤0.05 were considered statistically significant and P values between 0.05 and 0.10 are reported as trends. Analyses of associations between the characteristics of MDE (episode duration, psychosocial impairment, number of depressive symptoms, prevalence of individual depressive symptoms) and physical health were conducted within the subpopulation of the respondents with MDE (n = 68).

**Results**

The distribution of independent variables in the study population is presented in table 1.

In age- and sex-adjusted logistic regression analyses the association between MDE and diagnosed chronic illness was significant (table 2). Chronic illness accompanied by disability was associated with MDE among adolescents (table 2). The reported disability with chronic illness was not associated with psychosocial impairment in MDE \( F(1,67) = 0.002, P = 0.96 \). Of the individual illness categories only respiratory allergies, other allergies, musculoskeletal illness and neurological disorders (including migraine) comprised sufficient numbers of observations for more detailed analyses (table 1). Migraine in young adults and respiratory allergies were related to depression (table 2).

Poor self-rated health was associated with MDE (table 2). Among respondents diagnosed with MDE, neither psychosocial impairment \( F(1,67) = 0.867, P = 0.35 \), episode duration (Mann–Whitney U-test, \( Z = 0.489, P = 0.63 \)) nor mean number of depressive symptoms (t-test, d.f. 66, \( t = -0.090, P = 0.93 \)) was associated with perception of poor general health.

The median number of sick-days in the past 6 months (table 1) was higher among those with MDE during the past 12 months than among the non-depressed individuals (Mann–Whitney U-test, \( Z = -3.20, P = 0.001 \)). For logistic regression analysis the number of sick-days was dichotomized using a median split; three or more sick-days was related to MDE (table 2). Among subjects with MDE, the mean number of depressive symptoms was slightly higher in those with at least three sick-days \( 5.43, \text{standard deviation (SD)} = 1.46 \) compared with those reporting fewer sick-days \( 4.37, \text{SD} = 1.49 \) (t-test, d.f. 66, \( t = -1.79, P = 0.08 \)). Neither psychosocial impairment due to depression \( F(1,67) = 0.513, P = 0.48 \) nor episode duration (Mann–Whitney U-test, \( Z = -0.267, P = 0.79 \)) was associated with number of sick-days.

In multivariable analyses, associations between MDE and diagnosed chronic illness, poor self-rated health, reporting at least three sick-days, respiratory allergies and migraine remained significant when controlled for selected confounding factors (table 3). The relationship between MDE and disabling chronic illness was significant in adolescents (interaction with age \( P = 0.034 \)). Poor self-perceived health as well as a higher number of sick-days were more strongly associated with MDE among adolescents than young adults, and the interactions with age approached significance (self-rated health \( P = 0.091 \), sick-days \( P = 0.097 \)). No gender interactions were observed, indicating that no significant differences in the associations existed between genders.

Finally, the prevalence of individual depressive symptoms was compared between those with only MDE (n = 45) and those with both diagnosed chronic illness and a history of MDE during the past 12 months (n = 23). Thoughts of death were reported by 65.7% (n = 16) of those with both conditions, while the corresponding rate among those with only MDE was 35.2% (n = 15) \( F(1,67) = 5.64, P = 0.02 \). Frequencies of the other diagnostic symptoms of MDE did not significantly vary by chronic illness status.
Table 1 Weighted prevalences of measures of health among the Finnish Health Care Survey 1996 (FINHCS ‘96) respondents (n = 942), by MDE status and age group

<table>
<thead>
<tr>
<th>Chronic illness</th>
<th>Total (n = 942)</th>
<th>15–19 years (n = 509)</th>
<th>20–24 years (n = 433)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MDE (n = 874) (%)</td>
<td>MDE+ (n = 68) (%)</td>
<td>MDE (n = 482) (%)</td>
</tr>
<tr>
<td>Any</td>
<td>24.1</td>
<td>33.6</td>
<td>25.3</td>
</tr>
<tr>
<td>Diagnosed chronic illness</td>
<td>22.3</td>
<td>33.6</td>
<td>23.3</td>
</tr>
<tr>
<td>Respiratory allergies</td>
<td>4.5</td>
<td>10.4</td>
<td>5.7</td>
</tr>
<tr>
<td>Other allergies</td>
<td>11.8</td>
<td>14.7</td>
<td>12.7</td>
</tr>
<tr>
<td>Musculoskeletal illness</td>
<td>5.5</td>
<td>8.6</td>
<td>5.2</td>
</tr>
<tr>
<td>Neurological disorders</td>
<td>2.4</td>
<td>4.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Migraine</td>
<td>1.1</td>
<td>4.6</td>
<td>1.0</td>
</tr>
<tr>
<td>Disabling chronic illness</td>
<td>14.3</td>
<td>21.6</td>
<td>14.4</td>
</tr>
<tr>
<td>Poor self-perceived health</td>
<td>6.2</td>
<td>14.3</td>
<td>6.2</td>
</tr>
<tr>
<td>Sick-days (n, median (95% CI))</td>
<td>2 (1.0, 2.0)</td>
<td>3 (2.0, 4.61)</td>
<td>2 (2.0, 2.0)</td>
</tr>
</tbody>
</table>

95% CI: 95% confidence interval for the median

Table 2 Age- and sex-adjusted logistic regression analyses of the association of major depressive episode (MDE) with measures of health among the respondents (n = 942), by age group

<table>
<thead>
<tr>
<th>Chronic illness</th>
<th>Total (n = 942) (OR (95% CI))</th>
<th>15–19 years (n = 509) (OR (95% CI))</th>
<th>20–24 years (n = 433) (OR (95% CI))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic illness (any/none)</td>
<td>1.59 (0.93, 2.70)</td>
<td>2.00 (0.90, 4.44)</td>
<td>1.37 (0.66, 2.58)</td>
</tr>
<tr>
<td>Diagnosed chronic illness (yes/no)</td>
<td>1.76 (1.03, 3.01)</td>
<td>1.92 (1.10, 3.37)</td>
<td>1.52 (0.73, 3.17)</td>
</tr>
<tr>
<td>Respiratory allergies (yes/no)</td>
<td>2.71 (1.14, 6.45)</td>
<td>3.06 (0.96, 9.72)</td>
<td>2.59 (0.68, 9.79)</td>
</tr>
<tr>
<td>Other allergies (yes/no)</td>
<td>1.31 (0.65, 2.66)</td>
<td>1.52 (0.56, 4.15)</td>
<td>1.12 (0.41, 3.08)</td>
</tr>
<tr>
<td>Musculoskeletal illness (yes/no)</td>
<td>1.51 (0.60, 3.79)</td>
<td>1.21 (0.27, 5.42)</td>
<td>1.62 (0.51, 5.17)</td>
</tr>
<tr>
<td>Neurological (yes/no)</td>
<td>1.85 (0.53, 6.45)</td>
<td>–</td>
<td>3.33 (0.84, 13.3)</td>
</tr>
<tr>
<td>Migraine (yes/no)</td>
<td>3.67 (0.96, 14.0)</td>
<td>–</td>
<td>5.85 (1.26, 27.1)</td>
</tr>
<tr>
<td>Disabling chronic illness (yes/no)</td>
<td>1.35 (0.55, 3.31)</td>
<td>3.09 (1.12, 8.54)</td>
<td>0.33 (0.04, 2.50)</td>
</tr>
<tr>
<td>Poor self-perceived health (yes/no)</td>
<td>2.56 (1.23, 5.34)</td>
<td>4.22 (1.58, 11.3)</td>
<td>1.59 (0.52, 4.81)</td>
</tr>
<tr>
<td>Sick-days (≥3/0–3)</td>
<td>2.01 (1.23, 3.29)</td>
<td>3.53 (1.47, 8.46)</td>
<td>1.41 (0.74, 2.69)</td>
</tr>
</tbody>
</table>

Discussion

Disabling chronic illness and specific diseases

Disabling chronic illness relating to MDE is in accordance with general population studies reporting an association between adolescent MDD and functionally impairing physical illness.3,4 To our knowledge, this was the first general population study to replicate these results outside the USA in another culture. It has been suggested that chronic illness is particularly associated with depression if it represents a discontinuity of life experience and activities and results in unfavourable self-appraisal.15 Adolescents, owing to their developmental phase, may be especially vulnerable to such stress. On the other hand, MDD in adults reportedly predicts incident disability regardless of the type of chronic illness.3 Attributes of the individual rather than characteristics of chronic illness itself may contribute to the vulnerability in depression and emergence of disability.4,16

The prevalence estimates for specific illness categories in our study population were at the lower end of the range reported earlier,3,4,17,18 and our ability to examine the associations with MDE was limited. So far, epidemiological data testing the hypothesis that certain specific illness categories and MDD in young people co-occur more often than expected by chance is limited to only few studies. Associations between MDD and respiratory allergies have previously been observed in general populations of adolescents17 and young adults.15 The details of underlying mechanisms remain unclear but it has been suggested that, for example, dysfunction in both adrenergic and cholinergic activity would predispose to comorbidity.19 Likewise, consistent with prior research, MDE was related to migraine among young adults.16,20,21 Central nervous system serotonergic dysregulation has been suggested as the shared neurotransmitter abnormality in both depression and headaches.20 Unequivocal evidence for the causal relations between adolescent depression and physical illness is mostly lacking, and longitudinal studies are needed to investigate the issue.

Self-rated health and sick-days

In keeping with our findings, an association between poor self-perceived health and MDD has been reported.2 Cognitive style, as well as physiological, emotional and behavioural dimensions...
thoughts of death

Adolescent MDD is a strong predictor of completed suicide.24 General medical illness in young adults relates to suicidal thoughts and behaviour both independently of and along with MDD.25 In a community sample of 14- to 19-year-olds, suicidal thoughts experienced increased subjective impairment and had more sick-days than those with anxiety disorder and headache, or headache without any comorbid psychopathology. We observed a trend between number of depressive symptoms and number of sick-days, suggesting an association between functional disability due to physical illness and severity of MDE.

Methodological considerations

This study was carried out in a representative nationwide sample. A structured interview for MDE and data on physical health have seldom been combined in a general population study on adolescents. In a cross-sectional design the sequence of depression and physical illness was not possible to assess, nor did we have information on the lifetime course or previous episodes of depression. Although the somatic symptoms of depression (e.g., fatigue, changes in appetite) were not observed to be overrepresented among those with chronic illness, there is a possibility of symptom overlap between physical illness and depressive disorder. Additionally, the diagnostic interview only covered MDE, so associations between ill health and other psychiatric disorders could not be studied.

The assessment of self-reported physical symptoms as opposed to objectively verified pathology is a limitation. The agreement between self-reported or interview data and medical records is generally good, but may vary by disorder,26 with both under- and overreporting taking place.27 The agreement is very high regarding well-known chronic disorders with clearly defined diagnostic criteria, while diseases with ill-defined boundaries and fluctuating course may be less accurately reported.26 Existing data on younger age groups with clearly defined diagnostic criteria, while diseases with ill-defined boundaries and fluctuating course may be less accurately reported.

Despite the representative study population, low prevalence estimates of chronic medical conditions in this age group limited our ability to conduct analyses regarding specific illness categories. The restrictive definition of somatic illness in our study warrants attention.
study, together with one- or two-question assessment, is likely to have provided a lower bound estimate of the prevalence of physical illness leading to an underestimate of the association with MDE.  

The possible lower sensitivity of the SF of the diagnostic instrument compared with the full CIDI may also dilute associations. On the basis of an external validation study, we concluded that the use of higher cut-points of the CIDI-SF would lead to even lower sensitivity and misclassification of threshold cases common in non-clinical samples.  

Conclusions

Our findings suggest that patterns of disability observed later in life are already present in the young. The interrelations of physical illness and major depression in adolescents should be borne in mind, as depression often first emerges in adolescence and young people are usually considered to be in good physical health. Adolescents with frequent sick-days or chronic illness deserve special attention, and depressive symptoms should be investigated. The degree of reported disability should be noted. Young people with both chronic illness and depressive symptoms should be assessed for thoughts of death and possible suicidality.

Acknowledgement

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Key points

- Associations between major depression and chronic illness were investigated in the general population of adolescents and young adults.
- Chronic illness, disability related to chronic illness, poor self-rated health, frequent sick-days, and thoughts of death were associated with MDE.
- Of the specific illness categories respiratory allergies and migraine were associated with MDE.
- Patterns of disability observed later in life are already present in young people usually considered to be in good health.
- Depression should be carefully assessed in young people with chronic illness or frequent sick-days.

References