Impact of Adolescent Mental Disorders and Physical Illnesses on Quality of Life 17 Years Later

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Objective: To investigate associations of mental disorders and physical illnesses during adolescence with quality of life (QOL) 17 years later.

Design: The Children in the Community Study, a prospective longitudinal investigation.

Setting: Upstate New York.

Participants: A community-based sample of mothers and their offspring were interviewed.

Main Outcome Measures: Axis I disorders and Axis II personality disorders and physical illnesses were assessed by self-report and mother report in 1985-1986. Outcome indicators of QOL were assessed in 2001-2004.

Results: Compared with participants without adolescent illness or disorder, those with a history of physical illness reported poorer physical health (mean difference [MD], −4.8); those with a history of an Axis I disorder reported poorer physical health (MD, −8.0) and more problematic social relationships (MD, −4.5); and those with a history of personality disorder reported poorer physical health (MD, −8.2), more problematic social relationships (MD, −5.0), lower psychological well-being (MD, −3.6), and more adversity within their environmental context (MD, −4.6) in adulthood. Comorbid physical illness and mental disorder were associated with all 5 QOL domains (MD, −3.1 to −11.9). After adjusting for all demographic variables and comorbidity, associations remained between physical illness and poor physical health (effect size [ES], −0.33); an Axis I disorder and problematic social relationships (ES, −0.37); and personality disorder and problematic social relationships (ES, −0.36), low psychological well-being (ES, −0.23), impaired role function (ES, −0.24), and an adverse environmental context (ES, −0.50).

Conclusions: Mental disorders may have more adverse long-term associations with QOL than do physical illnesses. Adolescent personality disorders may have a more adverse impact on adult QOL than do adolescent Axis I disorders.

bathing, washing, dressing, and preparing food) in QOL scales that tap physical functioning and activities of daily life are directed at older adults or disabled populations and may be less useful with a general population sample of adults. The Young Adult Quality of Life (YAQOL) instrument assesses aspects of QOL related to the physical health, psychological well-being, social relationships, role function, and environmental context of young adults, thus meeting criteria for breadth of coverage of QOL. The YAQOL is the only generic measure of QOL designed specifically for young adults. A unique feature of the YAQOL, which distinguishes it from other generic QOL questionnaires for adults, is the measurement of role and residential context as well as perspective on life goals.

Research has shown that both physical illnesses and mental disorders are associated with reduced QOL. Furthermore, findings based on adult populations have indicated that the extent of impairment in QOL associated with mental disorders is comparable with the impairment associated with physical illnesses. Previous research has focused primarily on specific illnesses or evaluated only one or 2 QOL domains. Recently, researchers have begun to assess associations of physical illnesses with more comprehensive aspects of QOL; however, most studies have been cross-sectional and have focused on mood and anxiety disorders in clinical samples or among older adults. To date, no community-based prospective longitudinal studies have compared associations of mental disorders and physical illnesses during adolescence with subsequent QOL during adulthood.

The purpose of the present study was to examine and compare associations between adolescent mental disorders and adult QOL and between adolescent physical illnesses and adult QOL. Indicators of QOL included 5 broad domains of physical health, social relationships, psychological well-being, role function, and the environmental context. In addition, we investigated the relative magnitudes of the associations of Axis I disorders and Axis II personality disorders (PDs) assessed in adolescence with QOL impairment during adulthood. Axis I encompasses various disorders and conditions such as mood, anxiety, disruptive, and substance-related disorders that are typically the focus of clinical attention, whereas the Axis II PDs are maladaptive, inflexible, and enduring ways of thinking, acting, and feeling that lead to distress or impairment or both.

METHODS

PARTICIPANTS

This study examined longitudinal data from the now-grown youths in the Children in the Community Study, an ongoing investigation of childhood behavior and development based on a sample of families randomly selected in 1975 on the basis of residence in 2 upstate New York counties. Approximately 800 mothers and 1 randomly sampled child from each family (mean ± SD age, 5.5 ± 2.8 years; in 1975) have been reinterviewed in their homes by extensively trained and supervised lay interviewers in a series of follow-up surveys during the past 30 years. These families were generally representative of the northeastern United States in terms of demographic characteristics and socioeconomic status. However, the sample also reflects the relatively high proportion of Catholic (34%) and white (91%) residents living in the sampled region. Details of sampling, comparison with population, and retention rates are provided on the study Web site (www.nyspi.cpmc.columbia.edu/childcom). Earlier retention rates of 95% have dropped as the cohort became adults; this problem is shared by virtually all other recent longitudinal studies of community and clinical samples.

The present study focuses on 680 (81.1%) of the 750 young adults on whom mental disorders (Axis I disorders and Axis II PDs) and physical illnesses were assessed in 1985-1986 at the mean ± SD age of 16.0 ± 2.8 years and in 2001-2004 at the mean ± SD age of 33.0 ± 2.8 years. Participants lost to attrition at the age of 33 years had higher schizotypal symptom scores at the age of 16 years and were more likely to be male than those retained in the sample. The study procedures were approved in accordance with appropriate institutional guidelines and have been approved by the institutional review board of the New York State Psychiatric Institute. A National Institutes of Health Certificate of Confidentiality has been obtained for these data. Written informed consent or assent was obtained from all participants after the interview procedures were fully explained. Assessment was performed by computer-assisted interview in participants’ homes and by telephone for a small minority who moved out of the area.

ASSESSMENT

Axis I Disorders

In the 1985-1986 follow-up, the parent and youth versions of the Diagnostic Interview Schedule for Children were administered to assess Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition (DSM-III-R) Axis I disorders and grouped as follows: major depressive disorder, anxiety disorders (overanxious disorder, separation anxiety disorder, social phobia), disruptive disorders (attention-deficit/hyperactivity disorder, conduct disorder, or oppositional defiant disorder), and substance abuse disorders (alcohol or marijuana or other illicit drug abuse) at the mean age of 16 years. Research has supported the reliability and validity of those psychiatric diagnoses as assessed with the Diagnostic Interview Schedule for Children and administered in the present study.

Axis II PDs

No developed instruments existed for assessing PD before adulthood because recognition of the potential presence of PD in childhood or adolescence was first noted in the DSM-III-R. We created such an instrument by adapting items from the Personality Diagnostic Questionnaire for adults and by selecting appropriate items from other existing scales or writing age-appropriate items when necessary. At the mean age of 16 years, PD diagnoses based on both self-reports and mother reports were grouped at the traditional DSM cluster levels for analyses: cluster A (paranoid, schizoid, or schizotypal PD), cluster B (borderline, histrionic, or narcississic PD), and cluster C (avoidant, dependent, or obsessive-compulsive PD), and at a combined “any PD” level. The PD diagnoses indicate that the individual has a specific degree of severity with regard to personality traits. The validity of those assessed PD diagnoses on an individual and a cluster level has been supported by theoretically predicted associations with risks, correlates, and outcomes. At the mean age of 33 years, those same PDs were assessed by self-reports with the Structured Clinical Interview for Di-
agnostic and Statistical Manual of Mental Disorders, Fourth Edition, Axis II Personality Disorders (SCID-II) screen. Agreement between PD diagnoses obtained at the mean age of 16 years and at the mean age of 33 years was excellent (κ = 0.44) when compared with the level of agreement achieved by other instruments.\(^4\) Moreover, we also found excellent concurrent agreement between PD symptoms obtained with our original instrument and with the SCID-II screen (r = 0.66, 0.78, and 0.67 for cluster A, B, and C symptoms, respectively) and reasonable stability between self-reported PD symptoms from the mean age of 22 years (in an interim wave of data collection) to the mean age of 33 years (r = 0.61, 0.64, and 0.57 for cluster A, B, and C symptoms, respectively).

### Self-reported Physical Illnesses

In interviews conducted during adolescence, physical illnesses in the past year, including allergies or asthma, musculoskeletal diseases (orthopedic problems or chronic pain), neurologic diseases (migraine or other chronic headaches or epilepsy or other neurologic problems), heart problems, mononucleosis, severe vision problems, and hearing problems, were identified and summed from both youths’ and mothers’ responses. For each physical illness, we asked youths, “Did you have this problem in the past year?” and “Did you go to a doctor for the problem?” Mothers were asked parallel questions: “Did s/he have this problem in the past year?” and “Did s/he see a doctor for the problem?”

### Quality of Life

The YAQOL\(^9\) assessed 5 QOL domains in participants at the mean age of 33 years. The physical health domain was measured with an 8-item scale that assessed overall health, incapacitation due to illness, and energy level. The psychological well-being domain was measured with 3 scales that assessed expectations for the future (5 items), negative feelings (5 items), and church attendance or religious beliefs (2 items). The social relationships domain was measured with a 9-item scale that assessed the extent of contact and quality of relationships with friends and a 9-item scale that assessed the quality of relationship with a partner or close confidante. The role function domain was measured with 4 scales that assessed stress in a major productive role (employment, school, and home) due to excessive demand, conflict, safety, or health risk (6 items); degree of influence over role organization, scheduling, and decisions (5 items); role satisfaction and consistency with long-term goals (5 items); and role morale of coworkers or other students (6 items). The contextual domain was measured with 4 scales that assessed environmental factors, including residential comfort, safety, quietness, and privacy (9 items); social and service aspects of the neighborhood (8 items); ease of access to settings for work, school, shopping, and leisure; and social activities (6 items); and degree of medical care access and financial support (5 items). Internal consistency reliability of the YAQOL ranged from 0.88 to 0.63 (mean, 0.73). Detailed information regarding the reliability and validity of YAQOL is available in a previous report.\(^9\) All analyses considered indicators of QOL at the domain level. The minimum possible score for each domain was defined as 0 and the maximum possible score as 100, with higher scores indicating better QOL.

### STATISTICAL ANALYSES

Linear regression analyses were conducted to investigate the associations between adolescent physical illnesses and mental disorders, assessed at a mean age of 16 years, and adulthood QOL, assessed at a mean age of 33 years. All analyses were controlled for demographic variables (race, sex, age, family soci-economic status, earned income, marital status, and education) because there are significant variations in aspects of QOL for those groups.\(^9,\) Unstandardized regression coefficients were interpreted as the mean difference (MD) on each QOL domain score between those with a disorder and those without any physical illnesses or mental disorders (reference group, n = 256) after adjusting for all demographic variables in the equation. Regression analyses were also conducted, adjusting for all demographic variables and physical and mental disorder comorbidity to identify the independent association of each disorder with each of the QOL domains. The reference group was composed of participants without the disorder being examined. The QOL domains have different variability; thus, adjusted standardized regression coefficients are presented to make comparisons across the QOL scales. Effect sizes (ESs) of 0.20, 0.50, and 0.80 or greater were considered small, moderate, and large, respectively.\(^6\)

### RESULTS

#### SAMPLE CHARACTERISTICS AND PREVALENCE OF DISORDERS

Participants at a mean age of 33 years were 54.8% female, 91.3% white, and 8.7% black; 69.7% were married or cohabiting; 75.5% had some post–high school education; and 38.0% were from urban areas. Mean QOL domain scores were 67.8, 77.6, 80.6, 64.1, and 75.3 for physical health, social relationships, psychological well-being, role function, and environmental context, respectively. Among 5 QOL domains, correlations ranged from 0.08 to 0.50, with most in the intermediate range.

At a mean age of 16 years, 263 participants (43.3%) reported at least 1 of the physical illnesses assessed (Table 1). The most commonly reported illnesses were allergies or asthma (18.9%), musculoskeletal diseases (15.6%), and neurologic diseases (10.9%), whereas hearing problems, severe vision problems, heart problems, and mononucleosis each were reported by less than 6% of the participants. At this same assessment, 185 participants (30.4%) had at least 1 mental disorder, 115 (18.9%) had an Axis I disorder, 111 (18.3%) had an Axis II disorder, 41 (6.7%) had comorbid Axis I and Axis II disorders, and 96 (15.8%) had concurrent physical illnesses and mental disorders.

### ASSOCIATION OF QOL IMPAIRMENT WITH ADOLESCENT MENTAL DISORDERS AND PHYSICAL ILLNESSES

The mean QOL score for participants with a disorder was calculated and compared with a single reference group (the 256 participants without any physical illness or mental disorder). Table 1 presents the MD of QOL scores for disorders, adjusted by regression analysis for all demographic variables.

### MENTAL DISORDERS AND PHYSICAL ILLNESSES

Adolescents with a physical illness but not a mental disorder (n = 167) reported poorer physical health (MD, –4.8; P = .007) 17 years later, whereas adolescents with a mental disorder but no physical illness (n = 89) reported more
problematic social relationships (MD, −4.9; P = .001), lower psychological well-being (MD, −4.1; P = .01), and more adversity in their environmental context (MD, −3.9; P = .009) 17 years later (Table 1). In addition, adolescents with comorbid physical illness and mental disorder (n = 96) were more impaired in all 5 QOL domains (MDs, −3.1 to −11.9) 17 years later (Figure 1).

**AXIS I DISORDERS AND AXIS II PDs**

Those with an Axis I disorder but no PD in adolescence (n = 74) had poorer physical health (MD, −8.0; P < .001) and more problematic social relationships (MD, −4.5; P = .001) 17 years later, whereas those with a PD but no Axis I disorder in adolescence (n = 70) had poorer physical health (MD, −0.82; P = .002), more problematic social relationships (MD, −5.0; P = .001), lower psychological well-being (MD, −3.6; P = .046), and more adversity in their environmental context (MD, −4.6; P = .001) (Table 1). Individuals with comorbid Axis I disorders and Axis II PDs in adolescence (n = 41) were more impaired in all 5 QOL domains (MDs, −3.7 to −6.3) (Figure 2).

**SPECIFIC DISORDERS**

Each of the 14 physical and mental disorders produced a distinctive pattern of impairment in QOL. All disorders, except mononucleosis and hearing and vision problems, were associated with impaired QOL in at least 1 and up to 4 domains (Table 1). Allergies or asthma, musculoskeletal, etal diseases, heart problems, and substance abuse showed only an association with later poor physical health. Neurologic diseases and anxiety disorder were associated with poor physical health and problematic social relationships. Cluster B PDs (borderline, histrionic, or narcissistic PD) were associated with poor physical health and an adverse environmental context. Disruptive disorder and cluster A PDs (paranoid, schizoid, or schizotypal PD) predicted later problematic social relationships and an adverse environmental context as well as poor physical health. Major depression was associated with poor physical health, problematic social relationships, and impaired role function. Cluster C PDs (avoidant, dependent, or obsessive-compulsive PD) were associated with poor physical health, problematic social relationships, low psychological well-being, and an adverse environmental context.

**INDEPENDENT ASSOCIATION OF QOL IMPAIRMENT WITH ADOLESCENT MENTAL DISORDERS AND PHYSICAL ILLNESSES**

When comorbid physical and mental disorders exist in adolescence, which contributes to impaired adult QOL? To answer this question, we tested the independent association of each type of disorder with QOL (Table 2). Regression analyses were adjusted for all demographic variables and comorbid disorders to identify the independent association of disorder with each of the QOL domains; the reference group was composed of participants without the disorder being examined. The ES is the...
MD in QOL score between participants with and without the disorder divided by the standard deviation of the QOL score in the total sample.

MENTAL DISORDERS AND PHYSICAL ILLNESSES

After adjusting for all demographic variables and any mental disorder, those with an adolescent history of physical illness had poorer physical health (ES, −0.33; P < .001) in adulthood at the mean age of 33 years. After adjusting for all demographic variables and any physical illness, those with an adolescent history of mental disorder were more impaired in all 5 QOL domains (ESs, −0.24 to −0.46) (Table 2). In our data, musculoskeletal diseases (n = 95) and neurologic diseases (n = 66) have been associated with high rates of mental disorders (44.2% and 42.4%, respectively). A sensitivity analysis was conducted without these 2 categories. There was an effect of physical illnesses (n = 172) on the physical health QOL domain (ES, −0.25; P = .005); nonetheless, the effect of mental disorder was on all 5 QOL domains (ESs, −0.24 to −0.47). Those results are similar to results that considered all 7 physical illness categories assessed in our study (Table 2) but with slightly lower ESs (−0.33 to −0.25).

AXIS I AND AXIS II DISORDERS

Table 2 gives the results of analyses adjusting for all demographic variables, any physical illness, and either any Axis I disorder or any Axis II PD. An independent adolescent Axis I disorder effect was limited to the QOL domain of social relationships (ES, −0.37; P = .002). In comparison, adolescent Axis II PDs had a stronger impact, with significantly more impairment in QOL domains of social relationships (ES, −0.36; P = .006), psychological well-being (ES, −0.23; P = .04), role function (ES, −0.24; P = .04), and environmental context (ES, −0.50; P < .001). To test whether these results were due to the persistence of Axis I or II disorders into adulthood, we repeated these analyses with controls for an Axis I disorder or Axis II PDs at the mean age of 33 years. The same significant effects of any adolescent Axis I disorder on QOL 17 years later were found after controlling for an adult Axis I disorder, albeit the effects were somewhat smaller. Similarly, adolescent PDs still had significant but reduced effects on social relationships, role function, and environmental context. Associations with psychological well-being were no longer significant after controlling for any PD at the mean age of 33 years.

Our review of the literature indicates that these findings reported from a community-based longitudinal study provide initial support for the following: (1) mental disorders during adolescence may be more strongly associated with reduced QOL during adulthood than are adolescent physical illnesses; (2) Axis II PDs during adolescence may account for more subsequent QOL impairment than do adolescent Axis I disorders; (3) individuals with adolescent PD are at increased risk of living in a more adverse environmental context 17 years later; and (4) adolescents with comorbid physical illness and mental disorder tend to experience a particularly large reduction in QOL by adulthood.

The present findings are consistent with previous findings indicating that mental disorders are associated with considerable impairment and low QOL. Cross-sectional studies have shown that depressed disorders are associated with QOL impairment that is comparable to the impairment associated with physical illness. Spitzer et al2 reported findings of a cross-sectional study of 1000 adult primary care patients indicating that mental disorders tended to be associated with more impairment in QOL than were common physical illnesses. Hays et al21 found, in a 2-year follow-up study, that depressed patients had substantial and long-lasting decrements in QOL that were equal to or greater than decrements experienced by patients with chronic medical illnesses. Our findings suggest that although physical illnesses during adolescence are likely to be associated with poor physical health outcomes, they may not be associated with poor overall functioning or low global QOL. In contrast, our findings suggest that mental disorders during adolescence tend to be associated with profound impairment in areas that include physical health, social relation-
eral studies also have indicated that patients with mental illness at a mean age of 16 years, and any adolescent Axis I disorder, have symptoms to report diminished QOL.54-57 However, for some diseases agreement between mother reports and from 2 questions for each physical illness at the mean age of 16 years, and any adolescent Axis II disorder.

Table 2. Independent Association of Mental Disorders and Physical Illnesses at a Mean Age of 16 Years With Quality of Life at a Mean Age of 33 Years*

<table>
<thead>
<tr>
<th>Disorder</th>
<th>Physical Health</th>
<th>Social Relationships</th>
<th>Psychological Well-being</th>
<th>Role Function</th>
<th>Environmental Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any physical illness (n = 263)†‡</td>
<td>-0.33‡</td>
<td>0.08</td>
<td>0.10</td>
<td>0.03</td>
<td>0.08</td>
</tr>
<tr>
<td>Any mental disorder (n = 185)§</td>
<td>-0.25‡</td>
<td>-0.46‡</td>
<td>-0.24§</td>
<td>-0.25§</td>
<td>-0.31†</td>
</tr>
<tr>
<td>Any Axis I disorder (n = 115)¶</td>
<td>-0.15</td>
<td>-0.37‡</td>
<td>-0.12</td>
<td>-0.21</td>
<td>0.04</td>
</tr>
<tr>
<td>Any Axis II disorder (n = 111)¶</td>
<td>-0.18</td>
<td>-0.36‡</td>
<td>-0.23</td>
<td></td>
<td>-0.24</td>
</tr>
</tbody>
</table>

*Separate regression analyses for each quality-of-life domain.
†Participants with any physical illness at the mean age of 16 years are compared with those without physical illness, adjusted for all demographic variables and any adolescent mental disorder.
‡P<.01.
§Participants with any adolescent mental disorder are compared with those without mental disorder, adjusted for all demographic variables and any physical illness at a mean age of 16 years.
¶Participants with any adolescent Axis I disorder are compared with those without an Axis I disorder, adjusted for all demographic variables, any physical illness at a mean age of 16 years, and any adolescent Axis II disorder.
#Participants with any adolescent Axis II disorder are compared with those without an Axis II disorder, adjusted for all demographic variables, any physical illness at a mean age of 16 years, and any adolescent Axis I disorder.

In addition, the present findings are of interest because they confirm that when mental disorders and physical illnesses co-occur, they often are associated with a marked reduction in QOL. Research has indicated that approximately a quarter of medical inpatients have mental disorders as well as physical illnesses, that both types of conditions contribute independently to reductions in QOL, and that these effects tend to be additive.20,30,51 Several studies25,52,53 also have indicated that patients with coronary disease who have symptoms of anxiety or depression are more likely than those without these symptoms to report diminished QOL.

Several limitations of the current study require discussion. First, because the present study was conducted with a sample in which a relatively high proportion was Catholic (54%) and white (91%), it is not clear whether the findings are applicable to large US populations. A second limitation of our study is that the measures of physical illnesses relied on self-report rather than medical records. We have information from both youth and mother reports and from 2 questions for each physical illness (“Did you have this problem in the past year?” and “Did you go to the doctor for the problem?”). Several studies have indicated that self-reports are fairly accurate.24-57 However, for some diseases agreement between questionnaire data and medical record data are rather poor.54,55 Nevertheless, these data are expected to be valid for assessing the symptom rather than the diagnosis because patients are considered to be the best experts in reporting perceived disease symptoms.28 A third limitation is that 18.9% of this sample was lost at outcome. Participants lost to attrition at the mean age of 33 years had higher schizotypal symptom scores at the mean age of 16 years and were more likely to be male than those retained in the sample; however, there were no other significant differences in demographic variables and disorders.

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REFERENCES
An Older but Prominent View of Child Development: Ontogeny Recapitulates Phylogeny. This phrase expresses the 19th century idea that the development of an individual child recapitulates the history and evolutionary development of the entire race, or species. Spock's 1968 version of *Baby and Child Care* discusses this philosophical view. The idea is prominent in Freud and in the early writings of Jean Piaget. Piaget, however, sought in his later writings to explain recapitulation by appealing to general principles of structural change in cognitive development.

—From the *Stanford Encyclopedia of Philosophy*, by Edward N. Zalta, 2005