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What Clinical Differences Distinguish Depressed Teens with and without Comorbid Externalizing Problems?

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Abstract

Objective—This study examined differences in co-occurring symptoms, psychosocial correlates, health care utilization, and functional impairment in youth who screened positive for depression, stratified by whether or not they also self-reported externalizing problems.

Methods—The AdoleSCent Health Study examined a random sample of youth ages 13-17 enrolled in a health care system. 2,291 youth (60.7% of the eligible sample) completed a brief depression screen; the 2 item Patient Health Questionnaire (PHQ-2). The current analyses focus on a subset of youth (n=113) who had a follow-up interview and screened positive for possible depression on the Patient Health Questionnaire 9 using a cut off score of 11 or higher.¹ Youth were categorized as having externalizing behavior if their score was ≥ 7 on the Pediatric Symptom Checklist (PSC) externalizing scale.² Chi-squared tests and Wilcoxon rank sum tests were used to compare groups.

Results—Differences between groups included that youth with depression and externalizing symptoms had a higher rate of obesity and had higher self-reported functional impairment than youth with depression symptoms alone.

Conclusions—Adding screening for externalizing problems to existing recommendations for depression screening may help primary care providers to identify a high risk depressed group of youth for referral to mental health services.

INTRODUCTION

The US Preventive Services Task Force recommends screening for depression among adolescents.³ Comorbidity between depression and externalizing behavior problems is common⁴ and associated with increased risk of recurrence after treatment,⁵ higher lifetime health care utilization,⁶ more suicide attempts,⁷ and adult antisocial behavior.⁸ Additionally, depressed mood has been shown to increase risk for delinquency among adolescent boys, and externalizing behavior problems predict subsequent depressed mood.⁹ Although

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combined prevention programs for youth depression and delinquency are recommended, they are not current practice. Information regarding how youth with depression alone differ from youth with depression and externalizing behavior may help inform needed referrals and treatment in primary care. This study examines youth who screened positive for depression, stratified based on self-reported elevated externalizing behavior and evaluates differences in severity of depression symptoms, co-occurring symptoms, psychosocial correlates, health care utilization, and functional impairment in order to inform the potential benefit of concurrent externalizing disorder screening.

METHODS

This analysis used data from the AdoleSCent Health (ASC) Study.¹ All study procedures were approved by the Group Health (GH) IRB. Among a random sample of 4,000 GH-enrolled youth ages 13-17, 2,291 youth (60.7% of the eligible sample) completed a brief depression screen (see Richardson et al.¹ for more detail); the 2 item Patient Health Questionnaire (PHQ-2). Youth with a PHQ-2 ≥ 3 and a gender and age-matched sample of youth with a PHQ-2 < 3 were invited to participate in a baseline interview (n=499) and 444 completed the interview. These analyses focus on a subset of youth (n=113) who screened positive on the 9-item Patient Health Questionnaire (PHQ-9) during the baseline interview using a cut off score of 11 or higher, which has been found to have the highest sensitivity and specificity for the diagnosis of major depression.¹ Externalizing problems were defined based a self-report score of ≥ 7 on the Pediatric Symptom Checklist (PSC) externalizing scale,^{10,11} a widely used screening questionnaire that has good consistency with the Child Behavior Checklist.¹⁰⁻¹⁶ Parent-report of the child's depressive and externalizing symptoms using the Brief Parent Pediatric Symptom Checklist (PSC-17)¹¹ was used to validate youth self-report.

Groups were compared on 1) **demographic variables** (age, sex, race, mean household income for residence zip code, Medicaid or state insurance, parental marital status); 2) **severity of depression** measured by baseline PHQ-9 score and presence of suicidal ideation on either the PHQ-9 or the Child Diagnostic Interview Schedule (C-DISC); 3) **co-occurring symptoms** of anxiety on the Brief Self-Report of Childhood Anxiety Related Dysfunction (SCARED), medical comorbidity using the Pediatric Chronic Disease Score, smoking, and problem alcohol or drug behaviors (CRAFFT score); 4) **psychosocial correlates** including social support, minutes of exercise in a typical week, obesity (based on 90th percentile within age and gender on Body Mass Index calculated from self-reported height/weight),¹⁹ and parent-reported family history of anxiety or depression; 5) **health care utilization** based on GH administrative data showing the number of pediatric and mental health visits in the year prior to the study, and parent report of the child having ever received prior treatment for depression or anxiety; and 6) **self-reported functional impairment** in school, family, and peer relationships on the Columbia Impairment Scale.²⁰

Chi-squared tests and Wilcoxon rank sum tests (due to lack of normality in many of the continuous variables) were used to compare outcomes between groups. To account for multiple comparisons, we adjusted p-values using Hochberg's procedure to ensure the family-wise error rate at 0.05.²¹

RESULTS

Demographic variables did not differ significantly between groups (Table 1). Parental reports of symptoms corroborated youth self-report (Table 2). The correlation between parent-reported internalizing and child-reported depression symptoms was 0.21 ($p=0.02$),

and the between parent reported externalizing and child reported externalizing was 0.35 ($p < 0.001$).

Comorbid youth had a non-significant trend towards higher levels of suicidal ideation. No differences were found in co-occurring symptoms, social support, exercise, family history of depression or anxiety, or health care utilization. Obesity based on BMI criteria was higher in the comorbid group. Functional impairment was higher in the comorbid group.

DISCUSSION

Our population-based assessment suggests that youth who have both depression and externalizing symptoms did not differ from those with only depression symptoms in terms of severity of depression symptoms, co-occurring medical and psychiatric symptoms, psychosocial factors, or health care utilization. One significant difference between groups was higher obesity in the group with both depression and externalizing problems, despite similar self-reported amounts of exercise. This finding is intriguing, and adds evidence of an association between obesity and mental health problems.^{22, 23} Prior cross-sectional studies have shown associations between concurrent adolescent obesity and depression for girls.^{22, 23} In addition, the Great Smoky Mountain Study, showed an association between depression and chronic obesity between ages 9 and 16 in boys, and between externalizing problems and chronic obesity between the ages of 9 and 16 across gender.²³ The link between depression, externalizing behavior and obesity has been hypothesized to be due to a confounding common factor such as alteration of the hypothalamo-pituitary adrenal axis.²⁴ Further study will be needed to address causal mechanisms of these associations.

Youth with comorbid symptoms reported a greater functional impairment, but did not receive more mental health services. These results parallel prior studies showing that the presence of disruptive behavior did not differentiate which youth with depression had received mental health services.^{25, 8} However, lifetime mental health care utilization is higher among youth with depression who also have externalizing problems.⁶

Limitations of this study include that these data are cross-sectional, such that no direction of causality can be inferred; the sample size is small, limiting power for statistical comparisons; self-reported height and weight rather than measurements were used for BMI calculations; and missing data when comparing mental health service rates across groups may have further limited power to detect differences between groups.

Our results suggest that adding screening for externalizing problems to existing recommendations for depression screening may help primary care providers to identify a higher-risk depressed group of youth with greater functional impairment for referral to mental health services.

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Table 1

Demographic Variables and Parent-Report of Symptoms for Youth Self-Reporting Depressive Symptoms (PHQ-9 11), Comparing Youth with and without Externalizing Behavior

| Variable | Overall N=113 | Depressed Only (Externalizing < 7) N=94 | Depressed + Externalizing 7N =19 | Test Statistic | P (adjusted P) | Effect Size (Hedges' g) |
|--|---------------|--|-------------------------------------|--------------------------|----------------|----------------------------|
| Demographic Variables | | | | | | |
| Age Mean (SD) ^a | 15.25 (1.25) | 15.32 (1.23) | 14.90 (1.33) | F _{1,111} =1.42 | .24 (.84) | 0.34 |
| Gender Male N (%) ^b | 34 (30%) | 30 (32%) | 4 (21%) | $\chi^2_1=0.89$ | .35 (.84) | NA |
| Race=Caucasian N (%) ^b | 73 (66%) | 63 (69%) | 10 (53%) | $\chi^2_1=1.94$ | .16 (.84) | NA |
| Household Income (K) Mean (SD) ^a | 56.12 (19.07) | 55.89 (18.41) | 57.18 (22.39) | F _{1,104} =0.04 | .84 (.84) | 0.77 |
| With state insurance N (%) ^b | 9 (8%) | 9 (10%) | 0 (0%) | $\chi^2_1=1.98$ | .16 (.84) | NA |
| Parents Married N (%) ^b | 82 (75%) | 73 (80%) | 9 (47%) | $\chi^2_1=8.94$ | 0.003 (.06) | NA |
| Parent Report of Internalizing and Externalizing Behavior | | | | | | |
| Parent Report of Internalizing Behavior Mean (SD) ^a | 5.05 (2.29) | 4.99 (2.18) | 5.33 (2.79) | F _{1,108} =0.56 | .46 (.84) | 0.15 |
| Parent Report of Externalizing Behavior Mean (SD) ^a | 4.33 (3.03) | 4.02 (2.91) | 5.79 (3.26) | F _{1,108} =5.38 | .02 (.38) | 0.60 |

* adjusted p<.05;

** p<.01;

*** p<.001;

^aWilcoxon rank test;

^bChi-squared test.

Table 2

Comparison of depression severity, co-occurring symptoms, psychosocial correlates, health care utilization, and functional impairment among youth with PHQ-9 11, with and without Externalizing Behavior

| Variable | Depressed Only (Externalizing N=7) N=94 | Depressed + Externalizing N=19 | Test Statistic | P (adjusted P) | Effect Size (Hedges' g) |
|--|--|-----------------------------------|--------------------------|----------------|----------------------------|
| Severity of Depression | | | | | |
| Baseline Depression Severity measured by PHQ-9 Score Mean(SD) ^b | 14.51 (3.32) | 16.16 (4.62) | F _{1,111} =1.93 | .17 (.84) | 0.46 |
| Suicidal ideation endorsement N (%) ^d | 52 (55%) | 15 (79%) | $\chi^2_1=3.66$ | .06 (.84) | NA |
| Parent Report of Internalizing and Externalizing Behavior | | | | | |
| Parent Report of Internalizing Behavior Mean (SD) ^b | 4.99 (2.18) | 5.33 (2.79) | F _{1,108} =0.56 | .46 (.84) | 0.15 |
| Parent Report of Externalizing Behavior Mean (SD) ^b | 4.02 (2.91) | 5.79 (3.26) | F _{1,108} =5.38 | .02 (.38) | 0.60 |
| Co-occurring Symptoms | | | | | |
| Anxiety on the SCARED Mean (SD) ^b | 3.11 (1.96) | 3.84 (2.39) | F _{1,111} =1.77 | .19 (.84) | 0.36 |
| Medical Comorbidity N(%) ^{d,c} | | | $\chi^2_2=1.64$ | .44 (.84) | NA |
| Low | 35 (38%) | 8 (44%) | | | |
| Medium | 28 (30%) | 7 (39%) | | | |
| High | 29 (32%) | 3 (17%) | | | |
| Smoking N (%) ^d | 14 (15%) | 2 (11%) | $\chi^2_1=0.25$ | .62 (.84) | NA |
| Problem Alcohol/Drug Behavior N (%) ^d | 37 (39%) | 11 (58%) | $\chi^2_1=2.22$ | .14 (.84) | NA |
| Psychosocial Correlates | | | | | |
| Social Support Mean (SD) ^b | 28.14 (5.04) | 26.58 (6.20) | F _{1,111} =0.77 | .38 (.84) | 0.30 |

| Variable | Depressed Only (Externalizing < 7) N=94 | Depressed + Externalizing N=19 | Test Statistic | P (adjusted P) | Effect Size (Hedges' g) |
|--|---|--------------------------------|-------------------|----------------|-------------------------|
| Minutes of Exercise (per week) Mean (SD) ^b | 88.85 (78.69) | 110.28 (86.51) | $F_{1,111}=1.10$ | .30 (.84) | 0.27 |
| Obesity N(%) ^a | 24 (26%) | 13 (68%) | $\chi^2=12.95$ | <.001 (.02)* | NA |
| Family History of Depression N (%) ^a | 52 (58%) | 12 (67%) | $\chi^2=0.42$ | .52 (.84) | NA |
| Health Care Utilization | | | | | |
| # of primary care visits prior yr Mean (SD) ^b | 2.06 (2.36) | 2.05 (1.84) | $F_{1,111}=0.32$ | .57 (.84) | 0.004 |
| # of outpatient mental health visits in prior year Mean (SD) ^b | 0.48 (1.59) | 0.16 (0.69) | $F_{1,111}=0.85$ | .36 (.84) | 0.22 |
| Parent-reported anxiety or depression treatment pre-study N(%) ^{a, d} | 33 out of 36 respondents (92%) | 6 out of 7 respondents (86%) | $\chi^2=0.25$ | .62 (.84) | NA |
| Youth Reported Functional Impairment | | | | | |
| Functional Impairment Mean(SD) ^b | 22.07 (6.77) | 30.64 (6.64) | $F_{1,111}=22.03$ | <.001 (.02)* | 1.27 |

* adjusted $p < .05$;

** $p < .01$;

*** $p < .001$;

^a Chi-squared test;

^b Wilcoxon rank test;

^c $n=93$ for this analysis due to missing data.

^d $n=43$ for this row due to missing data.