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ORIGINAL ARTICLE

The Patient Health Questionnaire for Adolescents:

Validation of an Instrument for the Assessment of Mental Disorders Among Adolescent Primary Care Patients

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Purpose: **To investigate the validity of the Patient Health Questionnaire for Adolescents (PHQ-A), a self-administered instrument that assesses anxiety, eating, mood, and substance use disorders among adolescent primary care patients.**

Methods: **A total of 403 adolescents from California, New Jersey, New York, and Ohio completed the PHQ-A and the Medical Outcomes Study Short-Form General Health Survey (SF-20) during or shortly after a visit to a primary care clinic or a school nurse's office. A few days later, clinical psychologists who were blind to the results of the PHQ-A administered a semi-structured clinical interview to assess the same psychiatric disorders and to conduct a global assessment of functioning (GAF) among 403 patients. Diagnostic agreement coefficients were computed and analyses of covariance were conducted.**

Results: **Findings support the diagnostic validity of the PHQ-A. The PHQ-A and the clinical interview produced similar estimates of the prevalence rates of anxiety, eating, mood, and substance use disorders. The PHQ-A demonstrated satisfactory sensitivity, specificity, diagnostic agreement, and overall diagnostic accuracy, compared with the clinical interview. Adolescents with PHQ-A diagnoses experienced significantly poorer mental and overall functioning, more physical pain, and poorer overall health compared with those without psychiatric disorders. These differences remained significant after patients' age, gender, ethnicity, and site were controlled statistically.**

Conclusion: **The PHQ-A may be used to assist primary care practitioners in identifying psychiatric disorders among their adolescent patients. The PHQ-A is the first such tool to be tested for use in adolescents and offers an acceptable and efficient tool for early detection and recognition of mental disorders in this high-risk group.**

Mental disorders are common among adolescents [1] and are associated with impairment, distress, morbidity, mortality, and chronicity [2,3]. Adolescents with major depression, one of the most prevalent psychiatric disorders in this age group, are at elevated risk for subsequent anxiety, mood, and substance use disorders [4–6], disruption of academic and social development, and attempted or completed suicide. Recent studies document that even those adolescents with psychiatric symptoms that do not meet diagnostic criteria are at risk for psychosocial impairment and future psychiatric morbidity [7,8]. In the majority of cases, a mental disorder in adolescence precedes the onset or recurrence of psychiatric disorders during adulthood [9]. Early detection and intervention of mental disorders during adolescence can have an important impact on adult mental health outcomes [10].

Although many youths with emotional and behavioral problems visit primary care practitioners, few are treated by mental health professionals [11].

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Similar patterns have been observed among adult primary care patients, and these have been a focus of research and intervention for the past decade. Mental disorders are among the most common disorders seen among adult primary care patients [12,13] and these patients experience substantial impairment, distress, and health care costs [14,15]. Most adult patients with mental disorders seek treatment from primary care physicians rather than from mental health professionals [16]; however, most mental disorders among these patients are not recognized by their primary care physicians [17] resulting in inadequate or inappropriate treatment. Research has similarly revealed that most mental disorders among children and adolescents are not recognized by primary care physicians [18,19]. Case identification is essential in order to ensure early treatment and prevention of secondary morbidity.

To improve the recognition of mental disorders by primary care physicians, Primary Care Evaluation of Mental Disorders (PRIME-MD), a two-stage diagnostic system including a screening questionnaire and a clinical interview, was developed for use by primary care physicians [20]. Two of the principal co-developers of the PRIME-MD (R.L.S., J.B.W.) are co-authors of the present report. More recently, a self-administered version of this instrument, the PRIME-MD Patient Health Questionnaire (PHQ) was developed and has been found to accurately and reliably diagnose mental disorders among primary care patients [21]. However, the PHQ has not been validated in an adolescent population. In addition, the PHQ does not assess dysthymic disorder, generalized anxiety disorder, or drug abuse/dependence, disorders that are relatively common among adolescents in the community [22,23]. Therefore, an expanded version of the PHQ, the Patient Health Questionnaire for Adolescents (PHQ-A) was developed for the assessment of mental disorders among adolescent primary care patients [24].

Development of the PHQ-A

The two components of the original PRIME-MD (the patient questionnaire and the clinical evaluation guide) were combined into a 6-page, 67-item questionnaire that can be entirely self-administered by the patient in 5 minutes or less. The clinician scans the completed questionnaire and applies diagnostic algorithms that are printed in abbreviated form at the bottom of each page. In this study, the data from the PHQ-A were entered into a computer program that applied the diagnostic algorithms (written using the Statistical Package for the Social Sciences [SPSS Inc., Chicago, IL]).

The PHQ-A was developed to assess generalized anxiety disorder (GAD, also referred to as overanxious disorder of childhood), panic disorder; bulimia nervosa (BN); major depressive disorder (MDD), dysthymic disorder; and substance use disorders including alcohol, cocaine, hallucinogen, inhalant, marijuana, opiate, sedative, and stimulant abuse or dependence. Like the original PRIME-MD, these disorders are divided into two groups. Threshold disorders (BN, GAD, MDD, dysthymic disorder, and panic disorder) for which symptoms meet the Fourth Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria for diagnosis and subthreshold disorders (alcohol abuse or dependence, drug abuse or dependence) for which fewer symptoms are assessed than are required for any specific DSM-IV diagnosis [26].

Impairment for those who had endorsed any problem was assessed by an item at the end of the PHQ-A: "How difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?" Evidence of impairment, assessed with this item, was required for the diagnosis of an anxiety, eating, or mood disorder. Specific forms of impairment associated with substance abuse or dependence were assessed by items specific to those areas. As with the original PRIME-MD, the physician is expected to rule out physical causes of anxiety and depression and normal bereavement or history of a manic episode before making a diagnosis of depression.

Research Questions

The present study investigated the validity of the PHQ-A in a multisite sample of adolescent patients in a range of primary care settings, by focusing on the following questions: (a) "Are diagnoses made with the PHQ-A as accurate as diagnoses made with the original PRIME-MD interview, using independent diagnoses made by mental health professionals (MHPs) as the criterion standard?"; (b) "Is the prevalence of mental disorders identified using the PHQ-A comparable to that obtained from MHP interviews, and to that obtained in other primary care studies?"; and (c) "Is the construct validity of the PHQ-A comparable to the original PRIME-MD interview with regard to impaired functioning, distress, and poor overall health?"

Methods

Sample

The sample consisted of 403 English-speaking adolescent primary care patients (36.7% male, 63.3% female) between the ages of 13 and 18 years (mean age = 15.90 years, SD =1.24) who showed no evidence of mental retardation or organic mental disorder and had at least 9 years of education. The composition of the sample was 77.2% white, 4.2% African-American, 12.4% Hispanic, 2.2% Asian or Pacific Islander, 1.5% Native American and 2.2% Other. A total of 254 participants were recruited from the greater Sacramento and Northern California region through the University of California Davis Health System Primary Care Network (PCN) with offices in rural, suburban and urban locations and providing care to an ethnically diverse patient population. Complete data sets were obtained from 241 of these youths. A total of 404 participants were randomly recruited from primary care and school nurse offices in Ohio, New Jersey and New York: Columbia Presbyterian Medical Center Adolescent Medical Clinic, NY (n = 37); Staten Island Hospital Adolescent Medical Clinic, NY (n = 114); Monmouth County Medical Center, NJ (n = 7); family practice office, Monmouth, NJ (n = 8); Keyport High School, Keyport, NJ (n = 120); St. Mary's Regional High School, South Amboy, NJ (N = 13); First Care Family Health and Immediate Care Center, Akron, OH (n = 9) and Green High School, Green, OH (n = 96). Complete data sets were obtained from 403 of these youths, but the present analyses were conducted with 162 of these participants, as described below. Parents of those less than age 18 years and participants over age 18 years provided written informed consent, and youths under age 18 years provided written informed assent after having read a detailed description of the study procedures. Study procedures were approved by the Institutional Review Boards in accordance with review procedures at New York State Psychiatric Institute, Columbia-Presbyterian Medical Center, and the University of California Davis School of Medicine.

Validation Measures

Clinical validation interview. To determine the diagnostic agreement between the PHQ-A and the assessment of a mental health professional (MHP), a Ph.D.-level clinical psychologist conducted a telephone interview with each participant who completed and returned the PHQ-A by mail and could be contacted by telephone. The MHPs, who were blind to the results of the PHQ-A, administered a semi-structured clinical validation interview, which included items from the Structured Clinical Interview for DSM-III-R (SCID) [25]), the PRIME-MD Clinical Evaluation Guide (CEG) [20], and the DSM-IV Global Assessment of Functioning (GAF) [26]. The validation interview was identical in most respects to the validation interview that was administered in the original PRIME-MD 1000 validation study. Semi-structured interview items from the SCID were used to assist the interviewer in developing a broad clinical impression of the youth, while items from the PRIME-MD Clinical Evaluation Guide were used to assess specific diagnostic criteria. Data were not collected with regard to the validity of the clinical validation interview itself. However, because the interviewers were trained mental health professionals, and because they used information from both SCID items and the PRIME-MD Clinical Evaluation Guide in conducting their assessments, it is likely that the validity of the clinical validation interview is somewhat greater than that of the standard PRIME-MD interview as administered by a primary care physician. GAF ratings are made on a 100-point scale. The items from the PRIME-MD CEG were used to assess specific symptoms of anxiety, depressive, eating, and substance use disorders corresponding with those assessed by the PHQ-A. A high GAF rating indicates a high current level of overall functioning and a low current level of psychopathology. A GAF rating of 50 or lower is indicative of poor overall functioning and/or severe psychopathology.

The telephone interview began with several open-ended questions from the SCID regarding the patient's overall functioning, mood, recent stressful life events, and family or work problems to reveal psychopathology that might not be elicited by the more structured CEG. As in the standard administration of the SCID, the MHP was specifically encouraged to explore any ambiguous responses. The items from the CEG were administered to assess the specific anxiety, eating, mood, and substance use disorders that are assessed by the PHQ-A. Items from the alcohol abuse or dependence module of the CEG were modified to assess drug abuse or dependence. After completing the telephone interview, the MHPs conducted an assessment of the patient's overall level of functioning using the GAF. Telephone interviews were used because of their convenience and demonstrated comparability with face-to-face research interviews [27,28].

Table 1. Prevalence of Psychiatric Disorders Among 403 Adolescent Primary Care Patients, Diagnosed Using the PRIME-MD PHQ-A and the PRIME-MD Clinical Interview[a]

Psychiatric Disorder	PRIME-MD PHQ-A % (*n*/N)	Clinical Interview[a] % (*n*/N)
Any psychiatric disorder	20.8 (84/403)	19.6 (79/403)
Any anxiety disorder	4.2 (17/403)	5.0 (20/403)
Panic disorder	2.0 (8/403)	3.0 (12/403)
Generalized anxiety disorder	3.5 (14/403)	2.5 (10/403)
Any mood disorder	14.4 (58/403)	11.9 (48/403)
Major depressive disorder	12.4 (50/403)	9.4 (38/403)
Dysthymic disorder	8.7 (35/403)	7.2 (29/403)
Bulimia nervosa	1.0 (4/403)	0.7 (3/403)
Any substance abuse or dependence	8.9 (36/403)	7.2 (29/403)
Probable alcohol abuse or dependence	4.0 (16/403)	4.0 (16/403)
Probable drug abuse or dependence	7.7 (31/403)	5.0 (20/403)

[a] Administered by trained mental health professionals.
PHQ-A = Patient Health Questionnaire for Adolescents; PRIME-MD = Primary Care Evaluation of Mental Disorders.

The Medical Outcomes Study Short Form General Health Survey (SF-20). The SF-20 [29] is a 20-item self-report questionnaire which assesses six dimensions of health-related quality of life (physical, social, and role functioning, mental health, bodily pain, and general health perceptions). Scores on all six SF-20 scales range from 0 to 100, with higher scores indicating better health and less functional impairment. A 5-point reduction in SF-20 scale scores is generally considered clinically significant. Research has provided considerable support for the reliability and validity of the SF-20 [30–32].

Procedures

California sample. Adolescents with a recent primary care office visit within the Primary Care Network were identified using appointment records available through a centralized practice management system. Records were reviewed on a regular basis between November 1997 and June 1998. Letters describing the study and requesting written consent were sent to parents/guardians of all adolescents. In response to over 900 letters, parental consent was returned for 285 adolescents (32%); assent forms and self-report measures were then sent directly to the adolescent by mail. Of those, 254 adolescents (89%) completed and returned the questionnaires and consent. MHPs conducted telephone interviews with 241 of those subjects (95%) within a 1-week time frame. After the clinical interview was completed, each participant was mailed a payment of $20.00.

New York, New Jersey, and Ohio samples. Adolescent patients were informed by their physicians, between December 1995 and May 1997 of the opportunity to participate in the present study. The patients who chose to participate were provided with a packet including informed consent forms, the PHQ-A, and the SF-20. After completing these forms, 442 youths mailed them to the investigators in a stamped, self-addressed envelope that was included in the packet. When each questionnaire packet was received by mail, the participant's telephone number was provided to a MHP. The MHP attempted to conduct a clinical interview with the patient as soon as the patient could be contacted by telephone. An original sample of 442 patients completed the PHQ-A and SF-20 and returned them by mail. The MHPs succeeded in conducting interviews with 403 of these patients (91%). However, owing to scheduling difficulties, most of these interviews were conducted more than 2 weeks after the adolescents had completed the PHQ-A and the SF-20. Because diagnostic agreement tends to decline as the length of the inter-test interval increases [33], patients who were interviewed more than 18 days after they completed the PHQ-A were excluded from the present sample. The mean interval between the completion of the PHQ-A and the administration of the clinical interview among the 162 patients from the NJ, NY, and OH sites who were interviewed within 18 days of the completion of the PHQ-A was 11.11 days (SD=4.16). After the clinical interview was administered by the MHP, each participant was mailed a payment of $25.00.

Results

Diagnostic Results of PHQ-A Evaluations

As Table 1 indicates, 20.8% of the participants were

Table 2. Operating Characteristics of the Self-Administered PRIME-MD PHQ-A Adolescent Version (N = 403), the PRIME-MD PHQ Adult Version (N = 585),[a] and the Original Clinician-Administered PRIME-MD (N = 431)[b*]

	Sensitivity (%)			Specificity (%)			Overall Accuracy (%)			Diagnostic Agreement (κ)		
	PHQ-A[c]	PHQ[d]	Original PRIME-MD[d]	PHQ-A[c]	PHQ[d]	Original PRIME-MD[d]	PHQ-A[c]	PHQ[d]	Original PRIME-MD[d]	PHQ-A[c]	PHQ[d]	Original PRIME-MD[d]
Any psychiatric disorder	75	75	83	92	90	88	89	85	86	0.65	0.65	0.71
Any anxiety disorder	50	63	69	98	97	90	96	91	86	0.52	0.65	0.55
Panic disorder	42	81	57	99	99	99	98	98	96	0.49	0.84	0.60
Generalized anxiety disorder	50	—	57	98	—	97	97	—	94	0.40	—	0.52
Any mood disorder	75	61	67	94	94	92	92	88	84	0.63	0.58	0.61
Major depressive disorder	73	73	57	94	98	94	92	93	92	0.59	0.54	0.61
Dysthymic disorder	55	—	51	95	—	96	92	—	92	0.46	—	0.49
Bulimia nervosa	67	89	73	99	96	99	99	96	98	0.57	0.61	0.73
Any substance abuse or dependence	66	—	—	95	—	—	93	—	—	0.55	—	—
Probable alcohol abuse or dependence	56	62	81	98	97	98	97	95	98	0.54	0.60	0.71
Probable drug abuse or dependence	70	—	—	96	—	—	94	—	—	0.52	—	—

[a] Data reported by Spitzer et al. (1999).
[b] Data reported by Spitzer et al. (1994).
[c] The mean inter-assessment interval was 6.6 days (SD = 4.6).
[d] The maximum inter-test interval was 2 days.
[*] All data are reported using mental health professionals' diagnoses as the criterion standard.
PHQ = Patient Health Questionnaire (Adult Version); PHQ-A = Patient Health Questionnaire (Adolescent Version); PRIME-MD = Primary Care Evaluation of Mental Disorders.

diagnosed with psychiatric disorders using the PHQ-A, while 19.6% of the participants were diagnosed with psychiatric disorders by the mental health professionals. Thirty-three patients (8.2%) were diagnosed with one psychiatric disorder, while 51 (12.7%) were diagnosed with two or more disorders. There were 16 co-occurring anxiety and depressive disorders, 12 co-occurring depressive and substance use disorders, 3 cases with depressive disorders that co-occurred with bulimia nervosa, 2 cases with anxiety disorders that co-occurred with bulimia nervosa, and one case with an anxiety disorder that co-occurred with a substance use disorder. Anxiety disorders were significantly more prevalent among participants of Hispanic origin than among those of other ethnic backgrounds. Depressive disorders were significantly more prevalent among females than among males.

The findings in Table 1 indicate that the PHQ-A does not systematically over- or under-diagnose the psychiatric disorders that are assessed with this instrument. Analyses of contingency tables indicated that the prevalence of psychiatric disorders was somewhat lower among participants who were recruited from their high school nurses' offices (14.9%) than among those who were recruited from primary care clinics or physicians' offices (22.5%). However, this difference was not statistically significant (χ^2 = 2.34; df = 1; $p >$. 05).

Diagnostic Agreement of PHQ-A With Clinical Interviews by Mental Health Professionals

The operating characteristics of the PHQ-A are generally satisfactory and comparable to those obtained in the PRIME-MD 1000 and PHQ Primary Care studies (Table 2). Both the specificity (i.e., the percentage of cases without psychiatric disorders that were correctly identified) and overall accuracy (i.e., the percentage of cases with and without disorders that were correctly identified) of the PHQ-A were acceptable, and both were similar to those reported for the PHQ and original PRIME-MD clinical interview [20,21]. There was moderate diagnostic agreement between PHQ-A diagnoses and diagnoses by the mental health professionals [34]. The generally moderate sensitivity (i.e., the percentage of cases with psychiatric disorders that were correctly identified) and diagnostic agreement between the PHQ-A and the assessment of the mental health professionals tended to be similar to, but somewhat lower than those of the PHQ and original PRIME-MD clinical interview [20,21].

Findings regarding the positive and negative predictive power of the PHQ-A are presented in Table 3. The PHQ-A demonstrated high negative predictive power for each diagnostic category, indicating that very few adolescents who were not identified as having a mental disorder by the PHQ-A were diag-

Table 3. Predictive Power of the PHQ-A, Compared With Clinical Interview Administered by a Mental Health Professional

	No PHQ-A Psychiatric Diagnosis		Psychiatric Disorder Diagnosed Using PHQ-A	
	% of Cases Undiagnosed by Clinical Interview[a]	% of Cases Diagnosed by Clinical Interview	% of Cases Undiagnosed by Clinical Interview	% of Cases Diagnosed by Clinical Interview[b]
Any psychiatric disorder	94	6	30	70
Any anxiety disorder	97	3	41	59
Panic disorder	98	2	38	62
Generalized anxiety disorder	99	1	64	36
Any mood disorder	96	4	38	62
Major depressive disorder	97	3	44	56
Dysthymic disorder	96	4	54	46
Bulimia nervosa	100	0	50	50
Any substance abuse or dependence	97	3	47	53
Probable alcohol abuse or dependence	98	2	43	56
Probable drug abuse or dependence	98	2	55	45

[a] Negative predictive power.
[b] Positive predictive power.
PHQ-A = Patient Health Questionnaire for Adolescents.

nosed with a mental disorder by the MHP. The positive predictive power of the PHQ-A was moderate. Overall, most (70%) of the adolescents who were identified as having a mental disorder by the PHQ-A were diagnosed with a mental disorder by the MHP. However, 30% of those who were identified as having a mental disorder by the PHQ-A were not diagnosed with a mental disorder by the MHP. More than half of the adolescents who were identified as having dysthymic disorder, GAD, or probable drug abuse or dependence by the PHQ-A were not diagnosed with these mental disorders by the MHP.

To investigate the possibility that different findings would be obtained as a function of site, analyses were conducted separately in the subsamples from California (N = 241) and New Jersey, New York or Ohio (N = 162). Similar findings were obtained with regard to diagnostic agreement between the PHQ-A and the clinical validation interview in the two subsamples. Overall diagnostic agreement coefficients of $\kappa = 0.66$ and $\kappa = 0.65$ were obtained in these two subsamples. Overall diagnostic agreement coefficients of $\kappa = 0.74$ and $\kappa = 0.61$ were obtained in the male and female subsamples, respectively. Overall diagnostic agreement coefficients of $\kappa = 0.62$ and $\kappa = 0.77$ were obtained in the white and nonwhite subsamples, respectively.

Relationship of PHQ-A Diagnoses With Functional Status, Distress, and Impairment

Figure 1 presents findings regarding the functional status, distress, and impairment of patients with no PHQ-A symptoms, compared with patients who screened positive for psychiatric symptoms but were not diagnosed, patients with subthreshold disorders, and patients with threshold disorders. Patients with no psychiatric disorders had a higher level of functioning on all 6 SF-20 scales than patients with

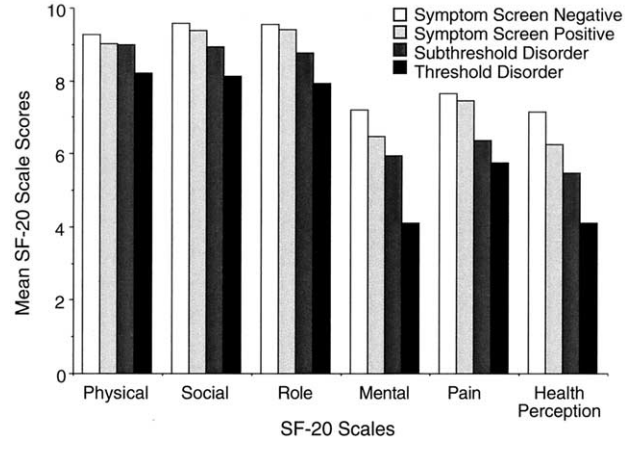

Figure 1. *Relationship of Primary Care Evaluation of Mental Disorders (PRIME-MD) Patient Health Questionnaire for Adolescents (PHQ-A) Results to Functinal Status, Distress, and Impairment. Note: Patients with threshold disorders had significantly lower scores than patients without any psychiatric symptoms on all six Medical Outcomes Study Short-Form General Health Survey (SF-20) scales; they also had significantly lower scores than patients who only screened positive for psychiatric symptoms on every scale except the physical functioning scale. Patients with subthreshold disorders had significantly lower scores than patients without any psychiatric symptoms on the SF-20 mental health, physcial pain, and overall health perception scales; they also had significantly lower scores on these three scales than patients who only screened positive for psychiatric symptoms.*

PHQ-A disorders. Analyses of covariance (ANCOVAs) indicated that the scores of the four groups on each of the 6 SF-20 scales were significantly different after patients' age, sex, ethnicity, and site were controlled statistically. Post-hoc tests indicated that patients with threshold disorders had significantly lower scores than patients without any psychiatric symptoms and patients who screened positive for psychiatric symptoms but had no psychiatric diagnoses on all 6 SF-20 scales. Patients with subthreshold substance use disorders had significantly lower scores than patients without any psychiatric symptoms on the SF-20 mental health, physical pain, and overall health perception scales; they also had significantly lower scores on these three scales than patients who screened positive for psychiatric symptoms but were not diagnosed.

An ANCOVA also indicated that the four groups differed significantly with regard to their clinician-rated global functioning after patients' age, sex, ethnicity, and site were controlled statistically. (F = 62.26; df = 3, 399; $p < .001$). Post-hoc tests indicated that the GAF scores of patients with threshold disorders (mean = 61.82; SD = 10.95) were significantly lower than those of patients without psychiatric symptoms (mean = 81.98; SD = 8.69), of patients who screened positive for psychiatric symptoms (mean = 76.92; SD = 10.20), and of patients with subthreshold disorders (mean = 69.69; SD = 11.97). Patients with subthreshold disorders had significantly lower GAF scores than patients without any psychiatric symptoms, and their GAF scores were also lower than those of patients who screened positive for psychiatric symptoms but were not diagnosed.

Discussion

The present findings indicate that the diagnostic validity of the PHQ-A is comparable to that of the original PRIME-MD interview and the adult PHQ. The diagnostic validity of the PHQ-A was demonstrated by agreement with an independent interview by a mental health professional (criterion validity) and by the association of PHQ-A diagnoses with indices of impaired functioning, distress, and poor health (construct validity). Compared with the findings of the MHP interview, the PHQ-A demonstrated satisfactory specificity, sensitivity, diagnostic agreement, and overall diagnostic accuracy (i.e., combined positive and negative predictive power; see column 3 in Table 2). Although the diagnostic agreement of the PHQ-A with the MHP interview was moderate (see column 4 in Table 2), it approximates the levels of agreement among MHPs themselves using diagnostic interview schedules [35]. Similarly, although the sensitivities of the PHQ-A diagnoses were modest using the interview diagnoses as the standard, the sensitivities were comparable to values obtained in a study of the sensitivity and specificity of the Diagnostic Interview Schedule [36]. Our findings regarding the overall diagnostic accuracy of the PHQ-A indicates that the self-report instrument correctly identified the vast majority of cases that were identified by the MHP interview as having or not having a psychiatric disorder. Our findings indicate that the PHQ-A may assist primary care physicians in the identification of anxiety, eating, mood, and substance use disorders among adolescent patients.

The adult PHQ-A has been recommended for administration to all new patients, patients in whom a psychiatric diagnosis is suspected, and established patients on a periodic basis (e.g., annually), as is done with other screening procedures [21]. Given the similarities between the PHQ and the PHQ-A, the same guidelines may be used for the administration of the PHQ-A to adolescent primary care patients. The most important advantage of following these recommendations is that it may be possible to alleviate a considerable amount of suffering among adolescent primary care patients by identifying and treating mental disorders in this population. However, it is important to recognize that some disadvantages, such as labeling, stigmatization, and provision of inappropriate or excessive treatment can also be associated with routine administration of screening instruments to adolescents [37]. Therefore, it is recommended that patients who are diagnosed with mental disorders by the PHQ-A should be asked follow-up questions by the physician in order to determine whether the psychiatric symptoms and associated impairment or distress are severe enough to merit treatment.

The PHQ-A is the first instrument of its kind to be tested in the adolescent population. It has several advantages over the original PRIME-MD interview or the adult PHQ for use with adolescents in primary care. Most importantly, the PHQ-A was designed to assess disorders that are likely to be present among adolescent primary care patients and it has been validated in an adolescent population. In addition, the PHQ-A assesses GAD, dysthymic disorder and drug abuse/dependence, disorders which are relatively common disorders among adolescents in the

community [27,28]. These disorders are not included in the adult PHQ and only the first two are included in the original PRIME-MD interview. Like the adult PHQ, the PHQ-A has the advantage of being entirely self-administered in less than five minutes.

The PHQ-A also has several advantages over other instruments that may be used in the pediatric population. The PHQ-A is the first instrument that has been developed and validated for the specific purpose of assessing and diagnosing anxiety, eating, mood, and substance use disorders among adolescent primary care patients. Other screening instruments used in pediatric primary care settings for the assessment of psychosocial or psychiatric morbidity in children and adolescents either assess a single type of psychopathology, psychosocial dysfunction, or general psychiatric symptoms [38–41]. In addition, screening scales only suggest the possible presence of a mental disorder, and the physician is not provided with the information necessary to diagnose a disorder. An advantage of the PHQ-A over such screening instruments is that, by providing the physician with clear evidence that the patient is likely to have a current psychiatric disorder, the PHQ-A yields findings that can be readily interpreted. In contrast, the clinical significance of a dimensional symptom index may not be immediately apparent.

The limitations of the present study merit consideration. The present study did not assess the health care utilization of patients with PHQ-A diagnoses or the effects of PHQ-A findings on physicians' recognition and treatment of psychiatric disorders. The PHQ-A was scored with a computer program to ensure that the diagnostic algorithms were applied correctly. The present study does not indicate how much training is necessary in different primary care settings to ensure that the diagnostic algorithms are applied correctly. Because less than one-third of the parents from the California sites who were contacted permitted their offspring to participate, there is some concern about the generalizability of the findings. However, one of the strengths of the present study with respect to generalizability is that the sample was obtained from a variety of geographically diverse locations.

The present study complements the PHQ Primary Care Study [21] and indicates that a self-administered diagnostic questionnaire can assist primary care physicians in diagnosing psychiatric disorders from adolescence through adulthood. The PHQ-A is the first such tool to be tested for use with adolescents, and it is an efficient and helpful tool for the early detection and recognition of mental disorders in this high-risk group. Further research regarding the management of adolescent mental disorders in primary care settings will play an important role in improving the effectiveness of early detection and treatment, and thereby reducing the likelihood that adolescents with mental disorders will develop chronic or recurring psychiatric conditions that persist into adulthood.

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