Journal of Adolescent Health 52 (2013) 546–551

ELSEVIER

JOURNAL OF ADOLESCENT HEALTH

www.jahonline.org

Original article

Patient Health Questionnaire-9 as an Effective Tool for Screening of Depression Among Indian Adolescents

Samrat Ganguly, M.D. [a,*], Moumita Samanta, M.D. [a], Prithwish Roy, M.D. [a], Sukanta Chatterjee, M.D. [a], David W. Kaplan, M.D., M.P.H. [b], and Bharati Basu, Ph.D., M.Sc. [c]

[a] *Department of Pediatrics, Medical College and Hospitals, Kolkata, India*
[b] *Department of Pediatrics and Adolescent Medicine, University of Colorado-School of Medicine, Children's Hospital, Aurora, Colorado*
[c] *Adolescent Health Clinic, Department of Pediatrics, Medical College and Hospitals, Kolkata, India*

Article history: Received April 2, 2012; Accepted September 30, 2012
Keywords: Adolescent; Depression; Screening; Diagnosis; Patient Health Questionnaire–9; Reliability; Validity; Primary care

See Related Editorial p. 511

A B S T R A C T

Purpose: Detection of depression among adolescents in the primary care setting is of paramount importance, especially in resource-constrained countries such as India. This article discusses the diagnostic accuracy, reliability, and validity of the Patient Health Questionnaire–9 (PHQ-9) when pediatricians use it among Indian adolescents.
Methods: Pediatricians administered the PHQ-9 to 233 adolescent students aged 14–18 years, along with the Beck Depression Inventory. Our psychologist clinically diagnosed depression based on an International Classification of Diseases, 10th Revision, interview of participants. One month later, the PHQ-9 was readministered among students. We conducted appropriate analyses for validity and diagnostic accuracy.
Results: A total of 31 students (13.3%) had a form of depression on psychiatric interview. A PHQ-9 score of $\geq$5 was ideal for screening (sensitivity, 87.1%; specificity, 79.7%). In addition to good content validity, PHQ-9 had good 1-month test–retest reliability (r = .875) and internal consistency (Cronbach's α = .835). There was high convergent validity with the Beck Depression Inventory (r = .76; p = .001). The concordance rate between the PHQ-9 threshold score of $\geq$10 and the International Classification of Diseases, 10th Revision based diagnosis was good (Cohen's κ = .62). The area under the receiver operating characteristic curve for PHQ-9 was .939.
Conclusions: The PHQ-9 is a psychometrically sound screening tool for use by pediatricians in a primary care setting in India. Because it is a short, simple, easy to administer questionnaire, the PHQ-9 has tremendous potential in helping to tackle the growing problem of depression among adolescents in developing countries.

IMPLICATIONS AND CONTRIBUTION

Our study showed that the Patient Health Questionnaire–9 is a reliable and valid screening tool for detection of depression among Indian adolescent students when pediatricians use it in the primary care setting. The PHQ-9 will prove beneficial in early diagnosis of depression among adolescents by the primary caregiver.

Depressive disorders are an increasing problem among adolescents worldwide. The lifetime prevalence of depression starting in adolescence is 15%–20% [1], with a recurrence rate of 60%–70% [2]. Depression often leads to suicide, school dropout, pregnancy, and substance abuse, and occasionally progresses to adult depression [3,4] and causes functional disability and significant impairment in daily activities [5]. Depression is undertreated throughout the lifespan [1], mostly because of poor awareness in society and the social stigmata associated with the disorder that prevents many patients and their families from seeking medical advice early.

* Address correspondence to: Samrat Ganguly, M.D., Department of Paediatrics, Kolkata Medical College, 88 College Street, Kolkata 700073, India.
E-mail address: 1samratganguly@gmail.com (S. Ganguly).

1054-139X/$ – see front matter
http://dx.doi.org/10.1016/j.jadohealth.2012.09.012

The primary health care provider and the pediatrician are important in this respect because sometimes they are the only health professional contact for an adolescent with multiple physical and mental health problems including depression. This is particularly true for developing countries such as India. The prevalence of depression among adolescents in primary care pediatric care settings in India is 11.2% [6]. However, up to 50% of depressed adolescents are not diagnosed in primary care settings [7]. There are a number of case-finding instruments for detecting depression in primary care, ranging from two to 28 items [8,9]. Generally, these can be scored as continuous measures of depression severity, and also have established cut points above which the probability of major depression is substantially increased [10]. The Patient Health Questionnaire–9 (PHQ-9) is one such tool that can be used in the primary care setting to detect depression among adolescents. It consists of the nine criteria on which the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV) diagnosis of depressive disorders is based, has comparable sensitivity and specificity with other similar tools, and is self-administered [11]. In case of other two-step depression measures, when scores are high, additional questions must be asked to establish DSM-IV depressive diagnoses. In comparison, the PHQ-9 can establish provisional depressive disorder diagnoses as well as grade depressive symptom severity [10]. At nine items, it is much shorter in length than other similar tools, and thus is effective in the primary care setting.

Although the PHQ-9 has been extensively used and validated elsewhere [12–14], to date, no validation studies with PHQ-9 have been carried out among the adolescent population of India. Thus, data are lacking regarding its usefulness in the Indian context. Therefore, we conducted this study to document the effectiveness of the PHQ-9 in the primary care pediatric setting in India when used by pediatricians.

Materials and Methods

The Institutional Ethics Committee, Medical College, Kolkata, India, approved the study proposal. We recruited participants from four English medium schools in Kolkata, where the Adolescent Health Clinic of Medical College, Kolkata, was conducting school-health activities. In their study, Kocchar et al [15] translated the Brief Patient Health Questionnaire into several Indian languages including Bengali, and validated the translated versions with more than 3,000 Indian subjects. However, the study was done only among patients older than 18 years of age, who presented to psychiatric and general clinics with one or more symptoms suggestive of depression. Because there were no validation studies of PHQ-9 among Indian adolescents, we decided to validate it against the Beck Depression Inventory (BDI), a well-known screening tool for depression, which Basker et al [16] previously validated among adolescents in India. We decided to perform this study with the original English version of both tools, because the Bengali translations have not been used in our target age group. We included adolescents aged 14–18 years in the study. We received approval from the school authority; during previous visits to the schools, we gave consent forms to students to give to their parents. These consent forms were in both Bengali and English so that the parents could understand them better. Students whose parents consented were included in the study. Assent was taken from students below 18 years. We used the following materials in the study.

Patient Health Questionnaire–9

The PHQ-9 is a nine-item depression module derived from the primary care evaluation of mental disorders (PRIME-MD, Pfizer Inc., New York, NY) tool [11]. The PRIME-MD is an instrument to help primary care clinicians make criteria-based diagnoses of five types of DSM-IV disorders commonly encountered in medical patients: mood, anxiety, somatoform, alcohol, and eating disorders [17,18]. The PHQ-9 is a one-page, self-administered depression module developed from the PRIME-MD. It helps screen for depression by relying on DSM-IV criteria for the diagnosis of depression. "Major depression" is diagnosed if five or more of the nine depressive symptom criteria have been present at least "more than half the days" in the past 2 weeks, and if one of the symptoms is depressed mood or anhedonia. One of the nine symptom criteria ("thoughts that you would be better off dead or of hurting yourself in some way") counts if present at all, regardless of duration. "Other depression" is diagnosed if two, three, or four depressive symptoms have been present at least "more than half the days" in the past 2 weeks, and one of the symptoms is depressed mood or anhedonia [10]. As a severity measure, the PHQ-9 score ranges from 0 to 27, because each of the nine items can be scored from 0 ("not at all") to 3 ("nearly every day"). A score of 5–9 indicates mild depression with watchful waiting and repeat test, 10–14 indicates moderate depression that should be followed up with due consideration as to counseling and/or pharmacotherapy, 15–19 signifies moderately severe depression that requires initiation of pharmacotherapy and/or psychotherapy, and a score of 20–27 is interpreted as severe depression with immediate initiation of pharmacotherapy and referral to a mental health specialist for psychotherapy and collaborative management [10,11]. Kroenke et al [11] also suggested that if a single screening cut point were to be chosen, a score of $\geq$10 is most effective, which has a sensitivity for major depression of 88%, a specificity of 88%, and a positive likelihood ratio of 7. Before making a clinical diagnosis of a depressive disorder, the clinician is expected to rule out physical causes of depression, normal bereavement, and history of a manic episode.

Beck Depression Inventory

The BDI is a 21 item, self-rated inventory in which each item is rated with a set of four possible answer choices of increasing intensity [19]. When the test is scored, a value of 0–3 is assigned for each answer and then the total score is compared with a key to determine the severity of depression. It can be administered to adolescents older than 14 years of age because the reading level of the measure is only at sixth-grade level and can be completed in about 10 minutes. The reliability and validity of BDI have been demonstrated with adolescents worldwide, including India [16,20]. We administered the BDI to determine the convergent validity of the PHQ-9.

Psychiatric interview

The clinical psychologist of the Adolescent Health Clinic, Medical College and Hospital, Kolkata, carried out this interview based on the *ICD-10 Classification of Mental and Behavioral Disorders (Clinical Descriptions and Diagnostic Guidelines)* [21], with emphasis on depressive disorders (F32.0, F32.1, F32.2, F32.3, F32.8, and F32.9), recurrent depressive disorders (F33.0, F33.1,