



Baseline screening tools as indicators for symptom outcomes and health services utilization in a collaborative care model for depression in primary care: a practice-based observational study



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ARTICLE INFO

Article history:

Received 7 February 2014

Revised 6 June 2014

Accepted 27 June 2014

Keywords:

Collaborative care

Depression

Mental and behavioral health screening tools

Utilization

Anxiety

ABSTRACT

Objective: Within a practice-based collaborative care program for depression, we examined associations between positive baseline screens for comorbid mental and behavioral health problems, depression remission and utilization after 1 year.

Methods: This observational study of 1507 depressed adults examined baseline screens for hazardous drinking (Alcohol Use Disorders Identification Test score ≥ 8), severe anxiety (Generalized Anxiety Disorder 7-item score ≥ 15) and bipolar disorder [Mood Disorders Questionnaire (MDQ) positive screen]; 6-month depression remission; primary care, psychiatric, emergency department (ED) and inpatient visits 1 year postbaseline; and multiple covariates. Analyses included logistic and zero-inflated negative binomial regression.

Results: At unadjusted baseline, 60.7% had no positive screens beyond depression, 31.5% had one (mostly severe anxiety), 6.6% had two and 1.2% had all three. In multivariate models, positive screens reduced odds of remission versus no positive screens [e.g., one screen odds ratio (OR) = 0.608, $p = .000$; all three OR = 0.152, $p = .018$]. Screening positive for severe anxiety predicted more postbaseline visits of all types; severe anxiety plus hazardous drinking predicted greater primary care, ED and inpatient; severe anxiety plus MDQ and the combination of all three positive screens both predicted greater psychiatric visits (all $p < .05$). Regression-adjusted utilization patterns varied across combinations of positive screens.

Conclusions: Positive screens predicted lower remission. Severe anxiety and its combinations with other positive screens were common and generally predicted greater utilization. Practices may benefit from assessing collaborative care patients presenting with these screening patterns to determine resource allocation.

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1. Background

Depression and anxiety are common challenges in primary care, and evidence suggests that recognition and management of these conditions is inconsistent and that mental health resources are scarce [1–4]. These realities have led many practices to improve outcomes through evidence-based programs such as collaborative care for depression, psychotherapy for anxiety disorders and others [5–12]. The use of tracking registries in these programs, along with quality measurement generally, have driven increased use of mental and behavioral screening and tracking tools to assess baseline problems and outcomes [13–16]. As might be expected, positive screens for anxiety, alcohol misuse and other mental and behavioral problems are

associated with poorer outcomes in practice-based implementation of collaborative care [17].

However, with the need for sustainability in practice-based settings [18], collaborative care programs are also increasingly being evaluated for cost containment via exploration of primary and secondary cost reduction [19,20]. Beyond an outcomes–utilization relationship found in prior studies [21,22], obtaining a clearer picture of the ties between mental/behavioral symptomatology and service use requires fully leveraging existing program data, including baseline screening tools. Gaining practical insight about patients' potential use of health care moving forward is also important from a care management perspective, since better awareness of patterns of presentation and utilization may help organize resources toward patients based on their expected combinations of visits for different services. Assessing utilization across service settings is key to this effort, since some utilization is needed and beneficial (e.g., services for

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management of symptoms and prevent worsening of existing conditions), whereas other kinds of use may be targets for reduction.

The present paper examines baseline self-assessments in a collaborative care program for depression in primary care and their association with clinical outcomes and health care utilization. We addressed the following specific aims:

- Aim 1 To assess the effects of positive screens for anxiety, bipolar disorder and alcohol use cumulatively predict lower symptomatic remission of depression in collaborative care, or if the specific combinations of screenings have different effects on remission. Severity on baseline mental and behavioral screens is associated with persistent depression in collaborative care [17]. Here, we examined combinations of baseline screens as cohorts to assess how the number and kind of positive screens predict 6-month remission.
- Aim 2 To examine how combinations of positive screens predict utilization in terms of visits for primary care, psychiatric specialty, emergency department (ED) and inpatient services over 1-year postscreening. Mental and behavioral health disorders are generally associated with greater utilization [23,24]. In this paper, we assessed whether combinations of positive screens for comorbid problems would differ in their effects on service use.

2. Methods

2.1. Data and sample

This study uses self-reported and electronic health record (EHR) data for patients enrolled in collaborative care for depression at a large, multisite primary care practice in the midwest. Descriptions of this program can be found elsewhere [17,19]. Basically, the collaborative care program was designed to target adult patients in a large primary care practice. Entry criteria for patients included a diagnosis of major depression or dysthymia, a patient health questionnaire, 9-item (PHQ-9) of 10 or more, age 18 or above and no previous diagnosis of bipolar disorder.

The program involved a care coordinator meeting with the patient to gather initial information using screening tools and a standard set of intake information that was presented the following week to the psychiatrist who would review all patients weekly (without physically seeing those patients). Care recommendations for each patient were then given to the primary care provider, who was responsible for all prescriptions. The care coordinator then would connect with the patient on a regular basis with motivational interviewing and behavioral activation techniques used to link health goals with patient-centered goals. Patients needing more direct mental health services were assisted in finding them (therapy or medication management).

For the present study, we assessed patients eligible for collaborative care between March 2008 and March 2011 (total=2525; see Appendix A). Patients were excluded if (a) we did not have research authorization to use their data and (b) the patient opted out of collaborative care (total remaining: 1709). Some patients were missing baseline screening data ($n=202$ missing), resulting in a cohort of 1507 patients; of these, 1090 also had a 6-month PHQ-9 (with missing questionnaire items due to incomplete follow-up information in the practice-based setting). We outline our use of these two groups below, as well as strategies to assess and adjust for potential bias due to missing data.

2.2. Measures

We employed binary (0–1) variables for each psychosocial screening tool to indicate a severe or threshold level for the respective problem based on existing scoring standards, specifically: (a) severe

anxiety based on a Generalized Anxiety Disorder, 7-item (GAD-7) score of 15 or greater as per Spitzer et al. [25]; (b) positive screen for bipolar based on the Mood Disorders Questionnaire (MDQ [26,27]) based on answering “yes” to 7 or more of the 13 behavioral/symptomatic items in Question 1, yes to Question 2 indicating cooccurrence of items from Question 1 and *moderate problem* or *serious problem* to Question 3 (relating to life disruption caused by items from Question 1); and (c) hazardous drinking based on a score of 8 or greater on the full Alcohol Use Disorders Identification Test (AUDIT [28]). Importantly, it was not our goal to address the sensitivity or specificity of these measures but, rather, to study the relation of a positive baseline screen on one or more of the scales in collaborative care for depression with symptomatic remission and, especially, utilization. We further created cohorts based on all combinations of positive screens, that is, those who had none; those who had only a positive MDQ, only severe anxiety on the GAD-7 or only hazardous drinking on the AUDIT; those with any combination of only two positive screens; and those with all three positive screens. Finally, we created a simple count of the number of positive screens per patient (0=no screeners positive/severe/hazardous; 1=any single screen being positive, 2=any two positive; and 3=all three positive).

We used 6-month scores on the PHQ-9 scale for depression at 6 months to calculate 6-month remission of depression (as measured by PHQ-9 score of <5 at 6months postbaseline). We did not use baseline PHQ-9 (e.g., an indication of severe depression) alongside other screeners for multiple reasons, including truncated distribution of PHQ-9 scores (since all individuals had a PHQ-9 of 10 or more to be included in the study), the potential for perfect prediction in 6-month remission models (i.e., all patients with severe depression, or all with less-than-severe depression, might have the same outcome on our binary logistic model).

Utilization measures were obtained from EHR review for consenting patients meeting inclusion criteria, and consisted of visit counts for 1 year postbaseline for the following: primary care, psychiatric specialty, ED and inpatient visits (we omitted nonpsychiatric specialty visits due to lack of granularity and limited interpretability). Contacts with care coordinators in collaborative care were not counted as “visits” in these categories. We also used the prior-year count of each visit type as a covariate.

Demographic covariates included an indicator for female (1=female, 0=male) and age in years at baseline.

2.3. Analyses

Beyond descriptive analyses, we conducted bivariate analyses using cross-tabulation and Kruskal–Wallis [29] and chi-square tests of association as appropriate to confirm associations for screening-based cohorts and depression outcomes and, more centrally, the association of those cohorts with utilization. Second, we conducted two sets of logistic regression for 6-month remission of depression, one using simple counts of positive screens and another using screening-based cohort indicators entered separately. Third, we conducted a series of regression models for count outcomes, specifically zero-inflated negative binomial (ZINB) models, to predict each utilization measure separately, with screening-based cohorts entered separately alongside covariates. Zero-inflated models allow for having many zeroes (common in utilization counts) by estimating two equations: first, a binary “zero-inflation” equation predicting a zero count (i.e., a logit model with the outcome of having a zero count versus ≥ 1 visit; independent variables entered here, based on performance in preliminary logistic models and sensitivity analyses, were prior-year visits of the respective type and age); and second, a “count” equation predicting number of visits (here, with independent variables being screening cohort indicators, age, sex and prior-year visits of the respective type). Comparisons of model fit using log-likelihood and Bayesian and Akaike Information criteria across zero-inflated and

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