Prevalence and comorbidity of major depressive disorder in young black and white women.

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Abstract

Objective This study reports the prevalence and comorbidity of depression in two large samples of black and white young adult women.

Method Clinical interviews of participants in a follow-up study of the National Heart, Lung, and Blood Institute Growth and Health Study (NGHS-Wave II; N = 378) were contrasted with a subsample of the National Comorbidity Survey (NCS; N = 3749) to examine the rates and comorbidity of lifetime major depressive disorder in black and white women using methodology described by Kraemer (1995). The sequencing of disorders was also examined to determine which disorder was primary. Comorbidity and sequencing were examined for alcohol and drug use disorder, panic disorder, specific phobia, social phobia, and post-traumatic stress disorder.

Results Prevalence estimates for depression, alcohol use disorder, and drug use disorder were higher for white women than for black women in both NGHS-Wave II and NCS. Over half of depressed participants in both samples had at least one comorbid disorder and depression was associated with an increased probability of all the investigated disorders. Only one ethnic difference was found in comorbidity, indicating that black women were more likely to have comorbid panic disorder than white women were. Depression was primary to alcohol and substance use disorders, whereas it was secondary to specific phobia and PTSD.

Conclusions High rates of comorbidity were found for both black and white women, though few ethnic differences in comorbidity were found. Preventive and treatment interventions are needed to address multiple disorders in young adult women.

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Depression in adolescence and young adulthood is of particular concern (Lewinsohn et al., 2003) with an estimated 8.3% of the population affected (Birmaher et al., 1996). Weissman and colleagues (1999) reported that depression beginning in adolescence persists, recurs,
and often leads to more serious illness in young adulthood. Thus, expanding our knowledge about depression in this developmental period has potentially significant clinical implications.

Psychiatric comorbidity is also an important area of study, both for the development of tailored treatment interventions and comprehensive prevention strategies. Furthermore, studies have found poorer outcomes in those with multiple disorders, including higher use of health services, more disability, greater functional impairment, and increased suicidality (Crown et al., 2002; DeBernardo et al., 2002; Kirchner et al., 2002). Expanding our understanding of comorbidity in depression will inform treatment approaches for individuals who present with multiple disorders.

Depression has very high rates of comorbidity, with estimates up to 33% in adolescent and young adult samples for lifetime comorbid disorders (Lewinsohn et al., 1993). A recent study (Kovacs et al., 2003) found that adolescent girls were more likely than boys to exhibit comorbid disorders contemporaneous with depression. In a large depressed adolescent sample, the negative impact of comorbidity was most pronounced for school problems, mental health treatment use, and past suicide attempts (Lewinsohn et al., 1998).

Few studies have examined rates of comorbidity in depressed ethnic minority samples. Although a substantial literature on comorbidity in depression exists, it is important to note that most data have been derived from white samples; little information has been reported for depressed ethnic minority groups, with a few exceptions (Blazer et al., 1994). This is particularly notable since the prevalence of depression appears to be similar, or in some cases higher (Kessler et al., 1994) across diverse groups (Williams et al., 1995). In the National Comorbidity Survey (Kessler, 1994), the association between major depression and alcohol abuse was consistently greater for females and blacks, relative to their male and non-black counterparts (Grant and Harford, 1995). Several additional studies suggest that comorbidity may be higher in blacks, but conclusions are limited by small sample sizes. In a study of 119 African American and 153 white depressed adults, the lifetime history of panic disorder, alcohol dependence, and obsessive compulsive disorder was higher in black subjects than in white subjects (Brown et al., 1996). Fabrega et al. (1993) reported that more African American subjects were found in the major depression/substance abuse group, relative to major depression alone and major depression with a comorbid non-substance abuse disorder. However, in neither of these studies was there an examination of the interaction of gender and ethnicity, making the rates of comorbidity difficult to interpret for specific groups such as black women. Thus a major aim of this study was to describe the prevalence and epidemiologic comorbidity (Kraemer, 1995) of major depressive disorder in an ethnically diverse sample of young adult women.

Specifically, Kraemer (1995) described the method of epidemiologic comorbidity (e-comorbidity), wherein the estimated proportion of the population in each category of psychiatric disorder is defined by comparing the presence or absence of one disorder with the presence or absence of the comorbid disorder. E-comorbidity is in evidence if two disorders exhibit statistical dependence—that is, having one disorder is associated with either increased or decreased probability of having the other disorder.

In a set of exploratory analyses, we calculated the “Number Needed to Take” (NNT) (Cooks and Sackett, 1995), which is an estimate of the number of depression cases one would expect to see before encountering another case with depression and the comorbid disorder. The smaller the NNT, the larger is the association between the two disorders. This concept has been used primarily in clinical trials (Kalliomaki et al., 2001), but we thought it might be of interest to examine estimates of comorbidity using this index as well.

A secondary objective of the current study was to provide additional evidence about possible causal relations between depression and comorbid disorders. Although a body of literature catalogues that depression is strongly associated with other disorders (Freehan et al., 1994; Kessler and Walters, 1998; Krishnan et al., 2002), few studies have examined the temporal sequencing of comorbid disorders. Kessler and colleagues (1996) examined the question of whether depression was primary or secondary vis a vis other disorders and found that in most cases, depression was secondary to other disorders. Questions related to causality can be illuminated by investigating the temporal order of disorders in conjunction with the strength of association among disorders. For example, if depression is associated with a strong increase in the probability of another disorder, and depression typically occurs before the other disorder, this suggests that depression may cause the other disorder. Given the impracticality of experimentally inducing psychological disorders, the next best option may be to use multiple sources of converging evidence from large non-experimental studies to approximate answers to questions of causality.

The current study capitalized on the availability of a large data set that included both black and white women to examine rates of comorbidity, thus allowing for comparisons across ethnic groups. The National Heart, Lung, and Blood Growth and Health Study (NGHS) National Heart, Lung, and Blood Institute Growth and Health Study Research Group, 1992 was a multicenter, ten-year longitudinal study designed to study risk factors for cardiovascular disease. Data on psychiatric disorders were collected from the NGHS cohort in early adulthood in a follow-up study termed “Wave
II” (Striegel-Moore et al., 2003). However, the NGHS sample was not nationally representative, thus limiting generalizability. In light of this, we contrasted our data to those of the nationally representative sample of the National Comorbidity Study (NCS) using methodology described by Kraemer (1995). NCS was designed to provide national estimates of the prevalence of and risk factors for psychological disorders in adolescents and adults between the ages of 15 and 54. The study was conducted in 1990–1992 (see Kessler (1994) for more information about the study).

1. Method

1.1. Participants

NGHS Wave-II. This study was designed to study risk factors for psychological disorders in young adult females. NGHS-Wave II involved 2054 individuals from the original NGHS sample (991 white and 1063 black, which is 85% and 88% of the white and black participants in the original NGHS, respectively). Of these, 201 white women and 177 black women completed a diagnostic interview and are used in the present study. After complete description of the study to the subjects, written informed consent was obtained.

NCS. The NCS included 8089 participants. Preliminary analyses showed that there were too few Black women ages 21–23 (N = 48) to provide statistically reliable estimates by ethnicity. Therefore, our analyses used all black or white women in NCS, consisting of 3163 White and 586 black women, ranging in age from 15 to 54. After complete description of the study to the subjects, written informed consent was obtained.

1.2. Instruments and procedure

NGHS-Wave II was conducted between 1998 and 2001, when the participants were between the ages of 21 and 23. NGHS-Wave II had two phases. In the first phase, all 2054 participants completed a screening interview. Based on this screening interview, participants were selected for a follow-up diagnostic interview. The diagnostic interview used the Structured Clinical Interview for DSM-IV (First et al., 1996) to determine DSM-IV diagnoses of substance use disorders, mood disorders, anxiety disorders, and somatoform disorders. Because the primary goal of NGHS-Wave II was to study risk factors for eating disorders, all women who screened positive for an eating disorder were asked to participate in the diagnostic interview. Of the remainder, approximately 10% of those screening positive for another disorder and 10% of those screening positive for no disorder were randomly chosen and asked to participate. A total of 378 women completed the diagnostic interview.

For NCS, diagnoses of DSM-III-R psychological disorders were made based on the results of the Composite International Diagnostic Interview (World Health Organization, 1990).

1.3. Data analysis

The analyses focused on disorders that met two criteria: (1) measures of lifetime prevalence were available in both NGHS-Wave II and NCS; and (2) estimated lifetime prevalence was relatively high (at least 2% in both studies). In addition to major depression, six disorders met these criteria: alcohol abuse or dependence; drug abuse or dependence; panic disorder; specific phobia; social phobia; and post-traumatic stress disorder.

Weights were designed to adjust for over-representation in NGHS-Wave II of women screening positive for psychological disorders, using the approach described by Addy et al. (1994). As described above, the design of NGHS-Wave II involved three basic sampling strata, (1) possible eating disorder (screened positive for anorexia nervosa, bulimia nervosa, or binge eating disorder), (2) psychiatric control (screened positive for some other psychiatric disorder), and (3) normal control (screened positive for no disorder). Initial weights were first created, defined as the inverse of the probability of selection for SCID of the women in each sample stratum (for details, see Table 1). These initial weights were further adjusted to reduce bias due to the over-representation of black women. This was done via post-stratification (Kish, 1965). Specifically, the initial weights were raked to target-population control totals for ethnicity from Census 2000, using the SAS macro of Izrael et al. (2000). Table 2 shows the proportion of black and white women in the target population (specifically, black or white women ages 21–23) in the 2000 US Census. Although it cannot be claimed that weighting makes the results nationally representative, weighting was expected to reduce the amount of bias in the estimates of psychological disorders in the target population. As shown in the rightmost column of Table 1, the weights achieved an upward weighting of the data for normal controls and a downward weighting of the data for possible eating disorders cases. Also, as shown in the rightmost column of Table 2, the weighting brought NGHS-Wave II into balance with the target population with respect to ethnicity. However, even with weights, the estimates from NGHS-Wave II differed from the target population on education and marital status, based on comparison with estimates from a comparable population (i.e., black or white females in the US, ages 21–23) in NHANES-III (Third US National Health and Nutrition Examination Survey, National Center for Health Statistics, 1988–1994), which was designed to provide
precise population estimates. Specifically, even with weights, the women in NGHS-Wave II appeared more educated and less likely to be married than women in the target population. This illustrates the fact that even though weighting was expected to make the NGHS-Wave II sample more comparable to the target population with respect to ethnicity and psychopathology (as roughly indicated by the sample strata), the NGHS-Wave II sample still differs from the target population to an extent that cannot be precisely quantified.

Because neither study used simple random sampling, variance estimates were computed with appropriate procedures (SUDAAN and PROC SURVEYMEANS in SAS). Because both surveys had small sampling fractions, sampling with replacement was assumed for analysis purposes.

The analyses first examined the prevalence of depression in black and white women. Then, the comorbidity of each disorder (lifetime) with lifetime major depression was calculated. The analysis approach was based on Kraemer’s (1995) framework for examining “epidemiologic comorbidity,” in which she recommends using the cross-product odds ratio as an index of comorbidity. If this is equal to 1, the disorders are independent. However, if it is greater than 1, having one disorder increases the probability of having the other; if it is less than 1, having one disorder is “protective” against having the other.

To examine ethnic differences in comorbidity, an ecologic analysis was conducted for black and white women. Ethnic differences in prevalence and comorbidity were tested with logistic regression models with the comorbid disorder as the outcome variable. Depression and ethnicity were entered as main effects and the model included the depression by ethnicity interaction. PROC RLOGIST in SUDAAN was used to account for the weighting and survey design.

The estimate for the Number Needed to Take (NNT) analyses was derived by taking the reciprocal of the difference between the estimated probability of having the disorder given depression and the estimated probability of having the disorder with no depression \(1/Pr(\text{Disorder}|\text{Depression}) - Pr(\text{Disorder}|\text{No depression})\). These analyses were done separately for black and white women in both NGHS-Wave II and NCS.

<table>
<thead>
<tr>
<th>Sample stratum</th>
<th>Number screened</th>
<th>Number selected for SCID</th>
<th>Initial weighta</th>
<th>Raked weight (white/black)b</th>
<th>Percent in stratum Unweighted percent (%)</th>
<th>Weighted percent (raked weights) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Screen positive for eating disorder</td>
<td>156</td>
<td>144</td>
<td>1.1</td>
<td>4.40/0.8</td>
<td>38.1</td>
<td>10.1</td>
</tr>
<tr>
<td>2. Psychiatric control</td>
<td>696</td>
<td>117</td>
<td>5.9</td>
<td>24.4/4.2</td>
<td>31.0</td>
<td>35.7</td>
</tr>
<tr>
<td>3. Normal control</td>
<td>1202</td>
<td>117</td>
<td>10.3</td>
<td>42.1/7.3</td>
<td>31.0</td>
<td>54.2</td>
</tr>
<tr>
<td>Total</td>
<td>2054</td>
<td>378</td>
<td></td>
<td></td>
<td>100.1c</td>
<td>100.0</td>
</tr>
</tbody>
</table>

a The initial weights were computed as the inverse of the probability of selection for SCID from the screening sample, i.e., within each stratum, 1/(number selected for SCID/number screened).
b The initial weights were raked to control totals for ethnicity in the target population (women ages 21–23) based on the Census 2000 short form. The raked weights shown in the table may be interpreted as the estimated number of women in the population (in thousands) that each SCID respondent represents.
c The column percentages add to over 100 due to rounding.

Table 2

Comparison of estimates from NGHS-Wave II (unweighted and weighted) with estimates from the US Census short form and NHANES-III for black or white women ages 21–23, selected characteristics (ethnicity, education, and marital status)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Census 2000 short form (%)</th>
<th>NHANES-III (%)</th>
<th>NGHS-Wave II (unweighted) (%)</th>
<th>NGHS-Wave II (weighted) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>17.4</td>
<td>17.7</td>
<td>46.8</td>
<td>17.4</td>
</tr>
<tr>
<td>White</td>
<td>82.6</td>
<td>82.3</td>
<td>53.2</td>
<td>82.6</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>Not collected</td>
<td>85.9</td>
<td>90.7</td>
<td>91.6</td>
</tr>
<tr>
<td>Less than H.S.</td>
<td>Not collected</td>
<td>14.1</td>
<td>9.3</td>
<td>8.4</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>Not collected</td>
<td>41.9</td>
<td>18.5</td>
<td>21.3</td>
</tr>
<tr>
<td>Never married</td>
<td>Not collected</td>
<td>51.8</td>
<td>78.8</td>
<td>77.1</td>
</tr>
<tr>
<td>Widow/sep/div</td>
<td>Not collected</td>
<td>6.3</td>
<td>2.7</td>
<td>1.6</td>
</tr>
</tbody>
</table>
Temporal sequencing was examined descriptively by calculating the percentage of cases in which depression was primary, secondary, or had the same age of onset as the comorbid disorder.

2. Results

2.1. Prevalence rates (lifetime)

Tables 3 and 4 provide prevalence results as well as basic indices of “e-comorbidity” for NGHS-Wave II and NCS, respectively. Weighted prevalence and comorbidity estimates for white and black women are provided. The logistic regression resulted in a main effect for ethnicity, indicating that estimated rates of depression were significantly higher among white women than among black women, in both NGHS-Wave II and NCS ($p < 0.05$). Specifically, based on NGHS-Wave II, depression estimates were 34% and 18% for white and black women, respectively. Based on NCS, depression estimates were 22% and 15% for white and black women, respectively. Ethnic differences were also found in the prevalence of alcohol use disorder and drug use disorder, with higher rates observed in white than in black women. Prevalence estimates for alcohol use disorder were 29% white vs. 13% black in NGHS-Wave II, and 17% white vs. 6% black in NCS; for drug use disorder, estimates were 23% white vs. 13% black in NGHS-Wave II, and 10% white vs. 5% black in NCS.

2.2. Comorbidity in major depressive disorder

In NGHS-Wave II, 58.9% of those who were depressed also had at least one other disorder. In the NCS subpopulation used in these analyses (i.e., black or white females ages 15–54), 65.8% of those who were depressed also had at least one other disorder. As seen in Tables 3 and 4, the column (“Pr(Disorder|Depression)”) shows the probability of having the disorder given depression. This is the weighted frequency of having the disorder and depression, divided by the weighted frequency of depression with or without the disorder. Shown in the next column (“Pr(Disorder|No depression)”) is the estimated probability of the disorder given no depression, where the weighted frequency of no depression is the denominator. For example, based on NGHS-Wave II, the probability of alcohol abuse/dependence given no lifetime depression is 0.23 for white women, and 0.9 for black women. The next column shows the “comorbidity index,” which is based on the forgoing estimates and is calculated as the natural logarithm of $\frac{\text{Pr(Disorder|Depression)}}{\text{Pr(Disorder|No depression)}}$ expressed as an odds ratio. Kraemer (1995) suggests that comorbidity indices between 1 and 2 indicate “strong” comorbid relations while indices above 2 indicate “very strong” comorbid relations. By this rule, black women in NGHS-Wave II showed strong comorbidity with alcohol use disorder, panic disorder, and PTSD; white women in this sample showed the strongest comorbidity with social phobia and...
specific phobia. In NCS, all disorders, for both black and white women, showed strong comorbid relations, with panic disorder and PTSD being very strong for black women. NCS tended to yield somewhat stronger comorbidity estimates than NGHS-Wave II.

The comorbidity analysis revealed only one significant ethnic difference. Specifically, the association between depression and panic disorder was significantly stronger for black women than for white women in NCS ($p < 0.05$), and this difference reached a marginal level of significance in NGHS-Wave II ($p < 0.10$). In NGHS-Wave II, depression was not strongly associated with panic for white women, whereas for all other groups (black women in NGHS-Wave II, both black and white women in NCS), depression was associated with strong or very strong increases in the probability of panic disorder.

The final column provides the “Number Needed to Take” and provides an estimate of the number of depression cases that would be necessary in order to find one more case of the comorbid disorder, relative to no depression. These results show variability both between the two samples (NGHS-Wave II and NCS) and also some ethnic differences for black and white women.

2.3. Temporal order of depression vs. comorbid disorders

Because only one statistically significant ethnic difference was found in rates of comorbidity (panic disorder), the data were collapsed across ethnic groups for the examination of the sequencing of disorders (except for panic disorder), which used age-of-onset data. Table 5 displays weighted estimates of the percentage with each possible temporal ordering for NGHS-Wave II and NCS: (1) Depression had the earlier age of onset; (2) Depression and the comorbid disorder had the same age of onset (same age of onset was defined as onset during the same year of age); or (3) The comorbid disorder had the earlier age of onset.

As shown in Table 5 for both NGHS-Wave II and NCS, the onset of depression most often occurred before the onset of alcohol use disorder and drug use disorder. The reverse was true for specific phobia and PTSD, in that the onset of depression most often occurred after the onset of these two disorders. The two studies differed in the temporal sequencing for social phobia: depression was primary for the NGHS-Wave II sample, but was secondary for the NCS sample.

Because rates of comorbid panic disorder were found to differ between black and white women, sequencing for this disorder was examined separately by ethnicity. For NGHS-Wave II, depression occurred before panic disorder for 55% of white women and 59% of black women; depression occurred after for 35% of white women and 41% of black women. For NCS, depression was primary for 46% of white women and 70% of black women and secondary for 21% of white and 10% of black women.

3. Discussion

The aims of this study were to examine prevalence and comorbidity of depression in two samples of black and white women and to explore the sequencing of depression and comorbid disorders.

The examination of ethnic differences in prevalence rates yielded interesting findings. Although the two sur-
veys differed with regard to the ages of black and white participants due to sample size issues in NCS, prevalence estimates for depression and substance use disorders were found to be higher for white women than for black women in both samples. This is similar to the findings of others (Buka, 2003; Jonas et al., 2003; Skaer et al., 2000; Turner and Lloyd, 2003), who reported higher rates of both disorders in white samples. Jackson (Angold et al., 2002), in a survey design, also recently confirmed lower rates of depression in African Americans. Interestingly, although depression appears to be less frequent in black samples, rates of medical problems (Peters et al., 1998; Whitfield et al., 2002) and risky behaviors are higher relative to white samples (Balluz et al., 2004; CDC, 2000; Cooper et al., 2003). It is possible that underlying psychological difficulties may be expressed differently in black and white individuals or that depression is more stigmatized in black than in white communities resulting in alternate ways of expression. Examination of potential explanations for differential prevalence rates awaits further research.

The higher prevalence of depression overall in NGHS-Wave II may be partly due to the fact that the women in the NGHS-Wave II sample were younger, on average, than the women in the NCS sample that was used for this analysis. This is consistent with Kessler et al. (1996) and others (Patten, 2003), who reported the somewhat counterintuitive finding that lifetime depression was more common in younger women than in older women.

Consistent with other studies, depression was found to be highly comorbid with other disorders, with over half of participants in each survey reporting at least one other disorder. However, it should be noted that disorders are measured in terms of lifetime prevalence, so it is possible that depression and the comorbid disorder occurred at different times. The strength of the comorbidity approach is that it takes into consideration the base rates of each disorder in a population. Thus, the estimates of comorbidity may be more reliable than when calculated by other means.

Comorbidity was observed to be similar in the two ethnic groups. The only ethnic difference was that panic disorder was more strongly comorbid with depression in black women. In addition, in NGHS-Wave II, panic disorder was not strongly associated with depression among white women, whereas for white women in NCS, the comorbidity index indicated that these disorders were strongly associated. The small number of women with both depression and panic disorder in NGHS-Wave II indicates that this finding should be viewed with caution. These findings are consistent with earlier studies indicating higher rates of comorbid depression and anxiety disorders in blacks than whites (Brown et al., 1996). It is not clear whether this single ethnic difference in comorbidity is due to when the studies were done, how participants were sampled, or what assessments were conducted. Overall, however, the general lack of ethnic differences found in these two large studies tentatively suggests that potentially a common mechanism underlies the comorbid relations in both ethnic groups. Clearly additional studies are needed that examine larger samples by both gender and ethnic group, in order to increase our knowledge base of comorbidity in minority populations.

With regard to the sequencing data, we found that for alcohol use disorder and drug use disorder, depression was primary in both samples. For social phobia, opposing results were found between the two studies, with depression primary in NGHS-Wave II, and secondary in NCS. This is likely due to the younger age range in the former dataset relative to the latter.

<table>
<thead>
<tr>
<th>Disorder</th>
<th>Temporal order</th>
<th>NGHS-Wave II (%)</th>
<th>NCS (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol use disorder</td>
<td>Depression first</td>
<td>62.7</td>
<td>58.8</td>
</tr>
<tr>
<td></td>
<td>Same age of onset</td>
<td>11.7</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td>Other disorder first</td>
<td>25.6</td>
<td>33.6</td>
</tr>
<tr>
<td>Drug use disorder</td>
<td>Depression first</td>
<td>54.9</td>
<td>64.8</td>
</tr>
<tr>
<td></td>
<td>Same age of onset</td>
<td>27.6</td>
<td>8.9</td>
</tr>
<tr>
<td></td>
<td>Other disorder first</td>
<td>17.4</td>
<td>26.2</td>
</tr>
<tr>
<td>Social phobia</td>
<td>Depression first</td>
<td>82.2</td>
<td>20.1</td>
</tr>
<tr>
<td></td>
<td>Same age of onset</td>
<td>0.0</td>
<td>13.2</td>
</tr>
<tr>
<td></td>
<td>Other disorder first</td>
<td>17.8</td>
<td>66.8</td>
</tr>
<tr>
<td>Specific phobia</td>
<td>Depression first</td>
<td>0.0</td>
<td>15.3</td>
</tr>
<tr>
<td></td>
<td>Same age of onset</td>
<td>0.0</td>
<td>12.7</td>
</tr>
<tr>
<td></td>
<td>Other disorder first</td>
<td>100.0</td>
<td>72.0</td>
</tr>
<tr>
<td>PTSD</td>
<td>Depression first</td>
<td>19.4</td>
<td>40.4</td>
</tr>
<tr>
<td></td>
<td>Same age of onset</td>
<td>25.0</td>
<td>13.3</td>
</tr>
<tr>
<td></td>
<td>Other disorder first</td>
<td>55.6</td>
<td>46.3</td>
</tr>
</tbody>
</table>

Table 5
Temporal sequencing of depression and other disorders
It is of interest that alcohol abuse was found to precede depression for 26% (Wave II) and 34% (NCS) of the participants. However, Kessler et al. (1996) reported that only 15.2% of the total NCS sample had alcohol abuse before depression. This percentage was based on the entire cohort, without regard to ethnicity or gender. This difference (34% vs. 15%) again underscores the importance of examining gender- and ethnic-specific groups before drawing conclusions about sequencing of disorders.

For specific phobia and PTSD, depression was secondary in the majority of cases. These data are consistent with earlier work by Kessler and colleagues (1994), in which anxiety disorders were found to most commonly pre-date the onset of depression.

The exploratory analyses resulting in NNT’s for comorbidity yielded some interesting findings. Perhaps most notable is that although for some disorders the comorbidity estimates are quite similar for black and white women, the corresponding NNT is quite different. For example, in the NCS data, comorbidity estimates for black and white women for alcohol use disorder and depression are very similar (1.07 vs. 1.05). The NNT, however, appears more discrepant between the two ethnic groups. In this case, the NNT for white women was 5.9 and for black women was 12.5, suggesting that twice as many depressed black women would be seen before a case of comorbid alcohol use disorder would be found than for depressed white women. The use of odds ratios in determining comorbidity estimates, which is quite commonly done, may provide different information than other methods of examining comorbid disorders. However, because the absolute numbers for several disorders are quite small in these analyses, these results should be interpreted cautiously and replicated in additional studies.

Our results have potential implications for both treatment interventions and prevention initiatives with depressed black and white women. For women who are depressed, clinicians should be mindful of the possibility that both substance use disorders and anxiety disorders are likely to co-occur, and should assess accordingly. High relapse rates for both substance and anxiety disorders (Schutte et al., 2003; Yonkers et al., 2003) suggest that the risk of future occurrence is high and should be monitored in depressed women with a history of these disorders. Depression was found to precede the onset of both substance use disorder and panic disorder in more than half the sample, suggesting that prevention efforts might include carefully assessing for early signs of excess substance use or initial symptoms of panic in women who are depressed. On the other hand, for specific phobias and PTSD, the majority of women became depressed after the onset of the anxiety disorder, indicating that women experiencing these anxiety disorders may benefit from interventions designed to prevent depression. Recent studies have shown, for example, that risk for depression can be reduced significantly through cognitive-behavioral interventions (Harrington and Clark, 1998).

Limitations of our study include the differences in the age ranges of women in the two samples, the non-representativeness of the NGHS-Wave II sample, and the difference in assessment strategies. NCS was based on diagnoses from DSM-III-R; Wave II was based on the SCID-IV, which uses the DSM-IV. The differences in prevalence rates found in anxiety disorders may be a function of different diagnostic criteria from one edition of the DSM to the next.

We believe these constraints are offset by the strengths of the data sets that afforded the opportunity to investigate prevalence rates, comorbidity estimates, and sequencing questions in an often-understudied population of young adult women.

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