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Depression In The Workplace: Effects On Short-Term Disability

Could treating workers’ depression help employers to save money on disability? These results are encouraging.

by Ronald C. Kessler, Catherine Barber, Howard G. Birnbaum, Richard G. Frank, Paul E. Greenberg, Robert M. Rose, Gregory E. Simon, and Philip Wang

ABSTRACT: We analyzed data from two national surveys to estimate the short-term work disability associated with thirty-day major depression. Depressed workers were found to have between 1.5 and 3.2 more short-term work-disability days in a thirty-day period than other workers had, with a salary-equivalent productivity loss averaging between $182 and $395. These workplace costs are nearly as large as the direct costs of successful depression treatment, which suggests that encouraging depressed workers to obtain treatment might be cost-effective for some employers.

Epidemiologic data suggest that some chronic conditions, such as allergies, ulcers, and depression, strongly affect short-term work disability. If treatment is effective in reducing these disabilities, gains in productivity might partially offset direct treatment costs. Documentation of such effects could help to shift employers’ attention from the cost of health care to the value of having a healthy workforce.

To illustrate the issues involved in these considerations, we estimated the short-term work disability associated with thirty-day major depression, based on an analysis of data from two national surveys.
surveys. We then compared the indirect salary-equivalent cost of this disability to the direct cost of successful depression treatment. Major depression is a good condition to consider in this regard because of its high prevalence, strong impact on short-term work disability, and low rate of treatment. Although a number of randomized effectiveness trials have documented significant improvement in self-reported work performance as a result of depression treatment, we know of no previous research that has attempted to estimate and compare the cost of short-term, depression-related work disability with the cost of successful depression treatment.

Data And Methods

The two surveys analyzed here are the National Comorbidity Survey (NCS) and the Midlife Development in the United States Survey (MIDUS). The NCS was conducted in 1990–1992 and included in-person interviews with a nationally representative sample of 8,098 persons ages fifteen to fifty-four (82.4 percent response rate). MIDUS was carried out in 1996 and included telephone interviews and mail questionnaires administered to a nationally representative sample of 3,032 persons ages twenty-five to seventy-four (60.8 percent response rate). The results reported here rely on data from both surveys, weighted to adjust for differential probabilities of selection and for differential nonresponse with respect to geography and census demographic variables. More details about the survey design are available elsewhere.

Both surveys used versions of the World Health Organization’s Composite International Diagnostic Interview (CIDI) to measure Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised (DSM-III-R) major depressive episodes during the thirty days prior to the interview. The NCS used the full CIDI, while MIDUS used the CIDI Short-Form (CIDI-SF). Clinical reappraisal studies have shown good agreement between the full CIDI and independent clinicians’ ratings of major depression, and psychometric analysis has shown good correspondence between the CIDI-SF and the full CIDI assessment of major depression. Both the NCS and MIDUS include continuous measures of depression symptom severity based on items from the Hopkins Symptom Checklist. Symptom severity was assessed for all respondents, not just for those with major depression. The symptom-severity-scale scores in the total sample were transformed to have a variance of one and a mean of zero in the subsample of those who met criteria for major depression.

Employed respondents in both surveys were asked how many days in the past thirty they could not work or carry out their normal daily activities because of problems with their physical or mental...
health (referred to hereafter as “work-loss days”). Comparisons of retrospective reports of this sort with employers’ sickness absence records show good agreement. Respondents also were asked how many days, exclusive of work-loss days, they cut back on the time they worked or got less done than usual because of problems with their physical or mental health (referred to as “work-cutback days”). Next, we created a summary measure of short-term work disability by summing the reported number of work-loss days and 40 percent of work-cutback days. The 40 percent figure is based on the results of a national telephone survey carried out as a pilot for MIDUS in which respondents rated the amount of work they did on their cutback days, using a scale from zero (no work at all) to 100 (a full day of work). The mean was approximately sixty, justifying the assumption of 40 percent work loss on cutback days.

A two-phase regression analysis was used to estimate the effects of major depression and depression symptom severity on short-term work disability in the two surveys. In the first phase, logistic regression analysis was used to estimate the effects of these predictors on the probability of having any short-term work disability. In the second phase, linear regression was used to estimate the conditional effects of these same predictors on number of short-term work-disability days in the subsample of respondents with any short-term disability. Both equations included controls for demographics (age, sex, race, and education) as well as for physical disorders assessed in a checklist of chronic conditions.

The regression equations were estimated assuming one-way causation; that is, depression causes work disability, but not vice versa. To evaluate the impact of this assumption, parallel equations were estimated in the NCS using the method of instrumental variables to adjust for the possibility of reciprocal causation. This was not done in MIDUS because plausible instrumental variables were not available in the MIDUS data. The regression results then were evaluated to estimate the impact of major depression on number of short-term work-disability days. Information on respondents’ earnings also was used to calculate the salary-equivalent cost of depression-related short-term work disability.

Results

The estimated thirty-day prevalence of major depression in the U.S. labor force is 1.8 percent in MIDUS and 3.6 percent in the NCS. As shown in Exhibit 1, the proportion of respondents with any short-term work disability is higher among workers with thirty-day major depression than among other workers in both MIDUS (36.8 percent versus 17.0 percent) and the NCS (48.2 percent versus 21.3
EXHIBIT 1
Distribution Of Short-Term Work Disability With And Without Thirty-Day Major Depression

<table>
<thead>
<tr>
<th>Survey source</th>
<th>Number of respondents</th>
<th>Any short-term work disability</th>
<th>Conditional mean number of work-disability days^a</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Percent</td>
<td>Mean</td>
</tr>
<tr>
<td>MIDUS</td>
<td>38</td>
<td>36.8%</td>
<td>10.9</td>
</tr>
<tr>
<td>30-day major depression</td>
<td>2,126</td>
<td>17.0</td>
<td>3.8</td>
</tr>
<tr>
<td>All others</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCS</td>
<td>162</td>
<td>48.2^b</td>
<td>7.0^b</td>
</tr>
<tr>
<td>30-day major depression</td>
<td>4,322</td>
<td>21.3</td>
<td>5.0</td>
</tr>
<tr>
<td>All others</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined^c</td>
<td>200</td>
<td>45.9^b</td>
<td>7.6^b</td>
</tr>
<tr>
<td>30-day major depression</td>
<td>6,448</td>
<td>19.9</td>
<td>4.7</td>
</tr>
<tr>
<td>All others</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: Authors’ analysis of MIDUS and NCS data.
NOTES: MIDUS is Midlife Development in the United States Survey. NCS is National Comorbidity Survey. Employed respondents in both surveys were asked separate questions about number of days in the past thirty that were either work-loss days (no work for an entire day) or work-cutback days (reduced amount of time at or speed of work for a day), as a result of problems with either their physical or mental health. A composite measure of short-term work disability was created by assuming that a work cutback day is equivalent to 40 percent of a work-loss day.

^a The conditional mean is the mean in the subsample of respondents with one or more short-term work-disability days.
^b Significant difference between workers with 30-day major depression and all other workers at the .05 level, two-sided test.
^c The distributions differ significantly across the two surveys but nonetheless are reported for the combined data set for heuristic purposes.

percent). The conditional mean number of short-term work-disability days also is higher among workers with thirty-day major depression than among other workers in both surveys (10.9 versus 3.8 in MIDUS and 7.0 versus 5.0 in the NCS).

The results of the regression analyses assuming one-way causation are reported in Exhibit 2. As shown there, the adjusted (for the control variables) odds of having any short-term work disability are higher among depressed workers than among other workers in both surveys (2.1 in MIDUS and 1.3 in the NCS). Depression symptom severity also is associated with significantly elevated odds of short-term work disability in both surveys (1.2 in MIDUS and 1.5 in the NCS). In addition, the conditional number of work-disability days is higher in both surveys among respondents with thirty-day major depression than among other workers (7.1 days in MIDUS and 1.6 in the NCS) after adjusting for the control variables. In comparison, depression symptom severity is not meaningfully related to the conditional number of disability days in either survey.

The results of calculations based on the regression analyses are presented in Exhibit 3. Depressed workers are shown there to have between 1.5 and 3.2 more short-term work disability days in a given thirty-day period than other workers, after adjusting for the control variables included in the regression equations. The average salary-
EXHIBIT 2
Associations Of Thirty-Day Major Depression And Depression Symptom Severity With Short-Term Work Disability

<table>
<thead>
<tr>
<th></th>
<th>Any short-term work disability&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Conditional number of work-disability days&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30-day major depression</td>
<td>Symptom severity</td>
</tr>
<tr>
<td></td>
<td>Odds ratio&lt;sup&gt;c&lt;/sup&gt;</td>
<td>95% CI</td>
</tr>
<tr>
<td>MIDUS</td>
<td>2.1</td>
<td>1.0–4.5</td>
</tr>
<tr>
<td>NCS</td>
<td>1.3</td>
<td>0.9–1.9</td>
</tr>
<tr>
<td>Combined&lt;sup&gt;f&lt;/sup&gt;</td>
<td>1.5&lt;sup&gt;e&lt;/sup&gt;</td>
<td>1.1–2.1</td>
</tr>
</tbody>
</table>

SOURCE: Authors’ analysis of MIDUS and NCS data.
NOTES: MIDUS is Midlife Development in the United States Survey. NCS is National Comorbidity Survey. See Exhibit 1 Notes.
<sup>a</sup> The equation for any work disability was estimated using a logistic regression model. The logistic regression coefficients have been exponentiated and can be interpreted as odds ratios; that is, the odds of any disability among depressed workers divided by the odds among other workers. “95% CI” denotes the 95 percent confidence intervals of the odds ratios. The equation controlled for age, sex, race, education, and physical disorder. The combined equation also controlled for a dichotomous variable for MIDUS versus NCS. The symptom-severity-scale scores in the total sample were transformed to have a mean of zero and a variance of one in the subsample of workers with major depression.
<sup>b</sup> The equation for conditional number of short-term work-disability days was estimated in the subsample of respondents with one or more such days using an ordinary least squares regression model. The regression coefficients (reported in the “difference in means” columns) can be interpreted as differences in means of conditional number of work-disability days between depressed workers and other workers (in the “30-day major depression” columns) or between workers who differ by one standard deviation in symptom severity (in the “symptom severity” columns). The equation controlled for the same variables and used the same transformation for the symptom-severity scale as did the equation for any work disability. (See preceding note.)
<sup>c</sup> The odds ratios describe the association between a dichotomous measure of any short-term work disability and two measures of depression. The odds ratios in the “30-day major depression” column represent the odds of disability \[ p/(1 - p) \], where \( p \) is the probability of disability among workers with major depression versus among all other workers. The odds ratios in the “symptom severity” columns represent the odds of disability among workers one standard deviation above the mean on the symptom-severity scale versus among those at the mean of this scale. An odds ratio of 1.0 indicates total lack of association, while odds ratios greater than 1.0 indicate that disability is more common among depressed workers than other workers.
<sup>d</sup> The differences in means in the “30-day major depression” columns are the differences in the average number of workdisability days among depressed workers with any short-term work disability and the comparable average among other workers. The differences in means in the “symptom severity” columns are the differences among workers who differ by one standard deviation in the symptom-severity scale.
<sup>e</sup> Significant at the .05 level, two-sided test.
<sup>f</sup> Coefficients differ significantly across the two surveys but nonetheless are reported for the combined data set for heuristic purposes.

equivalent disability costs of these days range between $182 and $395 per depressed worker.

Discussion And Policy Implications

Limitations. The above estimates are limited by the fact that they are based exclusively on data obtained from employed persons. This raises the possibility of sample selection bias. It also means that we ignored the additional depression-related costs to employers of paying long-term work disability benefits and of hiring and training replacement workers. In addition, the estimates exclude nonsalary costs of having depressed employees, such as increased numbers of accidents, lost profits as a result of poor worker performance, and reduced productivity of coworkers who are adversely affected by interacting with depressed workers.

The cost offset of depression treatment. A recently completed depression treatment trial carried out in a primary care sample esti-
mated that effective pharmacotherapy using nortriptyline hydrochloride can be provided at a total cost of $402 per thirty depression-free days. This total cost estimate includes the cost of recruiting patients into treatment as well as the cost of treatment and takes into consideration the fact that some patients will not respond to treatment and that others would have recovered even in the absence of treatment. Our calculations of the thirty-day salary-equivalent work disability associated with thirty-day major depression suggest that between 45 percent ($182/$402) and 98 percent ($395/$402) of this treatment cost would be offset by increased work productivity associated with symptom remission.

The cost-effectiveness of encouraging depressed employees to obtain treatment is even greater for some employers than suggested by these comparisons, for two reasons. First, as noted above, our calculations ignore other costs of untreated depression to the employer. Second, employees, rather than employers, pay the majority of health insurance costs over the long term in the form of wage adjustments. In comparison, there is no evidence that mentally healthy workers within a given occupation can command higher wages by virtue of being mentally healthy.

The degree to which individual employers can expect to benefit from encouraging their depressed employees to obtain treatment will vary, of course, depending on such things as the cost of outreach, the quality of treatment, the value of the employee to the company, the basis of the employee’s reimbursement (salaried, hourly, piecework), and whether the company pays employees for sickness absence days. If such encouragement is based on an expan-
sion of the company's mental health insurance benefit, the net cost-effectiveness to the employer also will be affected by the extent to which the expanded benefit leads to a higher proportion of depressed workers seeking employment in the company than would otherwise be the case. However, this adverse selection is less of an issue if the encouragement to seek treatment is based on expanded screening and outreach efforts designed to convince depressed workers to use their existing health insurance benefit.

**Barriers to change.** Based on these considerations, it seems likely that some employers, especially those with a largely white-collar workforce, would realize gains in productivity that partially offset the costs of treatment if they were to encourage their depressed employees to obtain treatment. However, if this is so, how can we make sense of the fact that employer-sponsored mental health benefits remain limited in many companies and that few companies are involved in outreach efforts to encourage depressed employees to take advantage of the benefits they have? A number of cultural, political, and market factors are likely to be involved. Two of these are emphasized here: that employers underestimate the indirect costs of untreated depression, and that employers hesitate to encourage depressed workers to seek treatment based on concerns about treatment effectiveness.

We believe that the indirect costs of untreated depression are underestimated because employers' concerns about the workplace costs of depression focus largely on long-term work disability and because most solutions to the problem of depression in the workplace involve the development of innovative disability management programs. The growing proportion of long-term work-disability claims associated with depression renders such issues of vital concern. However, it is equally important to recognize that depression is associated with a higher rate of short-term work disability than virtually any other chronic condition and that early intervention and treatment of workers with depression reduces hospitalization and long-term work disability.

The motivation of employers to encourage their depressed employees to seek treatment also depends on the belief that depression treatment can be effective in reducing short-term work disability. Absence of data on this issue has led to skepticism about treatment effects among employers. A number of recent effectiveness trials...
have documented that treatment is associated with a significant reduction in self-reported work disability. However, these results are questionable based on the concern that depression might lead to biased self-reports about work performance and that the improvement in self-reported productivity associated with treatment might actually be due to an effect of treatment on perceptual bias rather than on actual work performance. Demonstration studies are needed to determine whether depression treatment does, in fact, lead to improvements in actual work performance based on the analysis of objective productivity measures collected by employers. The results reported here are encouraging in suggesting that such studies are likely to document cost-effectiveness.

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NOTES


7. The instrumental-variables method attempts to circumvent the problem of reciprocal causation by identifying some predictor variables that can be assumed *a priori* to have direct effects on the causal variable of interest (in this case, worker depression) but not to have effects on the outcome of interest (in this case, short-term work disability) other than through the causal variable. The coefficient estimates are highly sensitive to violation of this assumption. As a result, we do not emphasize the estimates based on this method here. See J.D. Angrist, G.W. Imbens, and D.B. Rubin, “Identification of Causal Effects using Instrumental Variables,” *Journal of the American Statistical Association* 91, no. 434 (1996): 444–455. The instruments we used were respondents' reports about whether their biological mother suffered from depression when the respondent was growing up, whether their mother was hospitalized for depression, whether their mother ever attempted suicide, and comparable measures for their biological father.

8. As noted earlier, MIDUS used a screening scale rather than a full diagnostic interview to assess major depression. The MIDUS prevalence estimate includes only definite cases. This is why the MIDUS estimate is so much lower than the NCS estimate.

9. Although the results of a linear-additive specification are reported here, we also estimated equations that included nonlinear effects of depression symptom severity and interactions between thirty-day major depression and symptom severity. However, none of these effects was either statistically or substantively significant in either survey.


