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## Depression, Healthcare Utilization, Missed Work, and Health Behaviors among U.S. Young Workers: Data from the 2015 National Health Interview Survey

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### Abstract

**Objective:** We examined the prevalence of depression and its impact on healthcare utilization, work absenteeism, and health behaviors among United States (U.S.) young workers.

**Methods:** Data of 1,053 young workers (ages 18–25) from the 2015 U.S. National Health Interview Survey were analyzed to examine these associations.

**Results:** Seven percent of U.S. young workers reported feeling often depressed (daily or weekly). Often depressed young workers had increased odds for healthcare provider visits, mental healthcare use, 1–2 emergency department visits, and 3–5 and 6 missed work days, smoking and sleeping < 7 hours.

**Conclusions:** Our findings suggest that depressed young workers have increased needs for healthcare utilization and are at increased risk for missing work, smoking, and reduced sleep. Resources should be prioritized for depression screening and prevention programs at the workplace and healthcare settings.

### Keywords

young adults; depression; healthcare utilization; absenteeism; health behaviors; occupation; workers

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Depression is a growing problem in the United States (U.S.) and throughout the world. According to the National Institutes of Mental Health, 17.3 million, or 7.1% of, U.S. adults aged 18 or older reported at least one major depressive episode in 2017 and, particularly, young adults aged 18–25 years had the highest rate of 13.1%.<sup>1</sup> Young adults are exposed to different environmental and psychosocial exposures, such as starting college, moving out of the home, or entering the work force. Research suggests that the human brain is continuously developing throughout life and particularly goes through a dynamic rewiring process until 25 years of age.<sup>2, 3</sup> As a result, young adults may have different risks for depression, compared to the rest of the adult population.

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Depression can affect various aspects of an individual's life, from the home environment to social and work life. There is limited literature exploring the prevalence of depression among young adults and even fewer studies examining the effects of depression on health utilization and outcomes among this age group. Research shows that depression during adulthood is associated with increased unemployment, absenteeism, and poorer job performance and productivity.<sup>4</sup> Studies have also reported that depression is associated with increased healthcare use<sup>5</sup> and poorer health behaviors, such as cigarette smoking,<sup>6</sup> physical inactivity<sup>7</sup> and inadequate sleep.<sup>6</sup> Recent studies of young workers have shown that there is a relationship between poorer mental health with work productivity loss.<sup>8</sup> However, to our knowledge, no studies have focused on estimating the prevalence of specifically depression among U.S. young workers. Additionally, no studies have examined depression of young workers at the national level and the relationships between depression and healthcare utilization, absenteeism, and health behaviors among U.S. young workers. Therefore, further investigation is warranted.

The present study had two aims. The first study aim was to estimate the prevalence of U.S. young workers (ages 18 to 25) with depression by personal and occupational factors utilizing the National Health Interview Survey (NHIS) data. The second aim was to examine the associations between depression of young workers with healthcare utilization (healthcare provider visits, mental healthcare use, and emergency department visits), missed work days, and health behaviors (smoking, alcohol consumption, sleep duration, and physical activity).

## Methods

### Data Source

This study used data from the publicly available 2015 NHIS survey. The NHIS survey is a cross-sectional in-person survey conducted yearly to capture health-related trends that are representative of U.S. non-institutionalized civilians. The survey sample consists of approximately 35,000 households and 87,500 individuals. The NHIS uses a multistage area probability design that over-samples non-Hispanic Blacks, Hispanics, and Asians.<sup>10</sup> The 2015 NHIS had Occupational Health Supplements, which included detailed questions on work-related exposures and conditions.

There were 3,467 young adults between 18 and 25 years of age in the 2015 NHIS sample. Of these, 2,278 young adults were identified as working, either 'working for pay at a job/business,' 'with a job or business but not at work, or 'working but not for pay, at a family business.' After excluding participants who did not respond to the question regarding depression (n=1,225), 1,053 young workers were included in our analyses.

### Variables and Measures

**Depression**—Depression was ascertained through the question "How often do you feel depressed? Would you say daily, weekly, monthly, a few times a year, or never?" The NHIS responses were categorized as 'never,' 'a few times a year,' 'monthly,' 'weekly' and 'daily.' This study defined those who answered 'weekly' or 'daily' as often depressed per the Centers for Disease Control and Preventions' (CDC) report on depression prevalence<sup>11</sup>

and a previous publication by Xiang et al.<sup>12</sup> Not often depressed was defined as those who answered ‘never,’ ‘a few times a year,’ and ‘monthly.’

**Healthcare utilization**—Healthcare utilization was measured with the questions regarding healthcare visits, mental healthcare, and emergency department visits over the past 12 months. For healthcare visits, respondents were asked how often they saw a doctor or other healthcare professional (HCP) for their own health at a doctor’s office, clinic, or other place. This study categorized the number of HCP visits to ‘none,’ ‘1–2,’ and ‘3–8.’ For mental healthcare use, respondents were asked whether they saw or talked to a psychiatrist, psychologist, psychiatric nurse, or clinical social worker. The answers were categorized as ‘yes’ and ‘no.’ Emergency department (ED) visits were defined as the number of times the participant went to the hospital emergency department for their own health. Emergency department visits were categorized as ‘none,’ ‘1–2,’ and ‘3–6.’

**Missed work**—Missed work was based on the number of days the participants missed work due to illness or injury, excluding maternity leave, in the past 12 months. We categorized the number of missed work days to ‘none,’ ‘1–2,’ ‘3–5,’ and ‘6.’

**Health behaviors**—Health behavior variables included smoking, alcohol consumption, sleep duration, and physical activity. Smoking was derived from the following questions: “Have you smoked at least 100 cigarettes in your entire life?” and “Do you now smoke cigarettes every day, some days or not at all?” Alcohol consumption was derived from the following questions: “In your entire life, have you had at least 12 drinks of any type of alcoholic beverage?” and “In the past year, how often did you drink any type of alcoholic beverage?” As separate variables, the current status of smoking and alcohol consumption was categorized as ‘no’ and ‘yes.’ Sleep duration was ascertained through the question: “On average, how many hours of sleep do you get in a 24-hour period? Our study categorized sleep duration into “<7 hours,” “7–9 hours,” and “>9 hours” based on sleep recommendation guidelines by the National Sleep Foundation, where the appropriate amount of sleep for a young adult is 7 to 9 hours.<sup>13</sup> Lastly, physical activity was based on four questions: 1) “How often do you do light or moderate leisure-time physical activities for at least 10 minutes that cause only light sweating or a slight to moderate increase in breathing or heart rate?”; (2) “how long do you do these light or moderate leisure-time physical activities each time?”; (3) “how often do you do vigorous leisure-time physical activities for at least 10 minutes that cause heavy sweating or large increases in breathing or heart rate?”; and (4) “how long do you do these vigorous leisure time physical activities each time?” As per a previous publication, one minute of vigorous activity was considered equivalent to two minutes of light/moderate intensity.<sup>14</sup> Weekly minutes of moderate-intensity activity were calculated by adding 1) minutes of light/moderate aerobic activity with 2) the doubling of vigorous aerobic activity minutes. Physical activity was categorized as “<150 minutes per week” or “150 minutes per week.”

**Covariates**—The following sociodemographic variables were included as potential covariates: sex (female and male); race/ethnicity (Hispanic; Non-Hispanic, White; Non-Hispanic, Black; Non-Hispanic, Asian; and Non-Hispanic, Other); annual household income

as percent of the federal poverty level (FPL; 0–99%, 100–199%, 200–399%, 400%), body mass index (BMI; underweight, normal weight, overweight/obese), marital status (married/living with partner, widowed/divorced/separated, and never married). Occupational and workplace factors included the number of jobs (1, >1), work schedule (regular daytime shift, regular evening shift, regular night shift, rotating shift), job control (“the job allows me to make a lot of decisions on my own”), job demand (“I have enough time to get the job done”), job support (“I can count on my supervisor or manager for support when I need it”), job harassment (“threatened, bullied, or harassed by anyone on the job the past 12 months”), and work-family balance (“the demands of my job interfere with my personal or family life”). The responses to the questions regarding job control, job support, job demand, and work-family balance were categorized as ‘strongly agree,’ ‘agree,’ ‘disagree,’ and ‘strongly disagree.’ Our study defined ‘strongly agree’ and ‘agree’ as ‘high’ and ‘disagree’ and ‘strongly disagree’ as ‘low.’ The study did not re-categorize the responses to the questions regarding job harassment and work-family balance, which were ‘yes’ and ‘no.’

Information about occupation were coded according to the Census classification system. The NHIS survey collapsed occupation into 23 major occupation categories. Our study re-categorized the type of occupation by collapsing several categories as follow: 1) ‘management’ and ‘business and financial operations’ collapsed into ‘business’ occupations; 2) ‘healthcare-practitioners and technical’ and ‘healthcare support’ collapsed into ‘healthcare.’; and 3) occupation categories with  $n < 30$  (architecture and engineering; life, physical, and social science; community and social services; legal; arts, design, entertainment, sports, and media; protective service; and farming, fishing, and forestry) collapsed into ‘other.’

### Statistical Analyses

All analyses were conducted using Stata 15.1 version.<sup>15</sup> Prevalence estimates were weighted, per the NHIS study design, to account for differential probabilities of selection, non-response, and non-coverage as well as to produce nationally representative estimates.<sup>16</sup> The weighted prevalence of depression (often depressed) and 95% confidence intervals (CI) were generated by personal and job characteristics. The chi-square tests were used to compare proportions of depression (often depressed) by demographic, occupational, and health behavior characteristics.

Multivariable logistic regression was used to examine the relationships between depression (independent variable) and the following outcome variables: mental healthcare, missed work days, smoking, and alcohol consumption, in which the odds ratios (OR) with 95% CIs were obtained. Multinomial logistic regression was used to estimate the relationship between depression and HCP visits, emergency department visits, missed work days, and sleep duration, in which the multinomial relative risk ratios (RRR) with 95% CIs were obtained. Due to collinearity with the depression variable, anti-depression medication was not included in our adjusted regression models.

## Results

Of the 1,053 young workers between 18 and 25 years of age, 7.8% reported feeling often depressed; the weighted prevalence of feeling often depressed was 7.0% (95% CI=5.2, 9.3), where 1.9% reported feeling depressed daily and 5.1% reported feeling depressed weekly. The study sample characteristics and weighted prevalence of being often depressed by personal characteristics are shown in Table 1. The sample consisted of more males (54.1%) and Non-Hispanic Whites (58.4%); 33.6% of the participants had income 200–399% FPL. The depression prevalence was higher among females than males, but the difference was not statistically significant (8.9% vs. 5.4%,  $p=0.119$ ). Significant differences were found for race/ethnicity and income. The depression prevalence was highest among the Non-Hispanic, Other (American Indian, Alaska Native, Native Hawaiian, or Other Pacific Islander; 28.4%) followed by Non-Hispanic, Black (7.4%) and lowest among Hispanics (2.9%). As for income, the depression prevalence was highest in 100–199% FPL group (9.8%) and lowest in < 400 FLP group (2.9%). There was no difference in depression prevalence by BMI and marital status. Chronic conditions were reported by 1.4% of the sample, and those with chronic conditions had a significantly higher depression prevalence than those without chronic conditions (67.6% vs. 6.1%;  $p<0.001$ ). In the sample, 3.8% ( $n=40$ ) took depression medications; of these, 47.5% ( $n=19$ ) reported feeling often depressed. On the other hand, 6.3% ( $n=63$ ) of those without depression medications reported feeling often depressed.

Table 2 shows the weighted prevalence estimates of often depressed participants by occupation/workplace factors. The prevalence of being often depressed was higher among those who held one job (14.7%), worked a regular night shift (11.4%), perceived low job control (10.5%), high job demand (7.1%), low job support (11.3%), experienced harassment on the job (7.8%) and low work-family balance (15.2%). Depression was most common among young workers with transportation and material moving occupations (13.0%), followed by construction and extraction (9.9%) and office and administrative support (9.4%) occupations. On the other hand, depression was least common among other (3.5%) and production (1.9%) occupations.

Table 3 shows healthcare utilization, missed worked days, and health behaviors among young workers and the associations of depression with these outcome variables. Among young workers who were often depressed, 55.8% visited HCPs 3–8 times per year, 22.1% saw or talked to a mental health professional per year, and 14.4% visited the ED 3–6 times per year, and 15.7% had < 6 missed work days per year. In the adjusted models, and with a graded association, often depressed, compared to not often depressed, had a higher relative risk ratio of HCP visits (1–2 visits: adjusted RRR [aRRR]=2.35, 95% CI=1.04 to 5.32; 3–8 visits: aRRR=7.95, 95% CI=3.51 to 18.00) and missed work days (3–5 visits: aRRR=2.20, 95% CI=1.03 to 4.70; < 6 visits: aRRR=4.42, 95% CI=1.58 to 12.37). Young workers who were often depressed, compared to not often depressed, had almost 5 times increased odds of seeing a mental health professional (adjusted OR [aOR]=4.86, 95% CI=2.62 to 9.01). Similarly, in the adjusted model, workers who were often depressed, compared to not often depressed, had a 2.5 times increased risk for 1–2 ED visits (aRRR=2.53, 95% CI=1.44 to 4.44). Some significant associations observed in unadjusted models dissipated in the adjusted models, such that often depressed was no longer significantly associated with 3–6

ED visits in the past 12 months and 1–2 missed work days in the past 12 months. Lastly, young workers who felt often depressed had increased risks for smoking (aOR=3.14, 95% CI=1.81 to 5.44) and inadequate sleep less than 7 hours (aRRR=1.96, 95% CI=1.16 to 3.30), compared to those who were not often depressed. There were no associations between often depressed and alcohol consumption and physical activity.

## Discussion

To the best of our knowledge, this is the first study that investigated the prevalence of depression, associated factors, and the impact of depression on healthcare utilization and health behaviors among U.S. young workers. Our study utilizing a nationally representative sample from the 2015 NHIS found that 7% of U.S. young workers felt often depressed. Particularly, females had a higher prevalence of feeling often depressed. Among young workers who felt often depressed, 11.7% never visited a HCP, only 22.1% saw a mental health professional, 14.4% visited ED 3 or more times, and 44.7% missed work 3 or more days per year. Our study found that feeling often depressed was significantly associated with increased visits to HCP and mental health professionals, increased ED visits, and more missed work days among young workers. Young workers who reported feeling often depressed also had increased risks of smoking and reduced sleep.

Our findings may be an underestimation of the prevalence of young workers with depression, as compared to 13.1% of young adults in the general U.S. population,<sup>1</sup> since nearly half of young workers in our study did not respond to the depression question of the survey. Some participants reported that they were not often depressed but were taking depression medications (1.5%) or indicated that they had seen or talked to a mental health professional (5.8%). Therefore, those whose depression is under good control or those who have few symptoms due to medication management, psychotherapy, or other forms of treatment may have not been captured in our study that used the definition based on self-reported frequency of feeling depressed. Alternatively, the findings may be explained by other indications for taking anti-depression medication, such as for pain and other mental health disorders.<sup>17</sup> On the other hand, our study estimated that 37% of young workers on anti-depression medication felt often depressed. This finding has a limitation due to the small number of those workers (n=19) but may indicate a need to address their mental health in the workplace. For example, these workers may benefit from workplace stress reduction programs.

This study found that young workers with multiple jobs and low work-family balance are at increased risk for depression. While there were no studies examining the relationship between the number of jobs with young adult depression, one study of low-income mothers reported that working multiple jobs concurrently was associated with higher probabilities of depression.<sup>18</sup> Our study indicates that work-family balance can be important for mental health of young workers and may play a role in the development of depression. However, work-family balance may not account for all home-related stress factors. A study consisting of 129 participants in a range of occupations reported that home stress was associated with both depressive symptoms, as measured by the Beck's Depression Inventory-II.<sup>19</sup> While our study examined work-family balance, as opposed to home stress, the interaction of



home stress and its effects on work should be considered. Additionally, several studies have reported that poor work-life balance is associated with a higher prevalence of depression among different age groups and distinct occupational groups.<sup>20–24</sup>

On the other hand, job stress factors such as job demand, low job control, and low job support were not significant for feeling often depressed in our study. For example, in Weisner et al.'s (2005) study of young workers, high job boredom, low skill variety, and low autonomy were associated with depression.<sup>25</sup> These findings are also inconsistent with other studies that have documented the association of job stress and poorer mental health among various worker populations including young workers.<sup>26, 27</sup> Other recent studies have shown ill effects of mental health conditions on work productivity.<sup>8, 9</sup> Additionally, a recent systematic review reported that high job demand, low job control, and low job support were associated with poorer mental health.<sup>28</sup> Differences in findings among studies may be due to the everchanging workplace structure and differences in co-morbidities, both physical and psychological, over the last 30 years. Given the mixed or limited evidence in young workers, further examination of the effects of job stress, family stress and their balance, as well as multiple jobs held need to be further explored to determine occupational risk factors threatening mental health of young workers.

Our study shows that there are discernable differences in the prevalence of depression among young workers by occupation categories. Depression was most common in transportation and material moving (13%) and construction and extraction (9.9%) occupations. There is limited research that investigated depression by occupation. In Woodward et al.'s (2017) study utilizing the National Survey on Drug Use and Health, writers and authors (19.8%) followed by models, demonstrators and product promoters (14.2%) had the highest prevalence of depression among 18 and 64 years of age.<sup>29</sup> In Fan et al.'s (2012) study of Washington workers between 18 and 65 years of age, 16.5% of health service assistants and 14.6% of truck drivers had depression.<sup>30</sup> Variations among studies are likely due to differences in categorization. Sample size may have accounted for the differences as well since both Woodward and Fan's studies used large samples over 10,000 participants. Lastly, Fan et al.'s (2012) sample was state-representative rather than a national representation of the U.S. Both our study and Fan et al.'s study reported higher prevalence of depression among transportation workers; therefore, more studies to examine occupational risk factors for transportation workers are needed. Also, interventions are warranted for all occupations with higher prevalence of depression for prevention, screening, and proper management.

Depression was shown to be associated with increased healthcare utilization, increased absenteeism, as well as poorer health behaviors in our study. Of significance, the often depressed workers had higher risks for seeking general healthcare services, mental health support, and ED visits, indicating that often depressed young workers may have significant or severe physical or mental health symptoms that require help. These findings are consistent with evidence from other studies examining different age groups ranging from adolescents to older adults, as well as the overall broader adult population.<sup>31–34</sup> Our study found that only 22.3% of young adults workers who felt often depressed sought care from a mental health professional, which is lower than the CDC report on an all adult worker

population (29%).<sup>35</sup> It is reported that most young adults with mental health conditions and symptoms do not seek support and treatment from healthcare providers,<sup>36</sup> yet our study showed that the majority (70%) of all young adult workers sought some sort of healthcare service. While these findings are concerning since young adult workers who feel often depressed may not be seeking adequate care from appropriate providers as shown by the relatively low prevalence of mental health professional visits, primary healthcare providers are the first to identify and manage patients with depression.<sup>37</sup> Lastly, our findings support the literature that depression is associated with more missed work days.<sup>38</sup> Although it is unclear whether absenteeism is a direct result of feeling often depressed or due to other reasons in our study, depression is a leading cause of disability worldwide<sup>39</sup> and thus may have a major contribution to work productivity.

Sleep duration and smoking were shown to be associated with depression in our sample of young workers. The often depressed group were at higher risk for reduced sleep. Sleep problems are common among depressed individuals and associations are bidirectional, where depression is often associated with both inadequate or excessive sleep, falling asleep, and staying asleep.<sup>40</sup> It is estimated that about 75% of individuals with depression have sleep problems.<sup>41</sup> While we found a significant relationship between depression and sleep duration, the direction of this association is unknown. The relationship between depression and smoking is also complicated and inconsistent in the literature. Previous studies have reported that depression and smoking are linked.<sup>40</sup> Few studies have reported that smoking has a “self-medication” benefit,<sup>42</sup> but many other studies suggest that cessation contributes to mental health benefits, including a reduction of depression recurrence.<sup>43</sup> As regards to alcohol consumption and physical activity, contrary to the literature,<sup>44–46</sup> our study found no significant associations with depression. It is likely that our categorization of physical activity is not comprehensive of the physical activity definitions set forth by the Physical Activity Guidelines for Americans, 2<sup>nd</sup> Edition<sup>47</sup> since we combined light intensity with moderate-high intensity physical activity into one question. Additionally, alcohol consumption was categorized as a binary outcome, which may not adequately reflect drinking levels (i.e., moderate alcohol consumption, binge drinking, heavy alcohol use).

## Limitations

This study had the strength of using data from a nationally representative sample of U.S. workers, but also has limitations. First, there is potential selection bias since the sample was drawn from the non-institutionalized civilian population. Second, the study relied on self-reports. Items asking about mental health, events, symptoms, and feelings within the past 12 months may lead to recall and desirability bias, which may have influenced our findings. Third, the item asking about depression was assessed by one question rather than a structured screening tool. Since our study dichotomized the outcome variable, depression symptom severity could not be measured. The specificity and sensitivity of this one item in relation to a clinical diagnosis is unknown. Fourth, the number of HCP visits were assessed with one question and did not differentiate between primary and specialty care, as well as wellness visits versus sick visits. However, few participants had chronic illnesses necessitating specialty care. Lastly, we do not know the direction of our associations since this is a cross-sectional study, and residual confounding remains a possibility.



## Conclusions

Our findings provide evidence that depressed young workers contribute to increased use of healthcare resources and are at increased risks of absenteeism and poorer health behaviors. In particular, depressed young workers are more likely to seek care with mental health providers and at HCP and ED visits, miss more work days, and are at higher risk for inadequate sleep and smoking than non-depressed young workers. Along with these findings, our study discloses a gap in seeking proper mental healthcare among a considerable proportion of young workers who feel often depressed. Greater awareness of not only the prevalence of depression among young workers but also the relationships among depression and healthcare seeking behaviors could lead to improved patient care, decreased healthcare utilization, and better outcomes. Our study findings also indicate that young workers with multiple jobs need more attention and depression screening and that young workers can benefit from programs to improve skills for work-life balance. Future studies should focus on the development of depression prevention and management programs for young workers. Future research using a larger sample and a prospective design is needed to identify work-related stresses that contribute to depression of young adults. Increasing awareness of and resources for mental healthcare in both workplace and healthcare settings may reduce the negative outcomes of depression.

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**Clinical Significance**

Young workers from a national sample who reported feeling often depressed had higher odds of healthcare utilization, missed work days, as well as smoking and less sleep. Companies and primary healthcare settings should consider implementing depression screening and prevention programs for the mental well-being of young workers.

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**Table 1.**

Prevalence of depression among U.S. young adult workers aged 18–25 years by personal characteristics from the 2015 National Health Interview Survey

	Total sample		Depression <sup>a</sup>		$\chi^2$ P-value
	n	Weighted % <sup>b</sup>	n	Weighted prevalence %(95% CI) <sup>c</sup>	
<b>Total</b>	1,053	100	82	7.0 (5.2, 9.3)	
<b>Personal characteristics<sup>d</sup></b>					
<b>Sex</b>					
Male	534	54.1	31	5.4 (3.1, 9.2)	0.119
Female	519	45.9	51	8.9 (6.4, 12.2)	
<b>Race/ethnicity</b>					
Hispanic	235	19.7	10	2.9 (1.6, 5.2)	<0.001
Non-Hispanic, White	590	58.4	47	6.9 (4.8, 9.9)	
Non-Hispanic, Black	126	14.1	13	7.4 (4.2, 12.8)	
Non-Hispanic, Asian	55	3.5	4	3.2 (0.9, 11.2)	
Non-Hispanic, Other <sup>e</sup>	42	4.4	8	28.4 (10.9, 56.2)	
<b>Income (FPL)</b>					
<100%	230	18.5	23	7.9 (5.5, 11.4)	0.050
100 to 199	224	21.2	21	9.8 (5.7, 16.2)	
200 to 399	291	33.6	18	5.8 (3.3, 9.9)	
400	172	26.7	8	2.9 (1.2, 6.8)	
<b>BMI</b>					
Underweight	25	3.0	0	0	0.466
Normal weight	468	49.6	41	8.1 (5.3, 12.3)	
Overweight/Obese	468	47.4	38	7.4 (4.9, 11.1)	
<b>Marital Status</b>					
Married/living with partner	275	25.9	21	5.3 (3.5, 8.1)	0.255
Widowed/divorced/separated	16	1.4	2	6.5 (2.9, 14.2)	
Never married	762	72.7	59	7.6 (5.3, 10.7)	
<b>Chronic conditions</b>					
No	1042	98.6	78	6.1 (4.8, 7.9)	<0.001
Yes	11	1.4	4	67.6 (26.5, 92.4)	
<b>Depression medications</b>					
No	1013	97.8	63	6.3 (4.5, 8.7)	<0.001
Yes	40	2.3	19	37.4 (24.2, 52.7)	

Abbreviation: N, number; FPL, federal poverty level; BMI, body mass index; CI, confidence interval

<sup>a</sup> Feel depressed daily or weekly

<sup>b</sup> Column percent

<sup>c</sup> Row percent

<sup>d</sup>Missing data: 0.3% for race/ethnicity, 8.7% for BMI

<sup>e</sup>American Indian, Alaska Native, Native Hawaiian, or Other Pacific Islander

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**Table 2.**

Weighted prevalence of depression among U.S. young adult workers aged 18–25 years by occupation/  
workplace factors and occupation from the 2015 National Health Interview Survey

	Total sample		Depression <sup>a</sup>		$\chi^2$ <i>p</i> -value
	n	Weighted	n	Weighted	
<i>Occupational/Workplace factors<sup>d</sup></i>					
<b>Number of jobs</b>					
1	941	10.1	7	14.7(6.1. 31.3)	<b>0.050</b>
>1	111	89.9	1	6.1 (4.6. 8.0)	
<b>Work schedule</b>					
Regular daytime shift	596	54.5	4	7.8 (5.3. 11.2)	0.247
Regular evening shift	110	11.7	9	5.6 (3.3. 9.3)	
Regular night shift	63	7.7	9	11.4(5.6. 21.9)	
Rotating shift	283	26.1	1	4.7 (2.0. 10.5)	
<b>Job control</b>					
High	858	79.5	6	6.2(4.7. 8.1)	0.180
Low	189	20.5	2	10.5 (5.0. 20.6)	
<b>Job demand</b>					
High	976	92.5	7	7.1 (5.2. 9.6)	0.572
Low	75	7.5	9	5.9 (3.7. 9.4)	
<b>Job support</b>					
High	945	92.3	6	6.7(4.8. 9.1)	0.298
Low	78	7.7	1	11.3 (4.3. 26.6)	
<b>Job harassment</b>					
No	978	93.5	7	6.9 (5.0. 9.5)	0.765
Yes	74	6.5	1	7.8 (4.0. 14.7)	
<b>Work-family balance</b>					
High	838	80.8	3	5 (3.8. 6.6)	<0.001
Low	214	19.2	5	15.2(8.8. 25)	
<b>Occupation</b>					
Food preparation and serving related	141	14.3	1	5.5 (3.3. 8.89)	0.380
Sales and related	135	14.5	1	8.0 (3.3. 18.34)	
Office and administrative support	134	10.8	1	9.4 (5.9. 14.63)	
Other <sup>e</sup>	128	11.4	7	3.5 (1.6. 7.49)	
Transportation and material moving	73	9.1	6	13.0 (4.2. 33.94)	
Healthcare <sup>f</sup>	69	6.1	5	8.9 (5.7. 13.73)	
Education, training, and library	67	5.1	5	6.7 (3.4. 12.88)	
Management and Financial <sup>g</sup>	66	6.4	3	7.1 (1.9. 22.86)	
Production	60	6.7	3	2.1 (1.1. 3.8)	
Personal care and service	58	5.5	4	5.5 (1.6. 17.08)	
Construction and extraction	42	3.9	5	9.9 (6.7. 14.37)	

	Total sample		Depression <sup>a</sup>		$\chi^2$ <i>p</i> -value
	n	Weighted	n	Weighted	
Building and grounds cleaning and	35	3.9	3	5.9 (3.8, 9.19)	
Computer and Mathematical	32	2.3	2	6.1 (1.5, 22.56)	

Abbreviation: CI, confidence interval

<sup>a</sup>Feel depressed daily or weekly

<sup>b</sup>Column percent

<sup>c</sup>Row percent

<sup>d</sup>Missing data: 0.1% for work schedule, 0.6% job control, 0.2% for job demand, 2.8% for job support, 0.1% job harassment, 0.1% for work-family balance, 1.2% for occupation

<sup>e</sup>Combined occupations if n<30

<sup>f</sup>Combined healthcare occupations, such as 'healthcare-practitioners and technical' and 'healthcare support'

<sup>g</sup>Combined business occupations, such as 'management' and 'business and financial operations'

**Table 3.**

Associations of depression with healthcare utilization, missed work, and health behaviors among U.S. young adult workers aged 18–25 years: Bivariate and Multivariable logistic or multinomial logistic regressions from the 2015 National Health Interview Survey

Outcome Variable <sup>c</sup>	Depression <sup>a</sup>		Depression <sup>a</sup>	
	No (n=971) n (% weighted) <sup>d</sup>	Yes (n=82) n (% weighted) <sup>d</sup>	Unadjusted model OR or RRR (95% CI)	Adjusted model <sup>b</sup> OR or RRR (95% CI)
<b>HCP visits<sup>e</sup></b>				
None	303 (30.1)	9 (11.7)	1.0	1.0
1 – 2	476 (51.4)	29 (32.5)	2.05 (0.96, 4.39)	<b>2.35 (1.04, 5.32)</b>
3 – 8	192 (18.5)	44 (55.8)	<b>3.76 (2.29, 6.19)</b>	<b>7.95 (3.51, 18.00)</b>
<b>Has seen or talked to a mental health professional<sup>e</sup></b>				
No	907 (94.2)	62 (77.9)	1.0	1.0
Yes	63 (5.8)	20 (22.1)	<b>4.64 (2.64, 8.17)</b>	<b>4.86 (2.62, 9.01)</b>
<b>ED visits<sup>e</sup></b>				
None	797 (82.1)	46 (54.4)	1.0	1.0
1 – 2	158 (16.5)	29 (31.2)	<b>3.18 (1.94, 5.22)</b>	<b>2.53 (1.44, 4.44)</b>
3 – 6	16 (1.4)	7 (14.4)	<b>7.58 (2.97, 19.34)</b>	2.18 (0.58, 8.16)
<b>Missed work days</b>				
None	537 (56.6)	31 (32.7)	1.0	1.0
1 – 2	265 (28.9)	22 (22.6)	<b>1.76 (1.05, 2.94)</b>	1.64 (0.93, 2.91)
3 – 5	109 (10.0)	17(29.0)	<b>2.30, 1.16, 4.55)</b>	<b>2.20 (1.03, 4.70)</b>
6	60 (4.4)	12 (15.7)	<b>4.95 (1.86, 13.15)</b>	<b>4.42 (1.58, 12.37)</b>
<b>Smoking</b>				
No	845 (87.3)	51 (55.7)	1.0	1.0
Yes	125 (12.7)	31 (44.3)	<b>4.10 (2.53, 6.67)</b>	<b>3.14 (1.81, 5.44)</b>
<b>Alcohol consumption</b>				
No	318 (37.2)	21 (15.6)	1.0	1.0
Yes	648 (62.8)	60 (84.4)	1.40 (0.84, 2.35)	1.21 (0.69, 2.12)
<b>Sleep duration</b>				
<7 hours	260 (25.3)	36 (45.9)	<b>2.24 (1.40, 3.57)</b>	<b>1.96 (1.16, 3.30)</b>
7 – 9 hours	678 (71.4)	42 (51.4)	1.0	1.0
>9 hours	31 (4.3)	4 (2.7)	2.08 (0.70, 6.18)	1.28 (0.61, 2.64)
<b>Physical activity</b>				
<150 minutes/week	146 (19.5)	11 (21.7)	1.0	1.0
150 minutes/week	591 (80.5)	51 (78.3)	1.15 (0.58, 2.25)	1.28 (0.61, 2.64)

Abbreviation: OR, odds ratio; RRR, relative risk ratio; CI, confidence interval; HCP, healthcare professional, ED, emergency department

<sup>a</sup> Feel depressed daily or weekly

<sup>b</sup> Adjusted for race/ethnicity, income, chronic conditions, number of jobs, and work family balance

<sup>c</sup>Missing data: 0.1% for mental health professional, 0.1% for smoking, 0.6% for alcohol consumption, 0.2% for sleep duration, and 24.1% for physical activity

<sup>d</sup>Column percent

<sup>e</sup>In the past 12 months

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