

ORIGINAL RESEARCH

How employment status affects adult men's depression over time: a comparative study of educational attainment¹

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Abstract

As the prevalence of depression among adult men has been increasing over time, a longitudinal approach is necessary to understand more deeply how adult men's depression prevalence has been changing and what indicators influence their levels of depression over time. This study examines how employment status affects adult men's depression and investigates an interaction effect of education level on the relationship between employment and depression. The current study employed the National Longitudinal Survey of Youth 1979 for Children and Young Adults. Using eleven waves of data, a total of 999 adult men were selected for the final sample. The current study used a Random Effects Model (REM). Employment and educational attainment significantly affected adult men's levels of depression over time. Educational attainment moderated the relationship between adult men's employment and depression levels over time. Long-term social services to help unemployed adult men should focus on improving adult men's skills and opportunities to have stable employment, leading them to have lower levels of depression over time. More opportunities for higher education should also be provided to adult men of all ages. Opportunities for unemployed men without higher education to improve their educational attainment may also help to lower their rates of depression over time.

Keywords

Adult men; Employment; Educational attainment; Depression; Longitudinal study

1. Introduction

As women are more likely to experience depression in their lifetime as compared to men, depression among men remains understudied and underreported [1–6]. Socioeconomic factors, such as unemployment or educational attainment, have been posited as important factors associated with depression rates, especially among men [7–12]. However, many studies have utilized cross-sectional data, and fewer have examined the relationship longitudinally, *e.g.*, [13–15]. Thus, in this study, we sought to examine how differences in educational attainment affected the relationship between employment status and men's depression over time.

According to data from the National Health Interview Survey (2019), 15.0% of men reported mild, moderate, or severe depression symptoms over a two-week period [3]. According to the World Health Organization, approximately 4% of adult men experience depression globally [16]. When lifetime prevalence of depression is measured, the prevalence rate may be higher, with 13.3% of adult men in the 2020 Behavioral Risk Factor Surveillance System survey reporting any depression in their lifetime [17]. Although women tend to experience depression at higher rates than do men [2–4], many have

argued that depression among men is underdiagnosed [1, 5, 6]. There are many reasons why men may be less likely or more reluctant to report symptoms of depression, such as inability to recognize they are depressed, reluctance to discuss their feelings, and/or reluctance to receive mental health treatment [1, 5, 6]. Some theorize that the gender difference in depression rates is smaller among younger people because boys may be less entrenched in societal gender norms related to masculinity, and they may be more open to sharing their feelings and symptoms of depression [18]. Moreover, when researchers employed a measure of depression that included symptoms of depression that may be more typical for men than for women (*e.g.*, increased anger and aggression, substance abuse, and risk taking), the gender difference for depression prevalence was no longer significant [6, 19]. For both men and women, there have been mixed findings regarding how the prevalence of depression shifts over the lifespan. Some evidence suggests that average depressive prevalence varies across age *via* a U-shaped curve, in that rates are higher in adolescence than in adulthood, and higher in elderhood than adulthood [4]. In other studies, such as in one utilizing the China Family Panel Studies (2012, 2016 and 2018), depression levels were higher among the younger respondents than among the elder

respondents [20]. In the National Health Interview Survey (2019), there were significant age differences for mild and moderate depression symptoms, but not for severe symptoms [3]. For mild symptoms, adults aged 18–29 and those older than 65 experienced the highest prevalence, and for moderate symptoms, adults aged 45–64 reported the highest prevalence [3].

Although findings regarding the trajectories of depression rates across the lifespan have been mixed for men and women, gender differences in depression prevalence have been found to increase with age, in that depression rates between boys and girls are more similar in adolescence and diverge in adulthood, when women generally report higher rates than men [10, 21, 22]. Some evidence suggests that a gender difference in depression emerges during adolescence, remains consistent through adulthood, and then decreases again into elderhood [10, 22]. Also supporting this, in a meta-analysis of articles published between 1980 and 2019, gender differences in depression prevalence remained stable across adulthood after increasing during adolescence [21].

Overall, the literature indicates that depression is positively associated with unemployment among men and women, and that the relationship is particularly strong among men [7, 8, 10–12, 16]. First, among a community sample of Australian men in their 20s, 40s and 60s, not being employed, a recent job threat, and employment problems were all significant mediators for depression for men in all three age groups [10]. Further, in a sample of Spanish adults comparing depression rates between unemployed and employed people and by gender, there was a positive direct effect of unemployment on depression in the total sample, but there was no significant direct effect of gender on depression, nor was there a significant interaction between employment status and gender affecting depression [8]. However, the authors used a single-degree-of-freedom approach to test whether there was a difference in the effect of unemployment on depression between men and women, and they found that unemployment was a significantly stronger positive predictor of depression for men than it was for women [8].

Similarly, in the National Longitudinal Survey of Youth (1979–1994), unemployment was positively associated with depression symptoms for men and women in their thirties, but it was a stronger association for men [11]. Additionally, Korean men with precarious employment were 40% more likely to be depressed than men with stable or permanent employment in one study, and this relationship was only significant for men [12]. In another study of Korean adults, individuals who moved from stable employment to unemployment during 2008 to 2011 were 78% more likely to be depressed than adults who remained stably employed, and the association was stronger for men than it was for women [15]. Negative employment experiences were more common among men in a sample of Australian adults in their 20s, 40s and 60s, and such negative experiences were more strongly associated with depression among men than among women [10]. Last, in a systematic review and meta-analysis of articles published in English before December 2020, unemployed men experienced depression at more than twice the rate of employed men, and this was a stronger association than that found for women [7]. These

findings indicate that unemployment and depression have been found to be associated among both men and women, but that unemployment is a particularly important factor affecting depression for men.

Researchers have also examined the relationship between higher educational attainment and depression. Among older men and women in Europe, those who had any amount of tertiary education were 40% less likely to be depressed than those who had no education [9]. Moreover, in a systematic review and meta-analysis of studies examining the association between depression in and before adolescence and later educational attainment, depression earlier in life had a small but significant effect on later educational attainment [23]. Further, in a literature review of the longitudinal effects of depression on later educational attainment, depression had a stronger detrimental effect among men than among women [13].

Generally, as men's educational attainment increases, their rate of unemployment decreases [24]. In 2022, American men with less than a high school diploma had an 8% unemployment rate, and this rate decreased as educational attainment increased: 6% for men with a high school diploma, 5% for men with some college, and 3% for men with at least a bachelor's degree [24]. Data from the U.S. Bureau of Labor Statistics' 2023 Current Population Survey showed similar results, with men with a bachelor's degree or higher reporting the highest employment to population ratio (75.3%) compared with men with some college or an associate degree (67.2%), a high school diploma (63.5%), or no high school diploma (54.6%) [25]. Similar findings have been reported for European men in late 2020, with an 86.9% employment rate for men with high educational attainment compared to 78.5% for men with medium educational attainment and 65.9% for men with low educational attainment [26].

As women tend to exhibit higher rates of depression than men do [2–4, 17, 18], much previous research has examined prevalence, prevention and intervention for women experiencing depression. Even though the prevalence of depression among adult men has been increasing over time [27, 28], little evidence is available to more deeply understand adult men's depression over time. Fewer studies have examined socioeconomic factors affecting men's depression from a longitudinal perspective, *e.g.*, [13, 14], but a longitudinal approach is necessary to more deeply understand how adult men's depression has been changing and what indicators influence their depression over time. Given that the majority of adult men are employed [25], employment status is one of the primary factors influencing adult men's depression [7, 8, 10–12, 15]. Thus, based on longitudinal data, this study examines how employment status affects men's depression after they become an adult (at age 18 years). Further, studies have shown that men experience different levels of depression depending on whether they attained higher education [9, 10, 13, 14]. Therefore, this study also investigates an interaction effect of education level on the relationship between employment and depression across adult men.

2. Methods

2.1 Data and sample

The current study employed the National Longitudinal Survey of Youth 1979 for Children and Young Adults (NLSY79 CY), administered by the U.S. Bureau of Labor Statistics. Participants are representative of the United States population. The NLSY79 CY has been collected biannually since 1986. We used data from the 2004 to 2014 waves of data collection because 2004 was the first year that any participants entered adulthood (*i.e.*, turned 18 years old). As this study only focuses on adult men aged 18 years and older, boys younger than 18 years as well as women were excluded from analysis in the current study. Participants who refused to be interviewed were also not included in the present study. Thus, we used eleven waves of data (2004–2014), with a final sample of 999 adult men, to estimate how socioeconomic status influences adult men's depression levels over time.

2.2 Measures

2.2.1 Depression

Adult men's depression was measured *via* the Center for Epidemiologic Studies Depression Scale (CES-D). A shorter 11-item version of the scale was used in the NLSY CY. This scale employed a four-point Likert-type scale to measure how often participants felt depressed. The four response options were as follows: 0 = rarely, or none of the time (<1 day); 1 = some, or a little of the time (one to two days); 2 = occasionally, or a moderate amount of the time (three to four days); and 3 = most, or all of the time (five to seven days). The eleven questions included (1) My appetite was poor; (2) I felt I could not shake off the blues, even with help from family or friends; (3) I had trouble keeping my mind on what I was doing; (4) I felt depressed; (5) I felt that everything I did was an effort; (6) My sleep was restless; (7) I was happy; (8) I felt lonely; (9) I felt sad; (10) I could not get going; and (11) I felt that life was not worth living. One of eleven items regarding happiness was reverse-coded. The average score across the eleven items was used for analysis and higher scores indicate higher levels of depression. All waves of data collection measuring depression at different points in time utilized the same scale.

2.2.2 Employment

Participants reported their employment status with two response options. They were asked if they were currently employed at the time of the survey. Individuals who reported employment were coded as 1, while those who reported unemployment were coded as 0.

2.2.3 Educational attainment

Participants were asked their current educational attainment. They had eight response options from no degree to doctoral or professional degree. To show differences between adult men who attained higher education and those who did not, men who attained an associate's degree, bachelor of arts or science degree, master's degree, doctoral degree, or professional degree were classified as having attained higher education, while men with no degree or a high school diploma were classified as not having attained higher education. We used men's education attainment in the final wave of data collection for analysis.

2.2.4 Time-variable covariates and time-invariable covariates

Several time-variable factors that may influence depression were included. Men's income, marital status, residence, and health-related factors, such as hours of sleep and vegetable intake, were regarded as time-variable covariates. Participants' marital status was categorized as either married and non-married, and residence was classified as urban or rural. Vegetable intake had two dimensions: more than once a week or never. Across six waves of data collection, the same measures were used for each time-variable covariate. Particularly, while vegetable intake has been regarded as one important factor influencing depression [29, 30], it has not been considered often in previous studies. Health related outcomes were available in the NLSY79 CY, so we included vegetable intake as a covariate in the current study. Adult men's race/ethnicity and birth year/age were also controlled as time-invariant covariates. For race and ethnicity, three groups were included: White, Black, and Hispanic. When interpreting findings about the relationships between depression and the included covariates, the estimated relationships between time-variable covariates and depression can be interpreted causally, as they were repeatedly measured over time.

2.3 Analysis strategies

The current study used a Random Effects Model (REM) to estimate how employment status affects men's depression over time and whether it differs by their educational attainment. In other words, this study employed data collected at six points in time to identify the relationship between employment and depression among adult men. REM is one of the best approaches for analyzing panel data, as this analysis strategy is conducted based on a principle of maximum likelihood or general least squares [31]. Further, REM, which is also called the Generalized Least Square (GLS), is free of heteroscedasticity and makes it possible to approximate participants' changes at each point in time. The equation used in this study is as follows:

$$y_{it} = \beta_0 + \beta_1 x_{1it} + \beta_2 x_{2it} + \dots + \beta_k x_{kit} + \mu_i + v_{it}$$

$$E(\mu_i) = 0, \text{var}(\mu_i) = \sigma_\mu^2, \text{cov}(\mu_i, v_{it}) = 0$$

Based upon the above formula, time-variable covariates (*e.g.*, employment, depression, educational attainment) and time-invariable covariates were included across the six waves of data collection. The Statistical Package for the Social Sciences 23.0 (SPSS) and STATA 14.0 were utilized to prepare the raw data and for analysis.

3. Results

Table 1 presents descriptive statistics for the main variables and time-(in) variable covariates. Across the eleven years examined, the average value of depression was 0.62 and men's

average employment rate was 78.3%. Approximately one-fourth of adult men received higher education. For time-variable covariates, 21.1% had ever been married, and their average income over time was about \$41,829 annually. For area of residence, 81.2% of respondents lived in urban areas. For the health-related variables, men's average amount of sleep over time was about 8.55 hours per night, and approximately 94% of adult men consumed vegetables at least once a week on average. For time-invariable covariates, participants were 33.4 years old on average, and 50.6% of participants were White, 30.3% were Black, and 19.1% were Hispanic.

TABLE 1. Descriptive statistics.

Variables	% or Mean (Standard deviation)
Depression	0.62 (0.48)
Employment	78.30%
Educational attainment	25.68%
Marriage	21.10%
Income	8.34 (3.61)
Hours of sleep	2.56 (1.44)
Vegetable intake	94.00%
Residence (Urban area)	81.20%
Age	33.35 (3.19)
Whites	50.60%
Blacks	30.30%
Hispanics	19.10%

Note 1. $Income = \text{Log}(Income + 1)$.

Note 2. $Hours\ of\ Sleep = \text{Log}(Hours\ of\ sleep + 1)$.

Results of the Random Effects Model are presented in Table 2. Employment significantly affected adult men's levels of depression over time ($p < 0.001$). Further, educational attainment was significantly associated with depression over time ($p < 0.001$). Regarding the interaction effect, educational attainment moderated the relationship between adult men's employment and depression ($p < 0.01$). In addition, adult men's income was negatively associated with depression over time ($p < 0.05$).

4. Discussion

Although many adult men experience mental health problems such as depression [1, 3, 16], more attention has been given to women's mental health as they tend to report depression at higher levels than do men [2, 4, 16, 17]. Some research has been conducted regarding adult men's depression, but new literature reviews and empirical evidence are still required to understand adult men's mental health more deeply, including depression. During adulthood, most men are also likely to become employed, and those who attained higher education are more likely to obtain higher paying jobs than those who did not attain higher education [24, 32]. In other words, they may experience differences in income related to their educational attainment, which may also lead to differences in

TABLE 2. Random effects model predicting adult men's depression.

Variables		
(Constant)	12.580 (7.732)	
Employment	-0.105 (0.023)	***
Educational attainment	-0.168 (0.042)	***
Employment \times Educational attainment	0.119 (0.043)	**
Hours of Sleep	-0.008 (0.006)	
Vegetable intake	-0.045 (0.036)	
Marriage	-0.033 (0.024)	
Income	-0.007 (0.003)	*
Residence (Urban area)	-0.030 (0.024)	
Age	-0.006 (0.004)	
Hispanics	-0.048 (0.031)	
Blacks	0.015 (0.029)	

Note: * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

depression depending on their income and levels of financial strain [33, 34]. However, there is a lack of empirical evidence about adult men's depression levels over time, particularly considering whether they are employed and receive higher education. Thus, this study fills this research gap by using a longitudinal approach and investigating changes in the relationship between men's employment and depression during adulthood. The results of this study indicate that employment status significantly affected adult men's depression over time. Further, given that educational attainment has been found to be inversely associated with depression [35–37], the current study showed that educational attainment moderated the association between employment and depression among adult men over time.

Financial freedom can be achieved by stable employment, which makes it possible to cover living expenses. If an individual does not have stable employment or job security, they may be more likely to experience depression [7, 8, 11, 12, 15]. As such, employment is one of the most important factors influencing one's depression, and this was confirmed in the current study. This study indicated an inverse relationship between employment and depression over time, and it was found that adult men who had frequently experienced unemployment during adulthood were more likely to suffer from depression over time. It is well known that a lack of or unstable employment has a positive impact on depression [7, 8, 11, 12, 15], but this study demonstrated an accumulating effect of employment on depression among adult men. In other words, if adult men were unemployed for a long time, they are more likely to experience depression over a long period as well. Thus, one time or short-term job training programs or temporary employment opportunities might be helpful for unemployed adult men in the short-term, but their effects might not lead to continued employment and job security. As such, adult men who lose a temporary or short-term job might suffer from further depression once they are again

unemployed. Therefore, short-term or temporary actions may not be beneficial to decrease levels of depression across adult men in the long term.

Previous research has studied the association between men's educational attainment and depression [9, 13, 14], and the current study also found that educational attainment played a role in buffering depression over time. Adult men who attained a bachelor's degree or another higher degree were less likely to be depressed compared to those without higher education. Generally, education results in higher socioeconomic status and upward mobility [24, 32]. Good mental health or lower prevalence of mental health issues such as depression does not necessarily require having a high socioeconomic status, but individuals with higher education are more likely to have a high-paying job, which makes them freer from financial challenges, and thus influencing mental health problems [33, 34]. Therefore, educational attainment increases one's opportunities to obtain a good job, leading to lower levels of depression. Given that more adult men are in the labor force compared to adult women [25], the effect of higher education on depression is even greater for adult men because education positively influences their job security and likelihood to obtain a well-paying job. Increasing educational attainment continuously affects adult men's depression over time; thus, there is no age limit on the positive impact of higher education on depression among men, so more opportunities for higher education should be provided to adult men of all ages. This might be in the form of grants or scholarships for non-traditional or returning students to obtain or finish a degree, or part-time or flexible programs to accommodate older students who might attend a degree program while still working part- or full-time [38].

This study also indicated that educational attainment moderated the relationship between men's employment and depression over time. Among employed adult men, whether they received at least a bachelor's degree greatly affected their levels of depression over time. Given the results of the REM considering changes over the course of eleven years, stable employment was an important factor to decrease levels of depression for adult men, regardless of their educational attainment. However, men who received higher education showed lower levels of depression over time compared to their counterparts without higher education. One possible reason for the moderating effect of educational attainment is that individuals with higher educational attainment might have more opportunities to be promoted in the workplace or to switch jobs compared to those without higher education. Such benefits from higher education result in less distress in more job stability and higher wages, which may lead to lower depression. Besides employment, educational attainment was also effective to reduce levels of depression over time, particularly among unemployed men. Given that the effect of educational attainment on the association between employment and depression was greater for unemployed adult men, opportunities for unemployed men without higher education to improve their educational attainment, such as improved financial support from states or governments targeted toward returning or non-traditional students, may help to improve rates of depression among unemployed men.

5. Limitations

Although this study sheds a light on understanding of adult men's depression over time by considering changes in their employment and educational attainment, several limitations should be understood before interpreting the current study's findings. First, participants who refused an interview were not included in the present study. Respondents who declined to answer this interview were excluded, and this may introduce a bias into the estimates about depression. Second, social desirability bias may affect all self-report surveys, which may influence the reliability of the survey. As some people tend to answer questions in a way they think will be perceived positively by others, participants' answers in this survey may have been influenced by such bias. Second, this study's findings may be generalized to American men, but not to all adult men globally. Third, given that this study focuses on men, examining societal perceptions of masculinity would be beneficial to more deeply understand the relationships among employment, education and depression over time. Even though such a construct was not available in our data, we suggest that future studies show the effects of masculinity on depression. Last, although we were only able to examine the longitudinal effect of unemployment on men's depression, future studies may consider the longitudinal effect of depression on men's employment, a relationship which has been illustrated in the literature, *e.g.*, [39].

6. Conclusions

Long-term social services to help unemployed adult men should focus on improving adult men's skills and opportunities to have stable employment, leading them to have lower levels of depression over time. In addition, interventions to improve men's educational attainment, especially for adult learners, may include increasing availability of online courses or courses offered at times compatible with full-time work schedules; free childcare or childcare subsidies for fathers; and scholarships or fellowships targeted toward adult learners, *e.g.*, [38]. Further, although adult men tend to have lower levels of depression than adult women [3, 16, 17], unemployed adult men without higher education reported higher depression during adulthood in our study. Therefore, as inequalities in educational attainment influence adult men's depression over time, it is necessary to pay more attention to adult men's educational attainment and employment in the context of studying their experiences with mental health, including depression.

AVAILABILITY OF DATA AND MATERIALS

The data used in the current study is available on the website: <https://www.nlsinfo.org/content/cohorts/nlsy79-children>.

AUTHOR CONTRIBUTIONS

JL and HL—study design, data analysis. JL, JA, HL and WR—writing original draft; manuscript review and editing. All authors contributed to editorial changes in the manuscript.

All authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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