



Health status among NEET adolescents and young adults in the United States, 2016–2018

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ABSTRACT

Adolescents and young adults not employed or in education/training (NEET) could be at higher risk of adverse health outcomes. Approximately 4.6 million Americans aged between 16 and 24 fall in this group. However, differences in health between NEET and non-NEET population remain unaddressed. This study examines the association of NEET status and poor/fair self-reported health status (SRH), among adolescents and young adults in the United States. Data for this study come from the 2016–2018 National Survey on Drug Use and Health (NSDUH). Our analytical sample consisted of 53,690 respondents. We used logistic regression models to investigate the association between NEET and health status in the United States, while controlling for potential covariates. Approximately 14% of our analytical sample was classified as NEET. NEET report poor/fair health status at higher rates than their counterparts who remained in school and/or had a job (11.30% vs. 5.62%). The NEET population was older, had a higher proportion of non-Hispanic Blacks, engaged in more smoking but in less alcohol drinking than non-NEET. In our initial model, NEET were more likely report poor/fair SRH than their non-NEET counterparts (OR = 2.14; $p < 0.001$). This difference remains strong when demographic and socio-economic characteristics are accounted for in our empirical models (OR = 1.93, $p < 0.001$). In our fully specified model, which accounts for health behaviors, NEET continue to have higher odds of reporting poor/fair SRH (OR = 1.77, $p < 0.001$). Our analyses suggest that NEET populations report worse health than non-NEETs. The health of this population may improve if interventions to reinsert them into either education or employment are effectively deployed.

Introduction

In the United States, more than 4.6 million adolescents and young adults aged 16–24 are not employed or enrolled in some form of education or training, hereafter referred to as NEET (Mendelson, Mmari, Blum, Catalano, & Brindis, 2018). In 2016, the NEET population represented approximately 11.7% of individuals 16 to 24 in the U.S. (Mendelson et al., 2018). Significant increases in the estimates of the NEET population have been observed due to the ongoing COVID-19 pandemic, with a recent estimate placing the number of adolescents or young adults not working or in education/training between 20% and 28% in the summer of 2020, surpassing corresponding estimates for the same period in previous years (Fry & Barroso, 2020). The disconnection from both the educational system and the workforce may significantly

increase the propensity for risky health behaviors, which are found already at higher rates among adolescents and young adults, ultimately impacting future health (Cubbin, Santelli, Brindis, & ; Hair, Park, Ling, & Moore, 2009; Mendelson et al., 2018). Despite the size of this population, limited research in the U.S. has explored potential differences in health status between NEETs and the non-NEET population.

A life-course approach to health posits that all events over the life cycle influence future social and economic outcomes, and that particular experiences during key stages can have compounding impacts in later life (Elder, 1975; Jacob, Baird, Barker, Cooper, & Hanson, 2017). For instance, there is a vast body of evidence connecting adverse childhood experiences with poorer mental and physical health, as well as lower quality of life, in adulthood (Amato, 1991; Bonomi, Cannon, Anderson, Rivara, & Thompson, 2008; Monnat & Chandler, 2015; Reiser,

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McMillan, Wright, & Asmundson, 2014). Similarly, childhood socioeconomic status (SES) is associated with adult cardiovascular morbidity and mortality, all-cause mortality (Cohen, Janicki-Deverts, Chen, & Matthews, 2010), and the effect of adult SES on health in later stages is stronger for those from poorer childhood backgrounds (Luo & Waite, 2005). Thus, public health interventions with the objective of improving adult health should consider earlier stages of life, before the health problems are present.

Adolescence is a crucial time period in the life-course wherein childhood health trajectories are modified and the foundations of adult health are paved (Viner et al., 2012). During this stage, many unhealthy behaviors develop, which can have consequences for health and mortality in subsequent stages of the life-course, making it a prime phase of focus for improving adult health (Daw, Margolis, & Verdery, 2015). For instance, adult diabetes is related to body mass index (BMI) gains during high school and college years (Attard, Herring, Howard, & Gordon-Larsen, 2013). Adolescent health, and subsequent health disparities, are influenced by several factors pertaining social, physical, and natural environments in which individuals are born, live, work and play (Commission on Social Determinants of Health, 2008). Although social determinants impact health across all life stages (Yang et al., 2016), proximal determinants like family structure and peer-relationships, school environments, and neighborhood structures may be especially influential during adolescence (Currie et al., 2012; Daw et al., 2015; Wang, Zhang, Zheng, Kim, & Padilla, 2020). For adolescents, a prolonged absence from school could lead to worse health as they are disconnected from their peers and the protective effects of the school environment, as well as the health monitoring that occurs as part of the services provided through school (Holmes et al., 2016; Mendelson et al., 2018).

Comparatively, young adults have worse health than adolescents in a variety of outcomes that include, but are not limited to, injury, homicide, and substance abuse (Park, Paul Mulye, Adams, Brindis, & Irwin, 2006). During this stage, also known as emerging adulthood, individuals begin their path towards independence with differences in adult supervision, roles and responsibilities. Individuals in this stage, also engage in identity exploration and set the foundations for self-sufficiency by emphasizing their role as independent decision-makers, accepting responsibility for their decisions and becoming financially self-reliant (Arnett, 2000). Research continues to emphasize that employment and educational status during adolescence and young adulthood influence short and long-term health outcomes (Park, Scott, Adams, Brindis, & Irwin, 2014). Studying the health of the NEET population will expand our understanding of health dynamics at these two crucial stages of the life-course.

The relationship between SES and health disparities is well documented, with a variety of measurements consistently finding poorer health outcomes for those with lower SES (Abdalla, Yu, & Galea, 2021; Anderson, Sorlie, Backlund, Johnson, & Kaplan, 1997; Bell, Sacks, Thomas Tobin, & Thorpe, 2020). Individuals with lower education levels have lower life expectancy (Sasson, 2017), and children with less educated parents have higher likelihood of being in poor health (Chen, Martin, & Matthews, 2006). Similar gradients are found in adult and child health when income is used as a proxy for SES (Braveman, Cubbin, Egerter, Williams, &). With regard to employment, those who are in the workforce report better health than those who are not (Johansson, Böckerman, & Lundqvist, 2020). While a fraction of this gap is explained by the fact that healthier people are more likely to be employed (Schmitz, 2011), employer-sponsored insurance is the predominant source of health insurance in the U.S. and thus, access to healthcare (Carman, Eibner, & Paddock, 2015). In addition, other dimensions of employment such as work organization, job insecurity, and length of unemployment are associated with both health status and life expectancy (Laditka & Laditka, 2016; Landsbergis, Grzywacz, & Lamontagne, 2014; Luckhaupt, Alterman, Li, & Calvert, 2017). Given the impact of employment on adult health, and the relationship between education

and employment on adult SES trajectories, the association between youth employment, education, and training on health is crucial to expand our understanding of adult health disparities.

Self-rated health (SRH) is a widely used measure of health status and serves as a predictor of mortality (Finch, Hummer, Reindl, & Vega, 2002; Jylha, 2009; Woo & Zajacova, 2016). A large body of literature exists on the individual and social determinants of SRH broadly, finding differences by demographic and socioeconomic characteristics (Marquez-Velarde, Jones, & Keith, 2020; Santos-Lozada & Martinez, 2017; Zajacova, Huzurbazar, & Todd, 2017). While literature on the matter of SRH is widely available, very little research has examined this variable for adolescents specifically (Bauldry, Shanahan, Boardman, Miech, & Macmillan, 2012). The extant literature on the determinants of SRH during adolescence and young adulthood finds associations with SES (actual and perceived), education, race/ethnicity, family relationships, school conditions, chronic conditions, and body mass index (Almgren, Magarati, & Mogford, 2009; Heard, Gorman, & Kapinus, 2008; Vingilis, Wade, & Seeley, 2002). In addition, research has observed SRH to be relatively stable during the transition to adulthood (Boardman, 2006; Fosse & Haas, 2009), making it an ideal outcome to explore NEET differences in health as age differences are not expected among this population.

There is reason to believe that NEETs may be uniquely disadvantaged regarding their health status, due to socioeconomic characteristics and health behaviors. Although there is reason to question the selectivity of the NEET population due to general unhealthiness, evidence from longitudinal studies suggest health deterioration occurs after the exit from school and transition to unemployment (Robertson, 2019). In addition, this population has increased likelihood of engaging in deleterious health behaviors. For example, high school dropouts are more likely to meet criteria for nicotine dependence, report daily cigarette use, and substance abuse (Maynard, Salas-Wright, & Vaughn, 2015; Swaim, Beauvais, Chavez, & Oetting, 1997); all health behaviors associated with poorer health. NEETs in Canada are more likely to be smokers compared to their peers who remain either employed or in education/training (Davidson & Arim, 2019). A study conducted in Norway finds worse self-perceived health and poorer mental health among female NEETs compared to those who remained at school, but no difference among males (Stea, Abildsnes, Strandheim, &). At the same time, unemployment, and the length of time people spend unemployed, are associated with worse health, as well as increased use of tobacco, alcohol, and other substances (Compton, Gfroerer, Conway, & Finger, 2014; Montgomery, Cook, Bartley, & Wadsworth, 1998; Park et al., 2006). Since 1999, hospitalizations due to alcohol use, drug overdoses, and their combinations increased for adolescents and young adults, with the estimated costs of \$198 million to the healthcare system (White, Hingson, I-Jen, & Hsiao-Ye, 2011). This underscores the importance of studying not only young adults, but also subgroups within, as they may be placing a preventable burden on the national healthcare system.

The present study

While adolescents and young adults classified as NEET represent a significant number of people in the U.S., little research has studied differences in health status for this population in comparison to their counterparts who remain either employed or tied to some form of education, training, or both. We fill this gap in current scholarship by studying whether NEET status is associated with SRH, among the U.S. population aged 16 to 25. Specifically, we use three waves of a nationally representative sample of the U.S. population to: (1) study the characteristics of the NEET population, (2) examine the relationship between NEET status and health, and (3) explore if this association is present after covariates are considered.

Data

Data for this study are from the 2016–2018 National Survey on Drug

Use and Health (NSDUH; [McCance-Katz, 2019](#)). The NSDUH is a comprehensive household interview survey of substance use disorders, mental health, and the receipt of treatment services for these disorders in the U.S. It is collected through face-to-face interviews, followed by computer assisted self-interviews for sensitive items. Information is collected from the civilian (noninstitutionalized) population aged 12 and older, including those who live in college dorms and homeless shelters. Approximately 70,000 persons are interviewed every year. This data also includes demographic and socioeconomic characteristics and health status for each respondent interviewed. The NSDUH is the most appropriate source of data for this study because it includes: (a) all the information needed to determine whether the respondent is enrolled in education and their employment status (used to determine NEET status), and (b) measures of health status, demographic and socioeconomic characteristics, and health behaviors, which we include as covariates in our fully specified regression model.

Due to sample size when the population of persons aged 16–25 is disaggregated by education, employment, and NEET status, we aggregated all available samples from the 2016–2018 survey years for robustness. The initial sample size consisted of 54,677 observations. We employed list-wise deletion to produce our analytic sample. Finally, we only include observations with information for all the variables included in our descriptive and multivariate models. 987 observations were excluded due to missing values, which is equivalent to 1.81% of the initial sample. Our analysis of the characteristics of observations indicated that the variables were missing at random. Our final analytic sample consisted of 53,690 observations with valid information for every variable considered. The number of observations obtained from each year included in our analysis is balanced (~33% from each wave,

Table 1
Descriptive statistics for population 16–25 years, by NEET status in the United States, 2016–2018 National Survey on Drug Use and Health (n = 53,690).

	Overall	NEET		Chi-Square	p-value
		Yes	No		
NEET	14.02	–	–	–	–
Poor/Fair SRH	6.42	11.30	5.62	214.91	<0.0001
Sex					
Female	49.88	51.10	49.68	3.32	0.07
Male	50.12	48.90	50.32		
Age					
16–18 years	30.63	19.54	32.44	330.19	<0.0001
19–21 years	29.13	31.49	28.74		
22–23 years	20.05	24.77	19.28		
24–25 years	20.18	24.20	19.53		
Race/ethnicity					
Non-Hispanic white	54.15	47.66	55.20	209.50	<0.0001
Non-Hispanic Black	13.87	20.50	12.79		
Hispanic	22.23	22.62	22.16		
Non-Hispanic other	9.75	9.23	9.84		
Family Income					
Less than \$20,000	24.48	35.27	22.71	589.65	<0.0001
\$20,000 - \$49,999	31.02	35.90	30.22		
\$50,000 - \$74,999	14.04	10.57	14.61		
\$75,000 or more	30.46	18.26	32.45		
Health Behaviors					
Cigarette in last month	18.62	26.95	17.26	249.49	<0.0001
Drank alcohol in last month	48.17	39.50	49.59	158.4	<0.0001
County					
Large Metropolitan Area	56.15	53.00	56.66	64.09	<0.0001
Small Metropolitan Area	30.95	30.75	30.98		
Nonmetro	12.90	16.25	12.35		
Year					
2016	33.14	32.83	33.19	1.34	0.51
2017	33.40	34.14	33.28		
2018	33.45	33.02	33.52		
Unweighted n	53,690	7,831	45,859	–	–

see [Table 1](#)). Within our model specification, we include a control variable for the year of interview to account for any potential trends in the outcome. The analysis was conducted on de-identified, publicly available data and is considered exempt research as defined by Health and Human Services regulation 45 CFR 46.102.

Measures

Self-reported health

Self-reported health is collected in the NSDUH using one question with a categorical response structure, where respondents indicate if their overall health was “Excellent,” “Very Good,” “Good,” “Fair,” or “Poor” ([McCance-Katz, 2019](#)). We operationalized this variable as a dichotomous variable where: 0 represented those who rated their health as excellent, very good or good; and 1 represented those who rated their health as fair or poor. This is a standard operationalization of this variable, consistently used in research on this subject ([Acevedo-Garcia, Bates, Osypuk, & McArdle, 2010](#); [Finch et al., 2002](#); [Manor, Matthews, & Power, 2000](#); [Marquez-Velarde et al., 2020](#)).

Not in education, employment, or training (NEET)

In order to determine NEET status, we created a variable that indicated whether the respondent was attending school and/or whether they were employed during the time of interview. In the case of education, if the interview was conducted during a break period, the respondent was asked if they planned to attend once school resumed. For employment, the variable indicated if the respondent worked during the week prior to the interview. We recoded each of these variables into dichotomous variables, which produced four possible combinations, and the distribution of these categories within our analytical sample is illustrated in [Fig. 1](#). The highest prevalence was found for persons who were both employed and engaging in some form of education/training (37.92%), followed by employed individuals (32.41%) and the third to last category being those who are only engaged in education/training (15.77%). NEETs comprised the smallest fraction of our sample (14.02%).

Covariates

We account for demographic and socioeconomic characteristics, health behaviors, and metropolitan status in our fully specified model. Age is measured as a categorical variable with four levels: (1) 16–18 years, (2) 19–21 years, (3) 22–23 years, and (4) 24–25 years. Sex is measured as a dichotomous variable indicating whether the respondent is male or female. Race/ethnicity is measured as a categorical variable with four levels: non-Hispanic white, non-Hispanic Black, Hispanic and non-Hispanic others. Family income is self-reported and is measured as a categorical variable with four possible levels: (1) Less than \$20,000, (2) \$20,000–\$49,000, (3) \$50,000–\$74,999, and (4) \$75,000 or more. We account for health behaviors by incorporating drinking and smoking patterns. These variables indicate whether the respondent drank an alcoholic beverage or smoked a cigarette in the 30 days prior to their interview. We control for county type as a categorical variable indicating whether the respondent lived in a (1) Large Metropolitan area, (2) Small Metropolitan area, or a (3) Nonmetropolitan area. Nonmetropolitan counties are those outside of a metropolitan statistical area (MSA) by definitions of the Office of Management and Budget (OMB). Due to geographic masking of the public NSDUH files, this is the only available measure of contextual differences among respondents. As mentioned previously, we also control for NSDUH wave to account for potential trends in poor/fair SRH.

Analytic strategy

Our analyses consist of a descriptive analysis of our sample and three logistic regression models to determine the association between NEET and health status. First, we produce descriptive statistics for the overall sample, and by NEET status, to quantify the differences in poor/fair SRH

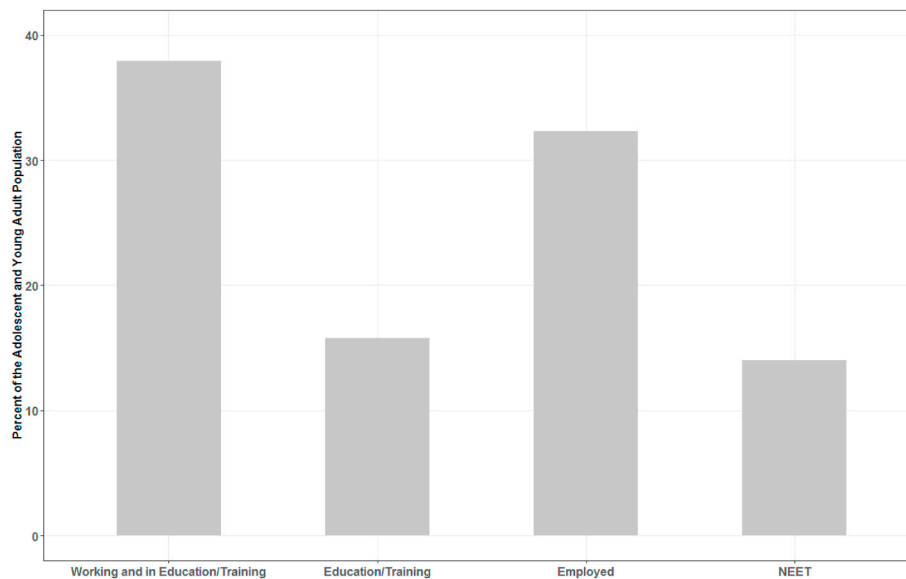


Fig. 1. Percent of the adolescent and young adult population by status regarding Education/Training or Employment, NSDUH 2016–2018.

between both groups. We calculate Chi-Squares (χ^2) for the outcome and each characteristic included in our study to ascertain differences based on NEET status. Second, we examine if NEET designation is associated with health status, and if this association is present when covariates are incorporated in the empirical models. We adjust for complex survey design as directed in the NSDUH documentation. These adjustments include stratification and the incorporation of weights that adjust for unequal probability of selection and makes the results generalizable to the U.S. population. Our first model presents the association between NEET status and health status alone. The second model incorporates the demographic and socioeconomic characteristics, county-classification, and survey year. The third model incorporates health behaviors, measured as cigarette and alcohol use in the last month. The inclusion of these variables allows us to determine if the relationship between NEET status and health is affected when these characteristics are accounted for within our empirical models. Results are presented as odds ratios (O.R.) with corresponding significance levels and 95% confidence interval (95% C.I.).

Results

In Table 1, we present the descriptive statistics for our analytic sample. Approximately 6.42% of the sample reported having poor/fair SRH and 14.02% were classified as NEET. The sample was relatively balanced in age, sex, and race/ethnicity in comparison to national demographics. Regarding health behaviors, 18.62% and 48.17% reported smoking and alcohol use, respectively. The population is largely concentrated within large/small metropolitan areas, with only 12.90% of the sample living in nonmetropolitan areas.

In our analysis by NEET status, we found that 11.30% of the NEET population reported poor/fair health, compared to 5.62% of non-NEETs ($\chi^2 = 214.91$, $p < 0.0001$). We do not find a sizeable difference in sex composition between both samples, but the NEET subsample is relatively older. Regarding race/ethnicity, 47.66% of the NEET subsample is non-Hispanic white, 20.50% is non-Hispanic Black, 22.62% is Hispanic, and 9.23% is non-Hispanic other. In contrast, the proportion of non-Hispanic white non-NEETs is 7.54% larger, while the non-Hispanic Black population is 7.71% smaller than the NEET subsample. No difference is found in the proportion of Hispanics or non-Hispanic others by NEET status. We found a greater proportion of respondents who smoked (26.95% vs. 17.26%) but fewer who drank (39.50% vs. 49.59%) among NEETs ($\chi^2 = 249.49$, $p < 0.0001$ and $\chi^2 = 158.4$, $p < 0.0001$,

respectively). The NEET subsample had a slightly higher percent living in metropolitan areas (3.66%). The contribution by year to each subsample is relatively balanced.

In Table 2, we present the results from the univariate (Model 1) and adjusted logistic regression models that account for demographic and socioeconomic characteristics, and county-classification (Model 2), and health behaviors (Model 3). In Model 1, we found the NEET population had higher odds of reporting poor/fair SRH in comparison to non-NEETs (OR = 2.14, $p \leq 0.001$). In Model 2, we account for demographic and socioeconomic characteristics and county-classification. Again, the NEET population had higher odds of reporting poor/fair SRH in comparison to the reference group (OR = 1.93, $p \leq 0.0001$). Differences are observed by sex, with males having lower odds of reporting the poor/fair SRH than females (OR = 0.86, $p \leq 0.0001$). Differences are also observed by age with every older group having higher odds of reporting poor/fair SRH than the reference group (16–18). Hispanics were found to have higher odds of reporting poor/fair SRH when compared to non-Hispanic whites (OR = 1.46, $p < 0.0001$). In addition, we observe differences by family income where respondents in the lower income groups have higher odds of reporting poor/fair SRH than those whose family income falls in the higher category (\$75,000 or more). Differences are observed based on county-classification where respondents living in large and small metropolitan areas have lower odds of reporting poor/fair SRH than those living in nonmetropolitan counties (OR = 0.84, $p < 0.0001$ and OR = 0.84, $p < 0.0001$, respectively).

In Model 3, we incorporate health behaviors to the specification presented in Model 2. In this model, the NEET population had higher odds of reporting poor/fair SRH in comparison to the reference group (OR = 1.79, $p \leq 0.001$). Older respondents had greater odds of reporting poor/fair SRH compared to those aged 16–18 years. Respondents aged 19–21 and 22–23 years had 17% and 15% higher odds of reporting poor/fair SRH than the reference group, respectively. No difference was present for respondents aged 24–25. Non-Hispanic Black and Hispanic respondents had higher odds of reporting poor/fair SRH than non-Hispanic whites (OR = 1.16, $p \leq 0.05$ and OR = 1.54%, $p \leq 0.01$). Differences were also observed by family income wherein respondents from lower income backgrounds had increasingly higher odds of reporting poor/fair SRH compared to the highest income group. Regarding health behaviors, we found those who reported smoking at least once in the past month had higher odds of reporting poor/fair SRH (OR = 2.06, $p \leq 0.001$). Conversely, those who reported having at least one alcoholic drink in the month before the interview had lower odds

Table 2

Logistic regression models of health status, for NEET and individual characteristics, 2016–2018 National Survey on Drug Use and Health (n = 53,690).

	Model 1		Model 2		Model 3	
	OR	95% CI	OR	95% CI	OR	95% CI
NEET	2.14***	1.93-2.37	1.93***	1.73-2.15	1.77***	1.58-1.97
Sex (Ref = Female)						
Male			0.86**	0.79–0.95	0.82***	0.75–0.90
Age (Ref = 16–18 years)						
19–21 years			1.19**	1.06–1.34	1.17**	1.03–1.33
22–23 years			1.16***	1.01–1.32	1.15*	1.00–1.32
24–25 years			1.15*	1.01–1.32	1.12	0.97–1.29
Race/ethnicity (Ref = Non-Hispanic white)						
Non-Hispanic Black			1.10	0.96–1.25	1.16*	1.01–1.32
Hispanic			1.46***	1.30–1.64	1.54**	1.37–1.73
Non-Hispanic Others			1.09	0.92–1.28	1.13	0.95–1.34
Family Income (Ref = \$75,000 or more)						
Less than \$20,000			1.74***	1.51–1.99	1.64***	1.43–1.88
\$20,000 - \$49,999			1.68***	1.47–1.92	1.60***	1.40–1.83
\$50,000 - \$74,999			1.54***	1.31–1.81	1.52***	1.29–1.78
Health Behaviors						
Cigarette in last month					2.06***	1.85–2.28
Drank alcohol in last month					0.78***	0.70–0.86
County (Ref = Nonmetro)						
Large Metropolitan Area			0.84**	0.74–0.95	0.91	0.80–1.04
Small Metropolitan Area			0.84**	0.74–0.96	0.89†	0.79–1.02
Year (Continuous)			1.02	0.96–1.08	1.03	0.98–1.11
Likelihood Ratio Test	F = 298.05, p < 0.001***		F = 43.35, p < 0.0001		F = 55.63, p < 0.001***	

Significance level: †p ≤ 0.10, *p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.001.

(OR = 0.78, p ≤ 0.001). Finally, no differences were found for respondents living in large metropolitan counties in comparison to those living in non-metro areas. However, those living in small metropolitan counties had marginally significant, lower odds of reporting poor/fair SRH than those in non-metro counties (OR = 0.89, p ≤ 0.10). Consistently, the results for sample year indicate that no trend exists in the patterns of poor/fair SRH by wave of the NSDUH.

In Fig. 2, we present the predicted probabilities of reporting poor/fair SRH for each education/training and employment combination. Within our analysis, those engaged in both education/training and employment had a probability of 0.05 of reporting poor/fair SRH. Those who were employed or engaging in some form of education/training had a probability of 0.06 and 0.07 of reporting the outcome, respectively. Finally, adolescents and young adults who were classified as NEET had a probability of 0.11 of reporting poor/fair SRH.

Sensitivity analysis

We conducted three sensitivity analyses, which are presented as Supplemental Table 1 in Supplemental Appendix. First, we replicated our fully specified model using the continuous operationalization of SRH, where a higher number represents worse health; the results were consistent to those produced using the dichotomous specification (Model S1). We replicated the regression analyses using a categorical specification of the variables contributing to NEET classification, as shown in Fig. 1 (Model S2). The predicted probabilities shown in Fig. 2 are derived from this model. Our results remained consistent with the findings presented in the main analysis, as the NEET population reported worse health than those who remained engaged in the education/training system. Our third sensitivity analysis concerns the length of unemployment. Our NEET status measure considers whether the respondent was unemployed in the week before the interview. We

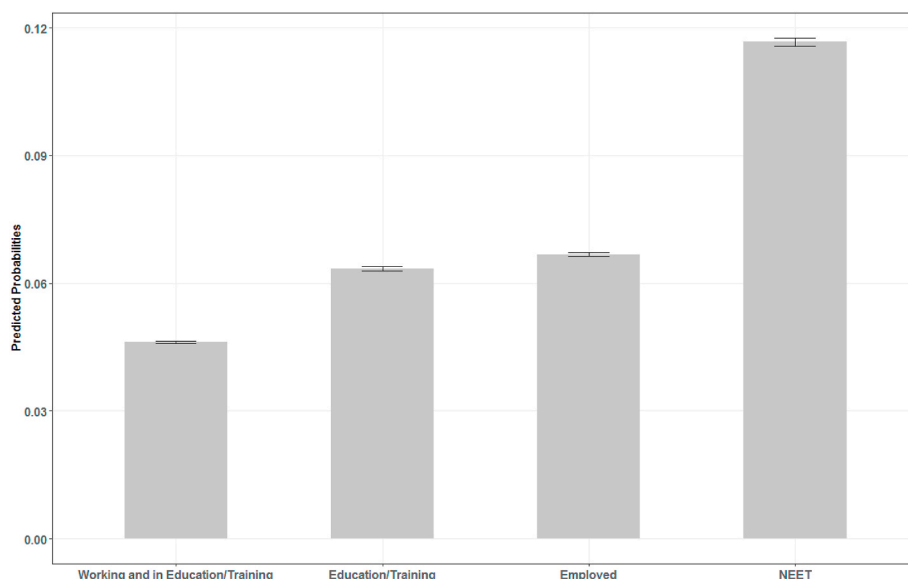


Fig. 2. Predicted probabilities of Poor/Fair Self-Reported Health Status for the adolescent and young adult population by status regarding Education/Training or Employment, NSDUH 2016–2018.

produced a second measure of NEET status that considered unemployment over a one-year period (Model S3) to reduce the possibility that SRH was capturing short-term changes. Our results indicated that respondents classified as NEET under the longer specification, once again, reported worse health than non-NEETs. Thus, our results are robust to different specifications of both the outcome and the main independent variable of interest.

Discussion

Established bodies of research suggest that both education and employment status are associated with health. However, research that considers the association between not being employed or in education/training among adolescents and young adults is limited, and has yet to be generalized to the population. We fill this gap in scholarship by exploring the relationship between NEET status and self-reported health among adolescents and young adults in the U.S. This is an important population to consider given the size of this population, and the fact that interventions at this stage may mitigate health deteriorations associated with disconnection from education and employment systems (Mendelson et al., 2018; Robertson, 2019). Our results indicate that the NEET population reports poorer health than their non-NEET peers, and this difference remains strong even when individual characteristics, health behaviors, and contextual characteristics are accounted for within the empirical models. The results support our working hypothesis that the health of the NEET population is worse than that of respondents who are connected to the major socioeconomic structures of our society. Though a previous study had found similar results using a small sample of Norwegian adolescents (Stea et al., 2019), such work only accounted for parental education and found support only for female adolescents. By incorporating individual, demographic, and socioeconomic characteristics, as well as metropolitan/nonmetropolitan context to the study of NEET health, we advance research on adolescent health. Our findings and sensitivity analyses indicate that NEETs report worse health even when controls are included, and when NEET status is measured using alternative specifications.

When discussing health differences by NEET status, our findings suggest that the covariates also influence health status among this age group. Notably, we find that men report better health than women do, which is consistent with the general patterns found for adults (Zajacova et al., 2017). Non-Hispanic Black and Hispanic respondents report worse health than non-Hispanic whites, but no difference is found for non-Hispanic others. Smoking is associated with worse health and we find a protective effect for drinking alcohol. Given that NEET status is likely influenced by a range of individual, family and community factors, future research should consider which determinants, and at what level, serve as protectors/magnifiers of NEET status disparities. Following a discussion of the strengths and limitations of our research, we discuss potential lines of inquiry that could be explored in future analyses.

Strengths and limitations

This study provides a number of contributions. Strengths include the use of multiple waves of a nationally representative dataset with homogeneous measurement of the dependent and independent variables considered in our analysis. Accounting for survey design makes our results generalizable to the U.S. adolescent and young adult population for the 2016–2018 period. A primary limitation of our analysis is that it relies on cross-sectional samples, which means that causality cannot be inferred. Longitudinal studies would be useful in the future in order to discern the changes in health status due to changes in the educational or employment status of the population. While the growing consensus is that NEET status leads to subsequent health deterioration (Robertson, 2019), this needs to be tested using longitudinal methods. Second, we use of a subjective health rating as the outcome, and previous research

has found socioeconomic characteristics such as educational attainment and income level influence these ratings (Dowd & Zajacova, 2007, 2010; Zajacova & Dowd, 2011). Given that SES tends to influence health ratings, and NEET is constructed using two components of SES, it is important to assess whether the NEET difference holds when studying other health outcomes. Future studies could build upon our findings by exploring whether our findings extend to objective markers of health. Third, the dataset employed for our analyses includes some other key variables of interest, such as household composition, however this variable is collected differently for respondents who are considered adolescents (16–17 years) and young adults (18–25 years). Thus, we could not incorporate this measure in our regression models. Moreover, the role of contextual characteristics, such as community level unemployment, cannot be accounted for and may explain some of this relationship as found in previous studies (Brydsten, Gustafsson, Hammarström). A final limitation, present in any survey, is potential loss of the population of interest, as it includes those with precarious living arrangements, who are often difficult to capture during data collection (Mendelson et al., 2018; Schoon & Bynner, 2019). Thus, our findings likely present conservative estimates of the health disparities among the NEET population in the United States.

Future directions

As our findings document, the NEET population reports worse health than those who remain either in education/training, employed, or both. This disparity may be concomitant to the disconnection from school, employment, and key social support structures; such as, pro-social peers, supportive teachers, career counselors, training providers, schools, and access to employment or education/training (Mendelson et al., 2018; Robertson, 2019). Given the size of this population, future research should address why the NEET population is reporting poorer health than their non-NEET peers. To do so, we recommend the following: (1) assess differences in prevalence of health conditions and their severity between both populations, (2) study the role of daily experiences among the NEET population, and how these may differentiate them from their non-NEET peers, (3) assess health for this population using objective health markers (i.e. biomarkers or allostatic load scores) in order to determine differences in a measure that is not based on self-report, prone to recall bias, or dependent on a diagnosis such as health conditions. As adolescence and young adulthood are critical developmental stages, identifying the factors associated with increased likelihood of being disconnected and the subsequent disparities associated with NEET status, will illuminate pathways for improvement in later-life outcomes such as reinsertion in the labor force, social mobility, and risk reduction of diseases and/or mortality.

Author statement

The authors contributed equally. Raeven Faye Chandler: Conceptualization, Methodology, Investigation, Resources, Writing - Original Draft, Writing - Review & Editing. Alexis R. Santos-Lozada: Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation, Writing - Original Draft, Writing - Review & Editing, Visualization.

Statement EA not required

The analysis was conducted on de-identified, publicly available data and did not involve human subjects research as defined at 45 CFR 46.102.

Declaration of competing interest

The authors have no conflict of interest to disclose.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ssmph.2021.100814>.

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