Long-term impact of adolescent chronic pain on young adult educational, vocational, and social outcomes

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Introduction

Pediatric chronic pain has a broad impact on the physical, psychosocial, and financial well-being of children and their families [13; 45]. Given the robust relationship between adverse childhood experiences and negative adult outcomes [12; 15; 19], it is important to consider how childhood pain may impact individuals as they transition into adulthood. The incidence of pediatric chronic pain peaks in adolescence, and can result in widespread disability including missed school, withdrawal from social activities, and over-dependency on parents [8; 17; 24]. While research has advanced our understanding of the initial impact of chronic pain during childhood, surprisingly little is known about its long-term consequences.

Young adulthood is a distinct period of life defined by a set of common developmental milestones and critical life transitions, including attending college, entering full-time employment, pursuing romantic relationships, and living independently [2]. The unique changes, processes, and challenges of young adult educational, vocational, and social transitions have long-term implications for health and well-being. According to developmental lifespan perspectives, threats to achieving these developmental milestones have significant consequences for later functioning and quality of life in adulthood [11; 23].

Unfortunately, the widespread and persistent disability experienced due to adolescent chronic pain may disrupt the attainment of developmental outcomes in young adulthood. Although population research has found that youth with other chronic illnesses (e.g., cancer, epilepsy) are at-risk for future educational failure and social impairments [25; 38], there is a paucity of prospective research focused on children growing up with chronic pain. In one of the few longitudinal studies that have examined developmental outcomes, a small cohort of adolescents with fibromyalgia (vs. those without chronic pain) reported lower rates of college attendance and employment in young adulthood [39]. Additionally, population-based

cohort studies following youth into adulthood have found that children with chronic pain do not simply "grow out" of pain and disability; these youth are at increased risk for unresolved chronic pain as well as psychiatric disorders in adulthood [29; 30; 42]. As the future pain and psychiatric profiles of children with chronic pain have grown clearer, several questions remain regarding the extent to which youth are at-risk for impairments in meeting critical milestones of young adulthood. As of yet, the long-term developmental consequences of pediatric pain have not been clearly defined, hindering opportunities to address educational failure, lost productivity, and social impairment in adulthood.

Using the National Longitudinal Study of Adolescent to Adult Health, this is the first nationally representative study to comprehensively determine the long-term impact of adolescent chronic pain on young adult educational, vocational, and social outcomes. We take an integrative approach derived from life course perspectives of pediatric to adult health [3; 5; 22; 33] Specifically, we examine (1) educational attainment, (2) vocational/economic outcomes (i.e., employment, income, and public assistance), and (3) social outcomes (i.e., independent living, interpersonal relationships, parenthood). After controlling for relevant sociodemographic and clinical covariates, it is expected that adolescent chronic pain will be associated with increased risk for adverse young adult outcomes across all domains.

Methods

This study presents secondary data analysis of the National Longitudinal Study of Adolescent to Adult Health (Add Health), a longitudinal study of a nationally representative sample of youth from adolescence to young adulthood with four waves of home interviews. The Add Health sample design is extensive and publicly available at (http://www.cpc.unc.edu/projects/addhealth/design). Briefly, participants were selected from 132 middle and high schools that were representative of all US schools in respect to region, urbanicity, school size, school type, and race/ethnicity. Students at each school were then stratified by age and sex and about 17 students from each stratum were chosen to form a core sample of 12,105 participants. In addition to the core sample, supplementary samples to oversample based on race, ethnicity, and disability status were drawn from selected schools. This sampling strategy resulted in 20,745 adolescents being included in the initial study cohort at Wave 1. The present analytic sample consisted of 14,790 youth with and without chronic pain who (1) completed home interviews during adolescence at Wave I (conducted in 1994–1995; grades 7–12) and Wave II (1996; grades 8–12), (2) had complete data on the primary outcomes of interest at Wave IV, around 12 years later representing the period of young adulthood (ages 24–32; 80.3% response rate), and (3) had valid sample weights. The Add Health study complied with standards set forth by the School of Public Health Institutional Review Board at the University of North Carolina. The present secondary analysis was also reviewed and approved by the Institutional Review Board at Seattle Children's Hospital.

Given the multi-wave design over multiple years, there are several inconsistencies in measurement between waves. Specifically, several variables of interest were only measured in adolescence at Waves I and II (i.e., chronic pain, depressive symptoms) but were not available in the data collection waves completed in adulthood.

Measures

Adolescent Chronic Pain Status.—At Wave I and Wave II, adolescents were asked to rate the frequency of common types of pain over the past 12 months: headache, stomachache, and musculoskeletal pain (i.e., aches, pain, or soreness in muscles or joints). Response options included: "never," "just a few times," "about once a week," "almost every day," and "every day." To avoid overinflating rates and in alignment with the World Health Organization's ICD-11 classification of chronic pain as "persistent or recurrent pain for at least 3 months" [1], we defined chronic pain as pain occurring daily or almost daily over the past 12 months. Specifically, *adolescent chronic pain status* was coded into a dichotomized variable: Youth reporting "almost every day" or "every day" pain over the past 12 months at Wave I and/or Wave II were classified in the Chronic Pain group and youth responding that pain occurred "once a week" or less frequently were classified in the No Chronic Pain group. Identical classification methods for defining chronic pain have been done in several prior studies using the Add Health cohort [29; 41].

Young Adult Outcomes.—The educational, vocational, and social outcomes were assessed with data reported by the young adults in Wave IV. Specifically, we were interested in comprehensively assessing young adult educational, vocational and social outcomes. These three domains are integral in life course perspectives of pediatric to adult health [3; 5; 22; 33; 35] and have been used in similar investigations of long-term developmental outcomes among young adults with childhood-onset chronic illnesses [26; 27; 31; 38]. For the current study, we included all available and relevant outcome data from Add Health capturing the three domains, all of which have been used in previous published research using data from Add Health [4; 26; 27].

Educational Outcomes.: Educational outcomes at Wave IV included *attainment of a general equivalency degree (GED)*, *attainment of a high school diploma*, and *attainment of college (bachelor's) degree*. All three were coded as dichotomous variables (1 = yes; 0 = no).

Vocational Outcomes.: Vocational outcomes encompassed occupational and financial attainment/status variables. *Currently employed full-time* was coded into a dichotomous variable: 1 = currently working full-time (35 hours or more); 0 = has never worked or is not currently working. We also coded *Employer-provided benefits* into a dichotomous variable: 1 = receive insurance through work; 0 = do not receive insurance through work. *Work-goal alignment* was assessed using an item that asked young adults to choose the statement that best described the alignment of their current job to future career goals, coded as 1 = it is part of long-term career goals or in preparation for long-term career goals and 0 = unrelated to long-term career goals or do not have long-term career goals. *Personal income* was reported on a continuous scale including all the personal earnings before taxes in the form of wages or salaries, tips, bonuses, and overtime pay, and income from self-employment (in U.S. dollars). Finally, r*eceipt of public assistance* assessed whether the young adult received any public assistance, welfare payments, or food stamps over the past six years and was coded as a dichotomous variable (1 = yes; 0 = no). For exploratory analyses, we also examined *age*

began first full-time job, or young adult report of the age (in years) they transitioned to their first full-time job.

Social Outcomes.: We assessed the following young adult social outcomes: independent living status, currently married/cohabitating, having children, romantic relationship quality, and number of close friendships. Current living arrangement or *living independently* was re-coded into one binary variable: 1 = living independently (i.e., living alone, with roommates, or in a dorm); 0 = not living independently (i.e., living with parents or a relative). *Currently married/cohabitation* was assessed using a categorical relationship status variable recoded to assess if the young adult was currently married or cohabitating with a romantic partner (1 = yes; 0 = no). Responses were coded yes if the young adult was married, cohabitating, or living with a pregnancy partner and were coded no if the young adult was not currently living with a partner. *Romantic relationship quality* was examined using a 7-item scale including questions about enjoyment in doing ordinary things with their partner, being satisfied with the way of handling disagreements and finances, being listened to by the partner, receiving love and affection, being satisfied with their sexual life and trusting their partner's fidelity. Responses were provided on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). A full description of the instrument can be found in Maslow's et al. work [26]. The reliability of the scores in this sample was adequate (α = .81). Finally, *number of close friendships* was assessed using one item asking young adults to select the option that best described their total number of close friendships, which was defined as "people whom you feel at ease with, can talk to about private matters, and can call on for help." This item was kept on a continuous scale (1 = none; 2 = 1 or 2 friends; 3 = 3 to 5 friends; 4 = 6 to 9 friends; 5 = 10 or more friends).

Covariates.—Multivariate analyses controlled for several sociodemographic variables including age, sex, race/ethnicity and parent economic status, which have all been shown to independently contribute to life course outcomes [14; 21; 32; 37]. Age at Wave IV was a continuous variable. Sex was coded as female or male (referent category). Race/ethnicity was based on Wave I self-report and classified into non-Hispanic white (referent), non-Hispanic Black, Hispanic, and Other race/ethnicity. Economic status of family of origin was based on parental income reported at Wave I.

In addition to the sociodemographic covariates mentioned above, models controlled for Wave 1 (adolescent) depressive symptoms. Adolescent depression was included as a covariate as it has been shown to prospectively predict adverse young adult educational, vocational, and social outcomes [7; 9]. Adolescent depressive symptoms were measured using items from the 20-item Center for Epidemiologic Studies-Depression Scale (CES-D) [34]. Items were scored based on the frequency with which depressive symptoms were experienced in the past week using a 4-point Likert scale (anchors: "never/rarely" and "most/all of the time"). Similar to previously published research using this variable [29; 36], total scores were calculated as a sum of the 20 items and could range from 0 (no depressive symptoms) to 60 (most frequent/severe depressive symptoms).

Data Analysis Plan

Data analyses were conducted using the survey package contained in Stata version 12.1 (StataCorp College Station, TX, USA). As recommended, we used sampling weights, regional stratification, and primary sampling unit formation to provide nationally representative estimates from the Add Health database. Consequently, descriptive statistics are presented as weights percentages, means, and linearized standard errors.

We began by examining bivariate associations between young adult outcome variables and adolescent chronic pain status. Continuous variables were compared using adjusted Wald testing after the survey estimation. Categorical variables were compared using Pearson chi-square analyses. To examine our primary aim of determining the long-term impact of adolescent chronic pain on young adult outcomes, we conducted multivariate regression analyses. Logistic regression was used to examine the association between adolescent chronic pain and the 10 discrete young adult outcomes (presented as odds ratios [OR] with corresponding 95% confidence intervals [CIs]). Multiple linear regression was used for the 4 continuous outcomes (presented as regression coefficients with corresponding 95% CIs). Thus, a total of 14 regression models were run. Analyses controlled for age, sex, race/ethnicity, parent income, and Wave 1 depressive symptoms, which were entered together (within the same block) for each regression model.

Results

Description of the sample

The total sample included 14,790 participants, who after survey weighting represented 21.95 million individuals. Table 1 presents the weighted characteristics of the sample separately for those with and without adolescent chronic pain. The prevalence rates of chronic pain within this dataset are similar to those cited in previous epidemiological research [20]. Of the total sample of 14,790 participants, 3,174 (weighted percentage = 21.9%) endorsed having chronic pain in adolescence (at Wave I and/or Wave II) whereas 11,610 did not endorse having chronic pain. As seen in Table 1, adolescent chronic pain was significantly associated with female sex and increased levels of depression in this sample.

Impact of adolescent chronic pain on young adult outcomes (12 years later)

Table 2 presents bivariate analyses of young adult outcomes by adolescent chronic pain status. Table 3 presents the results of multivariate analyses of the main effect of adolescent chronic pain on young adult outcomes controlling for sociodemographic variables (i.e., Wave I sex, race/ethnicity, parent income, and Wave IV age) and Wave I/adolescent depressive symptoms.

Educational outcomes.—Bivariate analyses (Table 2) found that young adults experiencing chronic pain in adolescence (vs. those without chronic pain) had significantly higher rates of attaining a GED and lower rates of attaining a high school diploma. Moreover, youth with chronic pain (vs. those without chronic pain) had significantly lower rates of college graduation.

In multivariate analyses (Table 3) controlling for sociodemographic factors and adolescent depression, adolescent chronic pain was associated with a 66% increased likelihood of attaining a GED. Moreover, adolescent chronic pain status was associated with decreased odds of attaining a high school diploma (34% less likely) and decreased odds of attaining a college degree (17% less likely) in young adulthood.

Vocational outcomes.—Bivariate analyses indicated that young adults with chronic pain in adolescence, vs. those without, were significantly less likely to have a full-time job (i.e., 35+ hours per week), had lower rates of employer-offered insurance, and were significantly less likely to have a job perceived to be part of their long-term career goals. Further, young adults with chronic pain in adolescence were significantly more likely to receive public assistance and reported personal incomes significantly lower than the adjusted mean income for young adults without chronic pain in adolescence. See Table 2.

In multivariate analyses controlling for covariates (Table 3), adolescent chronic pain was associated with 20% decreased odds of receiving employer-provided insurance benefits in young adulthood and, moreover, slightly decreased odds (13% lower) of being employed at a job related to their long-term career goals. Adolescent chronic pain was also associated with a 31% increased likelihood of receiving public assistance in young adulthood. Adolescent chronic pain was no longer significantly associated with personal income or odds of full-time employment after adjusting for covariates.

Exploratory analyses were conducted to determine whether adolescents with chronic pain transition to full-time work earlier compared to their peers without chronic pain (instead of, for example, attending college). We found that chronic pain during adolescence was associated with beginning full-time work at a younger age (M Chronic Pain = 19.2 years; M No Chronic Pain = 19.8 years; b = −0.22, SE = 0.07). See Table 3.

Social outcomes.—In bivariate analyses, compared to those without chronic pain, young adults with adolescent chronic pain were significantly more likely to be married or cohabitate with a partner and have biological children. Young adults with chronic pain in adolescence also reported significantly lower romantic relationship quality compared to those without chronic pain (M chronic pain = 3.9; M non-chronic pain = 4.1; F[1,128] = 26.29, p < .001). However, they were just as likely as those without chronic pain in adolescence to live independently (i.e., not with parents or relatives) and, further, reported a similar number of close friendships.

In multivariate models adjusting for covariates, adolescent chronic pain was associated with 28% increased odds of having biological children in young adulthood. Moreover, adolescent chronic pain continued to be associated with lower romantic relationship quality (b = −0.08, SE = .02). Adolescent chronic pain was no longer associated with likelihood of being married or cohabitating with a partner after adjusting for covariates. See Table 3.

Discussion

This is the first nationally representative study to provide a snapshot of the disruptive impact of adolescent chronic pain on young adult educational, vocational, and social outcomes (12 years later). We found that chronic pain in adolescence is associated with long-term risk for socioeconomic and social disparities. Similar to prior research in adolescent fibromyalgia[39] our findings demonstrated that adolescents with chronic pain are at risk for reduced educational attainment, poor vocational functioning, and early parenthood. However, our results extend this research to a large, community-based sample of youth with a variety of chronic pain types including headache, abdominal, and musculoskeletal pain. Overall, the results of this study contribute to the limited evidence base on long-term outcomes in youth growing up with chronic pain.

Research has shown that adolescents with chronic pain perceive their development to be significantly behind their peers across multiple facets, but most prominently in school progress [8]. Indeed, there is strong evidence to support the substantial negative impact of chronic pain on adolescents' school functioning as reflected in frequent and chronic school absences, decreased academic performance, and impaired ability to cope with schoolwork demands [24]. Our findings indicate that adolescent chronic pain is associated with reduced educational attainment in young adulthood, specifically, these youth were less likely to receive a high school and college degree. These results are consistent with data from the National Health Interview Survey which found that chronic pain is more prevalent among adults with lower levels of education, even after adjusting for age [6]. Thus, early disruptions in adolescents' school functioning may initiate a trajectory of educational disparities that persist into adulthood. The consequences of young adults not attaining a college degree have real-world significance; attainment of a bachelor's degree is associated with steep declines in mortality across every age, sex, and racial/ethnic group in the United States [16].

In addition, adolescent chronic pain was prospectively associated with several dimensions of socioeconomic disadvantage, including lower occupational and financial status. Adolescents with chronic pain who do not transition to college (or drop out of college) may enter the workforce at an earlier age than typical as a means of successfully transitioning to independence. While young adults with adolescent chronic pain (vs. without) were equally likely to be employed full-time, they were less likely to hold jobs that offered insurance benefits and 1.3 times more likely to receive public assistance. These findings are particularly concerning because young adults as a group are at risk for experiencing gaps in receiving high-quality health care as they transition to adult health services [28]. Moreover, young adults with a history of adolescent chronic pain were more likely to report that their work was unrelated to their long-term career goals, which may reflect lower job satisfaction. Overall, the transition from adolescence to young adulthood represents a high-risk period during which interventions to help youth stay engaged in, plan, and attain future educational and vocational goals may be critical for preventing a long-term trajectory of socioeconomic and health disparities.

Despite its importance, the long-term impact of childhood chronic pain on social outcomes is poorly understood. Adding to the limited research in this area, we found that young adults

with adolescent chronic pain (vs. those without chronic pain) had a higher likelihood of having biological children in young adulthood. These young adults also reported lower-quality romantic relationships. Early parenthood and relational impairments in this population are likely multifactorial. Lower education attainment is a strong predictor of early pregnancy [40] and unsatisfactory relationships [43]. Moreover, the development of adolescents' interpersonal skills development (e.g., problem-solving, assertiveness, positive engagement) may have been influenced by the experience of chronic pain and may therefore impact early adult romantic relationships [44]. Future longitudinal research following adolescents with chronic pain more closely as they transition to adulthood will be necessary for revealing differential trajectories of intimate and romantic relationships, including mechanisms that drive individual differences in social outcomes.

Potentially highlighting an area of resilience, young adults with a history of chronic pain in adolescence reported a similar number of close friendships compared to their peers. This finding was unexpected, as adolescents with chronic pain are at risk for social isolation and peer rejection [10]. However, previous research has found that youth with chronic pain are more than twice as likely to have non-reciprocal close friendships, meaning their peers are less likely to reciprocate the closeness of the relationship [10; 18]. Future work should explore multiple dimensions of friendships and social functioning (e.g., reciprocity, quality, support) as adolescents with chronic pain transition to adulthood, including the potential buffering effects of positive peer relationships.

Having established that adolescent chronic pain is linked to long-term educational, vocational, and social consequences in young adulthood, it will be imperative to identify modifiable clinical targets that can improve life course trajectories. Internalizing symptoms commonly co-occur in adolescents with chronic pain, and may continue into adulthood even as pain remits [39]. Moreover, a growing number of studies have linked adolescent internalizing disorders – particularly depression- with a wide array of adverse outcomes in young adulthood, including reduced academic and occupational functioning, early parenthood, marital instability, poor peer relationships, and low occupational and financial status [7; 9]. The potential for psychological vulnerabilities to amplify or heighten risk for (i.e., moderate) adverse developmental outcomes in young adulthood warrants further investigation.

This study has limitations that should be acknowledged. First, chronic pain conditions and depressive symptoms are not assessed in the Add Health study at Wave IV (young adulthood), thus preventing a complete understanding of the persistence and impact of pain and psychiatric impairments from adolescence to young adulthood. This study included a community sample of youth with chronic pain which may have attenuated effects; studies that focus on severe and disabling pain conditions in youth presenting to tertiary pain clinics may show more pronounced effects on young adult outcomes. Moreover, because of the sampling method, only teens enrolled in school were eligible; consequently, the generalizability of the results to teens with high pain or disability that prevented school enrollment is unknown. Similarly, the Add Health study includes a limited assessment of chronic pain. While we were able to conservatively categorize youth in terms of chronicity of pain (i.e., daily or almost daily pain), critical dimensions of chronic pain such as the

severity, duration, and functional impact of pain were unfortunately not included. The current study was also limited in the assessment of young adult outcomes; the majority were global (item-level) measures and had limited data on psychosocial functioning. Several young adult outcomes were dichotomized to reflect successful attainment of developmental milestones. However, creating discrete outcomes may have resulted in lower power to detect significant effects, and, moreover, may have failed to capture the dynamic, multifaceted nature of young adult functioning (i.e., living situations, romantic relationships). Future longitudinal studies that use multi-dimensional measures of educational, vocational, and social functioning will provide greater understanding of pain and functional outcomes over time.

Our findings clearly point to the need to support children growing up with chronic pain to become successful adults. Identifying early risk factors and underlying mechanisms that lead to positive and negative young adult outcomes is needed to guide preventative interventions that lessen the economic and social impact of pediatric pain. Indeed, adolescence is a period of rapid change and represents an opportune time to deliver preventative interventions, including those focused on educational attainment and vocational readiness. Healthcare providers can play an essential role in promoting successful life course trajectories by recognizing that adolescents with chronic pain are at increased risk for future educational, vocational, and social problems. Interventions may include educational and vocational goal-setting and fostering adolescent autonomy, sense of mastery in career and academic interests, and engagement in positive peer fand romantic relationships. Finally, continuity of care may be particularly important during the transition from adolescence to young adulthood. There remains a large gap in knowledge on best practices associated with the transition to adult care in pediatric chronic pain patients. It will be critical to identify barriers and facilitators of successful transition to optimize developmental and health outcomes in this population.

The transition from late adolescence to young adulthood is a critical period for youth with chronic pain, during which many economic and social vulnerabilities may arise. Using a large, nationally-representative sample recruited from the community, we found broad and lasting effects of adolescent chronic pain on developmental trajectories in young adulthood. Our findings contribute to the limited knowledge base of the scope of adverse long-term outcomes in young adults with a history of adolescent chronic pain, informing the need for more focused screening and intervention efforts. While our results provide a window into the future of adolescents with chronic pain, several questions remain. Increased research attention is needed to understand the life course impact of pediatric chronic pain, including early risk factors and underlying mechanisms that drive adverse outcomes as they unfold across the lifespan.

Acknowledgements

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Table 1.

Weighted sample characteristics of adolescents in the U.S. by chronic pain status

	Overall (N=14,790) % or Mean (SE)	Chronic pain (N=3,174; 21.9%) % or Mean (SE)	No chronic pain (N=11,610; 78.1%) % or Mean (SE)
Estimated U.S. population	21,952,103	4,799,105	17,135,328
Age at Wave I, in years	16.0(0.1)	16.0(0.1)	16.0(0.1)
Age at Wave IV, in years	28.9(0.1)	28.9(0.1)	28.9(0.1)
Female sex[*]	49.3	57.4	47.1
Race and ethnicity			
White, non-Hispanic	65.6	67.5	65.2
Black, non-Hispanic	15.5	15.5	15.5
Hispanic	12.0	10.6	12.4
Other	6.8	6.4	7.0
Parent Income	45,665 (1691)	43,945 (1796)	46,182 (1789)
Depression symptoms at Wave I[a*]	11.4(0.1)	14.9(0.3)	10.4(0.1)

Note.

[*] p < .01 from chi-square tests (dichotomous variables) or Wald tests (continuous variables).

Abbreviations: N = number of participants in the survey; SE = linearized standard error; % = weighted percentage for the entire USA population.

[a] Adolescent depressive symptoms were measured using items from the 20-item Center for Epidemiologic Studies-Depression Scale (CES-D; Range = 0–60)

Table 2.

Bivariate analyses: Young adult educational, vocational, and social outcomes by adolescent chronic pain status

	Overall % or Mean (SE)	Chronic Pain % or Mean (SE)	No Chronic Pain % or Mean (SE)
Educational / vocational outcomes			
Attainment of GED [**]	9.0	13.7	7.7
Attainment of high school diploma [**]	82.8	76.5	84.6
Attainment of college/bachelors degree [**]	29.9	24.8	31.4
Currently employed full time (35+ hours) [**]	56.3	52.4	57.4
Employer-provided benefits [**]	48.4	42.5	50.1
Work-goal alignment [**]			
Work is part of long-term career goals	39.7	35.4	40.8
Work is preparation for long-term career goals	25.1	24.6	25.3
Work is unrelated to long-term career goals	27.0	29.4	26.3
Do not have long-term career goals	8.3	10.6	7.7
Age began first full-time job [**]	19.7	19.4	19.8
Mean income, in U.S. dollars [**]	34,592 (912)	31,213 (1306)	35,572(963)
Receipt of public assistance [**]	24.7	31.9	22.6
Social outcomes			
Living independently	83.3	83.7	83.3
Current relationship status [*]			
Married	43.6	44.1	43.4
Cohabitating	20.7	22.7	20.2
Pregnancy partner	1.5	1.7	1.4
Dating	16.1	14.7	16.4
No current relationship/partner	18.2	16.9	18.6
Has biological children [**]	49.6	56.6	47.7
Romantic relationship quality [a**]	4.1(0.01)	3.9 (0.02)	4.1(0.01)
# of close friends [b]	2.1 (0.02)	2.1(0.03)	2.1(0.02)

Note.

[*] p < .01;

[**] p < .001 from chi-square analyses (dichotomous variables) or Wald tests (continuous variables).

Abbreviations: N = number of participants in the survey; GED = general equivalency degree; SE = linearized standard error; % = weighted percentage for the entire USA population.

[a] Romantic relationship quality was measured in terms of satisfaction with 7 relationship features (possible range 1–5); young adults who did not have a current relationship were excluded;

[b] The value of 2 for this variable corresponds with the answer "3–5 close friends"

Table 3.

Multivariate analyses: Impact of adolescent chronic pain status on young adult educational, vocational, and social outcomes

Dichotomous outcomes	OR [95%CI]
Educational/Vocational	
Attainment of GED [**]	1.66 [1.31 – 2.11] [c,g,i]
Attainment of high school diploma [**]	0.68 [0.57 – 0.82] [a,b,d,h]
Attainment of college / bachelors degree [*]	0.83 [0.71 – 0.96] [b,d,f,h]
Currently employed full time	0.92 [0.82 – 1.05] [a,c,h]
Employer-provided benefits [*]	0.80 [0.69 – 0.93] [a,c,f,h]
Work-goal alignment [*]	0.87 [0.77 – 0.98] [a,c,f,h]
Receipt of public assistance [**]	1.31 [1.16 – 1.48] [b,e,g,i]
Social	
Living independently	1.09 [0.91 – 1.30] [a,b,d,f]
Married or cohabitating	1.14 [0.99 – 1.30] [a,b,d,g]
Has biological children [**]	1.28 [1.13 – 1.45] [a,b,e,g,i]
Continuous outcomes	**b [SE]**
Educational/Vocational	
Age began full-time work [*]	−0.22 [0.07] [a,b,f,h]
Mean income, in US dollars	−1108 [1295] [a,c,e,f,h]
Social	
Romantic relationship quality [*]	−0.08 [0.02] [b,d,f,h]
# of close friends	0.02 [0.03] [c,d,f,h]

Note.

[*] p < .01;

[**] p < .001.

Covariates included sex, age (at Wave IV), race/ethnicity, and parental income. Notations for significant covariates (p < .05):

[a] Older young adult age;

[b] Female sex;

[c] Male sex;

[d] White, non-hispanic race;

[e] Black, non-Hispanic race;

[f] Higher parental income;

[g] Lower parental income;

[h]Fewer symptoms of depression

[i]Greater symptoms of depression.