Precarious employment in early adulthood and later mental health problems: a register-linked cohort study

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ABSTRACT
Background  Precarious employment is a determinant of self-reported mental health problems among young adults. Less is known about more severe and objectively measured health outcomes, such as mental health problems requiring inpatient care. The current study aims to investigate the effect of precarious employment in early adulthood on later mental health problems requiring inpatient care.

Method  A register-based cohort study, based on the Swedish Work, Illness and Labor-market Participation cohort, was conducted, following a cohort of young adults aged 27 years between 2000 and 2003 (born between 1973 and 1976) (n=339,403). Information on labour market position in early adulthood (precarious employment, substandard employment, unemployment and standard employment) was collected from registers 3 years after graduating from school. Information on the outcome of mental health problems (depression, anxiety and stress-related disorders) was collected from the National Patient Register. HRs with 95% CIs were obtained by Cox regression analyses.

Results  After adjusting for important covariates, such as prior mental health problems, compared with individuals in standard employment, individuals who were precariously employed in early adulthood had an increased risk of later mental health problems (HR, adjusted 1.51 95% CI 1.42 to 1.60). The association between precarious employment and mental health was slightly stronger for males.

Conclusions  In Sweden, entry into the labour market with precarious employment is associated with an increased risk of mental health problems, which is important given that precarious employment is becoming more prevalent among young adults.

BACKGROUND
Young people face difficulties entering the labour market due to limited work experience and work opportunities as well as a lack of social security in case of unemployment. Furthermore, youth appear to be sensitive to having a low attachment to the labour force as research suggests a ‘scarring’ effect in terms of lower pay and low labour force attachment later in life. The high unemployment rate and increased prevalence of non-standard forms of employment such as precarious employment have hit young people especially hard. Precarious employment is characterised by low wages, lack of employment security (ie, temporary employment), and limited social protection and workplace rights (ie, lack of benefits) which are considered inferior to permanent full-time employment. In Sweden from 1992 to 2017, the proportion of young men and women (aged 34 years or less) in precarious employment has increased by more than 50%. Research has previously demonstrated that precarious employment adversely affects both mental and physical health, among both the young and older working population. Previous research on the effects of precarious employment in early adulthood has relied on cross-sectional data to a great extent, consequently making it difficult to draw any conclusions about the temporality between the exposure and the outcome. Furthermore, previous research has not accounted for health selection and confounding due to prior health problems which are likely to bias the association between precarious employment and health. The few longitudinal studies that have investigated the effects of precarious employment in early adulthood have found an increased risk of self-reported mental health problems. Less is, however, known about more severe and objectively measured health outcomes, such as mental health problems requiring inpatient care, which has previously been linked to youth unemployment and precarious employment in the general working-age
population. A recent study found an increased risk of common mental disorders, substance use and suicide among individuals with low-quality employment trajectories, which had the lowest mean age compared with other trajectories. Given that a smooth transition from school to work is essential for the health and well-being of young adults, further research is needed to investigate this transition concerning the effects of precarious employment in early adulthood on later mental health. Taking a life course perspective, youth can be considered a sensitive period in life and mental health problems are a strong risk factor for later labour market marginalisation and early exclusion from the labour market.

The current study aims to investigate the effect of precarious employment in early adulthood on later mental health problems requiring inpatient care. To this end, a large cohort of young individuals registered in Sweden will be followed up in high-quality nationwide registers and using a multidimensional construct to define precarious employment.

METHOD
Study population
This register-based cohort study is based on the Swedish Work, Illness and Labour Market Participation (SWIP) cohort. The SWIP cohort is created through the linkage of nationwide registers and includes everyone between the ages of 16–65 years that were registered in Sweden in 2005 and followed up until 2019.

The study population comprised all individuals born between 1973 and 1976 and who had graduated from school (primary, secondary or tertiary education) before the age of 27 (n=472 171). Age 27 years was chosen as the focus was on labour market position in early adulthood (3 years after graduation), consequently, to be able to collect information on exposure before the age of 30 years. Similar to our previous study, exclusion criteria for the study were as follows: (1) received disability pension or died before baseline (3 years after graduation from school), (2) registered as a student after the age of 27 years, (3) missing information on the highest level of education at age 27 years and (4) missing information on covariates. Generally, the excluded individuals were more often females, born outside of Sweden and had parents with lower socioeconomic status (SES) and educational attainment (online supplemental table S1). The final analytical sample consisted of 339 403 individuals (figure 1).

Exposure: labour market position in early adulthood
Adapted from previous research, 3 years after graduation was used to determine the end of the school-to-work transition and when the exposure of labour market position was assessed. In a first step, the Longitudinal Integration Database for Health Insurance and Labour Market Studies (LISA) register was used to obtain the year of examination from primary, secondary or tertiary education the year the individuals turned 27 years (between 2000 and 2003), in line with our previous research. For the individuals with missing information on the year of examination (7.8% of the analytical measure), a crude measure was calculated by using the median year of graduation given the level of education of each birth cohort. In a second step, using the LISA register, information on labour market position was assessed 3 years after the year of graduation and used to categorise the study population into five mutually exclusive groups in the following order: precarious employment relation (PER), long-term unemployed, substandard employment relations (SSER), standard employment relations (SER) and other. SER served as the reference category.

PER, SSER and SER were defined using the Swedish Register-based Operationalisation of Precarious Employment (SVEROEPE) version 2.0. The three main components (employment insecurity, income inadequacy and lack of rights and protection) of PER that Kreshpaj et al identified are covered by five different components (contractual employment insecurity, temporariness, multiple-job holding, income level and coverage under collective bargaining agreement) in the SWE-ROPE, as seen in (table 1). The precarious score was calculated on the salaried working population only (ie, students, individuals with no income and self-employed were excluded), the self-employed have been excluded in the scoring of PER in the latest version of SVEROEPE as self-employed individuals are quite different from precariously employed individuals in terms of various factors, such as risk-taking and health. The five components were individually scored and summed up resulting in a precarious score between −9 and 2. In line with previous research, PER was defined as scoring <−3, SSER was defined as scoring between −3 and −1, and a score equal to and higher than 0 was defined as SER. The group SSER was established to create more contrasting groups of PER and SER.

Young adults reporting at least 180 days of unemployment during one calendar year 3 years after graduation were considered long-term unemployed. Young adults who did not classify into any of the groups (eg, self-employed, not registered as employed or student) were defined as other. This group was created to reduce the potential issue of selection bias when excluding individuals that did not classify into any of the other groups.

Figure 1 Flow chart describing the selection process of the analytical sample.

Study population
472 171
Born 1973-1976

Received disability pension before baseline
n = 2360 excluded

Died before baseline
n = 276 excluded

Registered as a student after the age of 27
n = 64 512 excluded

Missing information on highest level of education
n = 39 321 exclude

Final analytical sample
339 403
Outcome: psychiatric diagnoses
Information on the outcome was obtained from the National Hospital Discharge Register according to the Swedish version of the International Classification of Diseases (ICD) versions 9 (1987–1996) and version 10 (from 1997). In line with previous research, the outcome of mental health problems was defined as including depressive disorders (ICD-9: 296.2, 296.3; ICD-10: F32–F34), anxiety disorders (ICD-9: 300.0, 300.2, 300.3; ICD-10: F40–F42), and stress-related disorders (ICD-9: 308, 309; ICD-10: F43). First-time admissions during follow-up with a mental disorder either as a principal or contributing discharge diagnosis were of interest.

Covariates
Information on several individual and family-level factors was obtained from the registers and included in the analyses. On an individual-level information on sex, birth year, country of birth (Sweden or elsewhere) and own highest level of education (primary, secondary, university), as well as any prior mental health problems requiring inpatient care (ICD 10: F00–F99; ICD 9: 291–319). Information on parents’ highest level of education and highest levels of SES (non-manual, manual, self-employed/farmer and not classified) before the follow-up was also included.

Statistical analysis
Differences in baseline characteristics between the groups were tested using Pearson’s \( \chi^2 \) test. Three years after graduation from school (primary, secondary or university), information on the exposure variable of labour market position and baseline characteristics was collected. The association between labour market position 3 years after graduation and mental health problems were estimated by Cox proportional hazard models to obtain HRs with 95% CIs. Results of the Schoenfeld residuals test found the proportional hazards assumption was found not to be violated. Person-time, in years, was counted from 4 years after school graduation (1 January 1993, the earliest), until the first date of mental diagnoses, emigration, date of death or end of follow-up (31 December 2017), whichever came first.

All analyses were conducted on the total population as well as stratified by sex. In the analyses, the demographic factors (sex, age at baseline, country of birth and highest level of education) were included first. In the next step, we also included prior mental health problems as this covariate was of special interest due to health selection (i.e., poor mental health is a risk factor for worse labour market outcomes). In the last model, all covariates were included simultaneously.

Sensitivity analyses excluding individuals with prior mental health problems were conducted to further assess the potential bias due to health selection. Additional sensitivity analyses were performed, recategorising individuals with any unemployment (less than 180 days) from the precarious employment group into the group ‘other’, to investigate if the increased risk among PER was driven by experiences of unemployment. The last sensitivity analysis was conducted excluding all individuals with missing information on the year of examination from school. All analyses were performed using Stata Statistical Software, release V.17.

RESULTS
Baseline characteristics
The baseline characteristics of the study population, stratified by labour market position 3 years after graduating from school, can be found in table 2. The largest proportion of the study population was defined as being in SER and SSER while 12.4% were defined as PER. In general, individuals in PER had lower levels of education, worse mental health before follow-up and lower levels of parental SES compared with individuals in SER. Compared with individuals who were in long-term unemployment, individuals in PER had generally higher education, slightly better mental health before follow-up and a higher level of parental SES. Individuals defined as other were to a greater extent born outside of Sweden, with lower levels of education and worse prior mental health problems.

During follow-up, a total of 16 474 individuals (3.7%) were admitted to the hospital at least once due to mental health problems. On average, the follow-up time was 17.8 years. The incidence rate for PER to get mental health problems was 2.5 per 1000 person-years, while individuals in SER had an incidence rate of 1.4 per 1000 person-years.

Mental health problems
In table 3, the association between labour market position in early adulthood and mental health problems for the whole population and stratified by sex can be found. In the crude analyses, the individuals in PER had a 1.77-fold (95% CI 1.67 to 1.87) increased risk of receiving inpatient care due to mental health problems. After adjusting for important covariates, including prior mental health problems, the elevated risk among PER remained only slightly diminished (HR 1.51, 95% CI 1.42 to 1.60). Individuals defined as being in long-term unemployment and SSER 3 years after graduation were also at an increased risk compared with individuals in SER; HR 1.95 (95% CI 1.83 to 2.07) and HR 1.13 (95% CI 1.08 to 1.19), respectively. An increased risk was also found among individuals defined as others; HR 1.86 (95% CI 1.76 to 1.98).

Stratifying the analyses by sex the association between precarious employment and later mental health problems in the fully

**Table 1** SWE-ROPE scoring of items

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
<th>−2</th>
<th>−1</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractual employment insecurity</td>
<td>Score</td>
<td>Agency employed</td>
<td>Directly employed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporariness</td>
<td>Score</td>
<td>Unstable employment</td>
<td>Stable employment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple-job holding</td>
<td>Score</td>
<td>Multiple jobs (&gt;2 jobs and multiple sectors (&gt;1 sector)</td>
<td>Multiple jobs (&gt;2 jobs)</td>
<td>No multiple jobs (1 job)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income level (% of median)</td>
<td>Score</td>
<td>&lt;60</td>
<td>60–80</td>
<td>81–120</td>
<td>121–200</td>
<td>&gt;200</td>
</tr>
<tr>
<td>Coverage under collective bargaining agreement (% likelihood)</td>
<td>Score</td>
<td>&lt;70</td>
<td>70–90</td>
<td>91–100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SWE-ROPE, Swedish Register-based Operationalisation of Precarious Employment.
Sensitivity analyses excluding 9808 individuals with prior mental health problems demonstrated similar effects of PER on mental health among young adults.20 Previous research on young adults has used self-reported mental health and well-being, a finding that was extended to a more severe outcome in the current study. This is of importance as mental health problems are a main risk factor for later labour market marginalisation and early exclusion from the labour market.16 24 25 In line with previous research on the general working population, we found a link between precarious employment in early adulthood and later mental health problems requiring inpatient care.21 Given that the transition from school-to-work is a distinct and sensitive period in the life course it is important to focus on the effects of precarious employment during entry into the labour market.25 Subsequently, the results of the current study strengthen the importance of having a strong labour market attachment in early adulthood.5 34

In previous research, 3 months or more of youth unemployment has been linked to an increased risk of mental health problems requiring inpatient care,20 which was confirmed in the current study among young adults unemployed for at least 6 months, 3 years after graduation. Furthermore, the results of the current study lend support to the notion of conceptualising employment status as a continuum as opposed to employed or not employed. In the main analyses, there were clear differences in the five categories of labour market position where individuals

adjusted model was stronger among males (HR\textsubscript{men}: 1.56, 95% CI 1.42 to 1.71; HR\textsubscript{women}: 1.48, 95% CI 1.37 to 1.60), as seen in table 3.

Sensitivity analyses excluding 9808 individuals with prior mental health problems demonstrated similar effects of PER on mental health problems as in the main analyses (online supplemental table S2). Furthermore, recategorising PER individuals with unemployment (n=25 718) into the group of ‘other’ yielded similar, slightly attenuated, results among the PER group as in the main analyses (online supplemental table S3). Excluding individuals with missing information on the year of examination (n=25 053) did not change the estimations substantially (online supplemental table S4).

DISCUSSION

The results of this study suggest that individuals in precarious employment, 3 years after graduating from school, are at an increased risk of later mental health problems requiring inpatient care compared with same-aged individuals in standard employment. The association was slightly stronger among males.

The current results further strengthen and extend existing research on the association between precarious employment and mental health among young adults.17–19 Previous research on young adults has used self-reported mental health and well-being, a finding that was extended to a more severe outcome in the current study. This is of importance as mental health problems are a main risk factor for later labour market marginalisation and early exclusion from the labour market.16 24 25 In line with previous research on the general working population, we found a link between precarious employment in early adulthood and later mental health problems requiring inpatient care.21 Given that the transition from school-to-work is a distinct and sensitive period in the life course it is important to focus on the effects of precarious employment during entry into the labour market.25 Subsequently, the results of the current study strengthen the importance of having a strong labour market attachment in early adulthood.5 34

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in long-term unemployment and defined as other had the highest risk of later mental health problems. Lower increased risk estimates were found among young adults in SSER and PER. Here, this study adds to the discussion and body of literature investigating if any job is better than no job at all.15 Being unemployed or precariously employed might increase a sense of lack of control as the future is uncertain, and subsequently, it is more difficult to have long-term plans or goals which could have negative effects on individuals’ mental health.15 Results of previous research suggest that young adults in unemployment 3 years after education have a higher risk of being unemployed 10 years later compared with young adults in PER.2 This suggests that young adults in PER might have better chances of positioning themselves in the labour markets, which might explain the difference in risk estimates.

Furthermore, in line with previous research on young adults, we found that the association between precarious employment, health and labour market outcomes appeared to be slightly stronger for males.14 These findings are contradicting the hypothesis proposed by Menéndez et al, where the authors proposed a greater effect of precarious employment on women’s health due to the gendered division of employment and unpaid domestic work.36 A potential explanation for this is that although youth is considered a sensitive time for all, young males might be even more sensitive, resulting in a stronger association between labour market position in early adulthood and later mental health.23 The breadwinner model has also been proposed within the precarious employment literature, where differences in mental health between men and women arise due to differences in traditional roles concerning work and family.13 These differences in traditional roles are diminishing in recent times given the more dual earner/dual carer models and higher female participation in the labour market, subsequently, different results might be obtained if the same study was done today. Another potential explanation could be that men’s depression is more connected to their work and women are more depressed for other reasons that have less to do with their jobs, thus making the association weaker.37 Only a few studies have investigated the differential effects of precarious employment among men and women, research which is of importance as precarious employment tends to be more common among women which could reinforce the existing gender inequalities in health.6,33

### Strengths and weaknesses

The current study has several strengths and limitations that need to be considered in relation to the results. First, a major strength is being able to follow a large cohort of young adults for a long time in the nationwide registers. A limitation of this study is that the SWIP cohort was created including only the individuals registered in Sweden in 2005 which results in an exclusion of individuals in the study sample who died before 2005. In a separate database, we were able to calculate that it was only 1.5% of the birth cohorts (1973–1976) that were excluded due to these register constraints which should only have a marginal effect on the estimates.

A multidimensional construct (SWE-ROPE) was used to measure precarious employment which is advantageous compared with only using a single dimension, such as temporary employment which could lead to misclassification.30 38 39 The SWE-ROPE has been developed in line with the dimensions of precarious employment and has been used in multiple studies demonstrating its ability to capture the population of interest which is a strength.4 12 22 A limitation, however, is that due to register constraints, the SWE-ROPE does not include rights, perspective and part-time work, which have also been identified as an important dimension of precarious employment.39 Exposure information was only collected at a single-point-in time as

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**Table 3** Crude and adjusted HRs with 95% CI for the association between labour market position in early adulthood and later mental disorders requiring inpatient care, for all and stratified by sex

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>PER (HR 95%CI)</th>
<th>SSER (HR 95%CI)</th>
<th>Other (HR 95%CI)</th>
</tr>
</thead>
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<tr>
<td><strong>SER</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crude</td>
<td>1.00</td>
<td>1.77 (1.67 to 1.87)</td>
<td>2.29 (2.15 to 2.43)</td>
<td>1.19 (1.13 to 1.25)</td>
</tr>
<tr>
<td>Model 1</td>
<td>1.00</td>
<td>1.54 (1.45 to 1.63)</td>
<td>2.04 (1.91 to 2.16)</td>
<td>1.14 (1.08 to 1.20)</td>
</tr>
<tr>
<td>Model 2</td>
<td>1.00</td>
<td>1.51 (1.42 to 1.60)</td>
<td>1.98 (1.86 to 2.11)</td>
<td>1.13 (1.07 to 1.19)</td>
</tr>
<tr>
<td>Model 3</td>
<td>1.00</td>
<td>1.51 (1.42 to 1.60)</td>
<td>1.95 (1.83 to 2.07)</td>
<td>1.13 (1.08 to 1.19)</td>
</tr>
<tr>
<td>No of events n(%)</td>
<td>3127 (2.4)</td>
<td>1817 (4.3)</td>
<td>1607 (6.1)</td>
<td>3051 (2.8)</td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crude</td>
<td>1.00</td>
<td>1.82 (1.66 to 1.99)</td>
<td>2.52 (2.31 to 2.75)</td>
<td>1.16 (1.07 to 1.25)</td>
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<tr>
<td>Model 1</td>
<td>1.00</td>
<td>1.58 (1.45 to 1.74)</td>
<td>2.19 (2.00 to 2.40)</td>
<td>1.12 (1.04 to 1.22)</td>
</tr>
<tr>
<td>Model 2</td>
<td>1.00</td>
<td>1.55 (1.42 to 1.70)</td>
<td>2.12 (1.94 to 2.32)</td>
<td>1.11 (1.03 to 1.21)</td>
</tr>
<tr>
<td>Model 3</td>
<td>1.00</td>
<td>1.56 (1.42 to 1.71)</td>
<td>2.08 (1.90 to 2.27)</td>
<td>1.12 (1.03 to 1.21)</td>
</tr>
<tr>
<td>No of events n(%)</td>
<td>1306 (1.8)</td>
<td>752 (3.5)</td>
<td>1232 (2.2)</td>
<td>1306 (1.8)</td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crude</td>
<td>1.00</td>
<td>1.70 (1.58 to 1.84)</td>
<td>2.18 (2.01 to 2.37)</td>
<td>1.20 (1.12 to 1.28)</td>
</tr>
<tr>
<td>Model 1</td>
<td>1.00</td>
<td>1.50 (1.39 to 1.62)</td>
<td>1.92 (1.76 to 2.09)</td>
<td>1.12 (1.07 to 1.22)</td>
</tr>
<tr>
<td>Model 2</td>
<td>1.00</td>
<td>1.48 (1.37 to 1.60)</td>
<td>1.88 (1.72 to 2.04)</td>
<td>1.14 (1.07 to 1.22)</td>
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<tr>
<td>Model 3</td>
<td>1.00</td>
<td>1.48 (1.37 to 1.60)</td>
<td>1.85 (1.70 to 2.02)</td>
<td>1.14 (1.07 to 1.21)</td>
</tr>
<tr>
<td>No of events n(%)</td>
<td>1821 (2.9)</td>
<td>1065 (5.2)</td>
<td>801 (7.4)</td>
<td>1819 (3.6)</td>
</tr>
</tbody>
</table>

Model 1: Adjusted for sex (total only), country of birth, year of birth, age at baseline, highest levels of own education.
Model 2: Additional adjustment for prior mental health problems requiring inpatient care.
Model 3: Additional adjustment for highest level of parents’ educational attainment and socioeconomic status.
PER, precarious employment relation; SER, standard employment relation; SSER, substandard employment relation.
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