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The impact of in-work poverty on mental health: A cohort study of the Swedish population

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ABSTRACT

Background: In-Work Poverty (IWP) is an increasing phenomenon, and understanding its mental health consequences is crucial for addressing its individual and societal impacts. This study investigates if IWP is associated with an increased risk of mental health disorders in the Swedish population.
Methods: This register-based cohort study included 2590,742 Swedish workers (24–60 years old) at the 2013 baseline. Five exposure categories were defined using data on months worked during the baseline year and household income relative to the poverty line: i. full-year (non-poor) (reference); ii. IWP (full-year, poor); iii. part-year (non-poor); iv. part-year (poor); v. long-term unemployed. Outcomes included diagnosed mental health disorders and prescribed Selective Serotonin Reuptake Inhibitors (SSRIs). Sex-specific Hazard Ratios (HR) with 95 % Confidence Intervals (CI) were estimated using survival analysis from 2014 to 2019.
Findings: IWP was associated with an increased risk of diagnosed mental health disorders (men: HR 1.58, 95 %CI 1.51–1.66 and women: HR 1.30, 95 %CI 1.25–1.34) and SSRI prescriptions (men: HR:1.22 95 %CI 1.18–1.25 and women: HR:1.15 95 %CI 1.13–1.18) compared to the full-year (non-poor) category. Increased risks were found for all other employment categories, with the highest risks among those in the part-year poor category and long-term unemployment.
Interpretation: IWP was associated with an increased risk of mental ill-health. These findings highlight that employment alone does not safeguard mental health when economic security is lacking. Addressing drivers of IWP is critical for safeguarding workers' mental health. Policy must prioritise not only employment activation but also work stability and security to reduce mental health risks.

1. Background

In-work Poverty (IWP) is a form of relative poverty defined using a bi-dimensional construct (International Labour Organization, 2024). The first dimension is the 'working threshold', meaning the individual must be employed. Various studies on IWP have adopted different working thresholds, such as, having any employment income per year (Halleröd and Larsson, 2008), being employed for at least one month per year (Marx et al., 2012), working at least seven months a year (Eurofound, 2017; Halleröd, Ekbrand, and Bengtsson, 2015) or being employed the whole year (Maitre, Nolan, and Whelan, 2012). The second dimension is the 'poverty line'. There are also multiple approaches to measure poverty, but in most European studies, an individual is considered to be experiencing IWP if they meet the working threshold and their equivalised disposable household income falls below 60 % of the national median equivalised disposable household income for their country of residence (Eurofound, 2017).

Employment is traditionally seen as a means to improve health, well-being and living conditions. However, in high-income countries, the rise of (IWP raises the question of whether those in IWP experience the same health benefits from employment as those not in poverty. Between 2004 and 2019, IWP rates in Western European countries have remained

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relatively stable or slightly increased (Barbieri, Cutuli, and Scherer, 2024). In 2017, People in IWP made up around 10 % of the European workforce, an increase from 8 % in 2007 (Eurofound, 2017). The pervasive prevalence of IWP threatens the achievement of several Sustainable Development Goals (SDGs), most notably the goal to eliminate poverty in all its forms. There is a growing consensus that IWP needs to be highlighted and given more attention in future policy debates (Hartzén, 2022).

Research on IWP predominantly focuses on its prevalence, characteristics, or trends while empirical evidence about the impact of IWP on workers' health is scarce (Barbieri et al., 2024; Eurofound, 2017; Struffolino and Van Winkle, 2021). Only a few studies investigating the effects of IWP on health or well-being have been found (Eurofound, 2017; Llosa, Agulló-Tomás, Menéndez-Espina, Rivero-Díaz, and Iglesias-Martínez, 2022; Pförtner and Schmidt-Catran, 2017) and only one with a longitudinal design (Pförtner and Schmidt-Catran, 2017). The longitudinal study found that German workers in IWP were more than twice as likely to rate their health as "poor" or "bad" compared to the non-working poor (Pförtner and Schmidt-Catran, 2017). A Spanish cross-sectional study found that workers in IWP reported higher scores of self-criticism and lower scores in social support compared to the general working population (Llosa et al., 2022). Only one study has examined the relationship between IWP and wellbeing among Swedish workers (Eurofound, 2017). The report compared IWP across EU countries and found that Swedish workers in IWP reported the lowest levels of self-reported happiness compared to their counterparts in other EU countries. Additionally, within Sweden, workers in IWP reported considerably lower levels of life satisfaction and meaning of life compared to those in working and not in poverty (Eurofound, 2017). To the best of our knowledge, no longitudinal studies have investigated the association between IWP and diagnosed mental health conditions at a population level. That said, there is a great deal of research linking labour market inequalities and health. However, these studies often focus on individual characteristics (educational disparities or low wages) (Pförtner and Schmidt-Catran, 2017). The economic sustainability of work, however, and by extension IWP, cannot be measured through individual wages alone. For example, many low-wage workers are not in poverty thanks to the household context (e.g., income from other working-age adults) and social transfers (e.g., housing allowance or child allowance) (Crettaz, 2013). Thus, to accurately capture social inequalities among workers, household context should be taken into consideration.

The intersection of being both in-work and in-poverty positions the working poor as a distinct group, potentially facing negative mental health outcomes that could stem from feelings of injustice, diminished self-worth, or despair. These experiences align with theories like Effort-Reward Imbalance (ERI) (Siegrist, 1996) and organisational justice (Colquitt, Conlon, Wesson, Porter, and Ng, 2001). However, in IWP, employment may also offer non-pecuniary benefits, such as structure and social inclusion, that could buffer against the negative health effects of poverty (Farzin and Akao, 2004). Despite such hypotheses, little is known about the mechanisms linking IWP and health, particularly in comparison to other employment categories. Moreover, policy frameworks typically view employment as the primary means of alleviating poverty, often overlooking the economic instability experienced by those in IWP. When policy initiatives prioritize activation over alleviating poverty for those who already are employed, a support gap may emerge. This gap in support underscores the need to understand the health risks associated with IWP and how they compare to those faced by individuals in more precarious situations, such as long-term unemployment.

Long-term unemployment is well-established as a risk factor for poor mental health (Yang, Niu, Amin, and Yasin, 2024), yet it remains unclear whether IWP poses similar or even greater risks despite the presence of employment. Comparing these groups will provide critical insights into whether employment alone is sufficient to protect mental health when financial insecurity persists, offering a more nuanced understanding to inform policy decisions that address not only employment but also the stability and security of work. Finally, while gender differences in the overall prevalence of IWP tend to be modest, their impact on mental health may vary between men and women. Examining these differential effects is essential to determining whether IWP has distinct consequences beyond its incidence. Additionally, women's vulnerability to contemporary, precarious employment arrangements (De Moortel, Vandenheede, and Vanroelen, 2014) may further shape this relationship, emphasizing the importance of considering how poverty intersects with employment conditions.

Differences in IWP rates across countries are influenced by labour market structures and welfare state typologies (Halleröd et al., 2015). Even though Sweden's welfare system is generous in comparison to many other countries and the prevalence of IWP was lower than the European average in 2021 (Eurostat, 2023), Sweden ranks lowest among Nordic countries in combating economic disparities, with its Gini coefficient reaching its highest level in 2023 since 1975 (Sweden, 2023). Furthermore, over the past few decades, relative income poverty has risen at a faster pace than the OECD average (Eurostat, 2023; The Lancet Regional Health, 2023), and those at risk of poverty increased from 9.5 % in 2005 to 16.1 % in 2023 (Eurostat, 2023; Statistics Sweden, 2023). It has also been reported that there is rising food insecurity in Sweden, a key poverty indicator (Rost and Lundälv, 2021b) and social work agencies report a shift in those seeking support from individuals with overt difficulties like addiction or homelessness to working people who are economically struggling (Rost and Lundälv, 2021a). This rising economic divide threatens social cohesion and health equity. A lack of recognition or evidence base about the realities of those in IWP may result in their exclusion from government support programs.

This study aims to investigate the long-term effect of IWP on the risk of diagnosed mental disorders among men and women in Sweden, and compares these effects to those of other employment categories, such as long-term unemployment. By doing so, this paper makes four key novel contributions: 1) it moves beyond individual wage characteristics to provide a more comprehensive assessment of IWP, 2) it compares the mental health consequences of IWP with other employment situations including unemployment, 3) it adopts a longitudinal approach and 4) it is the first to examine these issues within the context of Sweden.

2. Method

2.1. Design and data source

This cohort study utilizes data from the Swedish Work, Illness, and Labor-market Participation (SWIP) cohort, which includes individuals aged 16 to 64 who were registered as residents of Sweden in 2005, totalling approximately 5.4 million people. The SWIP cohort was created by linking various registers, facilitated by Sweden's unique personal identity numbers assigned to all residents. Statistics Sweden (SCB) supplied the data, which was deidentified to ensure confidentiality. In this study, data from the Swedish Total Population Register provided information on birth, death, civil status, and migration. Sociodemographic details such as occupation, educational attainment, country of birth, and unemployment status were obtained from the Longitudinal Integrated Database for Health Insurance and Labor Market Studies (LISA). Data on diagnosed mental health disorders were sourced from the Swedish National Patient Register. Finally, data on drug prescriptions were taken from the National Prescribed Drug Register.

2.2. Study population

Men and women who were alive in 2013 and born between 1953 and 1989 (24–60 years old at the 2013 baseline) were selected for this study (n = 2590,742). The baseline exclusion criteria, applied during 2013,

was i) death or emigration, ii) being a student, iii) early retirement, iv) long-term sickness absence (>180 days), vi) without work (no established connection to the labour market), vii) self-employed or combiners (i.e. those in self-employment and paid work) as data on their working threshold was not available or vi) missing data on included variables. Fig. 1 is a flowchart detailing the exclusion criteria. The sample was followed from 2014 to the end of 2019.

2.3. Exposure – in-work poverty (IWP) and other employment categories

IWP, the main exposure in this study, has two dimensions: the working threshold and the poverty line. The first dimension, the working threshold, was based on annual employment status. This approach was used because the SWIP cohort does not have information on days worked per year. Information on annual employment status was taken from the Register-based Activity Statistics (RAKS), which were compiled by Statistics Sweden (Statistics Sweden, 2024b). Statistics Sweden created the RAKS variable for annual employment using control data (KU) that employers provide to the Swedish Tax Agency. For each employee, an employer reports whether the individual was employed or not for each month of the year. The KU was then used, by Statistics Sweden, to create a consolidated time stamp of employment (KTM) that indicates whether a person has worked 12 months of the year or <12 months of the year. For the second dimension, to determine if someone was below the poverty line, a variable on equivalised disposable household income was obtained from the LISA register. The variable was created by Statistics Sweden by dividing the sum of the disposable income of all family members by the equivalence scale (Statistics Sweden, 2024a). An individual was categorized as being below the poverty line if their equivalised disposable household income was below 60 % of the median equivalised disposable household in Sweden for the whole population in 2013. Thus, in this study, IWP was defined as working 12 months of the year at the 2013 baseline, with an equivalised disposable household income below 60 % of the median in Sweden for that year.

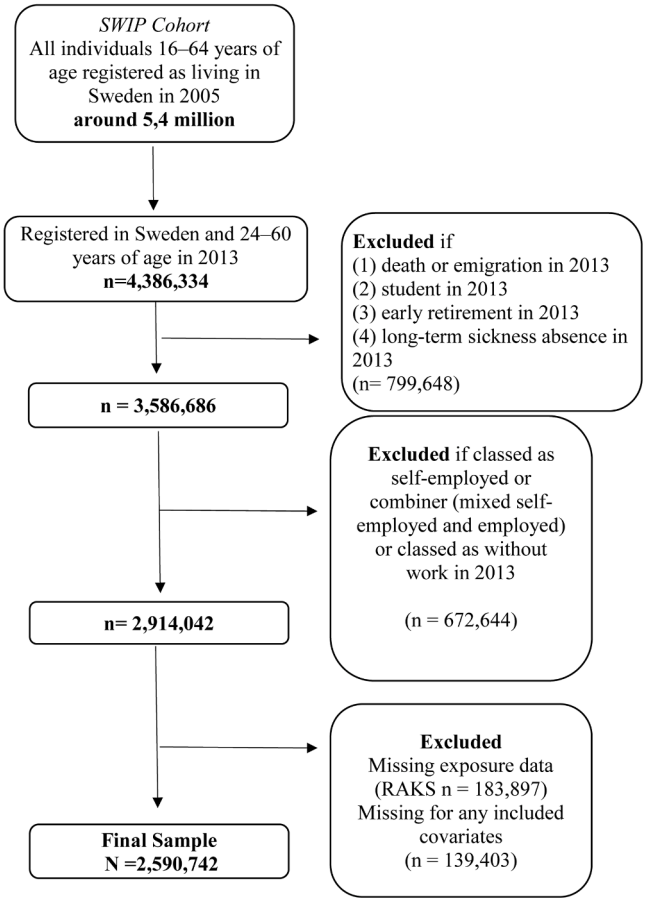

Fig. 1. Sample selection.

By combining these two dimensions a final exposure variable with five categories was created (Fig. 2). Four categories were based on working more or <12 months of the year: i. Full-year (non-poor) (working 12 months of the year and above the poverty line) (reference category); ii. IWP (working 12 months, below the poverty line); iii. Part-year (non-poor) (working <12 months, above the poverty line); iv. Part-year (poor) (working <12 months and below the poverty line). To compare whether the risks of being in IWP were greater or lesser than being out of the labour market for an extended period, a fifth category for long-term unemployment was created for anyone unemployed for >180 days in the baseline year with no poverty classification (Kaspersen et al., 2016). These were individuals currently unemployed but seeking employment.

2.4. Outcomes

Two mental health outcomes were investigated in this study to capture diagnosed mental health disorders: diagnosed mental health disorders and prescribed Selective Serotonin Reuptake Inhibitors (SSRI). Diagnosis of a mental health disorder was captured using data on diagnosed depression (F32–F33), anxiety (F41), stress-related disorders (F43) and suicide attempt (i.e., intentional self-harm (X60-X84)) from the National Patient Register which includes data on healthcare episodes in both in- and outpatient specialist care since 2001. As the SWIP cohort does not contain information on primary care, we also investigated cases of prescribed SSRIs. SSRI prescription was identified according to the Anatomical Therapeutic Chemical (ACT) classification system in the prescribed drug register. Antidepressants (N06A) and anxiolytics (N05B) were included, both widely used to treat common mental disorders. These outcomes were selected as they represent the most prevalent mental health problems in the working-age population (OECD, 2012, 2013) and align with hypothesised pathways through which IWP may affect mental health.

2.5. Confounders

The selection of confounders was informed by previous research on socioeconomic factors and mental health outcomes. The following confounders were taken from the LISA register for the baseline year 2013: *age* (24–29, 30–39, 40–49, and 50–60-year-olds); *educational attainment*, divided into four groups: (i) primary and lower secondary school or less (≤9 years); (ii) secondary (10–11 years); (iii) upper-secondary (12 years); (iv) tertiary (≥13years); *civil status* was categorized as married, unmarried, divorced and widowed; *family type* was categorized as married, married/cohabiting with children under 18 years old, married/cohabiting with children over 18 years old, single with children under 18 years old, single with children over 18 years old and single without children; *country of birth*, categorized as born in Sweden, born in the Nordics (but not Sweden), born in the EU and born outside of the EU. We further adjusted for low job control at baseline, aggregated at an occupational level, using a Job Exposure Matrix (JEM) (Almroth et al., 2021) categorised at the median as high and low job control. Controlling for the confounding of decision authority, an occupational determinant of mental health was intended to better isolate the association between poverty and adverse mental health. Last, rather than excluding individuals with the outcomes of interest, we adjusted for diagnosed mental health disorders or SSRI prescriptions prior to the follow-up to capture the full range of effects, including recurrence or worsening of mental health problems, which represent a significant portion of cases of interest.

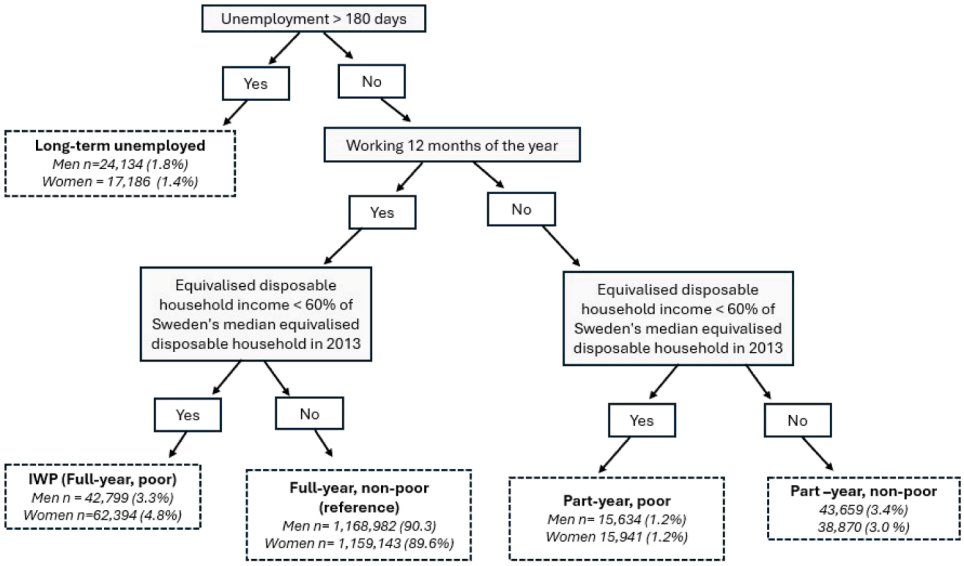

Fig. 2. Selection into the five employment categories used in this study and the proportion of men and women in each category.

2.6. Analysis

First, we explored the distribution of the baseline covariates across the five exposure categories Second, we calculated the percentage of cases of the outcomes of interest and the incidence rate for each exposure category. Third, Cox proportional Hazard models were used to estimate crude and adjusted sex-specific Hazard Ratios (HR) and 95 % Confidence Intervals (95 %CI) of the risk of developing a mental health disorder at any point during the follow-up period from 2014 to 2019. All statistical models were adjusted for mental health conditions before the follow-up to account for potential confounding. All analyses were stratified by sex, based on previous evidence suggesting that employment states and mental health disorders can differ between men and women. For the Cox regression analyses, time at risk was from 1 January 2014 until either emigration, death, the mental health outcome of interest or the end of follow-up on 31 December 2019, as this is currently the last available data in the SWIP cohort. To compare the mental health consequences of IWP with other employment situations, including unemployment, we added pairwise comparisons to the model. Fourth, to only focus on new mental health incidents that occurred during the follow-up period, we conducted a sensitivity analysis to explore how excluding individuals with pre-existing mental health conditions at or before the 2013 baseline affected the results. Fifth, to explore potential selection bias, we compared the sociodemographic characteristics of individuals excluded from the study with those included. Sixth, we identified the most prevalent occupations among those in our main exposure category, IWP, to illustrate the types of jobs most affected. Lastly, because existing literature uses different operationalisations of long-term unemployment duration, an additional sensitivity analysis was conducted by lowering the cut-off from 180 days to 90 days. All analyses were conducted using SAS V.9.4.

3. Results

3.1. Descriptives

The final sample included 2590,742 people (1295,208 men and 1295,534 women). During the follow-up from 2014 to 2019, we identified 34,146 (2.6 %) cases of diagnosed mental disorders and 108,849 (8.4 %) SSRI prescriptions among men, and 48,378 (3.7 %) cases of diagnosed mental disorders and 158,590 (12.3 %) SSRI prescriptions among women.

Table 1 presents the distribution of sociodemographic and health-related covariates within each exposure category, separately for men and women. Compared with the full-year non-poor group, the main reference group in this study, both men and women in IWP were more likely to be younger, born outside Sweden, and to have only primary education. They were also more often single with children under 18 years, reported low job control, and had a prior mental health diagnosis or SSRI prescription before baseline. These differences highlight the greater clustering of sociodemographic and health vulnerabilities among individuals in IWP compared with those in the full-year non-poor group. The comparisons of the socioeconomic characteristics of the included and excluded individuals showed that excluded individuals were slightly older, more often widowed, less likely to have children under 18 at home, and more likely to have a prior diagnosis or SSRI prescription, but overall differences were small, suggesting limited risk of selection bias.

3.2. IWP and the risk of diagnosed mental health disorders

The crude results indicated that both men and women in IWP had an increased risk of diagnosed mental health disorders compared to workers in the full-year (non-poor) category (Table 2). Additionally, increased risks were found among workers in the part-year (non-poor), part-year (poor) and long-term unemployed categories. The associations remained statistically significant after adjusting for the included confounders (Table 2).

Among men, the Adjusted Hazard Ratio (AHR) for those in IWP (AHR 1.58, 95 % CI 1.51–1.66) was higher than for part-year (non-poor) workers (AHR 1.47, 95 % CI 1.40–1.54). The pairwise comparison analysis (Supplementary material 2) suggests that the part-year (non-poor) workers were at a statistically significant lower risk of diagnosed mental health disorders than those in IWP (p-value < 0.05). The greatest risk was observed among male workers in the part-year (poor) category (AHR 1.83, 95 % CI 1.72–1.96). We found that the part-year (poor) category, had a statistically significantly higher risk of diagnosed mental health disorders than those in IWP (p-value < 0.001) or working part-year (non-poor) (p-value < 0.001), suggesting that poverty had a stronger impact on the likelihood of diagnosed mental health disorders than working part-year alone. Notably, the risk for workers in the part-year (poor) category was even higher than for those in long-term unemployment (AHR 1.70, 95 % CI 1.60–1.80). However, no statistically significant difference was found between the risks in these two groups.

Table 1
The distribution of the covariates across the exposure groups for men and women at the 2013 baseline.

		Men					Women				
		*Long-term unemployed	Part-year, poor	Part-year non-poor	IWP	Full-year non-poor	*Long-term unemployed	Part-year, poor	Part-year, non-poor	IWP	Full-year non-poor
		N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Age	*24–29 years old*	3848 (16)	5301 (34)	13,555 (31)	9940 (23)	165,526 (14)	2311 (13)	5879 (37)	12,537 (32)	14,663 (24)	145,617 (13)
	30–39 years old	6445(26)	4588 (29)	10,857 (25)	14,260 (32)	316,373 (27)	5010 (29)	5227 (33)	11,683 (30)	22,979 (37)	301,836 (26)
	40–49 years old	6924(29)	3398 (22)	9698 (22)	11,755 (30)	365,620 (31)	5327 (31)	3039 (19)	8030 (21)	17,250 (28)	368,443 (32)
	50–60 years old	6917(29)	2347 (15)	9549 (22)	6844 (15)	321,463 (28)	4538 (26)	1796 (11)	6620 (17)	7502 (12)	343,247 (30)
Country of birth	*Sweden*	18,168(75)	11,754 (75)	36,878 (85)	29,888 (70)	1041,075 (89)	12,715 (74)	12,056 (76)	32,219 (83)	48,223 (77)	1015,843 (88)
	Nordics (not Sweden)	576(3)	322 (2)	885 (2)	720 (2)	21,080 (2)	478 (3)	309 (2)	781 (2)	1221 (2)	27,625 (2)
	EU	1988(8)	1054 (7)	2466 (6)	3673 (9)	49,170 (4)	1464 (8)	1175 (7)	2450 (6)	4175 (7)	52,647 (5)
	outside EU	3402(14)	2504 (16)	3430 (8)	8518 (20)	57,657 (5)	2529 (15)	2401 (15)	3420 (9)	8775 (14)	63,028 (5)
Education	*Primary*	4548(19)	3142 (20)	6193 (14)	8146 (19)	122,066 (10)	2495 (15)	2620 (16)	3576 (9)	7923 (13)	69,179 (6)
	Secondary	7851(33)	3810 (24)	11,123 (26)	10,552 (25)	303,041 (26)	4258 (25)	3231 (20)	6680 (17)	13,774 (22)	241,868 (21)
	Upper secondary	6099(25)	4250 (27)	12,968 (30)	12,140 (28)	311,668 (27)	4747 (27)	4782 (30)	10,831 (28)	19,897 (32)	271,870 (24)
	Tertiary	6099(23)	4432 (28)	13,375 (31)	11,961 (30)	432,207 (37)	5686 (33)	5308 (33)	17,783 (46)	20,800 (33)	576,226 (50)
Civil Status	*Married*	6989(29)	3335 (21)	11,259 (26)	15,934 (37)	498,287 (43)	6171 (36)	3770 (24)	14,626 (38)	17,612 (28)	555,418 (48)
	Unmarried	13,627(56)	10,342 (66)	28,318 (65)	21,792 (51)	564,563 (48)	7724 (45)	9261 (58)	20,505 (53)	32,288 (52)	462,794 (40)
	Divorced	3486(14)	1932 (12)	4029 (9)	5017 (12)	104,561 (8)	3189 (18)	2829 (18)	3593 (9)	12,206 (20)	136,008 (12)
	Widowed	32 (1)	25 (1)	53 (1)	56 (1)	1571 (1)	102 (1)	81 (1)	146 (1)	288 (1)	4923 (1)
Family type	*Married without children*	1764(7)	424 (3)	3219 (7)	1037 (2)	115,240 (10)	1643 (10)	375 (2)	3491 (9)	1486 (2)	151,533 (13)
	Married with children under 18	4411(18)	2416 (16)	7575 (17)	13,517 (32)	326,093 (30)	3745 (22)	2594 (16)	10,262 (27)	12,696 (20)	334,721 (29)
	Married/ cohabiting with children over 18	4121(17)	1699 (11)	9434 (22)	7435 (17)	254,492 (22)	2977 (17)	1842 (12)	11,045 (28)	8707 (14.)	260,499 (23)
	Single with children under 18	774(3)	674 (4)	765 (2)	3461 (8)	27,010 (2)	2569 (15)	4208 (26)	1673 (4)	23,309 (37)	74,749 (6)
	Single with children over 18	1333(6)	533 (3)	3441 (8)	1175 (3)	35,443 (3)	1030 (6)	692 (4)	2334 (6)	3123 (5)	54,846 (5)
	Single	11,731(49)	9888 (63)	19,225 (44)	16,174 (38)	410,704 (36)	5222 (30)	6230 (39)	10,065 (26)	13,073 (21)	282,795 (24)
Job control	*Low*	15,952 (66)	10,797 (69)	25,741 (59)	31,707 (74)	573,491 (49)	9123 (53)	10,413 (65)	20,403 (52)	41,784 (67)	565,160 (49)
	High	8182 (34)	4837 (31)	17,918 (41)	11,092 (26)	595,491 (51)	8063 (47)	5528 (35)	18,467 (47)	20,610 (33)	593,983 (51)
Previous mental health diagnosis	*No*	21,383 (89)	13,507 (86)	39,623 (91)	39,064 (91)	1120,673 (96)	14,651 (85)	12,908 (81)	33,999 (88)	54,016 (87)	1086,222 (94)
	Yes	2751 (11)	2127 (14)	4036 (9)	3735 (9)	48,309 (4)	2535 (15)	3033 (19)	4871 (12)	8378 (13)	72,921 (6)
Previous SSRI prescription	*No*	17,457 (73)	11,444 (73)	33,976 (78)	34,080 (80)	1000,074 (86)	10,499 (61)	9745 (61)	26,155 (67)	41,184 (66)	866,763 (75)
	Yes	6677 (28)	4190 (27)	9683 (22)	8719 (20)	168,908 (14)	6687 (39)	6196 (39)	12,715 (33)	21,210 (34)	292,380 (25)

For women, a similar risk of diagnosed mental health disorders was observed among those in long-term unemployment (AHR 1.48, 95 % CI 1.39–1.58) and the part-year (poor) category (AHR 1.43 95 % CI 1.34–1.52). No statistically significant difference was found in the risk between these two groups. Likewise, the risk among those in the part-year (non-poor) category (AHR 1.34 95 % CI 1.28–1.40) was similar to the risk among those in IWP (AHR 1.30, 95 % CI 1.25–1.34). No statistically significant difference was found between the risks of these two groups.

3.3. IWP and the risk of prescribed SSRI medication

The crude results indicated that both men and women in IWP had an increased risk of prescribed SSRIs compared to workers in the full-year

Table 2
The risk of diagnosed mental health disorders among men and women in IWP and other employment categories.

	Diagnosed Mental Health Disorders			
Employment Categories	Cases/People at risk	Incidence rate per 1000 person-years	Crude HR (95 % CI)	Adjusted AHR (95 % CI)
Men				
Long-term unemployed	1229 / 24,134	8.7	1.90 (1.80–2.00)	1.70 (1.60–1.80)
Part-year, poor	927 / 15,634	10.6	2.07 (1.96–2.20)	1.83 (1.72–1.96)
Part-year, non-poor	1869 / 43,659	7.4	1.56 (1.49–1.63)	1.47 (1.40–1.54)
IWP	2018 / 42,799	8.2	1.71 (1.64–1.79)	1.58 (1.51–1.66)
Full-year, non-poor	28,103 / 1168,982	4.1	1	1
Women				
Long-term unemployed	1041 / 17,186	10.4	1.64 (1.54–1.74)	1.48 (1.39–1.58)
Part-year, poor	1086 / 15,941	12.1	1.65 (1.59–1.75)	1.43 (1.34–1.52)
Part-year, non-poor	2122 / 38,870	9.5	1.34 (1.30–1.41)	1.34 (1.28–1.40)
IWP	3786 / 62,394	10.5	1.51 (1.47–1.57)	1.30 (1.25–1.34)
Full-year non-poor	40,343 / 1159,143	5.9	1	1

Crude: age, diagnosed mental health disorders/SSRI prescriptions before follow-up.
Adjusted: age, diagnosed mental health disorders/SSRI prescriptions before follow-up, education, native/non-native-born, civil status, family type, decision authority.

(non-poor) category (Table 2). Additionally, increased risks were found among workers in the part-year (non-poor), part-year (poor) and long-term unemployed categories. The associations remained statistically significant after adjusting for the included confounders (Table 3).

For men, the risk of SSRI prescription was the same among those in IWP (AHR 1.22, 95 % CI 1.18–1.25) and those working part-year (non-poor) (AHR 1.22, 95 % CI 1.18–1.25). The pairwise comparison analysis (Supplementary material 3) showed no statistically significant difference between the risks in these two groups. The highest risks were observed among male workers in the part-year (poor) category (AHR 1.36, 95 % CI 1.30–1.42) and those in long-term unemployment (AHR 1.34, 95 % CI 1.28–1.39). No statistically significant difference was found between the risks of these two groups. However, their risks in both these categories were statistically significantly greater than the risks among those in IWP or part-time (non-poor).

For women, similar patterns were observed. The risk of SSRI prescription was comparable between those in the IWP category (AHR 1.15, 95 % CI 1.13–1.18) and those in the part-year (non-poor) category (AHR 1.14, 95 % CI 1.10–1.17). No statistically significant difference was found between the risks in these two groups. Higher risks were found among women in the part-year (poor) (AHR 1.20, 95 % CI 1.15–1.25) and long-term unemployment categories (AHR 1.24, 95 % CI 1.19–1.30). No statistically significant difference was found between the risks of these two groups or between the part-year poor category and those in IWP.

3.4. Sensitivity analysis

Supplementary material 4 and Supplementary material 5 show the results of a sensitivity analysis replicating the main analysis but excluding individuals with pre-existing mental health conditions before the follow-up period. The exclusion of individuals with prior mental health diagnoses resulted in slightly higher AHRs for men but had minimal effect on women's AHRs, with most estimates remaining similar between this restricted sample and our main sample. An additional sensitivity analysis was conducted by lowering the threshold for long-term unemployment from 180 to 90 days (Supplementary material 6 and 7), resulting in a larger group classified as long-term unemployed. This change was associated with slightly lower AHRs for diagnosed mental health disorders across all categories: long-term unemployed (men: 1.70 to 1.68; women: 1.48 to 1.47), part-year poor (men: 1.83 to 1.73; women: 1.43 to 1.40), part-year non-poor (men: 1.47 to 1.43; women: 1.34 to 1.31), and IWP (men: 1.58 to 1.55; women: 1.30 to 1.27). For SSRI prescriptions, AHRs among the long-term unemployed remained largely stable (men: 1.34 to 1.35; women: 1.24 to 1.23), while small decreases were observed for the part-year poor (men: 1.36 to 1.30; women: unchanged at 1.20), part-year non-poor (men: 1.22 to 1.21; women: 1.14 to 1.12), and IWP categories (men: 1.22 to 1.21; women: 1.15 to 1.15). Overall, the results remained consistent with our main findings.

An exploration of the top occupations undertaken by those in IWP (Supplementary Material 1) showed that women in IWP mainly work in care and service roles (healthcare, nursing, childcare), while men are spread across healthcare, transport, and manual labour. Among both men and women, healthcare support work was common, but women dominated in caregiving and hospitality, and men dominate transport and manual jobs.

Table 3
The risk of prescribed SSRIs among men and women in IWP and other employment categories.

	SSRI prescriptions			
Employment Categories	Cases/People at risk	Incidence rate per 1000 person-years	Crude HR (95 % CI)	Adjusted AHR (95 % CI)
Men				
Long-term unemployed	2482 / 24,134	18.1	1.48 (1.42–1.54)	1.34 (1.28–1.39)
Part-year, poor	1729 / 15,634	20.3	1.50 (1.43–1.57)	1.36 (1.30–1.42)
Part-year, non-poor	4294 / 43,659	17.6	1.27 (1.24–1.31)	1.22 (1.18–1.26)
IWP	4560 / 42,799	19.1	1.36 (1.32–1.39)	1.22 (1.18–1.25)
Full-year, non-poor	95,784 / 1168,982	14.3	1	1
Women				
Long-term unemployed	2278 / 17,186	16.6	1.35 (1.29–1.41)	1.24 (1.19–1.30)
Part-year, poor	2301 / 15,941	26.9	1.35 (1.30–1.41)	1.20 (1.15–1.25)
Part-year, non-poor	5245 / 38,870	24.6	1.16 (1.13–1.19)	1.14 (1.10–1.17)
IWP	9210 / 62,394	27.0	1.32 (1.29–1.35)	1.15 (1.13–1.18)
Full-year non-poor	139,556 / 1159,143	21.5	1	1

Crude: age, diagnosed mental health disorders/SSRI prescriptions before follow-up.
Adjusted: age, diagnosed mental health disorders/SSRI prescriptions before follow-up, education, native/non-native-born, civil status, family type, decision authority.

4. Discussion

This study investigates whether IWP is associated with an increased risk of mental ill-health. The findings indicate that, compared to the full-year (non-poor) category, IWP is linked to an increased risk of both diagnosed mental health disorders and SSRI prescriptions among men and women, underscoring the significant mental health burden of financial insecurity even among those in stable employment. Furthermore, among men and women in less stable employment (working <12 months), poverty status had a greater impact on mental health outcomes than part-year employment alone.

The increased risks of diagnosed mental ill-health among those in IWP in this study align with findings from a previous longitudinal German study, which found that people in IWP were more than twice as likely to self-rate their health as "poor" or "bad" compared to the non-working poor (Pförtner and Schmidt-Catran, 2017). We build upon this by comparing the risks among individuals in IWP with those in other employment states, seeking to capture the nuanced dynamics of the labour market. We found that those in IWP faced similar risks to those in less secure employment who were not below the poverty line (part-year, non-poor). Individuals in IWP face the struggle of having more stable employment but without financial security, which may contribute to feelings of injustice, diminished self-worth, or despair that align with theories like the Effort-Reward Imbalance (ERI) (Siegrist, 1996) and organisational justice (Colquitt, Conlon, Wesson, Porter, and Ng, 2001). However, because those in IWP have technically achieved the policy goal of employment, they often fall outside the scope of targeted government support systems. In line with our initial premise that employment alone may not be sufficient to protect mental health when financial insecurity persists, our findings contribute to ongoing policy debates by challenging the assumption that stable employment inherently safeguards health (Beck, Warren, and Lyonette, 2024).

We also found that workers in the part-year (poor) category experienced higher risks than those in the part-year (non-poor) category, suggesting that poverty has a stronger impact on the risk of diagnosed mental health disorders and SSRI prescriptions than part-year employment alone. Given the growing evidence that precarious work, marked by instability, insecurity, and economic vulnerability, is linked to poor mental health (Padrosa, Vanroelen, Muntaner, Benach, and Julià, 2022), it is unsurprising that individuals facing both poverty and unstable employment are the most vulnerable. Notably, these risk differences were more pronounced for men, possibly reflecting a greater reliance on work for structure, stability, and identity (Kendler and Gardner, 2014). This highlights how the intersection of poverty and precarious work arrangements may have particularly severe mental health consequences for men.

To our knowledge, this is the first longitudinal study to examine the long-term effects of IWP on diagnosed mental health conditions at a population level. A key strength of this study is its large sample size, which allows for a sex-specific analysis of health outcomes among individuals experiencing IWP. Additionally, the longitudinal nature of register-based cohorts like SWIP eliminates attrition bias. By relying on diagnoses and prescription records as mental health outcomes, both objectively assessed by healthcare professionals, this study also minimizes the biases commonly associated with self-reported data.

It is also important to note that this study has several limitations. First, while we used a robust measure of IWP based on individuals working 12 months of the year, detailed information on the exact months worked was unavailable. Consequently, it is also somewhat difficult to interpret the findings for the group working <12 months as this is a heterogeneous group that could have been working either one month of the year or 11 months. Second, Statistics Sweden defines household composition for calculating equivalised disposable income based on the youngest generation in the household and one other generation. This means that only two generations can be included in the official classification, which may not capture older individuals living in multigenerational households. However, multigenerational households are relatively uncommon in Sweden, meaning this limitation is unlikely to have a substantial impact on our findings. Furthermore, the definition of family units only includes married or cohabiting couples with children. As a result, cohabiting couples without children may be misclassified as single-person households, leading to an overestimation of the number of single-person households. Nevertheless, these data are official statistics, which ensures standardized and systematic data collection methods. As such, they provide a reliable foundation for the analysis, despite the noted limitations. Third, the exclusion of self-employed individuals (due to incomplete information on working time), a group with a high risk of IWP (Hartzén, 2022), also limits the scope of our analysis, highlighting the need for further research into this population. Fourth, we chose to retain individuals with the outcomes of interest and adjusted for previous mental health diagnoses before follow-up, to capture the full spectrum of effects, including recurrence or exacerbation of mental health problems, which constitute a substantial share of relevant cases. However, this approach limits our ability to establish the temporal order between IWP and mental health outcomes. To address this, we conducted a sensitivity analysis excluding individuals with pre-existing mental health conditions before the follow-up, the results remained largely consistent with the main findings. Fifth, we were unable to identify if individuals were employed full-time or part-time. Sixth, although we adjusted for decision authority, a key occupational determinant of mental health, residual confounding from other unmeasured work-related exposures (e.g., job demands, social support) may have influenced the results and warrants consideration in future studies. Last, this study investigates the relationship between IWP measured at the 2013 baseline and subsequent mental health outcomes from 2014 to 2019, therefore, duration of exposure to IWP before the baseline or changes in exposure during the follow-up were not accounted for. Both components of IWP, work and poverty, are dynamic, therefore future studies should investigate how changes in employment status related to IWP could impact health.

In conclusion, our findings provide new insights into the link between IWP and mental ill-health. After adjusting for confounders, IWP was associated with an increased risk of both diagnosed mental health disorders and SSRI prescriptions among men and women. These results highlight the significant mental health burden associated with financial insecurity, even among those in stable employment. Moreover, among men, IWP and part-year non-poverty were associated with similar elevated risks, while part-year poverty showed the highest risk, suggesting a combined or additive effect of economic insecurity and employment instability on SSRI prescriptions. Addressing the health burden of IWP requires tackling both its structural and individual determinants and moving beyond a narrow focus on labour market participation. Policy frameworks must prioritise not only employment activation but also the stability, security, and quality of work as critical factors for promoting mental health. Without economic security, stable employment alone does not necessarily safeguard against mental ill-health.

Ethical standards

Ethical permission was granted for the study by the Regional Ethics Board of Stockholm with 2017/1224–31 with a amendment for updated data - diary number 2022–02,725–02. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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Data availability

The data used in this study are available from Statistics Sweden and the Swedish National Board of Health and Welfare and was used in the current study under license after ethical review. Hence, the data is not publicly available. For questions regarding this data, contact the corresponding author of this study.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work the author(s) used Chatgpt in order to support with the coding for the development of the figures in the supplementary material. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the published article.

CRediT authorship contribution statement

Jessie Gevaert: Writing – review & editing, Writing – original draft, Visualization, Investigation, Formal analysis, Data curation. **Gun Johansson:** Writing – review & editing, Validation, Methodology, Conceptualization. **Melody Almroth:** Writing – review & editing, Validation, Methodology, Conceptualization. **Sherry Baron:** Writing – review & editing, Methodology, Conceptualization. **Theo Bodin:** Writing – review & editing, Validation, Supervision, Methodology, Conceptualization. **Rod Hick:** Writing – review & editing, Validation, Supervision, Methodology, Conceptualization. **Kathryn Badarin:** Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Kathryn Badarin reports financial support was provided by Forskningsrådet för hälsa arbetsliv och välfärd. Jessie Gevaert reports financial support was provided by Forskningsrådet för hälsa arbetsliv och välfärd. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Supplementary materials

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