

Shift work and prescriptions of anxiolytic and antidepressant drugs among healthcare workers in Region Stockholm: a prospective cohort study

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Objective The aim of this study was to investigate the associations between shift work (including night work) and multiple prescriptions of anxiolytic and antidepressant drugs (PAD) among nursing staff in Region Stockholm, Stockholm County's healthcare authority.

Methods Using register-based data, 32 375 nurses and nursing assistants employed at Region Stockholm for ≥ 1 year between 2008 and 2019 were included. Exposures were obtained from an employee register, while PAD were obtained from a national pharmaceutical register. With a one-year follow-up, discrete-time proportional hazards models were used to estimate hazard ratios (HR) after adjusting for covariates, in a final analytical sample of 17 834.

Results Increased hazards of PAD were recorded among those who were on permanent night shifts [HR 1.39, 95% confidence interval (CI) 1.32–1.47] compared to those who worked days only. We observed a dose–response association between the number of night shifts and PAD. Among night workers, increased hazards were observed for those who worked ≥ 3 consecutive nights > 21 times (HR 1.11, 95% CI 1.03–1.20) compared with those with none. Lastly, among non-night workers, decreased hazards were observed for quick returns from afternoon shifts (< 11 hours) compared with those with no quick returns.

Conclusion Exclusive night work is associated with increased risks of multiple PAD compared to day work, implying an increase in risk of mental disorders among nurses and nurse assistants.

Key terms night work; observational study.

Shift and night work are common across many industries in Europe (1), with about 20% of the population engaged in shift work, for example, night shifts (2). It is especially common in healthcare, with about 40% in Europe (2) and 44% in Sweden (3), due to the essential and unpredictable nature of the sector. Shift and night work have been associated with negative health outcomes for healthcare professionals such as cerebrovascular disease, pregnancy and preterm birth, and sleep disorders (4–6). Particularly, shift work has been deemed a risk factor for mental disorders as it disturbs the circadian rhythm of workers, which may disrupt the release of hormones that deal with stress, resulting in negative moods and emotions, thereby affecting mental states (1, 7), and employees' social relations and ability to work (8).

The World Health Organization (WHO) estimated that 1 in every 8 persons lives with mental disorders

globally, culminating in huge health and economic costs (9). In Sweden, mental ill health is considered the most common cause of sickness absence and prolonged sick leave, requiring huge efforts towards rehabilitation and return to work (10, 11). This necessitates the continued study of how shift and night work relate to the risks of mental disorders.

Mental disorders such as depression and anxiety can be treated with various psychotropic medications. While not all people with a mental disorder are prescribed medication, a study shows that as mental disorders increase, so do the prescriptions and usage of these drugs (12). The Anatomical Therapeutic Chemical (ATC) classification developed by WHO (13) identifies categories of psychotropic drugs such as neuroleptics, sedatives, and hypnotics (N05), psychoanaleptics (N06, eg, antidepressants), and phenothiazine derivatives (N06AD). These

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drugs help in easing anxiety and negative moods and reducing symptoms of insomnia, thereby treating sleep disorders (12, 14).

Studies on the relationship between shift and night work and psychotropic medications, remain inconclusive, with more studies focusing on usage rather than prescriptions. While some studies found associations between shift work (including night) and increased redeemed prescriptions (15) as well as usage (eg, 12, 14, 16, 17), other studies found no significant associations between shift and night work and prescriptions (eg, 1, 18, 19).

These inconsistent findings warrant further investigation into this association, especially in the long term, considering the prevalence of mental ill health and how harmful prolonged usage of psychotropic drugs can be. Additionally, previous studies reveal methodological concerns. Some of the studies (eg, 12, 14) measured either one or both the exposure (shift work) and outcome (psychotropic medication prescription or usage) using subjective reports or surveys from respondents. This makes data susceptible to bias, misclassification, inaccurate results, and possible erroneous conclusions.

To address these issues, this study makes use of objective, register-based data for both exposure and outcome to investigate the longitudinal association between shift and night work, and psychotropic drugs, specifically, multiple prescriptions of anxiolytic and antidepressant drugs (PAD) among nursing staff in Sweden.

Methods

Study population and analytical sample

The population of this study comprised employees in the healthcare sector identified using HEROMA, a computerized administrative employee register in Region Stockholm. Region Stockholm is a Swedish public authority that provides public healthcare through hospitals, local medical centers, maternity clinics, and family doctors. This study was limited to six hospitals offering emergency care and other services. The inclusion criteria were workers employed ≥ 1 year at any time between 1 January 2008 and 31 December 2019, and occupations that often entail shift and night work: nurses, nursing assistants, and specialist nurses (including midwives). We excluded employees who had registered <100 shifts per year during the follow-up period and those who had been on any medically certified sick leave in the year prior to prescription dates. A final analytical sample of 17 834 (15 721 women and 2113 men) was completed from the total cohort of nurses and nursing staff assistants (see analytical model in figure 1). The data collec-

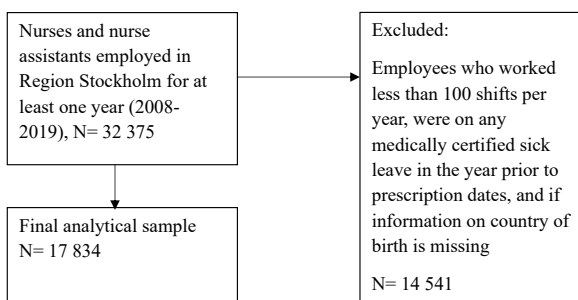


Figure 1. Flowchart for the inclusion and exclusion.

tion was part of a larger project examining the effects of shift work on various health outcomes (eg, 4–6, 20). We followed the STROBE guidelines and checklist (21) for reporting observational studies.

Assessment of exposure

The HEROMA register provided information on the exact daily start and end times of each shift for individuals throughout the years in the study period in the full sample. Working time patterns were aggregated and classified using a previously developed method in Finland (22) for register-based working hours among healthcare employees. This method has been adapted to HEROMA in our studies investigating shift and night work and different health outcomes (eg, 4–6).

All shifts were classified as follows: day shifts (starts after 06:00 and ends no later than 18:00 hours); afternoon shifts (starts after 12:00 and ends later than 18:00 hours, but not a night shift); and night shifts (≥ 3 hours of work between 22:00–06:00 hours). Based on this classification, for every year, the cohort participants were classified as (i) permanent daytime workers, (ii) persons working daytime and/or afternoon shifts but not night shifts, (iii) persons working various shift types including night shifts (day and/or afternoon shifts, and night shifts), and (iv) persons working permanent night shifts. We chose a one-year window of exposure, and the exposure classification was assessed yearly to consider variations over time.

Additionally, we calculated the annual frequencies of night shifts, quick returns from night shifts, and quick returns from afternoon shifts (among non-night workers). Quick returns from night shifts were defined as <28 hours between the end of a night shift and the start of the following shift (the following shift could be a day, afternoon, or night shift). Quick returns from afternoon shifts were defined as <11 hours between the end of an afternoon shift and the start of the following shift (either a day or an afternoon shift). This was limited to those without any night shifts during the year to reduce overlap and confounding effects of shifts with night work.

These definitions of quick returns have been used in earlier related studies (eg, 5, 6). Lastly, the frequency of ≥ 3 consecutive night shifts per year was also calculated.

Assessment of outcome

Data on PAD were obtained from the National Prescribed Drug Register (2005–2023) provided by Socialstyrelsen (National Board of Health and Welfare, Sweden). Psychotropic drugs were identified by code classifications in the ATC (13). We included all prescriptions of drugs classified as N05 (neuroleptics, sedatives, and hypnotics) and N06A (antidepressants), except N06B and N06D. We excluded prescriptions of psychostimulants classified as N06B and dementia drugs classified as N06D since they were outside the purview of this study. These exclusions were made based on consultations with certified medical professionals. Data from this register were matched to the exposure register by unique identification numbers.

Covariates

Information on covariates, namely, age, sex, and country of birth, was sourced from Statistics Sweden in the population register, while information on profession was obtained from HEROMA.

Statistical data analysis

Descriptive analyses were conducted for a subpopulation at approximately the midpoint of the follow-up period (2013), corresponding to a 1-year exposure period. This was due to time-dependent exposure variables, in which individuals may have changed their shift types during the study period, thereby changing their exposure groups (day-only, shift without night, shift with night, and permanent night work).

Discrete time proportional hazard models were used to estimate hazard ratios (HR) using 2009–2020 as the follow-up period. This follow-up period was subdivided into one-year calendar periods for the analyses (23). We investigated whether exposure to different types of shift work in one year was associated with the prescriptions of psychotropic medications in the subsequent year. Adjustments in the models were made for both time-dependent variables (age) and time-invariant variables (sex, profession, country of birth). Shift patterns were treated as time-varying, and adjustment for calendar year of follow-up was inherent in the analytical model. Individuals were at risk from 1 January of the year after ≥ 1 years of employment until the dispatch of prescriptions for psychotropic medications, death, or end of follow-up, whichever came first. Quartiles were computed as cut-off points for the distributions of expo-

sures as 1st–25th, 25–50th, 50–75th, and >75th percentiles in the exposed groups. Furthermore, the analysis of quick returns from both afternoon and night shifts was adjusted for the number of night and afternoon shifts, respectively. Linear trend tests were also conducted using exposure on a continuous scale in a regression model to assess the association between exposure and outcome. The trend tests analyzed the risk increases per ten additional times of the different aspects of shift work for those with incidents of psychotropic medication prescriptions. These tests were conducted on only the exposed groups (quartiles) and excluded the unexposed reference groups.

Sensitivity analysis was also conducted by including those who had been initially excluded for being on medically certified sick leave in the year prior to the prescription date. The same hazard models, exposure groups, distributions, covariates, and trend tests used for the main analyses were employed here, to allow for comparison.

We used SAS software, version 9.4 for Windows (SAS Institute Inc, Cary, NC, USA) for the analyses. Significance of statistical associations was determined at $P < 0.05$ for all analyses.

Ethics

Ethical permission for the study was granted by the Ethical Review Board in Stockholm and the Swedish Ethical Review Authority (2016/2490–31; 2017/1157–32, 2022-06828-02).

Patient consent statement

Informed consent for participation in the study was not required and not requested for register-based research. Individuals cannot be tracked using the data, as it was anonymized.

Results

The characteristics of the subpopulation for 2013 (about halfway through the follow-up period) are presented in table 1. These characteristics are further divided by shift type: day-only, shift without night, shift with night, or permanent night work. The employees working only days were 4141; those working shifts without nights were 7474; those working shifts with nights were 3968; and employees on permanent night shifts were 1461. A huge majority of the workers were women (94%) and were born in Sweden (84%). Regarding age groups, employees aged 50 and above represented the highest proportion among day-only workers (54.31%), shift

Table 1. Characteristics of the subpopulation for the year 2013 (N=17 044) subdivided by work schedule based on how the person worked during that year. In all analyses, the cohort subjects were classified dynamically for each year of follow-up.

	Full cohort		Day work only ^a		Shift work, without night shift ^b		Shift work, with night shift ^c		Permanent night work ^d	
	N	(%)	N	%	N	%	N	%	N	%
Total	17 044		4141		7474		3968		1461	
Sex										
Women	16 101	94.5	4008	96.8	7045	94.3	3661	92.3	1387	94.9
Men	943	5.5	133	3.2	429	5.7	307	7.7	74	5.1
Age (years)										
≤40	5047	29.6	587	14.2	2745	36.7	1463	36.9	252	17.3
41–50	4943	29.0	1305	31.5	1854	24.8	1261	31.8	523	35.8
>50	7054	41.4	2249	54.3	2875	38.5	1244	31.3	686	46.9
Country of birth										
Sweden	14 268	83.7	3421	82.6	6251	83.6	3367	84.9	1229	84.1
Nordic countries (except Sweden)	975	5.7	276	6.7	307	4.1	248	6.2	144	9.9
Europe (except Nordic countries)	534	3.1	107	2.6	307	4.1	103	2.6	17	1.2
Outside Europe	1267	7.4	337	8.1	609	8.2	250	6.3	71	4.8
Profession										
Nursing assistants ^e	8220	48.2	1567	37.8	4357	58.3	1562	39.4	734	50.2
Nurses, including midwives	8824	51.8	2574	62.2	3117	41.7	2406	60.6	727	49.8

^a Starts after 06:00H and ends no later than 18:00H.^b Starts after 12:00H and ends later than 18:00H, but not a night shift.^c ≥3 hours between 22:00H – 06:00H, but not permanent night work.^d No day work or afternoon shifts.^e Assistant nurses and carers.

workers without night work (38%), and permanent night workers (47%). There was a somewhat fair distribution of shifts with night work among the three age groups, although those aged ≤40 represented the largest proportion (37%). There were also more nurses (including midwives) for day-only (62%) and shifts with nights (61%) than for nursing assistants, while the opposite was true for shifts without nights. However, there was a fair distribution among permanent night workers for the two professions. The 17 834 participants in the final analytical sample contributed to 313 687 person-years, and during the follow-up period (January 2009–December 2020), there were 18 251 cases of PAD.

Associations between shift work and the risk of PAD

The results for the analysis are presented in table 2. Having worked shifts without nights in the preceding year was associated with a lower HR for PAD (HR 0.90, 95% CI 0.87–0.94) compared with day-only. However, permanent night work was associated with an increased HR for PAD (HR 1.39, 95% CI 1.32–1.47) compared with day-only.

Regarding the frequency of night shift work, all quartiles were associated with an increased HR of PAD compared with those who never worked nights. These results were confirmed in the trend test, which showed a dose–response association between the number of night shifts and PAD ($P < 0.001$). The highest HR was recorded for those who worked >124 night shifts (the highest quartile) in the preceding year (HR 1.35, 95% CI 1.28–1.42), followed

by the second highest quartile, those who worked 74–124 night shifts (HR 1.21, 95% CI 1.15–1.28). The overlapping CI across the first three quartiles also support the finding that permanent night work is associated with a higher HR of multiple PAD. Among those who worked night shifts, frequently working ≥3 consecutive night shifts 16–22 times (HR 1.08, 95% CI 1.00–1.16) and >22 times (HR 1.11, 95% CI 1.03–1.20) in a year were associated with increased HR of PAD, compared to those who never worked ≥3 consecutive nights. Contrarily, working ≥3 consecutive nights 6–15 times was associated with a decrease in HR of PAD. However, the trend analysis indicates a significant dose–response association between frequency of ≥3 consecutive night shifts and PAD ($P < 0.001$). Lastly, there was no dose–response association between quick returns from night work (<28 hours) and PAD. However, those with >71 quick returns in a year had a higher HR for PAD (1.25, 1.07–1.46). This association became non-significant after adjusting for the number of nights.

Among non-night workers (day-only and shift without night), all groups with quick returns (<11 hours) from afternoon shifts were associated with a lower HR of PAD, compared with those with no quick returns. Similarly, the trend test was non-significant.

The results from the sensitivity analyses showed a similar pattern, with permanent night being associated with a small but significant increase in the HR of PAD compared with day-only (HR 1.02, 95% CI 1.00–1.04). Frequency of night shifts >124 times (HR 1.03, 95% CI 1.02–1.05), and frequency of ≥3 consecutive night shifts

Table 2. Hazard ratios (HR) for prescriptions of anxiolytic and antidepressant drugs in association with various aspects of shift work (N=17 834) among health care employees during follow-up, January 2009–December 2020. [CI=confidence interval.]

Exposure	Person years	Cases (N)	Crude HR ¹	P-value trend	Adjusted HR ² (95% CI)	P-value trend	Adjusted HR ³ (95% CI)	P-value trend
Type of shift work (the full sample)								
Day work only	86 834	4896	1		1			
Shift work, without night shift	121 003	6414	0.90 (0.86–0.93)		0.90 (0.87–0.94)			
Shift work, with night shift	79 635	5030	1.03 (0.99–1.07)		1.03 (0.99–1.08)			
Permanent night	26 215	1911	1.41 (1.34–1.49)		1.39 (1.32–1.47)			
Frequency of night shifts (the full sample)				0.000		0.000		
Never night shifts ⁴	207 837	11 310	1		1			
1–21	26 042	1664	1.10 (1.04–1.15)		1.11 (1.05–1.16)			
22–73	27 278	1766	1.09 (1.03–1.14)		1.09 (1.04–1.15)			
74–124	28 838	1835	1.25 (1.19–1.31)		1.21 (1.15–1.28)			
>124	23 692	1676	1.36 (1.29–1.43)		1.35 (1.28–1.42)			
Frequency of >3 consecutive night shifts (includes only those with night shifts) ⁵				0.000		0.000		
0 times	25 558	1609	1		1			
1–5	22 252	1483	0.95 (0.88–1.02)		0.95 (0.88–1.02)			
6–15	18 765	1100	0.86 (0.79–0.93)		0.86 (0.80–0.93)			
16–22	21 822	1424	1.10 (1.02–1.18)		1.08 (1.00–1.17)			
>22	17 453	1325	1.12 (1.04–1.20)		1.11 (1.03–1.20)			
Quick returns (<28 hours) from night shifts (includes only those with night shifts) ⁵				0.100				0.417
No quick returns from night shifts	2673	173	1		1			
1–11	24 929	1630	1.01 (0.86–1.18)		1.02 (0.87–1.20)		1.00 (0.86–1.18)	
12–39	25 854	1637	0.95 (0.81–1.11)		0.96 (0.83–1.13)		0.90 (0.76–1.06)	
40–71	27 328	1681	1.05 (0.90–1.23)		1.03 (0.88–1.21)		0.86 (0.70–1.07)	
>71	25 066	1820	1.24 (1.06–1.45)		1.25 (1.07–1.46)		0.98 (0.77–1.26)	
Quick returns (<11 hours) from afternoon shifts (excludes workers with night shift) ⁴				0.973				0.814
No quick returns from afternoon shifts	18 880	1054	1		1			
1–15	18 646	996	0.80 (0.73–0.87)		0.80 (0.73–0.88)		0.81 (0.74–0.89)	
16–31	21 261	1167	0.82 (0.76–0.89)		0.83 (0.76–0.90)		0.81 (0.74–0.89)	
32–49	28 003	1315	0.73 (0.68–0.80)		0.74 (0.68–0.81)		0.70 (0.64–0.76)	
>49	34 274	1882	0.87 (0.80–0.93)		0.86 (0.80–0.93)		0.77 (0.71–0.84)	

¹ Adjusted for the calendar year.² Adjusted for the time-dependent variables age and the fixed variables profession, sex, and country of birth. Adjustment for years of follow-up is inherent in the analytical model.³ Further adjustments for the number of shifts for analyses of quick returns.⁴ Those who worked day-only and shifts, but no night shifts (non-night workers).⁵ Delimited to those who work nights (shift work with nights or permanent night work.)

>22 times (HR 1.03, 95% CI 1.00–1.05) were also associated with small but increased HR of PAD. Consistent with the main analyses, all quartiles of quick returns from afternoon shifts (<11 hours) were associated with decreased HR of PAD. However, all quartiles of quick returns from night shifts (<28 hours) and frequency of ≥ 3 consecutive night shifts 1–5 times were associated with decreased HR of PAD, contrary to the main analyses, which showed no significant associations. The results of these additional analyses are presented in the supplementary tables (www.sjweh.fi/article/4327).

Discussion

The current study showed that among healthcare employees, permanent night-shift work was associated with an increased hazard of PAD compared with permanent day-shift work. This is consistent with the study by Albertsen et al (15), who found a small associa-

tion between night shift work and increased redeemed prescriptions for psychotropic drugs among Danish employees. Lassalle et al (12) found that among women in France, night work was associated with an increase in odds of psychotropic drug use. Furthermore, a study among nurses in Norway found that, compared to shift with night work, day-only was associated with >50% lower odds of sleep medication use (16). No statistically significant difference was, however, recorded between shifts with and without nights (16). This differs from our study, in which we found that those working shifts without nights had a reduced HR for PAD, while those working shifts with nights had a small but non-significant increase in HR, compared to permanent day work.

This study also showed that frequently working night shifts, often working ≥ 3 consecutive nights (>16 times) and many quick returns from night shift (>71 times) were associated with an increased hazard of PAD. A reason for these findings may be that the night shift disrupts an employee's natural circadian rhythm (eg, 8, 24), which may lead to common mental disorders (eg,

25, 26) that need medical treatment. It may also be that sleep deprivation following night shift (6) is a mechanism between night work and PAD. Sleep deprivation often goes in tandem with mental ill health, such as anxiety and depression (24), and night shift has been similarly linked with these mental health conditions (25, 27).

Although exposure was assessed prospectively, the study is susceptible to two related selection processes. First, left truncation is likely present as the cohort was initiated in 2009 and information on prior mental health is limited, implying that individuals who developed mental health problems and subsequently left night work before cohort entry are not observed. This would result in a healthier subset of workers being included among those exposed at baseline. Second, a healthy worker survivor effect may have operated during follow-up, whereby workers experiencing deterioration in mental health reduced or discontinued night work, leading to a progressive selection of healthier individuals among those remaining exposed. Together, these mechanisms are likely to attenuate a true harmful association between night work and psychiatric affective disorders. The observed lower hazard among workers engaged in shift work without night work compared with day-only work may therefore reflect residual selection into less demanding schedules rather than a protective effect.

While previous studies have indicated that there may be differences in the association between shift work (measured as shift work or not) and type of psychotropic drug (1), it is important to point out that the same psychotropic medication may be used for treating different mental symptoms, ie, anxiety, depression, and sleep problems, and we have no way of distinguishing this. This is why we have not distinguished between types of drugs, and we acknowledge that this may impact the interpretation of our results.

Worth mentioning is that those who worked ≥ 3 consecutive nights less often (< 16 times) had a reduced HR of PAD. The reason for this may be that this group worked fewer night shifts overall, either because they have fewer mean weekly hours or because they worked fewer shifts with nights.

Among day workers, the vast majority were > 50 years old. Conversely, for those working shifts without nights, there was a nearly balanced distribution between people aged > 50 years and those aged < 41 years. Regarding professions, the majority of day-only workers were nurses, while among shift workers without nights, the majority were nurse assistants. These distributions may, to some extent, contribute to the results, although further investigations are warranted.

Additionally, this study found that, among non-night workers, having quick returns from afternoon shifts (regardless of intensity) was associated with lower

HR for PAD, compared with those without any quick returns. This is somewhat surprising, as quick returns (< 11 hours) have been found to reduce sleep duration and alertness among nurses (28). However, while quick returns may impact sleep among nurses, this impact may be short-term and not enough to impact mental health problems that need medical treatment. One reason for our results may be that shift workers compress their working time, which increases the number of quick returns, allowing them to have a longer time between shifts. This results in intense periods of work but also extended periods of recovery, which may lead to better work–life balance and job satisfaction (28, 29). In 2022, Sweden implemented a stricter interpretation of the Working Time Act (30) that prohibited quick returns; future research could investigate whether this implementation affects the association between shift work and PAD. Furthermore, the susceptibility of this study to the healthy worker survivor effect, discussed earlier, may also explain this finding, in that healthier workers may have been selected for more quick returns.

Using register data, this study strengthens previous findings on the association between night work and use of psychotropic medications. This strengthens the case for greater consideration of shift and night work when assessing workers' mental health. More importantly, this study does not merely vilify night work and laud day-only work; adequate limitations should be put on workers' exposure to night work since it is inevitable in healthcare. Lastly, frequent psychological evaluations should be encouraged among healthcare workers and supported by hospital management.

Strengths, limitations, and future research

This study utilized objective data in assessing both the exposure (shift work) and outcome (prescriptions of anxiolytic and antidepressant drugs). The use of a large analytical sample with a 12-year follow-up period and adjustments for accessible confounders contributes to the study's strengths. The exposure period was limited to one year because we determined that this duration offers a balanced approach to capturing the potential impacts of shift work, weighing the likelihood of immediate effects against the need to consider longer-term influences. Also, reporting bias associated with self-reported measures was substantially minimized.

This study also has some limitations. First, although the study adjusted for some confounders, there may be other potential confounders we do not have access to, such as lifestyle factors, which could alter the results. As such, future studies could replicate this study while accounting for additional confounders.

Secondly, the pharmaceutical register included data on prescriptions and dispatches of medications but not

necessarily on their use. Although usage may be inferred from their renewals and dispatches, this is not concrete and, therefore, future studies could obtain information on their usage to assess associations with shift work. Also, this study does not distinguish between types of psychotropic drugs within a particular classification in the analyses. The reason is that the same drugs can be used to treat different types of diagnoses.

Third, although we assessed multiple prescriptions, we did not adjust for prior prescriptions because we believed they were integral to the outcome in the follow-up year. Also, because we excluded those on sick leave in the previous year, we believed that not adjusting for prior PAD could bolster the assertion that shift work was associated with repeated prescriptions during follow-up. We also had no information on exposure to shift work before 2008. We acknowledge that these may have affected the results of this study. Future studies could increase the follow-up period and make these adjustments.

Lastly, this study does not assess causal relations between shift work and psychotropic medication prescriptions. To strengthen evidence for causality, future studies could assess how changes between different types of shifts or the reduction of night shifts could influence these prescriptions.

Concluding remarks

Our study showed that, compared to day-only work, shifts without nights were associated with a decrease in the rate of psychotropic drug prescriptions, while permanent night shifts were associated with an increase in the rate of psychotropic drug prescriptions, specifically anxiolytics and antidepressants, among nurses and nurse assistants. Frequency of both night shifts and ≥ 3 consecutive night shifts further affirmed the association between night work and an increased HR of psychotropic medication prescription. The study corroborates the significant link between night work and psychotropic medication prescriptions among healthcare professionals. Although selection cannot be ruled out, findings indicate the disruptive effects of night work on workers' circadian cycles.

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Data availability statement

The sensitive and confidential data used in this study

cannot be made public in accordance with the General Data Protection Regulation, the Swedish law SFS 2018:218, the Swedish Data Protection Act, the Swedish Ethical Review Act, and the Public Access to Information and Secrecy Act.

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Conflict of interest

None declared.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used Grammarly to edit the language. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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