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Sickness absence trajectories among young employees in their first full-time employment and subsequent long-term sickness absence: a Danish register-based cohort study

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ABSTRACT

Background Sickness absence (SA) poses an important and costly societal and public health challenge. However, no previous studies have investigated SA trajectories among individuals in their first full-time employment, delving into the contribution of early SA to future long-term absence among young employees. We aimed to identify SA trajectories in young full-time employees and explore them as risk markers for subsequent long-term SA (LTSA).

Method In a nationwide register-based cohort of 91 633 young employees (aged 15–30) entering the Danish labour market between 2010 and 2018, we applied group-based multi-trajectory modelling to identify SA trajectories based on daily information on SA during the first year of full-time employment. Proportional hazard models were used to examine associations between trajectory groups and subsequent 2-year risk of LTSA after the first year (>30 days).

Results A model with three distinct SA trajectory groups was selected: (1) no or few shorter SA spells (59% for women, 62% for men), (2) frequent shorter spells (36% for women, 34% for men) and (3) frequent longer spells (6% for women, 4% for men). A clear social and health gradient in SA trajectories was identified with individuals with frequent shorter or frequent longer SA spells having lower education and a history of mental health problems. Compared to having no or few shorter spells, belonging to trajectories with frequent shorter or longer spells was associated with higher risk of subsequent LTSA (fully adjusted HRs ranging from 1.82 to 2.21).

Conclusion Around 40% of young employees' SA was characterised by frequent shorter or longer spells during the first year of full-time employment, constituting an early risk marker for future LTSA. More attention should be paid to young individuals

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Extant knowledge suggests a recurrent nature of sickness absence (SA), with both frequent shorter and longer spells of SA being associated with an increased risk of long-term work absenteeism. However, knowledge regarding young employees at the start of their work life remained limited and only a limited number of studies had employed a multidimensional approach, considering both the frequency and duration of SA.

WHAT THIS STUDY ADDS

⇒ In this study, we used a nationwide register-based population including 91 633 young employees followed from their first year of full-time employment. Daily records on SA frequency and duration were used to identify three distinct SA trajectories. A clear social and health gradient was observed among individuals belonging to trajectories of SA characterised by either frequent shorter or frequent longer spells. These identified patterns served as crucial early risk markers for future long-term SA (LTSA).

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ From a societal and public health perspective, it is noteworthy that a clear association between frequent shorter SA and LTSA was already identified during the first year of full-time employment. Considering the labour shortages across various occupational groups, this underscores the importance of determining factors contributing to elevated SA patterns among young employees. To enhance existing knowledge, greater attention should be given to understanding why some young individuals, at the beginning of their work life, tend to experience higher rates of sick absence than others.

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who, at the beginning of their work life, show increased SA patterns.

INTRODUCTION

Sickness absence (SA) poses an important societal and public health challenge, leading to financial consequences due to workers' compensation and decreased productivity.[1 2] Studies have highlighted the recurring nature of SA, linking past SA to future SA.[3–5] This pattern has been confirmed in multiple cohort studies reporting both shorter (often defined as SA spells <7 days) and longer spells (≥7 days) of SA to be potentially early risk markers of long-term SA (LTSA) (>30 days) and disability.[6–8] Most SA research has modelled SA in one dimension, either focusing on the frequency of SA spells or the duration of SA. In 2020, Duchemin and Hocine conducted a scoping review, highlighting the current state of statistical methods for modelling SA data.[9] They proposed that a more nuanced approach, involving a multidimensional model that considers both the frequency and duration of SA, would advance our comprehension of the nature of SA.[9]

In Denmark, a large number of young individuals (63%) are employed in marginal part-time jobs while being enrolled in high school or university.[10–13] In contrast to young individuals in full-time employment, workers in marginal part-time jobs exhibit overall fewer days of SA,[13] possibly owing to increased flexibility in shifting or swapping schedules. Previous studies have highlighted age-related differences in SA patterns, such as shorter spells among young employees and longer spells among older ones.[12 14] However, despite these insights, most research on SA has predominantly focused on midlife or older employees in stable jobs,[15 16] leaving a substantial gap in understanding of the recurrent nature of SA among young employees.

A broader understanding of SA patterns as potential early risk markers for long-term absenteeism among younger employees could provide important insights for future public health strategies.[17] Therefore, the present study aims to (1) identify distinct SA trajectories among young employees in their first full-time employment, (2) describe these distinct SA trajectories characteristics and (3) assess whether they may function as early risk markers for subsequent risk of LTSA.

MATERIALS AND METHODS

Study design and participants

We used data from the Danish Work Life Course Cohort study,[18] an open register-based inception cohort including 579 114 young Danish employees who entered the Danish labour market for the first time between 2010 and 2018, while being aged 15–30 and followed up in national registers until 2020. Using the unique Danish social security number, we linked individual-level data on daily SA from the combined Danish Register of Work Absence (RoWA).[19] This database includes information on public employees and an annual sample of employees from medium to large private companies (≥10 employees).[19] Consequently, we were able to follow 301 778 individuals in RoWA for at least 1 year between 2010 and 2018. We excluded individuals who emigrated (n=397), received disability pension (n=150) or died (n=0) before or during their first year of employment. We also removed individuals because of unknown information on their sex (n=46). To identify those in their first full-time employment, we excluded employees with contracts of less than 32 work hours per week (n=209 552). The final study population consisted of 91 633 individuals, with the baseline year defined as their first full-time employment year between 2010 and 2018.

Sickness absence

From RoWA, we included data on all-length SA due to own sickness.[19] In the baseline year, we recorded the monthly number of SA spells (≥1 day) and the monthly number of days with SA during 12-month follow-up from 1 January to 31 December. The prospective outcome of LTSA was defined in the Danish Labour Market Account[20] between 2011 and 2020 as payment of SA benefits for more than 30 days in a 2-year period after the first year of full-time employment. In Denmark, if employees are unable to work due to illness or injuries, the employer is obligated to pay wages from the first day of absence. After 30 days of SA, the employer can request reimbursement for SA benefits from the municipality.[21]

Covariates

From Danish administrative registers,[22] we included data on sex (women, men), age, migration background (Danish, immigrant, descendent of immigrants), cohabitation (single, cohabited) and highest educational attainment (primary, secondary, vocational training, bachelor or higher). From the National Patient Register and the Psychiatric Central Research Register,[23] we identified individuals who had been diagnosed with any mental disorder using the International Classification of Diseases (ICD)-10 system (ICD-10: F00–F99) before labour market entry. As an indicator of health status, we included information on the annual number of health services used within primary healthcare (eg, general practitioner, physiotherapists, chiropractors) 1 year before baseline from the National Health Service Register.[23] At last, we included information on the employment sector (public, private), occupation (professionals, semiprofessional and clerical, routine) and industry (knowledge work, private service, care work and education, industrial work, building and construction, other). See online supplemental material appendix 1, (table S1) for grouping of occupation and industry.

Statistical analyses

Identifying distinct SA trajectories

To identify distinct SA trajectories within the first year of full-time employment, we used the group-based

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multi-trajectory model (GBMTM) with the PROC TRAJ procedure developed by Nagin *et al* for SAS 9.4.[24] A detailed description of the applied model is presented in online supplemental material appendix 2. Briefly, GBMTM is a statistical method for analysing longitudinal data to identify distinct groups sharing similar trajectories over time. Unlike traditional approaches, GBMTM examines multiple outcomes simultaneously and aims to identify subgroups with comparable trajectories across time.[24] Among women and men separately, we modelled SA trajectories using GBMTM, including simultaneous information on the monthly number of SA spells and the monthly number of SA days within the baseline year. To find the optimal number of SA trajectories, we used a random subsample of 5000 women and 5000 men and compared model fit for GBMTMs with one to eight SA trajectories. Following previous research and current recommendations,[25] we used three key factors to compare different statistical models and to assess how well the chosen model fitted our data: (1) the Bayesian information criteria (BIC; lower values indicate better model fit); (2) the average group probability (average values above 70% indicating a better model where more individuals are assigned group membership with high probability) and (3) a sufficient number of individuals in each trajectory group to ensure comparison (all groups should contain approximately 2% of the population or more). The best fitting model was chosen by authors JKS, KBC and IEHM based on these criteria. At last, the best-fitting model was applied to the full study population, and individuals were assigned to the SA trajectory group to which they had the highest probability of belonging.

Characteristics of SA trajectories

We investigated the SA trajectory groups for explanatory variables by comparing group prevalence across different factors within the baseline year. First, we compared yearly SA spells and yearly SA days across SA groups. Second, we compared prevalence across sociodemographic (age, migration background, cohabitation and highest educational attainment), health (history of mental disorder before labour market entry, and yearly number of health service use) and occupational factors (employment sector, occupation and industry). At last, we explored the first weekday of each SA spell within SA group membership, as we wanted to explore if the prevalence of the starting weekdays would be higher among individuals with frequent shorter spells of SA.[26]

SA trajectories as an early risk marker for LTSA

To determine whether SA trajectories during the first year of full-time employment could serve as an early risk marker for LTSA, we estimated Hazard Ratio (HR) and 95% CIs for the risk of LTSA, using a Cox proportional hazard model.[27] Fulfilment of the proportional hazards assumption was assessed by visual inspection of the log–log survival plots. We assessed the prospective risk of LTSA during a 2-year follow-up, from 1 January of the year following baseline to 31 December 3 years after baseline. Calendar time was used as the underlying time axis, and participants were censored at the first instance of migration (n=4336, defined in the Danish Civil Registration System[22]), disability pension (n=13, defined as outpayment of disability benefits in the Danish Labour Market Account[20]), death (n=38, defined in Danish Death Register[28]) or end of follow-up (31 December 2019). Associations were presented as crude LTSA cases per 1000 person-years and additionally adjusted for potential confounders in three models. In model 1, associations were adjusted for age (continuous). In model 2, we further included the employment sector (public, private) and years since labour market entry (continuous) to account for the uneven distribution of public and private employees in RoWA and cohort design. In model 3, we further included migration background (Danish, immigrant, descendent of immigrant), cohabitation (single, cohabited), educational attainment (primary, secondary, vocational training, bachelor or higher), history of any mental disorder (no, yea), annual health services used (0, 1–3, 4–7, 8–15, 16+), occupation (professionals, semiprofessionals and clerical, routine) and industry (knowledge work, private service, care work and education, industrial work, building and construction, other or unknown) to explore to what degree associations could be explained by additional potential confounders. All analyses were conducted separately for women and men.

Supplementary analyses

We conducted three sensitivity analyses. First, we investigated effect modification by a history of mental disorder (yes/no) for the association between SA trajectories and LTSA, as mental health has been identified as an important predictor of SA.[16] Second, we analysed the association between SA trajectories and LTSA among public employees, as RoWA only include a yearly sample of private employees from companies with more than 10 employees. Third, we stratified analyses by the occupational group, to explore if SA trajectories served as an early risk marker for LTSA differently across industries.

Patient and public involvement

Key stakeholders contributed to the development of research questions and the study design by providing input from the early stages of the grant application. While patients were not involved in setting the research question or the outcome measures, nor in developing plans for the design, conduct, or implementation of the study, the National Research Centre for the Working Environment incorporated patient and public involvement through established advisory boards as part of its research and dissemination strategy. The results of the study will be discussed with key stakeholder representatives and disseminated to the Danish public. This will be achieved by providing Danish summaries of the study results published online, delivering these summaries

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to key stakeholders via newsletters, and presenting the results at public seminars.

RESULTS

Table 1 shows the study population characteristics of the 91 633 young individuals in their first year with full-time employment (baseline year), including a similar proportion of women (n=44 720, 48.8%) and men (n=46 913, 51.2%) with a mean age of 22.5 years (SD 4.3) and 22.7 years (SD 4.4), respectively. A large proportion (women: 40.9%, men: 41.7%) had low educational attainment with only primary school, whereas 17.2% (women) and 19.4% (men) had high education with a bachelor's degree or higher degree. Most women worked in semiprofessional and clerical occupations (54.8%), including sales and service work, and most men worked in a routine occupation (43.5%).

SA trajectories during the first year with full-time employment

We selected a model with three distinct SA groups based on our criteria of low BIC, high average group probability (>70%) and at least 2% in each trajectory (online supplemental material appendix 3 (table S3 and figure S1)). Table 2 and figure 1 present SA characteristics during first full-time employment across the three identified SA groups. Among women (58.6%) and men (61.8%), the most common SA groups were labelled 'no or few shorter SA spells', characterised by either no SA or few short-term SA spells of one to 2 days during their first year of full-time employment (table 2 and figure 1). A second SA group was labelled 'frequent shorter SA spells' and comprised approximately one-third of the women (35.9%) and men (33.8%). This group was characterised as having more frequent SA spells spanning one or 2 days. Among women, the yearly average number of SA spells within the first year of employment was 5.6 with an average length of 3.1 days. Among men, the yearly average number of SA spells was 4.2 with an average length of 2.5 days. A small proportion (women: 5.5%, men: 4.4%) was assigned to the third SA group labelled 'Frequent longer SA spells'. This group was characterised by a higher number of longer SA spells with on average 14.0 and 11.2 yearly SA spells with an average length of 4.7 and 4.1 SA days among women and men, respectively.

Characteristics of individuals within the SA groups

Among both women and men, individuals with frequent shorter or frequent longer SA were, compared with individuals with no or few shorter SA spells, younger (figure 2A), less educated (figure 2B) and more often had a history of mental disorders (figure 2C). Frequent longer SA spells, compared with no or few shorter SA spells, were more common within care work and education and among men working within building and construction (online supplemental material appendix 3 (table S5 and figure S2)). Across the three SA groups, most SA spells started on a Monday (women: 25.5% and men: 28.7%) and we found overall no indication of differences in the start day across SA trajectories or sex (online supplemental material appendix 3 (figure S3)).

SA groups and subsequent LTSA

We identified 2386 (5.3%) and 1573 (3.4%) cases of at least one LTSA during 2 years of follow-up (mean follow-up 1.5 years) among women and men, respectively. Among both women and men, SA group membership was associated with LTSA (table 3). Women in the SA group with frequent shorter SA and women in the SA group with frequent longer SA had, compared with women in the SA group with no or few shorter SA spells, HRs (95% CI) of LTSA of 2.14 (1.96 to 2.33) and 2.55 (2.20 to 2.96), respectively (model 2). Among men, the corresponding HRs of LTSA were 2.23 (2.01–2.48) (frequent shorter SA) and 2.89 (2.39–3.50) (frequent longer SA), respectively (model 2). In fully adjusted analysis, associations attenuated but remained significant: HR of 1.82 (1.66–1.99) and 1.90 (1.63–2.22) among women and HR of 1.90 (1.70–2.11) and 2.21 (1.82–2.69) among men for frequent shorter and frequent longer SA spells compared with no or few shorter SA spells, respectively (model 3).

Supplementary analyses

In supplementary analyses (online supplementary material appendix 4 (table S6)), we found that SA groups of frequent shorter and frequent longer SA spells were associated with a higher risk of LTSA among both women and men in those individuals with and without a history of mental disorder when compared with individuals in the SA group with no or few shorter SA spells. Among individuals with a history of mental disorders, the associations were weaker with HRs of 1.51 (1.18–1.93) and 1.50 (1.10–2.05) for frequent shorter SA spells, and 1.44 (1.02–2.04) and 2.15 (1.35–3.41) for frequent longer SA spells for women and men, respectively. Stratified by industries, all categories showed similar associations.

DISCUSSION

In a cohort of 91 633 young Danish employees in their first full-time employment, we sought to identify distinct SA trajectories and examine their associations with subsequent LTSA. We found that most of the young employees were categorised as having no or few shorter SA spells and around one-third were categorised as having frequent shorter SA spells. A small proportion of individuals (5%) were categorised as having frequent longer SA spells. We found a strong social and health gradient within SA groups with low age, low educational attainment and a history of mental disorders being more prevalent among individuals with both frequent shorter and longer SA spells compared with individuals with no of few shorter SA spells. In prospective analyses, we found frequent shorter and frequent longer SA trajectories to be associated with subsequent higher risk of LTSA during 2 years of follow-up.

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Table 1 Characteristics of young (aged 15–30) Danish individuals in their first full-time employment (baseline) between 2010 and 2018 across sociodemographic, health and occupational factors for women (n=44 720) and men (n=46 913)

	Women		Men	
Baseline-year characteristics	**n**	**%**	**n**	**%**
Total	44 720	100.0	46 913	100.0
Age in years: mean (SD)		22.5 (4.3)		22.7 (4.4)
15–19	13 125	29.3	13 033	27.8
20–25	16 808	37.6	17 446	37.2
>25	14 787	33.1	16 434	35.0
Educational level				
Primary	18 312	40.9	19 579	41.7
Secondary	9893	22.1	9575	20.4
Vocational training	7434	16.6	6707	14.3
Bachelor or higher	7684	17.2	9119	19.4
Unknown	1397	3.1	1933	4.1
Cohabitation				
Single	18 767	42.0	22 300	47.5
Cohabited	25 953	58.0	24 613	52.5
History of hospitalisation with any mental disorder				
No	41 352	92.5	43 320	92.3
Yes	3368	7.5	3593	7.7
Annual health service use				
0	7783	17.4	16 623	35.4
1–3	5610	12.5	10 862	23.2
4–7	7648	17.1	8785	18.7
8–15	10 829	24.2	6777	14.4
16+	12 844	28.7	3861	8.2
Employment sector				
Public	42 665	95.4	43 456	92.6
Private	2055	4.6	3 457	7.4
Occupation				
Professionals	9402	21.0	9625	20.5
Semiprofessional and clerical	24 510	54.8	16 833	35.9
Routine	10 761	24.1	20 411	43.5
Unknown	46	0.1	44	0.1
Industry				
Knowledge work	5357	12.0	7924	16.9
Private service	19 500	43.6	21 422	45.7
Care work and education	15 561	34.8	7656	16.3
Industrial work	3156	7.1	6743	14.4
Building and construction	227	0.5	2462	5.2
Other or unknown	919	2.1	706	1.5
Sickness absence (SA) characteristics				
Yearly SA spells: mean (SD)		3.3 (3.8)		2.2 (3.0)
Yearly SA days: mean (SD)		10.7 (24.1)		6.0 (14.9)

SA, sickness absence; SD, standard deviation.

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Table 2 Sickness absence (SA) characteristic across SA trajectory groups among young Danish women (n=44 720) and men (n=46 913) in their first full-time employment between 2010 and 2018

	N (%)	SA spells Mean (SD)	SA days Mean (SD)	Length of SA spells Mean (SD)
Women				
No or few shorter SA spells	26 207 (58.6)	0.96 (1.10)	1.41 (1.68)	1.48 (2.44)
Frequent shorter SA spells	16 037 (35.9)	5.55 (2.28)	17.39 (20.77)	3.13 (3.95)
Frequent longer SA spells	2476 (5.5)	13.95 (3.97)	65.14 (59.07)	4.67 (4.44)
Men				
No or few shorter SA spells	28 997 (61.8)	0.51 (0.75)	0.71 (1.06)	1.38 (2.90)
Frequent shorter SA spells	15 859 (33.8)	4.20 (1.95)	10.41 (9.45)	2.48 (2.53)
Frequent longer SA spells	2057 (4.4)	11.25 (3.51)	46.59 (46.70)	4.14 (4.35)

SD, standard deviation.

Comparison with the previous literature

To the best of our knowledge, this study is the first to investigate SA trajectories among young individuals in their first full-time employment. The study population consisted of relatively young employees (mean age 23) with mostly primary or secondary education, consistent with some of the young individuals entering their first full-time employment between educations. Consequently, findings from prior studies on SA trajectories in midlife and older employees make direct comparison with our study difficult. However, previous research on employees of all ages has found similar trajectories.[29] Similar to our finding, a study representative of Finnish working-aged employees identified three distinct SA groups characterised as low (54%), slowly increasing (34%) and high (12%) SA periods, with clear differences across education and health.[29] This study was, however, limited to only model trajectories based on the dimension of SA (frequency).

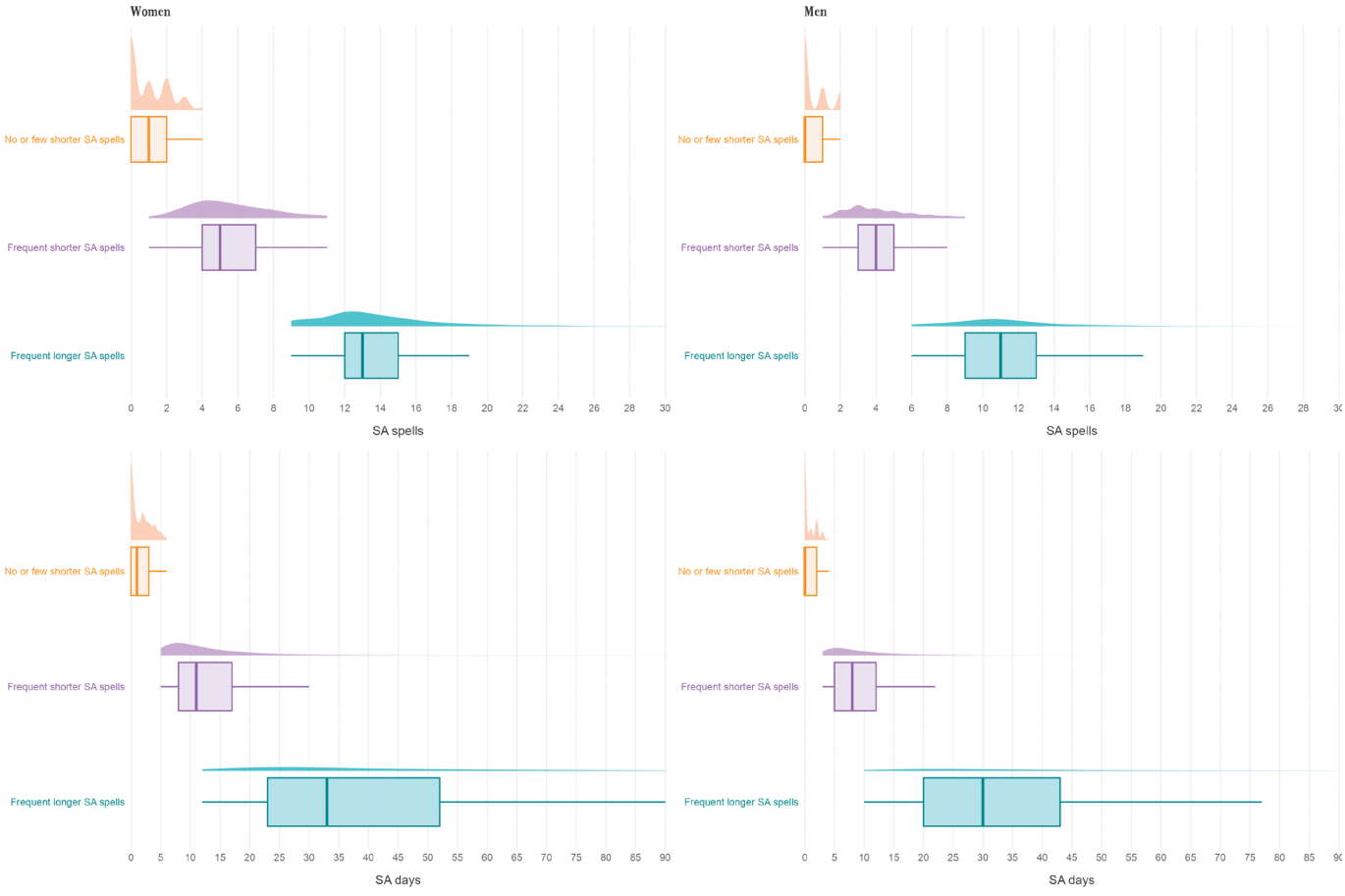

Figure 1 Raincloud plot of sickness absence (SA) spells and SA days across SA groups for young Danish women (n=44 720) and men (n=46 913) in their first full-time employment between 2010 and 2018.

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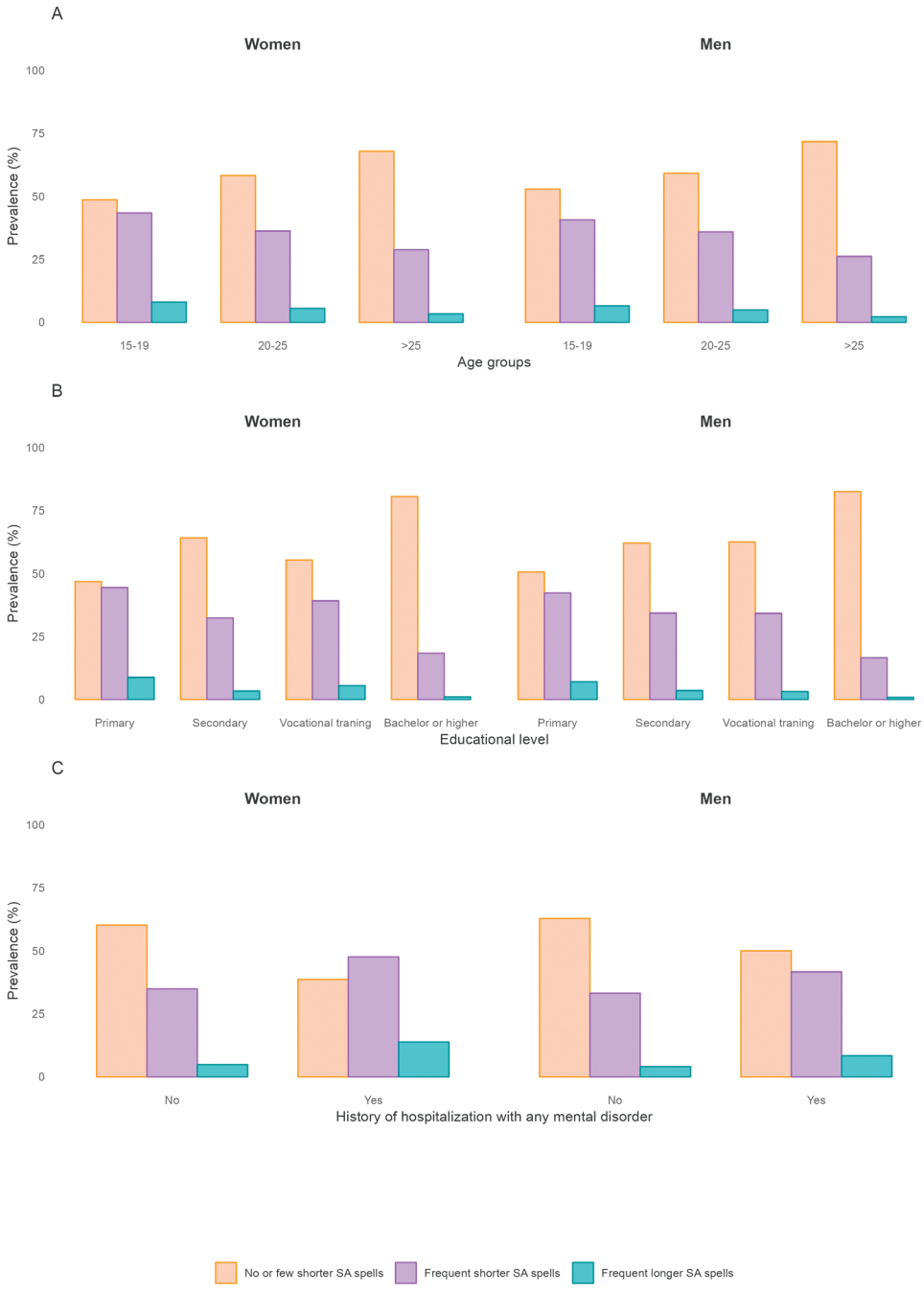

Figure 2 Prevalence of sickness absence (SA) groups across age (A), educational level (B) and history of mental disorder before labour market entry (C) for young Danish women (n=44 720) and men (n=46 913) in their first full-time employment between 2010 and 2018.

Only few studies have investigated SA trajectories using a multidimensional approach. One study analysing data from Finish public employees revealed that young employees (aged 20–34) experiencing frequent short SA spells had a significantly higher risk of subsequent LTSA due to mental disorders.[7] This result corresponds to the findings from our study indicating that frequent shorter and frequent longer SA spells may be an important early risk marker for LTSA among young employees. We encourage future studies to identify SA trajectories separately for younger employees and to model SA using both frequency and duration when possible.

SA trajectories and subsequent LTSA

In this study, we identified a group of young individuals with frequent shorter and frequent longer spells of SA who, compared with individuals with no or few shorter SA spells, had a markedly higher risk of LTSA two years after their first full-time employment. We know from previous studies that longer spells of SA are associated with future risk of LTSA in working-aged employees (aged 18–59).[6] The results of this study enhance the existing knowledge[7 30] by showing that both frequent shorter and frequent longer SA spells are important early risk markers for LTSA among young workers in full-time employment,

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Table 3 Association between sickness absence (SA) groups and 2-year risk of long-term sickness absence (LTSA) among young Danish women (n=44 720) and men (n=46 913) in their first full-time employment between 2010 and 2018

	PY	LTSA cases	Cases per 1000 PY	HR (95% CI) Crude	HR (95% CI) Model 1	HR (95% CI) Model 2	HR (95% CI) Model 3
Women							
No or few shorter SA spells	40 509	964	23.8	1.00	1.00	1.00	1.00
Frequent shorter SA spells	23 825	1205	50.6	2.17 (2.00 to 2.36)	2.10 (1.92 to 2.29)	2.14 (1.96 to 2.33)	1.82 (1.66 to 1.99)
Frequent longer SA spells	3581	217	60.6	2.62 (2.26 to 3.04)	2.48 (2.13 to 2.88)	2.55 (2.20 to 2.96)	1.90 (1.63 to 2.22)
Men							
No or few shorter SA spells	44 910	662	14.7	1.00	1.00	1.00	1.00
Frequent shorter SA spells	23 334	781	33.5	2.26 (2.04 to 2.51)	2.23 (2.00 to 2.47)	2.23 (2.01 to 2.48)	1.90 (1.70 to 2.11)
Frequent longer SA spells	2966	130	43.8	2.98 (2.48 to 3.59)	2.89 (2.39 to 3.49)	2.89 (2.39 to 3.50)	2.21 (1.82 to 2.69)

Model 1: adjusted for age. Model 2: further adjusted for the employment sector, and years since labour market entry. Model 3: further adjusted for migration background, cohabitation, educational attainment, history of hospitalisation with any mental disorder, health service use, occupation and industry.
PY, person-years.

even after adjustment for socioeconomic position and health. However, some questions still remain about the causality of the associations. To expand the existing literature further, identifying underlying predictors of different SA trajectories is of great interest. According to the International Classification of Functioning, Disability and Health, absence from work due to sickness can be seen as a temporary impairment of workability, which is not only a biological and medical phenomenon but also a phenomenon affected by individual functioning, participation, and environmental factors.[31] Individual factors such as work environmental factors, illness behaviour and family situation[16] might be important predictors of SA and potential long-term consequences. To expand our knowledge, future studies should focus on exploring the reasons why some young individuals at the beginning of their work life more often call in sick than others.

Strengths and limitations

We were able to identify more than 90 000 younger employees in their first full-time employment between 2010 and 2018. With data on daily SA for all public employees and a sample of private employees, we were able to identify SA trajectories based on both the frequency and duration of SA spells using the GBMTM approach, which has been suggested to enhance the understanding of the nature of SA trajectories.[9] Furthermore, the large study population made subgroup analysis across individual health and industry possible. However, this study was limited to only a sample of private employees from companies with 10 or more employees, and hence findings from this study are not generalisable to all private employees. Additionally, information on the start and end date of employment was not available and hence we were not able to account for some employees starting their first full-time employment during follow-up. However, we accounted for months with unemployment benefits during follow-up (see online supplemental material appendix 2) to account for some individuals not being at risk of SA while not working. Furthermore, SA might differ across occupational groups. In some occupational groups, such as knowledge workers, employees with reduced workability might be able to avoid SA by working with less intensity and in some occupational groups, such as care workers or teachers, employees might be encouraged to call in sick to minimise the spread of infections to patients, colleagues or students. Such occupational differences might have affected the trajectory group membership. However, supplementary stratified analyses by occupational group indicated an overall similar association between SA trajectories and subsequent risk of LTSA. While register data are comprehensive and large, it is a limitation that we were not able to control for potentially important covariates such as health behaviour, which might to some degree explain some of the association between the SA group and the subsequent risk of LTSA. However, after additionally controlling for sociodemographic and socioeconomic positions and health markers, the associations attenuated but remained statistically significant. At last, in this study, we only focused on first full-time employees with a working time of 32 hours or more a week. We know from previous research that many young individuals are

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working in marginal part-time jobs while they are studying.[10–13] Compared with young full-time employed, young marginal part-time workers have overall fewer days with SA,[13] which might be attributed to increased flexibility in swapping or altering shifts when being unable to work due to sickness. Hence, as the group of young employees is very diverse, results from this study should not be generalised to young employees in marginal part-time work.

CONCLUSION

Most young employees' (both women and men) SA were characterised by no or few shorter SA spells during their first year of full-time employment. One-third had more frequent shorter SA spells and around 5% had frequent longer SA spells. We found a social and health gradient in SA trajectories, with individuals with frequent shorter or frequent longer SA spells having lower education and a history of mental health problems. Prospective analyses indicated that SA trajectories within the first full-time employment are important early risk markers for subsequent risk of LTSA. To facilitate effective action and intervention based on these findings, more attention should be paid to young individuals who, at the start of their working life, already show increased SA.

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