Thieme

Age- and occupation-dependent differences in sick leave due to varicose veins in the lower extremities

Berufsgruppen- und altersabhängige Unterschiede in der Arbeitsunfähigkeit durch Varizen der unteren Extremitäten

Authors
Claudia Brendler[1,2], Falk Liebers[1], Jacqueline Müller-Nordhorn[2,3], Ute Latza[1,2]

Affiliations
1 Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, Berlin
2 Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin, Humboldt-Universität zu Berlin, and Berlin Institute of Health, Berlin School of Public Health
3 Bavarian Federal Institute for Cancer Registration, Bavarian Health and Food Safety Agency

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Correspondence
Claudia Brendler, MPH
Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA)
Nöldnerstraße 40/42
10317 Berlin
Tel.: +49 30 51548 4230
Email: brendler.claudia@baua.bund.de

ABSTRACT

Aim/Background Sick leave caused by venous diseases occurs frequently. The occurrence of such sick leave events depends on occupational requirements. The aim is to clarify whether occupation specific differences in the incidence of sick leave events due to the ICD-diagnosis "varicose veins of lower extremities" vary depending on age.

Methods The study is based on secondary analysis of sick leave data from almost all German statutory health insurance providers in 2008. The database consists of sex-stratified aggregated data of 26.2 million compulsory insured. The number of sick leave events stratified by sex and age were calculated. Indirectly standardized morbidity ratios for the events of sick leave stratified by age and occupational group were estimated.

Results Employees in manufacturing occupations with lower and medium skill level are especially often on sick leave because of varicose veins. In both genders, we found in all age groups at least one and a half as many sickness absences cases of varicose veins as in qualified sales and administrative occupations (reference group). In the age group of 33–44 year olds, employees in the lower qualified administrative occupations were one and a half time on sick leave as in the reference group. Variations of effects due to age were found.

Discussion/Conclusion As more elderly employees are to be expected in the future (postponement of retirement, improved medical care, increases in the share of older people among gainfully employed persons) prevention in the workplace should be strengthened (also in the context of preventive health care). A specific emphasis should be laid on production occupations and low skilled occupations.

ZUSAMMENFASSUNG

Hintergrund/Zielsetzung Arbeitsunfähigkeit (AU) durch Venenerkrankungen ist relativ häufig. Sie ist bei Erwerbstätigen abhängig von der beruflichen Tätigkeit. Es soll geklärt werden, ob berufsspezifische Unterschiede im Auftreten von AU-Ereignissen aufgrund der ICD 10-Diagnose „Varizen der unteren Extremitäten" zudem abhängig vom Lebensalter sind.

Methodik Die Untersuchung basiert auf einer Sekundärdatenanalyse von AU-Daten fast aller gesetzlichen Krankenkassen Deutschlands des Jahres 2008. Es liegen geschlechtsstratifizierte, aggregierte Daten von 26,2 Mio. gesetzlich pflichtversicherten Erwerbstätigen vor. Berechnet werden AU-Fallzahlen stratifiziert nach Geschlecht und Alter sowie indirekt standardisierte Morbiditätsratios für das Auftreten von AU-Fällen nach Alter und Berufsgruppen stratifiziert.

Ergebnis Beschäftigte in Produktionsberufen mit geringem und mittlerem Qualifikationsniveau sind aufgrund von Varizen besonders häufig arbeitsunfähig. In beiden Geschlechtern treten in allen Altersgruppen mindestens anderthalbmal so viele AU-Fälle wie bei qualifizierten kaufmännischen und Verwaltungsberufen (Referenzgruppe) auf. In der Altersgruppe der 35- bis 44-Jährigen sind Beschäftigte in gering qualifizierten Verwaltungsberufen ebenfalls anderthalbmal häufiger

arbeitsunfähig als in der Referenzgruppe. Variationen der Effekte über das Lebensalter sind nachweisbar.

Diskussion/Zusammenfassung Da in Zukunft mehr ältere Erwerbstätige zu erwarten sind (Verschiebung des Rentenalters, bessere medizinische Versorgung, Erhöhung des Anteils der Erwerbstätigkeit bei Älteren), sollte die Prävention im Betrieb (z. B. im Rahmen der arbeitsmedizinischen Vorsorge) verstärkt werden. Ein besonderer Schwerpunkt sollte in Produktionsberufen sowie grundsätzlich in Berufen mit geringer Qualifikation liegen.

Background and research question

Background

Cardiovascular diseases (CVD) account for a large proportion of morbidity and mortality in industrialised countries (1). In Germany they are responsible for approx. 40 % of all deaths, approx. 15 % of hospital cases and the highest costs in the healthcare sector (2, 3). It is often only the economic impact of diseases of the heart and arterial vessels that is considered. However, the socioeconomic importance of diseases of the veins and lymphatic system is also considerable. These diseases account for approx. 5 % of the sickness costs of CVD, almost as much as myocardial infarctions (4). Almost one-third is caused by varicose veins of the lower extremities, coded as I83 in ICD 10. The importance of vascular diseases – and venous diseases in particular – for the workforce has not been researched sufficiently.

This paper presents a descriptive analysis, based on the sick leave data of the German statutory health insurance providers from the year 2008, of occupation-related differences in the occurrence of sickness absence due to varicose veins of the legs, controlled for age and stratified for age.

Importance

Varicose veins are a frequent treatment diagnosis in general practice (rank 14) (5). Varicose veins are a chronic disease that can lead to sickness absence as well as early retirement. They cause approx. 8 % of all sick leave events and days lost through sickness due to CVD (6). Not all patients have clinically relevant symptoms. If left untreated, varicose veins often lead to complications such as chronic oedema, trophic skin changes, venous leg ulcer, deep venous incompetence, inflammation and an increased risk of thrombosis.

Operations on epifascial veins are some of the most common surgical procedures in Germany. It is estimated that every year more than 350,000 operations are performed for varicose veins (7). In 2015, there was a total of approx 93,000 full inpatient hospital admissions because of varicose veins (approx. 34,000 men and 59,000 women) and 140,000 full inpatient surgeries (approx. 49,000 men and 91,000 women). The number of cases increases continually with age. The age-specific number of cases rises from 50 cases per 100,000 inhabitants among 15- to 44-year-olds to 162 cases per 100,000 inhabitants among 45- to 64-year-olds (8).

Frequencies

Varicose veins of the lower extremities are the most common disease of the veins. Depending on the definition and the population investigated, the reported frequencies differ widely. In population-based studies, the prevalence is quoted as between 14 % and 30 % (9–11). In 2015, there were more than 94,000 cases of sickness absence due to varicose veins, nearly 60,000 among women and more than 34,000 among men (6).

Data from Germany about the effect on the ability to work are so far limited to the Tübinger Vein study of 1979. About 5 % of patients with varicose veins suffered severe restrictions at work. 45 % of these patients were absent from work for at least six weeks and 55 % had to change their job, retrain or give up work completely (12). For 2015, the pension insurance reported 58 retirements per 100,000 insured persons because of reduced ability to work caused by varicose veins (13).

Risk factors

The formation of varicose veins is a multifactorial event. Widely recognised risk factors are age, female gender and the combination of genetic disposition with mechanical factors such as prolonged standing, obesity or pregnancies. Other general influences, such as social status, the intake of oral contraceptives, low physical activity, chronic constipation, increased height and weight, arthritis as well as alcohol consumption and smoking, are being discussed to some extent controversially. Associations with diseases of the arterial vascular system, such as hypertension and arteriosclerosis have also been described (14–25).

The history of medicine has long recognised – and epidemiological studies have demonstrated – the connection between prolonged standing at the workplace (more than 4 hours) and the occurrence of varicose veins. Although not all authors agree, the connection has been confirmed in many recent investigations (10, 11, 17, 22, 26, 27). Predominantly sedentary activities have been variously described as a possible risk (17), without effect (22) or protective (19). Individual studies have reported other occupational risk factors such as the occupational status as a manual worker (11), heavy lifting and carrying (28,29), working in closed rooms (29) and occupational exposure to heat and humidity (30).

The Federal Institute for Vocational Education and Training (BIBB) in cooperation with the Federal Institute for Occupational Safety and Health (BAuA) regularly conducts the BIBB/BAuA employment survey. In the 2012 survey (31), employees (men and women) who often have to stand, reported complaints due to swollen legs twice as often as those who never had to stand (13.5 % vs. 6.6 %). Pain in the legs and feet were reported five times more frequently (29.2 % vs. 5.9 %) (our own calculations). Overall, women complained of symptoms in the legs more often than men.

Research question

Due to demographic trends and the statutory postponement of the retirement age until 67, sick leave due to varicose veins is likely to increase, since they occur increasingly with age. Because the re-

▶ **Tab. 1** Number of cases and days of sick leave events due to "Varicose veins of the lower extremities", stratified according to sex and age (5 age groups), Germany 2008.

	Men					Women				
Age (years)	Number insured	Sick leave cases	Cases/1,000 insured	Days off sick	Days/ case	Number insured	Sick leave cases	Cases/1,000 insured	Days off sick	Days/ case
15 to 24	2,155,260	725	0.34	8,756	12.1	1,777,943	1,091	0.61	12,000	11.0
25 to 34	3,149,471	3,040	0.97	46,245	15.2	2,695,645	5,025	1.86	64,908	12.9
35 to 44	3,575,320	7,992	2.24	137,167	17.2	3,195,389	14,674	4.59	219,886	15.0
45 to 54	3,214,339	11,732	3.65	214,517	18.3	3,237,518	20.873	6.45	346,474	16.6
55 to 64	1,635,679	8,798	5.38	180.811	20.6	1,539,247	13,279	8.63	253,799	19.1
Total	13,730.069	32,287	2.35	587,496	18.2	12,445,742	54,942	4.41	897,067	16.3

quirements imposed by jobs differ, it is important to know the occupation-dependent association between age and sickness abscence.

In the regularly published statistics of the health insurance providers and the Federal Government about persons insured through statutory schemes, cases of sick leave and days lost due to sickness for both sexes are aggegrated according to diagnosis – as well as also sometimes due to age or occupational group (6). Previous analyses of sickness absence due to varicose veins of the legs have not considered either occupation or dependency of age for the occurrence of sick leave due to varicose veins.

This paper examines the occurrence of cases of sick leave due to "varicose veins of the lower extremities" (I83) between different occupational groups. Age-dependent and occupation-dependent patterns are investigated. It is assumed that the standardised morbidity ratio (SMR) in the affected occupational groups is increased, especially in the young to middle-aged classes and that there is an approximation to the reference group with age, because varicose veins at a young age are less common and a healthy worker effect is likely in older persons.

The results are described separately for men and women.

Methods

Basis of the data

The analysis presented in this paper was part of a research project of the BAuA (F2255) using secondary data (32). This project used aggregated data from almost all German statutory health insurance providers (GKV) about sick leave in Germany for the calendar year 2008. Information was obtained from the insurance companies: AOK, BKK, IKK, BARMER, TK, DAK, GEK and the Knappschaft for a total of 26.2 million insured employees. The data was transferred as five age groups from 15 to 64 years.

The number of sick leave events and days lost due to sickness caused by the 22 most common CVD diagnosis (Chapter IX, ICD-10) (33) including the diagnosis I83 Varicose veins of the lower extremities were available separately for both sexes.

The dataset, with a total of 13.7 million men and 12.5 million women, is an almost complete picture of the workforce compulsorily insured with the GKV in 2008. The age range of 35–44 years (3.6 million men and 3.2 million women) has the largest share of workforce, whilst those aged between 55 and 64 years (1.6 million men, 1.5 million women) have the least share (▶ **Table 1**).

Data analysis

Information about occupation was coded with a three digit number according to the German classification of occupations (34). The occupational groups were formed corresponding to the Blossfeld Classification (35). This then classifies the 336 occupations into 12 occupational groups corresponding to skill level and job requirements. ▶ **Table 2** and ▶ **Table 3** list the information about the group size for men and women. A more detailed description can be found in Liebers et al. 2016 (32).

Only the results for cases of sick leave events are shown in this paper. For information on relative frequencies, the number of sick leave events per diagnosis took into account the number of insured per age group and occupation (or occupational group). SMRs as the ratio of observed to expected number were calculated as the effect estimator. The SMR is interpreted as relative risk.

- The general occupational group-specific SMR is standardised indirectly. Age and insurance scheme membership were controlled for. All calculations were stratified for sex. The reference group for the analysis were office workers and skilled sales and administrative occupations respectively. The choice was based on the high number of such employees of both sexes and the relatively limited physical strains and stresses.
- To calculate any change in the occupation-specific SMR with age, the calculation was always made for subjects of an occupational group within one of the five age groups compared to subjects in the reference occupational group of the same age group. In this case, the indirect standardisation only took into account the insurance scheme membership.

Exact confidence intervals (CI) were calculated for the SMR. Enlarged 99.99 % CI were used because of the multiple testing. Effect estimators with a CI of the SMR that did not include 1 were assessed as significant.

▶ **Tab. 2** Standardised morbidity ratio with 99.99 % confidence interval (CI) of age- and occupation-specific sickness absence due to the diagnosis "Varicose veins of the lower extremities" compulsorily insured of employees in Germany 2008, men. Standardised for the statutory health insurance providers.

	Insured	Standardised morbidity ratio [99.99 % CI]					
Occupational group according to Blossfeld 1985		**15–24 years**	**25–34 years**	**35–44 years**	**45–54 years**	**55–64 years**	**Total**
Skilled manual occupations	3,538,972	1.21 [0.96–1.49]	1.94 [1.71–2.20]	1.74 [1.61–1.88]	1.60 [1.50–1.71]	1.50 [1.39–1.61]	1.61 [1.55–1.68]
Low-skilled manual occupations	2,951.981	1.19 [0.84–1.61]	1.97 [1.72–2.25]	1.77 [1.63–1.92]	1.52 [1.42–1.62]	1.55 [1.43–1.68]	1.61 [1.55–1.68]
Low-skilled administrative occupations	542,660	1.08 [0.48–2.04]	1.20 [0.82–1.70]	1.47 [1.18–1.82]	1.20 [0.97–1.47]	1.11 [0.86–1.41]	1.24 [1.10–1.40]
Low-skilled service sector occupations	2,333,934	1.29 [0.80–1.96]	1.70 [1.43–2.01]	1.18 [1.06–1.31]	1.15 [1.06–1.25]	1.11 [1.01–1.21]	1.18 [1.12–1.24]
Skilled service sector occupations	318,130	0.58 [0.08–1.97]	1.25 [0.74–1.96]	1.12 [0.81–1.51]	1.17 [0.90–1.49]	1.19 [0.87–1.59]	1.16 [0.99–1.34]
Agricultural occupations	309,992	1.12 [0.40–2.41]	1.47 [0.83–2.38]	1.34 [0.98–1.77]	1.06 [0.81–1.35]	1.03 [0.75–1.38]	1.15 [0.98–1.33]
Technicians	667,643	0.35 [0.03–1.27]	1.08 [0.70–1.57]	1.39 [1.14–1.68]	1.05 [0.88–1.25]	0.97 [0.79–1.17]	1.09 [0.99–1.21]
Semiprofessionals	404,730	1.11 [0.34–2.60]	1.40 [0.89–2.10]	1.24 [0.94–1.60]	0.93 [0.72–1.17]	1.07 [0.81–1.38]	1.08 [0.94–1.24]
Managers	221,965	1.27 [0.05–5.83]	0.76 [0.34–1.42]	0.56 [0.31–0.92]	0.90 [0.62–1.27]	0.93 [0.65–1.29]	0.82 [0.66–1.01]
Engineers	331,193	0.79 [0.01–4.35]	0.60 [0.32–1.01]	0.70 [0.46–1.01]	0.83 [0.57–1.15]	0.82 [0.56–1.15]	0.76 [0.62–0.91]
Professionals	133,762	0.00 [0.00–0.00]	0.29 [0.07–0.76]	0.50 [0.20–1.00]	0.65 [0.30–1.22]	1.05 [0.53–1.84]	0.61 [0.41–0.86]
Unclassifiable	345,331	0.74 [0.37–1.29]	1.03 [0.53–1.80]	0.81 [0.46–1.31]	0.74 [0.47–1.09]	0.42 [0.21–0.74]	0.70 [0.55–0.88]
Skilled administrative occupations	1,636,398	1 (reference)	1 (reference)	1 (reference)	1 (reference)	1 (reference)	1 (reference)
Sick leave events/10,000 in reference (raw)		3	6	14	26	37	15

Only information on sex, age group and health insurance provider could be taken into account as covariables in the calculation. Other information such as socioeconomic status, income, education, constitution or disposition was not available.

The relational database Microsoft Access 2003 was used for data management and statistical analyses.

Results

Age-specific sick leave events

In 2008, 87,229 sick leave events due to varicose veins of the legs were observed in employees aged 15 to 64 years. In the men, 32,287 sick leave events (2.1/1,000 employees) led to 587,496 days lost due to sickness (42.8/1,000 employees). In the women, the 54,942 sick leave events (4.1/1,000 employees) led to 897,067 days lost due to sickness (72.1/1,000 employees). The average duration of sick leave was 18.2 days among men and 16.3 days among women. Both men and women showed an age-dependent increase in sick leave. Similarly, the absolute number of sick leave events increased in both sexes with age (see ▶ **Table 1**). More details can be found in Liebers 2016 (32).

Occupation-specific sick leave

Compared to the reference group, more sick leave events due to varicose veins occurred in workers in skilled manual occupations (♂ SMR 1.61; CI: [1.55–1.68] and ♀ SMR 1.73 [1.61–1.84]), in low-skilled manual occupations (♂ SMR 1.61 [1.55–1.68] and ♀ SMR 1.51 [1.43–1.58]), in low-skilled administrative occupations (♂ SMR 1.24 [1.10–1.40] and ♀ SMR 1.39 [1.34–1.45]) and in low-skilled service sector jobs (♂ SMR 1,18 [1.12–1.24] and ♀ SMR 1.35 [1.30–1.41]). Among women – but not among men – more varicose vein-related sick leave events also occurred in semi-professional occupations[1] (SMR 1.23 [1.18–1.29]), the skilled service

1 Semiprofessional: service sector occupations characterised by the need for advanced knowledge and skills, e. g. nurses, social workers, social education workers, primary (elementary) and secondary school teachers in contrast to the professions: liberal professions and highly qualified service professions, e. g. doctors, dentists, pharmacists, lawyers, grammar school teachers, social scientists and humanities graduates

▶ **Tab. 3** Standardised morbidity ratio with 99.99 % confidence interval (CI) of age- and occupation-specific sickness absence due to the diagnosis "Varicose veins of the lower extremities" compulsorily insured of employees in Germany 2008, women. Standardised for the statutory health insurance providers.

	Insured	Standardised morbidity ratio [99.99 % CI]					
Occupational group according to Blossfeld 1985		**15–24 years**	**25–34 years**	**35–44 years**	**45–54 years**	**55–64 years**	**Total**
Skilled manual occupations	482,647	1.29 [0.77–2.01]	2.16 [1.70–2.70]	1.72 [1.49–1.96]	1.68 [1.50–1.87]	1.74 [1.53–1.97]	1.73 [1.61–1.84]
Low-skilled manual occupations	842,681	1.04 [0.59–1.66]	1.91 [1.56–2.31]	1.52 [1.37–1.68]	1.44 [1.33–1.56]	1.54 [1.40–1.70]	1.51 [1.43–1.58]
Low-skilled administrative occupations	1,719,310	1.25 [0.92–1.66]	1.62 [1.40–1.85]	1.47 [1.36–1.58]	1.31 [1.22–1.40]	1.38 [1.27–1.50]	1.39 [1.34–1.45]
Low-skilled service sector occupations	1,448,912	1.21 [0.83–1.69]	1.60 [1.35–1.87]	1.34 [1.23–1.46]	1.30 [1.22–1.39]	1.39 [1.29–1.50]	1.35 [1.30–1.41]
Skilled service sector occupations	1,282,075	1.30 [0.99–1.67]	1.27 [1.08–1.48]	1.23 [1.10–1.37]	1.20 [1.09–1.32]	1.25 [1.10–1.42]	1.23 [1.16–1.30]
Agricultural occupations	130.253	0.60 [0.12–1.71]	1.34 [0.76–2.18]	1.19 [0.86–1.59]	1.19 [0.89–1.55]	1.24 [0.84–1.77]	1.19 [1.0–1.40]]
Technicians	358,308	0.84 [0.29–1.84]	1.48 [1.08–1.96]	1.13 [0.93–1.36]	1.08 [0.91–1.28]	1.16 [0.92–1.45]	1.15 [1.03–1.27]
Semiprofessionals	1,851,860	0.99 [0.69–1.37]	1.34 [1.16–1.53]	1.27 [1.17–1.38]	1.20 [1.12–1.28]	1.24 [1.13–1.36]	1.23 [1.18–1.29]
Managers	245,286	0.61 [0.10–1.94]	0.68 [0.43–1.03]	0.70 [0.51–0.93]	0.83 [0.63–1.06]	1.00 [0.72–1.35]	0.80 [0.68–0.93]
Engineers	107,437	0.45 [0.00–5.59]	0.94 [0.54–1.52]	0.61 [0.37–0.94]	0.84 [0.52–1.27]	0.78 [0.34–1.50]	0.77 [0.59–0.97]
Professionals	223,620	0.57 [0.00–4.16]	0.60 [0.38–0.91]	0.74 [0.54–0.98]	0.81 [0.59–1.07]	0.88 [0.57–1.29]	0.75 [0.63–0.89]
Unclassifiable	249,508	0.71 [0.38–1.20]	0.70 [0.38–1.18]	0.53 [0.32–0.81]	0.61 [0.40–0.89]	0.60 [0.32–1.03]	0.62 [0.49–0.76]
Skilled administrative occupations	3,509,418	1 (reference)	1 (reference)	1 (reference)	1 (reference)	1 (reference)	1 (reference)
Sick leave events/10,000 in reference (raw)		5	14	37	52	63	34

sector occupations (SMR 1.23 [1.16–1.30]), agricultural occupations (SMR 1.19 [1.00–1.40]) and technicians (SMR 1.15 [1.03–1.27]) than in the reference group (see ▶ **Table 2** and ▶ **Table 3**). The following age-dependent investigations were carried out for the occupational groups mentioned here.

For both sexes it could be confirmed that some specific occupations from the groups of manual occupations and low-skilled service sector and administration occupations had an increased risk. With 2 or 3 times higher numbers of sick leave events per 1,000 insured than in office workers, both men and women in the following occupations were particularly affected: pastry cooks (SMR ♂ 3.08 and ♀ 2.74), bakery workers (SMR ♂ 2.77; ♀ 2.21) and plastics processors (SMR ♂ 1.94; ♀ 1.95). Results were not shown, for details see Liebers et al. 2016 (32).

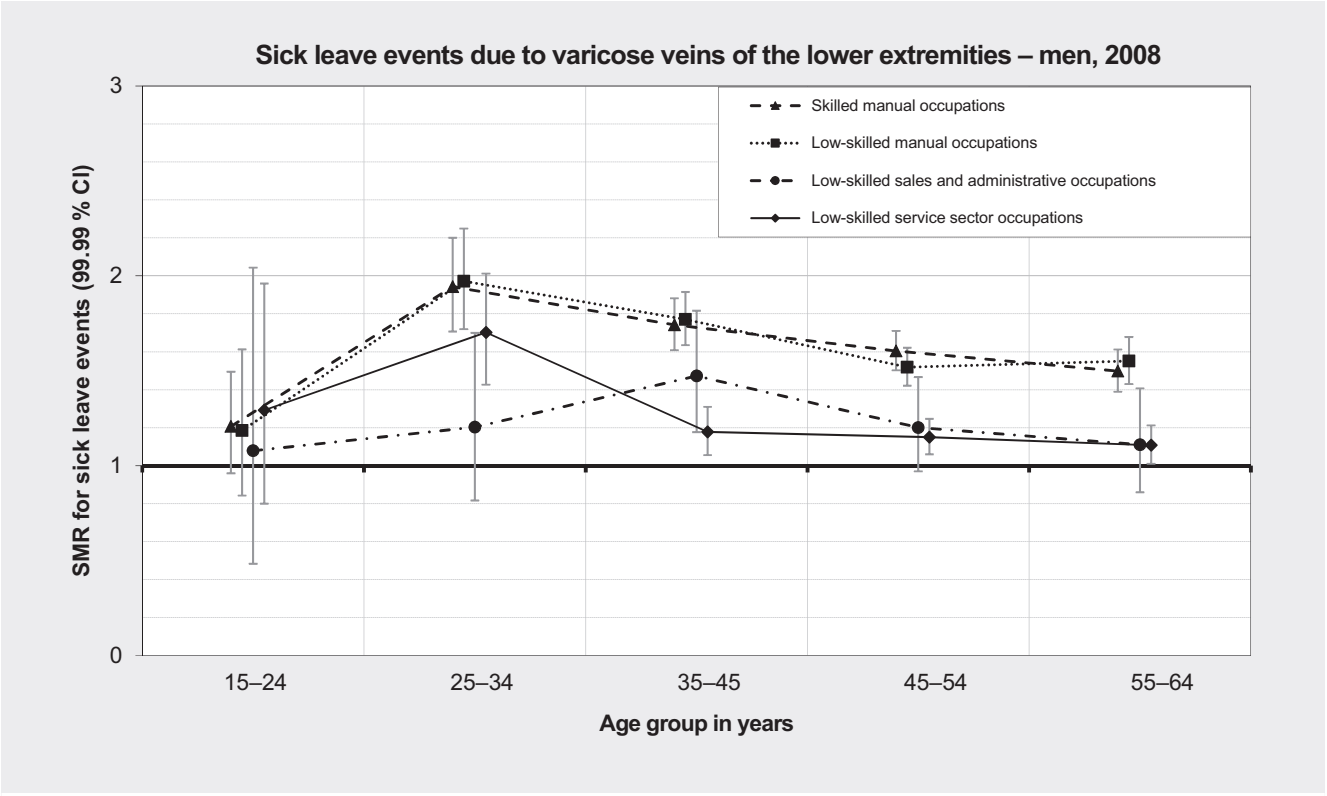
Age- and occupation-specific sick leave

In all occupational groups, the frequency of occurrence of cases of sick leave due to the ICD-10 diagnosis I83 increased with age.

Across all occupational groups and in both sexes, there were very few sick leave events in 15–24 year olds. No occupational group showed significantly more sick leave events than the reference group.

Among the three age groups from 25 to 54 years, there were consistently significantly more sick leave events among men in skilled and low-skilled manual occupations and in low-skilled service sector occupations, corresponding to the results of the age-independent investigation. The high numbers in the age range 25- to 34-year-olds in these occupational groups compared to the reference group were noteworthy. In the highest age group (55 to 64 years) there continued to be significantly more sick leave events among manual workers than in the reference group. In the other occupational groups, the risk approached that of the skilled administrative occupations (reference). Among the low-skilled sales and administrative occupations, there were significantly more sick leave events than in the reference group only in the middle age group (35 to 44 years) (see ▶ **Fig. 1**).

In women, as with the age-independent results, the age groups above 25 years showed significantly more cases of sick leave for



▶ **Fig. 1** Standard morbidity ratio (SMR) among men of various age groups for the occurrence of sick leave events due to varicose veins of the lower extremities for occupational groups with an age-independent increased number of sick leave events compared to aged-matched employees in skilled sales and administrative occupations (reference)

skilled and low-skilled manual occupations, skilled and low-skilled service sector occupations, semiprofessional jobs, low-skilled administrative occupations and technicians than in the reference group (see ▶ **Fig. 2**).

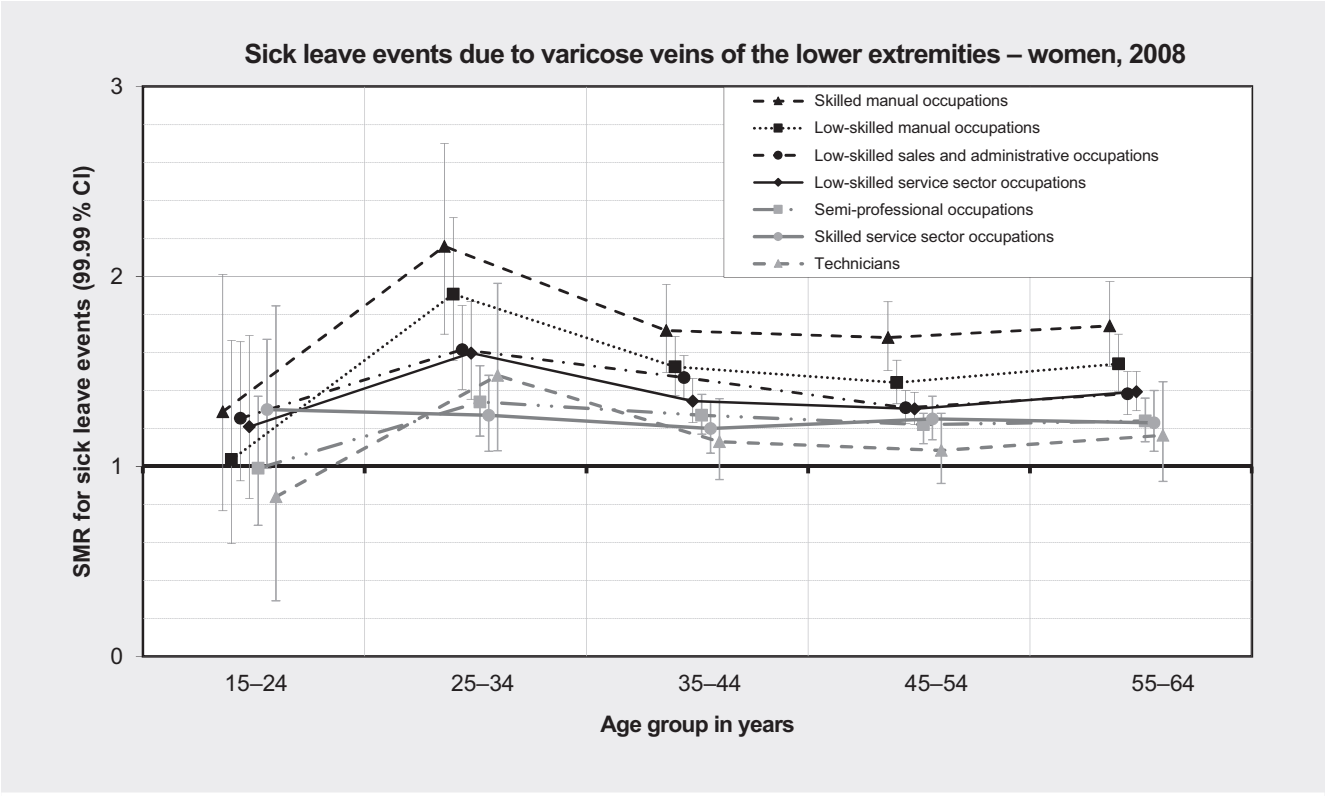
Most cases of sick leave in the oldest age group occurred – as among men – in the manual occupations and additionally in the low-skilled service sector and administrative occupations. Notably (as also among men) there were relatively many sick leave events in the age group 25- to 34-year-olds in manual jobs, the low-skilled service sector occupations and also in the low-skilled administrative occupations compared to the occupational groups of the skilled sales and administrative occupations. Semiprofessional jobs, skilled service sector occupations and technicians also had more sick leave events in this age group than in the reference group. Despite a relative reduction, the risk of sick leave events due to varicose veins also continued to be higher with age compared to the reference group. In the agricultural occupations, no age group showed a significantly different result compared to the reference group (not illustrated). Due to the low cell frequency, it was not possible to undertake a differentiated analysis of the five age groups relative to the individual occupations.

Discussion

Summary of results

The occupation-related analysis of sick leave data provides information predominantly about the extent of the social impact on those affected in different occupations and occupational groups. Many occupations can be easily carried out despite varicose veins, whereas in others, depending on the tasks involved, the ability to perform them is limited. If employees are no longer able to undertake their work because of the symptoms or only under their further deterioration, then this results in sick leave being taken. In common with other CVD, varicose veins can lead to long sickness absence or even exit from work (12).

The analysis of the occupation- and age-dependent occurrence of sick leave due to varicose veins of the lower extremities was carried out with aggregated secondary data. Since the analysis covered approx. 90 % of the working population with compulsorily statutory health insurance, the data can be regarded as representative. As expected, the selected diagnosis showed a marked absolute and relative increase in sick leave events with age. This corresponds to the already available results on other CVD diagnosis (36). Although only minor differences in the frequency of varicose veins between the sexes are known in adolescents and young adults (37), more cases of sick leave occurred among women than among men even in the youngest age group. The occupational groups of skilled and low-skilled manual jobs, low-skilled service sector occupations and low-skilled sales and administrative occupations showed increased



▶ **Fig. 2** Standard morbidity ratio (SMR) among women of various age groups for the occurrence of sick leave events due to varicose veins of the lower extremities for occupational groups with an age-independent increased number of sick leave events compared to aged-matched employees in skilled sales and administrative occupations (reference)

risks of the occurrence of sick leave for both sexes irrespective of age. Among women, this increase was also seen in semiprofessional occupations, skilled service sector jobs, agricultural work and among technicians.

Varicose veins constitute a chronic, progressive disease, which – along with its sequelae – occurs less often in the young. Due to the short time in the job, it can be assumed that the occupation-related increased risk of the disease and of sick leave is low. The relative frequency of varicose veins increases with age. The accumulated physical stresses and strains over the course of a working life can lead to a further increase in the relative frequency of sick leave events among employees. The stratification of the analysis according to age groups provides a differentiated picture of the impact caused by sick leave.

Due to the low number of cases and in the youngest age group, the estimated values for almost all occupational groups are imprecise. There was a marked increase in sick leave events for almost all occupational groups compared to the skilled sales and administrative jobs from the age group 15–24 years to the 25–34 years age group.

This has already been observed among men in studies of other diseases (myocardial infarction, back pain and arthritis of the knee). No such increase was found among women with these diagnoses. In the case of arterial hypertension, this applied to both sexes (36, 38).

The risk of becoming unfit to work due to varicose veins was relatively constant from the age of 35 upwards. Existing differences between the occupational groups did not change. However, those engaged in manual occupations also showed the highest number of cases of sick leave in the oldest age groups.

Limitations

The results of the age-related analysis are based on cross-sectional data and do not constitute a long-term observation of a cohort (39). No causal interpretation between occupational exposure and disease is possible. Apart from age, sex and insurance company membership, no other influencing factors could be considered. Socioeconomic status and lifestyle factors could be regarded as possible confounders.

The analysis was based on aggregated, not person-related sick leave data. No conclusions can be drawn from the number of sick leave events to the number of insured persons affected, because several sick leave events per insured person per year could occur. For a more detailed interpretation of the study results, the reader is referred to the discussion of limitations in the available literature (32) about the occupation as a surrogate for work-related and non-occupational risks and the possibilities of misclassification in the occupational coding.

One of the reasons for the marked increase in risk in the 25- to 34-year-olds is the relatively few cases of sick leave in the comparator group in this age range. It is possible that the occurrence of varicose veins at this age is equally distributed among the occupational groups, but sick leave only occurs in workers in the occupational groups under particular risk become unable to work because of

this diagnosis. It is also possible that the varicose veins occur earlier in these occupational groups and therefore lead to sick leave being taken even in this relatively young age group. In the older groups, it can be assumed that long years of standing activities, for example, cause more varicose veins and complications (27).

Healthy worker effects should also be considered. Employees who suffer from varicose veins even in their youth, will less often take up or remain in occupations with additional risk factors – in particular standing for long periods.

The available data do not permit any conclusions to be drawn about the cause (outpatient or inpatient treatment, surgical or conservative therapy) of the sick leave. With more than 75,000 inpatient operations in the 15 to 64 years age group (8) and probably just as many outpatient operations (7), it can be assumed that many sick leave events result from surgical procedures.

Conclusions

The results of the analysis show that, based on the frequency of sick leave in the working population, the diagnosis of varicose veins of the lower extremities is a significant health and economic factor. Although varicose veins are not a serious disease, they have a high public health relevance. During the course of their lives, the majority of the population suffer from varicose veins that can cause symptoms as well as economic loss. This analysis expands knowledge about the current age- and occupation-related frequencies of a single diagnosis that have not been reported in this way before. It underlines the need for action regarding prevention (primary and secondary) and work design as well as the need for research.

It is assumed that due to the higher prevalence of risk factors (obesity, lack of exercise), the known increase in sick leave due to CVD with age will tend to affect the young of today to an even greater extent (40). Varicose veins as the direct or indirect (e. g. complications such as venous leg ulcer) cause of sick leave increase markedly with age. Since there is likely to be a significant rise in the number of older employees in the future (41), suitable primary and also secondary preventative measures should be used to try to prevent an increase in sick leave due to varicose veins in the working population. It remains to be seen how far operational measures in the workplace with other aims – such as the reduction in physical underexercise at the workplace through the introduction and introductioin of work stations requiring the employees to work standing – has an impact with regard to the development of varicose veins of the lower extremities.

Varicose veins are an above-average cause of sick leave in manual occupations of the manufacturing and service sector industries in which standing work is characteristic. Occupation-specific preventative approaches, e. g. through the reduction in prolonged standing, or early detection as part of occupational medical screening, should be established even earlier in some cases. These measures should be aimed not only at behavioural prevention, but also at structural (enviromental and organisational) prevention, i. e. redesigning working conditions.

Conflict of interest

The authors declare that they have no conflict of interest.

Ethics committee, consent

The consultation of an ethics committee is not required for analyzes based solely on secondary data. (According to: Good Practice Secondary Data Analysis [GPS], Guidelines and Recommendations, 3 rd edition 2012, slightly modified 2014).

Only aggregated data was transmitted and evaluated. Conclusions/references to individuals are not possible. Therefore, no declarations of consent are required.

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