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Musculoskeletal diseases are the main cause of sick leave among oil industry workers in Brazil: results of a cohort study

Doenças osteomusculares são a principal causa de absenteísmo-doença entre trabalhadores da indústria de petróleo no Brasil: resultados de um estudo de coorte

Abstract

Objective: to describe the incidence of sickness absence among workers of an oil industry in Brazil. *Methods*: retrospective cohort study conducted with 2,028 workers. Study data were obtained from workers' medical records from 2012 to 2016. Indicators of absenteeism were calculated by sociodemographic characteristics, occupational characteristics, and morbidity. *Results*: of the participants, 87.6% were men, 49.2% with high school educational level, 46.9% aged 50 years or older, 65.1% worked in non-operational activities. The cumulative incidence of sick leave was 71.5% and its incidence rate, 25.8 per 100 person-years. We found the highest incidence rates amongst women (31.6), workers aged 50 years or older (29.9), lower educational attainment (29.2), work experience spanned 30 years or more (31.9), working in operational activities (27.9), and regular work schedule (26.1). Musculoskeletal (n=2,001), respiratory (n=1,016), and digestive diseases (n=967) were responsible for the largest number of sick leaves. The highest number of absence days was due to musculoskeletal diseases (n=11,640), followed by injuries (n=6,267) and mental disorders (n=5,042). Low back pain diagnostic was responsible for the greatest number of absence days (n=3,632). Conclusions: health programs aimed at controlling the identified morbidities should target women, those with longer work experiences, and those with lower educational attainment.

Keywords: absenteeism; oil industry; musculoskeletal diseases, cohort studies; occupational health.

Resumo

Objetivo: descrever indicadores de absenteísmo-doença entre trabalhadores de indústria de petróleo. Métodos: estudo de coorte retrospectiva, realizado de 2012 a 2016, com dados secundários de prontuários médicos e de bases de dados da empresa. Foram calculados indicadores de absenteísmo por morbidade, características sociodemográficas e ocupacionais. Resultados: participaram 2.028 trabalhadores, do sexo masculino (87,6%), com idade maior ou igual a 50 anos (46,9%), nível médio de escolaridade (49,2%) e que trabalhavam em atividade não-operacional (65,1%). A incidência acumulada de afastamento do trabalho foi de 71,5% e a taxa de incidência de 25,8/100 pessoas-ano. Maiores taxas foram observadas entre mulheres (31,6), trabalhadores com 50 ou mais anos (29,9), 30 ou mais anos de serviço (31,9), menor escolaridade (29,2), em atividade operacional (27,9) e horário regular (26,1). Doenças osteomusculares (n=2001), respiratórias (n=1016) e digestivas (n=967) foram responsáveis pelo maior número de licenças. Os maiores números de dias de ausência ao trabalho foram por doenças osteomusculares (n=11640), lesões por causas externas (n=6267) e transtornos mentais (n=5042). Dor lombar foi o diagnóstico com maior número de dias de absenteísmo (n=3632). Conclusão: mulheres, trabalhadores com mais tempo de serviço e de menor escolaridade escolaridade devem ser alvo de programas de saúde que visem o controle das morbidades identificadas.

Palavras-chave: *absenteísmo; estudos de coortes; indústria de petróleo e gás; doenças musculoesqueléticas; saúde do trabalhador.*

Introduction

Absenteeism refers to workers' absences from work, excluding those due to holidays, vacations, and rest periods. Sickness absence (or sick leave) refers to absence from work owing to a temporary incapacity for work whether due to trauma or illness, excluding absences due to normal pregnancy[1-3].

Sickness absence is a critical problem as it indicates the existence of risk factors for general and occupational morbidities, overloads workers who are present at the workplace, affects productivity, and decreases the services quality[4,5]. It is a costly situation for individuals and society in general. Studies show that long-term sick leaves are associated with unemployment, psychological problems, social exclusion, retirement due to disability, and death, increasing social security costs [3,6,7].

Absenteeism levels are influenced by personal, organizational, and socioeconomic factors. Therefore, they can be seen as an indicator that integrates health, as biopsychosocial well-being, with coping strategies for maintaining this well-being at work[2,3,8,9].

Absenteeism in the world is estimated to vary between 1% and 7% of total workdays and health problems most related to it are musculoskeletal diseases and mental disorders. In the European Union, Scandinavian countries show the highest rates of sickness absence, with a time absent from work percentage – designated as Lost Time Rate – of around 4.0%[3]. In 2010, the average percentage in Norway was 5.2%, ranging from 4.0% to 7.2%[10].

In many countries, national statistics on sickness absence are incomplete. Also, cross-country comparisons and comparisons between regions within a country are limited by differences in definitions, ways of regulating sick leaves and granting disability benefits, and database types and scope[1].

In Brazil, the official data from the National Social Security Institute (INSS) refer to the population participating in the formal labor market, individual micro entrepreneurs, and special insured, self-employed or cooperative workers, among others. These data indicate that injuries due to external causes and musculoskeletal diseases were responsible for most social security benefits granted in 2017. Digestive system diseases were in the third place among welfare benefits. Among accidental benefits, mental disorders were in the third place[11]. A study conducted in 2012 among workers in the Brazilian oil industry showed these trends by identifying musculoskeletal diseases as responsible for the greater number of sick leaves, followed by digestive system diseases[12]. Musculoskeletal diseases were also the most common diagnoses for sickness absence in a multicohort study conducted in Europe in 2018 followed by depressive disorders and external causes[13].

A European study showed that civil servants, education and industry workers had the highest levels of absenteeism, whereas agriculture, hotels, restaurants, and the real estate sector[3] showed the lowest percentages. In Brazil, a study involving nursing professionals from the Unified Health System primary care network in the city of Campinas indicated a 5.6% percentage of annual lost time[14], whereas the values of this indicator observed among workers of a state-owned bank in Minas Gerais ranged from 0.9% to 3.9% during the six years of observation[15].

There is relevant scientific work on sickness absence, especially regarding public services, educational institutions, and the health sector[4,14-23]. However, there are difficulties in accessing health data in the private sector, particularly in industries. Most studies which overcame this difficulty have a cross-sectional approach, especially studies in low- and middle-income countries.

Oil and gas industry is of great importance in modern economy since fossil fuels are still crucial sources of energy. Although the sector has undergone important changes in work organization with increasing use of technology and automation, its operational activities still present risks to workers' physical integrity and health, such as tool handling, operation of pressurized equipment, and work at height, which can cause accidents and health problems, especially musculoskeletal diseases.

This study aims to describe the indicators and pathologies associated with sickness absence in a workers' cohort of a nationwide oil company in Brazil.

Methods

This is a retrospective cohort study conducted with all workers of an industrial unit owned by a nationwide oil company. The unit was located in the state of Bahia, Brazil. Workers in activity on January 1, 2012 were included in the study. Those who were absent from work due to sick leave on the date the

cohort began were excluded. Workers' follow-up lasted until December 31, 2016. They ceased to be part of the cohort before that date in the following situations: transfer to another company unit, dismissal, retirement due to disability, and death.

The industrial unit that was used as the research field operates oil and gas wells; primary oil processing facilities; oil and gas storage and transportation facilities; gas compression stations; water treatment facilities and injection wells; maintains and inspects equipment and facilities; samples and physiochemically analyzes the water, oil, and gas produced or recovered from reservoirs; performs general services; and transports and stores cargo. The industrial unit headquarters are located in the municipality of Salvador, Bahia, Brazil. Its employees are distributed throughout several municipalities in that state. Work activities are carried out in administrative (offices) and operational units (operational bases, stations of various types, and oil fields).

The data used in the study were obtained from the employees' electronic medical records in the occupational health service databases and the company human resources information system. To describe the characteristics of this population, data on employees' registries were considered: sex, age (distributed in four strata: < 30; 30-39; 40-49; >= 50 years old), time working for the company (distributed in four strata: <10; 10-19; 20-29; >= 30 years of work), type of activity (non-operational or operational – the latter including manual labor performed by operation technicians), educational attainment (below high school graduate – 11th grade or lower; high school graduate – 12th grade or General Equivalency Diploma; or college graduate – bachelor's degree or at least four years of college), and working hours (regular work schedule or shift work).

Records on absence from work due to sick leave for medical or dental treatment were obtained for the period between January 1, 2012 and December 31, 2016. General sickness absence indicators and those stratified by the pathology groups causing absence from work were calculated in line with the literature on absenteeism[1,24]. Sick leave indicators were used in this study as an integrated health measure influenced by personal, organizational, and socioeconomic factors, such as health status, job satisfaction, work environment, labor market conditions, and social security system[2,3,8,24].

As for the data statistical analysis, the occurrence of approved and registered sick leaves was the observational unit firstly used to measure the frequency and duration of sickness absence. Average absence time was calculated considering the number of absent days divided by the number of sick leaves approved in the period.

In the second step, cumulative incidence was calculated by the number of workers who had at least one leave in the period divided by the number of workers at the beginning of the period.

To provide the most accurate incidence measure possible, in the third step, incidence density (rate) was calculated by the number of workers who had at least one leave in the period as the numerator divided by the number of people-years.

Absenteeism indicators were calculated from sick leaves due to incapacity for work. Absence data related to administrative issues were excluded, such as maternity leaves, attendance certificates, patient follow-up certificates, and certificates related to contacts with health services failing to indicate incapacity for work. Considered unrelated to incapacity for work, sick leaves associated with the following ICD-10 codes: Z00, Z00.0, Z00.4, Z00.6, Z00.8, Z01, Z01.0, Z01.1, Z01.8, Z01.9, Z02, Z02.7, Z04, Z10, Z36, Z41, Z52.0, Z71.2, Z76, and Z76.3 were also excluded. ICD-10 Z codes indicating invasive procedures, post-surgical states or infectious diseases were maintained, such as Z03.9, Z08.1, Z09.0, Z09.4, Z12, Z13, Z20, Z22.9, Z30, Z42, Z44, Z45.8, Z47.8, Z47.9, Z48, Z54, Z96, Z96, and Z96.8.

Data analysis was performed using the IBM SPSS Statistics version 20 software package (SPSS).

This research was approved on 25/01/2018 by the Research Ethics Committee at the Faculdade de Medicina da Universidade Federal da Bahia (Protocol number 82539618.6.0000.5577).

Results

At baseline, the cohort consisted of 2,028 individuals. Follow-up lasted five years, with an average of four years per worker. Of the total number of participants in the study, 1,450 (71.5%) had at least one sick leave in the period, and the accumulated annual incidence ranged from 35.4% to 41.9%, with an average of 39.5%. There were 8,969 sick leave spells, totaling 48,116 days of absence from work, averaging 5.36 days absent per sick leave (**Table 1**).

Of the workers we observed in this study, 87.6% were male, 49.2% were high school graduates, 46.9%

aged 50 years or older, 45.0% had been working for the company between 20 and 29 years, 65.1% worked in non-operational activities, 70.0% worked in regular schedule (**Table 2**).

Sick leave incidence rate was 25.8 per 100 person-years (PYs) for the considered period (five years). We found the highest incidence rates among women (31.6 per 100 PYs), staff aged 50 years or older (29.9 per 100 PYs), those working for the company for 30 years or more (31.9 per 100 PYs), workers with lower educational attainment (29.2 per 100 PYs), and workers involved in operational activities (27.9 per 100 PYs). Those who worked in regular schedule showed a sick leave incidence rate equal to 26.1 per 100 PYs, which is slightly higher than the rate found among workers on shift work: 25.1 per 100 PYs (**Table 2**).

Table 1 Sick leave indicators among oil industry workers, Bahia, Brazil, 2012-2016

Year	Total workers	Workers on sick leave[1]	Cumulative incidence[2]	Sick leave spells	Days absent	Average duration of sick leave spells[3]
2012	2,028	849	41.86	2,238	11,320	5.06
2013	1,979	757	38.25	2,069	10,670	5.16
2014	1,832	740	40.39	1,973	11,121	5.64
2015	1,548	629	40.63	1,502	9,561	6.37
2016	1,455	515	35.40	1,187	5,444	4.59
Mean	1,768	698	39.48	1,794	9,623	5.36
2012-2016	2,028	1,450	71.50	8,969	48,116	5.36

[1] New sick leave spells related to incapacity.
[2] Number of workers on new sick leaves in the period/number of workers at the beginning of the period × 100.
[3] Number of days of sick leave in the period/number of sick leave spells in the period.

Table 2 Sick leave incidence among oil industry workers, according to sociodemographic and occupational characteristics shown at the beginning of the cohort, Bahia, Brazil, 2012-2016

Variables	Total workers[1]		Workers on sick leave		Person-years	Incidence rate[2]
	n	%	n	%		%
Sex						
Female	251	12.38	217	14.97	686.83	31.59
Male	1,777	87.62	1,233	85.03	4,938.98	24.96
Age						
< 30	164	8.09	96	6.62	467.31	20.54
30-39	310	15.29	203	14.00	905.41	22.42
40-49	602	29.68	445	30.68	1,866.53	23.84
≥ 50	952	46.94	713	49.17	2,386.56	29.88
Working Years						
< 10	673	33.19	431	29.72	1,947.84	22.13
10-19	57	2.81	43	2.97	161.86	26.57
20-29	912	44.97	703	48.48	2,637.40	26.66
≥ 30	386	19.03	280	19.31	878.71	31.86
Educational attainment						
< High school	309	15.24	240	16.55	823.04	29.16
High school	997	49.16	742	51.17	2,694.66	27.54
College	719	35.45	465	32.07	2,099.82	22.14
Working hours						
Regular schedule	1,420	70.02	1,004	69.24	3,851.78	26.07
Shift work	608	29.98	446	30.76	1,774.03	25.14
Type of activity						
Non-operational	1,321	65.14	907	62.55	3,676.18	24.67
Operational	707	34.86	543	37.45	1,949.63	27.85
Total	**2,028**	**100.00**	**1,450**	**71.50**	**5,625.81**	**25.77**

[1] Data were lost for some variables.
[2] number of workers who had at least one sick leave in the period/number of person-years × 100.

Table 3 shows sick leave indicators by ICD-10 groups. Musculoskeletal and connective tissue diseases were responsible for the highest number of sick leave occurrences in the period (n = 2,001), followed by respiratory, with 1,016 episodes of absence from work, and digestive diseases, with 967 sick leave spells. Musculoskeletal and connective tissue diseases were also responsible for the greatest number of absent days from work in the period (11,640), followed by injuries due to external causes (6,267) and mental and behavioral disorders (5,042). Sick leave spells due to mental and behavioral disorders lasted the longest: 20.3 days per leave. Next came neoplasms, with 13.2 days per sick leave, and injuries due to external causes, with 12.6 days per sick leave, on average.

Table 4 shows sick leave indicators according to ICD-10 diagnoses responsible for the highest number of sick leave spells and highest total number of days absent from work. Lumbar pain, when associated with lumbago with sciatica, low lumbar pain, and intervertebral disc disease, was the most frequent morbidity, responsible for 615 sick leaves, and for the greatest number of days

absent from work: 3,632. Among musculoskeletal diseases, rotator cuff syndrome is also highly prevalent – responsible for 1,193 days of absence from work and sick leave spells with an average duration of 16.8 days.

Depressive disorders had the second-highest total number of absent days from work: 1,786. They were associated with 30 sick leave spells which lasted an average of 59.5 days per sick leave. Hypertension was responsible for the second-largest number of sick leave occurrences (340), with an average absence duration of 2.09 days. There were three sick leave spells due to cerebral infarction with a duration of 267 days on average.

Dental treatments were also responsible for a high number of sick leave occurrences and days of absence from work: 336 and 1,223, respectively. Such sick leave spells were generally short (3.6 days per sick leave). Diarrhea was responsible for 210 sick leave occurrences with 419 days of absence from work, therefore, two days on average. Acute nasopharyngitis, unspecified viral infection, and abdominal and pelvic pain had similar frequencies, as **Table 4** shows.

Table 3 Sick leave indicators by ICD-10 groups among oil industry workers, Bahia, Brazil, 2012-2016

ICD-10 Chapter	Sick leave spells		Days of absence	Average duration of sick leave spells[1]
	n	%		
A00-B99 – Certain infectious and parasitic diseases	603	6.72	1,592	2.64
C00-D48 – Neoplasms	201	2.24	2,646	13.16
D50-D89 – Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	7	0.08	23	3.29
E00-E90 – Endocrine, nutritional and metabolic diseases	82	0.91	301	3.67
F00-F99 – Mental and behavioral disorders	248	2.77	5,042	20.33
G00-G99 – Diseases of the nervous system	110	1.23	931	8.46
H00-H59 – Diseases of the eye and adnexa	774	8.63	2,677	3.46
H60-H95 – Diseases of the ear and mastoid process	124	1.38	479	3.86
I00-I99 – Diseases of the circulatory system	646	7.20	3,539	5.48
J00-J99 – Diseases of the respiratory system	1,016	11.33	2,479	2.44
K00-K93 – Diseases of the digestive system	967	10.78	4,234	4.38
L00-L99 – Diseases of the skin and subcutaneous tissue	177	1.97	545	3.08
M00-M99 – Diseases of the musculoskeletal system and connective tissue	2,001	22.31	11,640	5.82
N00-N99 – Diseases of the genitourinary system	431	4.81	1,536	3.56
O00-O99 – Pregnancy, childbirth and the puerperium	61	0.68	571	9.36
Q00-Q99 – Congenital malformations, deformations and chromosomal abnormalities	7	0.08	27	3.86
R00-R99 – Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	682	7.60	1,405	2.06
S00-T98 – Injury, poisoning and certain other consequences of external causes	499	5.56	6,267	12.56
V01-Y98 – External causes of morbidity and mortality	7	0.08	27	3.86
Z00-Z99 – Factors influencing health status and contact with health services	326	3.63	2,155	6.61

[1] Number of days of sick leave/number of sick leave spells.

Table 4 Sick leave indicators according to ICD-10 diagnoses that caused major impact in sickness absence among oil industry workers, Bahia, Brazil, 2012-2016

ICD-10 diagnosis	Sick leave spells		Days absent	Average duration of sick leave spells[1]
	n	%		
Musculoskeletal diseases				
Lumbar pain (M51.1 + M54.4 + M54.5)	615	6.86	3,632	5.91
Pain in joint (M25.5)	140	1.56	390	2.79
Rotator cuff syndrome (M75.1)	71	0.79	1,193	16.80
Mental disorders				
Depressive disorders (F32.0 + F33.2)	30	0.33	1,786	59.53
Dissociative disorders (F44.9)	1	0.01	972	972.00
Diseases of the circulatory system				
Hypertension (I10)	340	3.79	711	2.09
Cerebral infarction (I63)	3	0.03	800	266.67
Dental treatments				
Dental extraction and implants (K08.1 + Z96.5)	336	3.75	1,223	3.64
Acute infectious diseases				
Other and unspecified gastroenteritis and colitis of infectious origin (A09.0)	210	2.34	419	2.00
Acute nasopharyngitis (J00)	161	1.80	301	1.87
Viral infection, unspecified (B34.9)	153	1.71	363	2.37
Unespecific symptoms				
Abdominal and pelvic pain (R10)	167	1.86	260	1.56

[1] Number of days of sick leave/number of sick leave spells.

Discussion

This study followed a cohort of workers from an oil company for five years, observing the incidence of sickness absenteeism. During the follow-up period, 71.5% of workers had at least one episode of absence due to work incapacity. Another study, conducted with workers in the administrative area of a Brazilian oil company, considered all sick leave occurrences, including parental leaves, and found a 69.3% accumulated incidence of absence from work after a three-year follow-up[12].

The absence frequency found in this study is compatible with that in the national and international literature. A study conducted with Brazilian nursing professionals disregarded maternity leaves and work-related absences[19], finding a 63.2% sickness absence prevalence. In the Netherlands, a group of metal workers and welders was followed for two years, and 87% of individuals had at least one episode of sick leave in the period[25]. On the other hand, a study with municipal civil servants showed a 47.5% frequency of sick leave in a six-year follow-up. It considered only absences longer than three days, which may explain the lower frequency found, compared to other studies[26].

We observed a 39.48% average accumulated annual incidence, a result compatible with an international survey conducted in the European Union which showed that 25.9% of industry workers and 30.7% of civil servants had been absent from work due to illnesses in the previous year[3]. In the public service of a Brazilian municipality, when considering only sick leave spells lasting more than three days, their average annual prevalence was 26.2% among women and 15.9% among men[26].

On the other hand, a study conducted in Norway among industrial workers showed that 61% of them had at least one day of sick leave in the previous year[27]. In this study, the annual incidence density observed in the period was 25.8 per 100 person-years, whereas in Finland, in a study that included different occupations and workplaces, the incidence rate of absence from work for four or more days was 98.4 among women and 63.7 among men[28] per 100 person-years.

These values are in line with the literature, which reports that Scandinavian countries have the highest absenteeism rates among the countries in the European Union. One possible explanation for this phenomenon is the fact that these countries have higher levels of social protection, which includes formally recording incapacity for work and granting the resulting benefits, as well as greater employment protection in the event of frequent or long-term illnesses[3].

On the other hand, the literature reports that disability more often affects vulnerable populations, especially those living in precarious conditions or in low- and middle-income countries[3]. This apparent discrepancy can be explained, in part, by the fact that sickness absenteeism rates – which indicate the levels of absence from formal work due to illnesses – fail to reflect the incapacity for work profile of the population in low- and middle-income countries. These countries still show precarious work conditions, high unemployment rates, and high incidences of informal labor, which can lead to a reduction of the formal incapacity for work record. Within the European Union, higher absenteeism rates are associated with occupations related to higher educational attainment and stability, compared to work in sectors in which precarious work is more common. Moreover, it is impossible to dismiss the role of underreporting of work incapacity in unregulated work situations[3,13].

As in other studies involving industry workers[5,29], our study population was mainly men. Women showed the highest rate of absence from work: 31.6 per 100 person-years, confirming the pattern found in other studies[5,14,15,26,30,31]. A Finnish study investigated the higher absenteeism among women and concluded that this could be partly explained by differences in the type of occupation[28]. Following this finding, a study conducted in an airline company also showed a positive association between women and absenteeism, which was explained in part by educational attainment and type of activity[30].

Our study population consisted of a high percentage of workers aged over 50 years: 46.9%. This is due to the great working life expectancy in that population, related, in turn, to a certain employment stability and consequent low worker turnover in the investigated industrial unit, where we even found workers receiving social security retirement benefits.

We observed that the incidence of work absence increased together with age and work experience, confirming the results of previous studies[15,23,26,31].

The workforce aging leads to an increase in the prevalence of chronic diseases among active workers, such as cardiovascular diseases, mental disorders, diabetes, and neoplasms. Workers may experience complications of these pathologies, leading to higher levels of absenteeism[3,30]. Additionally, a longer time in activity may imply longer exposure to occupational risk factors, which could explain the greater sickness absence in this population. The opposite occurred regarding educational attainment: the incidence of absence from work decreased as educational attainment increased. Other studies corroborate this finding, indicating that workers with lower educational attainment and/or performing functions at the lower levels of the organizational hierarchy have a higher frequency of absenteeism[3,8,13,15,19,26,32]. Sumanen et al. found that education had a strong association with sickness absence, partly mediated by occupational class[32]. Literature claims that this difference could be attributed to these workers' greater exposure to physical and psychosocial demands at work, such as low job control, exposure to repetitive movements, and load handling[14,19,32].

Regular work schedule led to a slightly higher absenteeism rate than shift work. The fact that shift workers may have time off on working days may contribute to this finding, for they do not need to take time off work to carry out small health procedures which may give rise to short-term sick leaves. Another issue is that the workers' absence on the day they are on schedule causes inconveniences to their co-workers and to their hierarchical superiors – requiring the absent worker to be replaced by another – which may inhibit short term absenteeism.

Workers involved in operational activities had higher rates of work absence than those in support, such as logistics and administrative activities. In the industrial unit studied, operation technicians are the professionals who perform the manual labor involved in oil and gas production. Their activities include handling tools, pressurized equipment and vessels, which can cause accidents. These workers are also subject to biomechanical risks by adopting anomalous postures, which may have contributed to increase this group absenteeism levels.

This study described sickness absence considering the frequency and duration of sick leave spells, as well as the diagnoses which motivated absence from work. Musculoskeletal diseases were the most frequent and with the longest total duration absence from work. These data confirm the findings of previous studies with different worker populations [12,13,15,16,19,23].

Regarding absence from work total duration, injuries due to external causes and mental disorders followed musculoskeletal diseases. Similarly, previous studies conducted with industrial workers, civil servants, and nursing professionals showed that these diagnostic groups were responsible for the greatest impact on the number of absent from work days[12,13,19,31].

The longer absence due to sick leave was associated with mental disorders, followed by neoplasms and injuries due to external causes, situations that generate episodes of long-term absence from work since they require a longer time for remission, control or recovery. A previous study in the oil industry found similar results. These three diagnostic groups were observed among the five others associated with sick leave longer duration occurrences [12].

Among musculoskeletal diseases, lumbar pain (lumbago with sciatica, low lumbar pain, and intervertebral disc disease) was responsible for the highest number of sick leave spells and the highest total number of days lost, followed by rotator cuff syndrome. Dorsopathies were also the most common musculoskeletal causes among municipal civil servants and industry workers[12,26]. Fernandes and Burdorf reported that industrial and urban cleaning service workers with low back pain had greater sickness absence than those with musculoskeletal pain in other body regions[33].

When compared to mental disorders, neoplasms, and lesions caused by external causes, musculoskeletal diseases fail to cause long periods of absence from work. However, as these diseases are associated to frequent sick leaves, when we totaled the lost days of each sick leave spell, musculoskeletal diseases determined the longest absence from work total duration in the follow-up period. These are long-term chronic pathologies which have periods of remission and worsening, affecting workers' quality of life and causing relevant impacts on their work capacity.

Among mental disorders, depressive and dissociative disorders were associated with long-term sick leaves, leading to a high absence total time despite its low frequency. These are pathologies of more difficult remission which have a great impact on affected workers' working capacity and quality of life. Mood disorders were also relevant among municipal servants, as described in previous studies[26,31,34].

Hypertension was the most frequent isolated diagnosis among sick leave occurrences, and together with its complications, such as cerebral infarction, were among the diagnoses causing the longest absenteeism total time in the period.

Sick leave occurrences due to respiratory and digestive diseases, such as diarrhea, acute nasopharyngitis, and unspecified viral infection were frequent but failed to cause a high work absence total time due to the low average duration of sick leaves characteristic of acute and self-limiting infectious diseases. Both pathology groups were also among the most frequent in other studies[12,15,16,19,31]. Dental treatments (including implants) had a high frequency and determined a long absence from work total time.

Conclusions

Absenteeism studies are limited by the fact that sick leave may not be the best indicator of illness since sickness absence has a multifactorial etiology influenced by socioeconomic, personal, and organizational factors. Presenteeism cannot be excluded, although it is minimized in this population who owns a relative job stability. A strength of this study is that the physicians in the company occupational health service approved and registered sick leaves.

The reality described in this study highlights the importance of implementing programs to promote health in the workplace, which aim at controlling chronic diseases among workers, especially hypertension, musculoskeletal diseases, and mental disorders. These actions can contribute to improve health conditions and prevent consequences of chronic diseases, among them incapacity to work and the consequent absenteeism.

The results related to musculoskeletal diseases, with emphasis on low back pain and shoulder diseases, highlight the importance of programs to protect workers' health, which adapt workstations and reduce those working conditions requiring anomalous postures, load handling, and repetitive movements.

Workers on leave due to musculoskeletal diseases deserve especial attention from the occupational health service professionals. Visits to the workplace with a focus on assessing working conditions, readjusting workstations, and adapting tasks before returning to work could be useful to prevent worsening of injuries and new sick leave episodes.

Authors' contribution

Almeida CGSTG and Fernandes RCP substantially contributed to the study design, survey, data analysis and interpretation, drafting and critical revisions of the manuscript and approval of the final published version and assume full public responsibility for the study performed and the published content.

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