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Presenteeism and associated factors in industry workers

Fatores associados ao presenteísmo em trabalhadores da indústria

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Abstract

Introduction: presenteeism can be defined as being at work despite perceiving limitations, physical or psychological, which can reduce the work ability. *Objectives*: to estimate presenteeism prevalence and its association with socio-demographic characteristics, life styles, work and interpersonal relational aspects and general health conditions in industry workers in Bahia, Brazil. *Methods*: presenteeism was measured by the sum of positive responses to questions about lack of motivation, lack of concentration, and indisposition or discouragement to work, along with negative absenteeism. In the multivariate analysis, we used the Poisson model with robust variance to estimate the associations magnitude by means of the prevalence ratio. *Results*: among the 2,093 workers whose data were analyzed, be under 30 years of age, having higher education, feel pain, having poor sleep quality, feeling stressed and experiencing negative feelings about life were associated with higher prevalence of presenteeism. *Conclusion*: presenteeism can lead to a progressive worsening of the worker's health, so early identification and promoting interventions to reduce its determinants is a challenge for organizations.

Keywords*:* presenteeism; work conditions; health level; occupational health; interpersonal relations.

Resumo

Introdução*: o presenteísmo pode ser definido como estar no trabalho mesmo percebendo limitações, físicas ou psíquicas, que podem reduzir a capacidade laborativa.* Objetivos*: estimar a prevalência do presenteísmo e sua associação com características sociodemográficas, estilos de vida, aspectos relacionais no trabalho e interpessoais e condições gerais de saúde em trabalhadores da indústria na Bahia.* Métodos*: o presenteísmo foi medido pelo somatório das respostas positivas às questões sobre falta de vontade, falta de concentração e indisposição ou desânimo para o trabalho, em conjunto com o absenteísmo negativo. Utilizou-se na análise multivariada o modelo de Poisson com variância robusta para estimar a magnitude das associações por meio da razão de prevalências.* Resultados*: entre os dados analisados de 2.093 trabalhadores, ter menos de 30 anos, ter maior escolaridade, apresentar dor, dormir mal, sentir-se estressado e experimentar sentimentos negativos em relação à vida associaram-se a maiores prevalências de presenteísmo.* Conclusão*: o presenteísmo pode evoluir para piora progressiva da saúde do trabalhador. Portanto, identificá-lo precocemente e promover intervenções para reduzir seus determinantes é um desafio para as organizações.*

Palavras-chave: *presenteísmo; condições de trabalho; nível de saúde; saúde do trabalhador; relações interpessoais.*

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Introduction

Harm to workers' health generates a chain of problems for the individual, the family, the company, the government and society in general. Changes in workers' health conditions can lead to decreased ability or total inability for work and consequent loss of productivity, whether due to absenteeism or presenteeism[1].

Presenteeism and absenteeism are part of a continuum in which workers move throughout their lives. Absenteeism is a well-known, well-studied problem, sometimes addressed in organizations. The same is not true of presenteeism, which is generally viewed as an obstacle to productivity without triggering discussions about related health issues[2].

Presenteeism can be defined as being present at work despite awareness of limitations that reduce the work ability[3]. Such limitations relate to psychological or physical suffering, compromising well-being inside and outside the workplace[2]. Presenteeism has been measured by recording the days when workers, albeit present in the workplace, sense they should be absent due to their physical, cognitive or emotional condition, therefore feeling unable to perform to the best of their abilities[4-7].

The international literature mentions two conceptions of presenteeism. The first, predominant among European authors, studies the outcome from an epidemiological perspective, centered on occupational traits responsible for workers' stress and illness. The second, originated in American schools (but not exclusively), investigates the impact of diseases on workers' productivity and the costs related to such loss[3].

In the epidemiological approach, it is an outcome mediated by personal and workplace-related issues, with an impact on workers' health conditions[4,5]. In the economic dimension, presenteeism expresses reduced productivity in the workplace due to health problems, and therefore has a financial impact for organizations.

Longitudinal studies have indicated that the frequency of presenteeism is related to the frequency and duration of short- and long-term absenteeism[6-8], with morbidities such as serious coronary events[9], depression[7] and burnout[10]. In addition, frequent presenteeism can also lead to decreased work ability[11].

On the other hand, some authors have recently discussed the positive consequences of presenteeism within the process of professional rehabilitation in a favorable and socially positive work setting[11], such as increased self-esteem and consistent productivity. In these conditions, being present at work, despite health limitations, could reveal the existence of compensations in the workplace that would result in the worker remaining at work and having a positive perception about being present. However, this was not the perspective adopted in this study or in most studies on presenteeism.

Presenteeism can be related to organizational and personal factors[5,6,11,12] that interact to influence workers' decision about their presence at or absence from work. In general, there is a trend to attribute presenteeism to personal issues[3], although some studies have pointed to organizational issues as the main predictors[6,13].

Although Brazilian studies on the subject are scarce[14], the international literature shows that presenteeism is a current and frequent issue[5,7,13,15-17] and that its study may favor the early identification of health problems, besides encouraging reflection on organizational stressors[11,18].

Thus, knowing the characteristics of presenteeism among workers can contribute to improve health and ability for labor, in addition to preventing long-term absenteeism and disability by early identification of complaints.

In the industrial context, where this study was conducted, there is a growing need to ascertain the impact of health promotion programs (HPP). HPP consists of systematic initiatives in the workplace that aim to expand the health resources of workers, such as lectures and workshops (healthy eating, non-communicable diseases, physical activities, oral health, etc.), workplace gymnastics, massage therapy and other activities jointly developed with companies[19].

Measuring presenteeism can contribute to elucidate a morbidity or situation of discomfort and inadequacy at work that cannot be identified by means of absenteeism indicators. Therefore, this study investigated the prevalence of presenteeism and its association with sociodemographic traits, lifestyle, workplace and interpersonal relational aspects and general health conditions in industry workers.

Methods

A cross-sectional epidemiological study was carried out with secondary data from the Leisure Management System (SGL) database of the Social Service of Industry/Regional Department of Bahia (Sesi/DR-BA), for which authorization was granted. The database comprised technical diagnostic assessments (TDA) answered by workers prior to their participation in health promotion programs (HPP)[19] in the workplace in 2013.

TDA is always administered by Sesi/DR-BA professionals before implementing HPP in

industries. The data are tabulated in SGL, where the epidemiological reports of the workers' lifestyle profiles are generated.

The study included all records of industrial workers in Bahia engaged in HPP and who fully answered the TDA. Records of workers from non-industrial companies and records on absence from work in the last 30 days were excluded for being incompatible with the outcome of interest, which is being present at work despite performance limitations.

The data were collected according to specific Sesi/DR-BA standards, which define the conduct of the assessor and the form of administering TDA[19]. TDA is administered in an appropriate place within the company (reserved room) and guided by the Sesi professional (who explains the reason and goal of TDA, the ethical aspects and clarifies doubts about the questions). A non-random sample of workers was used in all HPP participating companies, that is, all were invited to take part during the assessment period.

The data collection instrument used was designed by the actual institution to verify the lifestyle profile of the population of workers before and after intervention with HPP. It consists of 30 questions, of which 21 were used in this study.

The procedures used at the time of collection ensured voluntary participation, anonymity and confidentiality of information. The ethical aspects complied with Resolution 466/2012 and the project was approved by the Research Ethics Committee of the School of Medicine of Bahia, Federal University of Bahia, according to opinion 950.362.

Dependent variable

Presenteeism was measured by means of three questions extracted from TDA that showed a relationship with the workers' capability to remain at work despite being aware of some kind of limitation to their performance, that is, in a situation of presenteeism.

The selected questions, available in TDA, related to cognitive and emotional components in the face of work situations, namely: "*In the last 30 days, how many days did you not feel like coming to work*?"; "*In the past 30 days, how many days did you feel unwell or discouraged to perform tasks that your job requires*?"; "*In the past 30 days, how many days did you find it difficult to concentrate at work*?" These questions had four alternatives on a 0-3 Likert scale, representing the answers: 0 = "none," 1 = 1 to 2 days," 2 = "3 to 7 days" and 3 = "8 or more days."

The question about absenteeism was used as an exclusion criterion: *"In the last 30 days, how many days were you absent from work for health reasons (with or without sick leave)?"* Only workers who reported not having been absent from work were included for characterizing the outcome, that is, the workers who reported some cognitive and/or emotional limitation to perform work in the last 30 days and yet continued working, the definition of presenteeism in this study.

The added scores of the three questions ranged from 0 to 9. The higher the result, the greater the awareness of limitations to work performance.

It is noteworthy that the TDA questions chosen to assess presenteeism and the manner of reaching a score were based on the literature on the subject[20]. These questions address the psychic and cognitive condition of workers in the face of work, expressed in the difficulties (lack of concentration, indisposition and unwillingness) to perform work tasks. These complaints are conditions that can lead to both physical and psychological illness.

Independent variables

The independent variables used, considering plausible associations, were sociodemographic traits (sex, age, education and marital status), lifestyle (smoking, alcohol consumption, diet and physical activity), general health conditions (general health assessment, body pain and discomfort, sleep quality and stress), and interpersonal and workplace relational aspects (quality of relationships, feelings about life and level of adaptation and integration in the workplace in general). All questions and response scales used were based on TDA. The variables were categorized as follows.

Sociodemographic variables: age (median split, 30 years); education level, *with higher education* and *without higher education* (incomplete elementary school; complete elementary school; complete secondary school); and marital status, *with partner* (married or living with a partner) and *without partner* (single, widowed, separated or divorced).

Lifestyle characteristics: smoking: *no* for non- or ex-smokers; and *yes* when smoking was reported, regardless of frequency.

Leisure time physical activity, as recommended by the American College of Sports Medicine[21], was classified as *sufficient* (yes, 3 or 4 times a week; yes, 5 or more times a week) and *insufficient* (no, and I am not interested in doing physical activities in my leisure time in the near future; no, but I am interested in doing

physical activities in my leisure time in the near future; yes, 1 or 2 times a week).

Food consumption, according to the guidelines of the Food Guide for the Brazilian Population[22], was classified as *recommended* for consumption of *fresh* food (fruit and vegetables) four times a week or more, and with no consumption of *highly processed* foodstuffs (soft drinks); and *not recommended* for consumption of fresh food three times a week or less and any consumption of highly processed foodstuffs.

Binge drinking was defined according to the recommendations of the Center for Disease Control and Prevention and was characterized as positive when workers reported consuming five or more drinks on a single occasion[23].

General health conditions: the answers to the variables about self-assessed general health, sleep quality and stress were respectively classified into: *excellent*/*good* (always/almost always sleeps well; rarely/sometimes stressed) and *average*/*poor* (sometimes/never/rarely sleeps well; almost always/always stressed). The variable related to frequency of pain and discomfort was classified into three levels: *none*, *1 to 7 days* and *more than 8 days*.

Interpersonal and workplace relational aspects: the answers were respectively classified as: quality of relationships, *excellent*/*good* and *average*/*poor*; feelings about life, *positive* (feels very good/good) and *negative* (feels bad/very bad); and level of integration and adaptation in the workplace, *excellent*/*good* and *average*/*poor*.

Analysis

Positive cases of presenteeism were considered those in which the overall score for the three questions was above 1 and no absence from work for health reasons was reported in the last 30 days, i.e., the workers came to work despite emotional and/or cognitive limitations (unwillingness, indisposition/discouragement or lack of concentration).

Presenteeism was classified into two levels of frequency: short term (scores 1 to 4); and long term (scores 5 to 9). The group with a score of 0 was used as a control group, equivalent to negative presenteeism.

Data analysis was performed using R software version 3.1.3. The first step comprised describing the independent variables and those that made up the outcome, as well as the overall scores obtained in the questions. The bivariate analysis started with the construction of $k \times 3$ tables followed by calculation of the prevalence ratios (PR) and confidence intervals (CI, crude association).

The analyzed data did not support the convergence criterion for using the multinomial model. As an alternative, the Poisson model with robust variance was used to estimate the magnitude of associations by means of the prevalence ratio[24]. Therefore, in the multivariate analysis, short- and long-term presenteeism were analyzed separately in relation to negative presenteeism. The smoking variable was excluded from the exploratory model due to the low number of smokers.

Being an exploratory study and considering theoretical and biological plausibility criteria, all independent variables were included in the Poisson model concurrently and the results analyzed were those derived from the associations observed in the first exploratory model.

The estimated coefficients for each independent variable of the model were used to calculate the PR, as well as its respective 95% confidence intervals, merely to verify the magnitude of the effect and the accuracy of the data in relation to the investigated population, as well as to compare them with the results of the bivariate analysis.

Residual analysis was carried to verify the dispersion of the observations in relation to expected outcomes, demonstrating the quality of data adjustment to the model used.

Although the population studied did not originate from a random sample, confidence intervals were used merely to demonstrate the degree of precision of the estimates found. According to Rothman[25], in these cases the intervals serve only as a minimum estimate of the actual uncertainty about the estimated object. This enabled the adoption of a critical position and parsimonious interpretation of results, with all variables preserved in the final models. In other words, no variables were removed based on statistical inference.

Results

The population comprised 2,093 industrial workers, mostly men (63.5%), between 16 and 81 years of age (sd = 9.5), averaging 31.4 years (data not shown). Most reported being married (53.7%) and not having higher education (82%) (**Table 1**).

Table 1 Characteristics of industry workers participating in Health Promotion Programs in Bahia, in 2013 (n = 2.093)

Population traits	*n*	*%*
Sociodemographic traits		
Sex		
Male	1,330	63.5
Age group*		
Aged 30 or below	1,152	55.1
Marital status		
With partner	1,124	53.7
Level of education		
No higher education	1,717	82.0
Lifestyle		
Smoking		
No	2,018	96.4
Binge drinking		
No	1,597	76.3
Eating habits		
Recommended	96	4.6
Leisure time physical activity		
Sufficient	578	27.6
Overall health conditions		
Self-assessed overall health		
Excellent/Good	1,759	84.0
Sleep quality		
Always or almost always sleeps well	1,327	63.4
Stress		
Rarely/Sometimes	1,845	88.2
Pain/discomfort in the last 30 days		
None	1,071	51.2
Relational aspects		
Quality of relationships		
Excellent/Good	1,922	91.8
Feeling about life		
Positive (very good/good)	2,040	97.5
Integration and adaptation in workplace		
Excellent/Good	1,911	91.3
Awareness of limitations at work		
Unwillingness to attend work		
None	1,333	63.7
Indisposition/discouragement to perform tasks		
None	1,159	55.4
Difficulty to concentrate at work		
None	1,363	65.1
Presenteeism		
Negative (score 0)	888	42.4
Positive (score 1 to 9)	1,205	57.6
Frequency of presenteeim		
Short term (score 1 to 4)	1,042	49.8
Long term (score 5 to 9)	163	7.8

*Data loss n = 4.
Source: Technical Diagnostic Assessments (TDA) of Social Service of Industry/Regional Department of Bahia (Sesi/DR-BA).

Only 3.6% reported smoking, 23.4% reported binge drinking, 95.4% had non-recommended eating habits and 72.4% did insufficient leisure time physical activity.

Prevalence of *average/poor* overall health assessment, poor sleep quality and stress was 16% (n = 334), 36.6% (n = 766) and 11.8% (n = 248), respectively.

Prevalence of pain and body discomfort in performing work activities was high, reported by 48.8% (*n* = 1,022) of individuals. The duration of pain ranged from 1 to more than 8 days, with a

higher percentage among those who reported up to 7 days in the last month (42.5%; *n* = 890) (data not shown).

As for relational aspects, more than 90% of individuals reported positive relational aspects.

A high prevalence of cognitive and/or emotional limitations in relation to work was observed, assessed by the following questions: unwillingness to go to work (36.3%; n = 760), indisposition or discouragement to perform work tasks (44.6%; *n* = 934) and lack of concentration at work (34.9%; *n* = 730) in the last 30 days.

Prevalence of general presenteeism among industry workers was 57.6%, with a score between 1 and 9.

Table 2 and **Table 3** respectively feature the outcomes most strongly associated with short- and long-term presenteeism in relation to the control category, negative presenteeism (score = 0).

Table 2 Separate multivariate analysis for short-term presenteeism (score 1 - 4; n = 1,042) in relation to the control group, negative presenteeism (score 0; n = 888), among industry workers participating in Health Promotion Programs in Bahia, in 2013 (n = 1.930)

Independent variables			*Short-term presenteeism*			
	n	*%*	*Crude PR*	*95%CI*	*Adjusted PR*	*95%CI*
Sociodemographic traits						
Sex						
Male	607	49.2	1		1	
Female	435	62.4	1.27	1.12-1.43	1.11	0.97-1.26
Age group*						
31 or more	416	46.5	1		1	
30 or less	623	60.4	1.30	1.14-1.47	1.32	1.15-1.51
Level of education						
No higher education	818	51.9	1		1	
Higher education	224	63.5	1.22	1.05-1.41	1.43	1.21-1.66
Marital status						
No partner	503	56.9	1		1	
Partner	539	51.5	0.91	0.80-1.02	0.97	0.85-1.10
Lifestyle						
Binge drinking						
Yes	782	53.1	1		1	
No	260	56.9	1.07	0.92-1.23	1.14	0.98-1.31
Eating habits						
Recommended	45	50.6			1	
Not recommended (negative)	997	54.2	1.07	0.80-1.46	1.06	0.79-1.46
Leisure time physical activity						
Sufficient	269	50.9	1		1	
Insufficient	773	55.2	1.09	0.94-1.24	1.04	0.90-1.20
Overall health conditions						
Pain/discomfort in the last 30 days						
None	408	39.1	1		1	
1 to 7 days	575	71.3	1.83	1.60-2.07	1.76	1.53-2.00
8 or more days	59	73.8	1.89	1.42-2.45	1.75	1.30-2.30
Self-assessed overall health						
Excellent/Good	850	51.2	1		1	
Average/Poor	192	71.1	1.39	1.18-1.62	1.11	0.93-1.30

(To be continued)

Table 2 Continuation

Independent variables			Short-term presenteeism			
	n	*%*	*Crude PR*	*95%CI*	*Adjusted PR*	*95%CI*
Sleep quality						
Always or almost always sleeps well	607	48.1	1		1	
Sometimes/Never/Rarely sleeps well	435	65.0	1.35	1.19-1.52	1.17	1.01-1.31
Stress						
Rarely/Sometimes stressed	901	52.0	1		1	
Almost always/Always stressed	141	71.9	1.38	1.15-1.64	1.15	0.94-1.38
Relational aspects						
Quality of relationships						
Excellent/Good	946	52.6	1		1	
Average/Poor	96	72.7	1.38	1.11-1.69	1.20	0.95-1.49
Feeling about life						
Positive (Very good/Good)	1022	53.8	1		1	
Negative (Bad/Very Bad)	20	66.7	1.24	0.76-1.87	0.90	0.55-1.37
Integration and adaptation in workplace						
Excellent/Good	949	53.1	1		1	
Average/Poor	93	65.0	1.22	0.98-1.50	1.01	0.79-1.25

*Data loss n = 3.
Source: Technical Diagnostic Assessments (TDA) of Social Service of Industry/Regional Department of Bahia (Sesi/DR-BA).

Table 3 Separate multivariate analysis for long-term presenteeism (score 5 - 9; n = 163) in relation to the reference group, negative presenteeism (score 0; n = 888), among industry workers participating in Health Promotion Programs in Bahia, in 2013 (n = 1,051)

Independent variables			High presenteeism			
	n	*%*	*Crude PR*	*95%CI*	*Adjusted PR*	*95%CI*
Sociodemographic traits						
Sex						
Male	97	13.4	1		1	
Female	66	20.1	1.50	1.09-2.04	0.89	0.62-1.25
Age group						
31 or more	42	8.1	1		1	
30 or less	121	22.9	2.84	2.01-4.07	2.05	1.41-3.01
Level of education						
No higher education	140	15.6			1	
Higher education	23	15.1	0.97	0.60-1.47	1.50	0.91-2.36
Marital status						
No partner	85	18.2			1	
Partner	78	13.3	0.73	0.53-0.99	0.86	0.62-1.19
Lifestyle						
Binge drinking						
No	124	15.2	1		1	
Yes	39	16.5	1.09	0.74-1.54	1.13	0.76-1.63
Eating habits						
Recommended	124	13.7			1	
Not recommended (negative)	39	15.6	1.14	0.57-2.67	0.83	0.40-2.00

(To be continued)

Table 3 Continuation

Independent variables			High presenteeism			
	n	*%*	*Crude PR*	*95%CI*	*Adjusted PR*	*95%CI*
Leisure time physical activity						
Sufficient	49	15.9	1		1	
Insufficient	114	15.4	0.97	0.69-1.36	0.83	0.58-1.18
Overall health conditions						
Pain/discomfort in the last 30 days						
None	27	4.1	1		1	
1 to 7 days	84	26.7	6.55	4.30-10.28	5.24	3.38-8.34
8 or more days	52	71.2	17.49	11.09-28.22	10.94	6.57-18.47
Self-assessed overall health						
Excellent/Good	99	10.9	1		1	
Average/Poor	64	45.1	4.14	3.00-5.65	1.15	0.77-1.71
Sleep quality						
Always or almost always sleeps well	66	9.2	1		1	
Sometimes/Never/Rarely sleeps well	97	29.3	3.20	2.34-4.38	1.42	0.99-2.02
Stress						
Rarely/Sometimes stressed	111	11.8	1		1	
Almost always/Always stressed	52	48.6	4.13	2.95-5.71	1.80	1.20-2.65
Relational aspects						
Quality of relationships						
Excellent/Good	124	12.7	1		1	
Average/Poor	(39)	52.0	4.09	2.82-5.80	1.42	0.90-2.19
Feeling about life						
Positive (Good/Very good)	140	13.8	1		1	
Negative (Bad/Very Bad)	23	69.7	5.07	3.17-7.71	1.83	1.07-3.00
Integration and adaptation in workplace						
Excellent/Good	124	12.9	1		1	
Average/Poor	39	43.8	3.40	2.34-4.82	1.13	0.70-1.78

Source: Technical Diagnostic Assessments (TDA) of Social Service of Industry/Regional Department of Bahia (Sesi/DR-BA).

The variables associated with short-term presenteeism were: age group up to 30 years old, higher education and presence of pain and discomfort. For the long-term presenteeism outcome the associated variables were: age range, pain and discomfort, stress and negative feelings about life.

None of the lifestyle characteristics remained associated with the outcome or presented weak estimates, nor did sex, marital status, self-assessed overall health and level of integration and adaptation in the workplace.

Discussion

This study showed a high prevalence of presenteeism among industry workers, especially short-term presenteeism. Younger workers and those with pain or discomfort were the most affected by presenteeism, whether short or long term. In addition, workers more exposed to stressful situations and who experience negative feelings about life showed higher prevalence of long-term presenteeism.

High prevalence of presenteeism was compatible with studies that analyzed different populations, even when using different instruments[4,5,7,13,15-17], demonstrating that it is a common phenomenon[5].

Previous studies indicate high prevalence of presenteeism in occupations related to health care and education[4], which involve caring for dependent people or vulnerable clients,[3,12] or meeting some human need[4]. Although this is not the profile of industrial workers, such studies also relate high prevalence of presenteeism to occupations that combine risk factors, high workload, stress, low wages and greater absenteeism[4].

Although some studies report a higher prevalence of presenteeism among older people,

associated with greater vulnerability regarding job insecurity and greater difficulty in professional repositioning[15,26], in this study there was a higher prevalence among younger people.

Among industrial workers, age group was relevant for short- and long-term presenteeism, whose adjusted PR was 1.32 and 2.05, respectively, demonstrating that younger people have a higher prevalence of presenteeism, an association that increases in the longer-term outcome.

Potential factors for this result relate to the employment relationship of young workers, potentially more temporary compared to older groups, leading to overcommitment to gain a footing in the labor market, that is, to ensure job security. Therefore, young people tend to report greater limitation for work in the last 30 days, although they do not stop working[15,26].

Overcommitment may also be a result of the "presenteeism culture" in organizations, in which absenteeism is avoided due to intense competitiveness and attendance is a criterion for career enhancement, which may pressure workers to avoid being absent despite their limitations[27]. This culture also reflects the behavior of leaders and supervisors, which leaves workers in doubt about how to behave when they feel unable to perform their tasks. Moreover, sometimes the latter themselves do not stay away when ill, perpetuating this behavior and supposedly setting an example to their subordinates[10,26].

It is necessary to consider the possibility of the absence from work of older workers, since the frequency of presenteeism is a predictor of absenteeism[6,28].

Greater presenteeism among workers with higher education levels was not expected for this population, a relevant fact to the short-term outcome, as shown by the PR of 1.43. Other studies did not show a clear relationship between education and presenteeism[5,28].

In the case of Brazil, in some professions, education level does not mean higher positions and salaries, as seen in a study with prison officers[29], which is also likely in the case of industrial work. However, even if the better educated occupy leadership or supervision positions, aspects related to responsibility[17] and lack of replacement[5,30], for example, are related to attendance at work, also reflecting efforts to preserve jobs or positions.

Prolonged pain (lasting 8 days or more) was strongly associated with perceived limitation in terms of discouragement, unwillingness and lack of concentration for work in the last 30 days. Although it was already expected that workers in pain would be more aware of limitations to work, it was possible to demonstrate a gradient of expanding association between duration of pain and long-term presenteeism, that is, the more days in pain, the greater the discouragement, lack of concentration and unwillingness to go to work, as measured in this study and as expected.

The longer the duration of pain, the greater the perceived limitation for work. Those who experienced pain lasting up to one week in the last month had a prevalence of long-term presenteeism five times greater those who had no pain. This association is about eleven times greater for those who experienced more than 8 days of pain in the past 30 days. It is noteworthy that pain is among the most important reasons for inability at work, a consequence of the combination of physical factors, related or not to work, psychosocial and individual factors[31].

It can be assumed that the workers evaluated showed a reduction in their work ability and may have compensated for this reduction by working overtime and/or making greater physical and cognitive effort, as suggested by Demerouti et al.[10], which can lead to worsening of pain, emergence of comorbidities, especially those related to mental health, and disability[10,32].

Presenteeism of people in pain deserves attention, since these disorders, more common in jobs with great physical overload, affect body structures, causing physical and psychological suffering. Working in pain can prolong the persistence of symptoms and or reduce the likelihood of recovery[12].

In the exploratory model used in this study, poor sleep quality and stress were associated with short- and long-duration presenteeism, respectively. Compromised sleep quality resulted in 17% more short-term presenteeism and 42% more long-term presenteeism in the last month, when compared to those who reported sleeping well, although the confidence interval of this result was less precise.

In a cross-sectional study to investigate the relationship between insomnia and work disability, Sivertsen et al.[33] demonstrated that although insomnia does not justify the granting of benefits, it was a robust predictor of long-term disability (OR = 1.75; 95%CI = 1.40-2.20), even adjusted for physical and psychic morbidities.

The relationship between insomnia and work disability is mediated by somatic and psychological factors, and it is often addressed as a symptom of such morbidities[33]. The results found in this study are in agreement with this relationship between sleep quality and presenteeism.

Reports of stress resulted in 80% more long-term presenteeism compared to no stress. Stress emerges when personal resources are insufficient to meet the demands of the environment and the degree of stressors to which one is subjected. The answers to this imbalance can be emotional, physiological or behavioral, favoring the worsening of health[34].

In general, industrial labor is characterized by high psychological demand and low worker control, traits associated with stress and presenteeism[35] and which lead to deteriorated health[36].

Like presenteeism among people in pain, presenteeism among people with prolonged stress deserves attention, as this state generates cumulative psychological suffering with consequences for physical and mental health[10,37].

The expressive association of negative feelings about life with long-term presenteeism (PR = 1.83) is striking. It is possible that such feelings are characteristic of a negative emotional state and may be linked to other mental disorders.

Self-assessed overall health did not show a consistent association with the outcome, although a study conducted by Aronsson and Gustafsson[5], using a similar question, found a strong relationship between this variable and presenteeism (OR = 3.32; 95%CI = 2.71 -4.07). In this regard, further studies are desirable to investigate the role of possible confounders or effect modifiers not yet analyzed.

There is no consensus in the literature regarding the relationship between presenteeism and the sociodemographic variables of sex and marital status[3,5]. In the multivariate analysis of this research with industrial workers, neither showed any significant association with the outcome.

There no consensus either on the impact of lifestyle traits on presenteeism. Some studies have shown that healthier people or people with fewer behavioral risk factors have better levels of productivity, better health and lower levels of presenteeism and absenteeism, although further research is desirable in this area[38,39]. In the industrial population surveyed, these factors were not important to characterize the outcome.

As this is a cross-sectional study, the results should consider the limitations of this type of design, including the possibility of reverse causality for the identified associations.

The TDA questions used in this study were not tested in this format to measure presenteeism, although aspects of the tool validated for Brazil, SPS-640, were used as reference points. Many instruments available in the literature still show limitations regarding validity and there is no gold standard. However, the database questions used measure characteristics/outcomes that are compatible with those measured by a validated instrument[20].

The use of secondary information, derived from TDA, did not allow the insertion and analysis of work-related variables, which may be more relevant to the outcome, as shown in the international literature on the topic[3]. For this reason, there is no information on the total population and percentage of adherence to TDA in each industrial company participating in HPP.

Considering the scarcity of national studies and the unavailability of data on industrial workers, the results presented, despite the limits of the study, may be important to characterize presenteeism in this population, also in addition to contributing to the discussion of its implications for health and guiding future studies.

Conclusions

This study made it possible to conclude that being younger and having a higher education level, reporting pain or discomfort, having poor sleep quality, experiencing stress and negative feelings about life are factors associated with presenteeism, i.e., with the perception of impairment of the ability to work, whether in the short or long term.

Presenteeism was measured through reports of unwillingness, indisposition and or discouragement and lack of concentration to perform work activities, including the cognitive (unwillingness and lack of concentration) and physical/emotional (indisposition or discouragement) dimensions, which reflect negative feelings in response to work situations.

Workers who remain active in these conditions may have reduced ability to work and evolve to a specific health complaint. This relationship was demonstrated through the associations obtained between presenteeism and different health conditions measured in this population.

In this sense, early identification and management of conditions related to presenteeism may contribute to reduce or avoid work leave and inability for work. In addition, it can help to identify various structural problems in the organization, responsible for the illness of workers, as well as assist in the deployment of favorable organizational policies.

It is emphasized in this study that, in the face of a health problem, physical or psychological, specific or not, with or without a defined diagnosis,

the decision between seeking treatment and fully recovering or continuing to work with the risk of aggravating the health condition depends mainly on the organizational culture and, most likely, on the social support and workplace safety available to workers.

Authors' contributions

Pie ACS performed the entire work, from designing the overall study to writing the paper, namely, complete review of the literature on the topic, theoretical and methodological discussion, complete drafting of the article, including revisions, corrections and interpretation of results. Fernandes RCP contributed to the general conception of the study, theoretical guidance and discussion related to the theme, interpretation of results, joint development of the analysis method, correction of preliminary versions and necessary adjustments, support in preparing and submitting the manuscript, systematic monitoring of the evolution of the article. Carvalho FM contributed with a theoretical discussion related to the theme, joint elaboration of the analysis method, interpretation of results, correction of preliminary versions and necessary adjustments. Porto LA provided important methodological contributions, specifically in the method of data analysis, interpretation of results and contributions in the preliminary versions. All authors approved the final published version and assume public responsibility for the work performed.

References

1. Prins R. Sickness absence and disability: an international perspective. In: Loisel P, Anema JR, editores. Handbook of work disability: prevention and management. New York: Springer; 2013. p. 3-14. doi: 10.1007/978-1-4614-6214-9_1.
2. Araújo JP. Afastamento do trabalho: absenteísmo e presenteísmo em uma instituição federal de ensino superior [dissertação]. Brasília: Universidade de Brasília; 2012.
3. Johns G. Presenteeism in the workplace: a review and research agenda. J Organ Behav. 2010;31(4):519-42. doi: 10.1002/job.630.
4. Aronsson G, Gustafsson K, Dallner M. Sick but yet at work: an empirical study of sickness presenteeism. J Epidemiol Community Health. 2000;54(7):502-9. doi: 10.1136/jech.54.7.502.
5. Aronsson G, Gustafsson K. Sickness presenteeism: prevalence, attendance-pressure factors, and an outline of a model for research. J Occup Environ Med. 2005;47(9):958-66. doi: 10.1097/01.jom.0000177219.75677.17.
6. Bergström G, Bodin L, Hagberg J, Aronson G, Josephson M. Sickness presenteeism today, sickness absenteeism tomorrow? A prospective study on sickness presenteeism and future sickness absenteeism. J Occup Environ Med. 2009;51(6):629-38. doi: 10.1097/JOM.0b013e3181a8281b.
7. Conway PM, Hogh A, Rugulies R, Hansen AM. Is sickness presenteeism a risk factor for depression? A Danish 2-year follow-up study. J Occup Environ Med. 2014;56(6):595-603. doi: 10.1097/JOM.0000000000000177.
8. Janssens H, Clays E, De Clercq B, De Bacquer D, Braeckman L. The relation between presenteeism and different types of future sickness absence. J Occup Health. 2013;55(3):132-41.
9. Kivimaki M, Head J, Ferrie JE, Hemingway H, Shipley MJ, Vahtera J, Marmot MG. Working while ill as a risk factor for serious coronary events: the Whitehall II study. Am J Public Health. 2005;95(1):98-102.
10. Demerouti E, Blanc PML, Bakker AB, Schaufeli WB, Hox J. Present but sick: a three-wave study on job demands, presenteeism and burnout. CDI. 2009;14(1):50-68. doi: 10.1108/13620430910933574.
11. Sanderson K, Cocker F. Presenteeism implications and health risks. Aust Fam Physician. 2013;42(4):172-5.
12. d'Errico A, Viotti S, Baratti A, Mottura B, Barocelli MT, Tagna M, et al. Low back pain and associated presenteeism among hospital nursing staff. J Occup Health. 2013;55(4):276-83.
13. Hansen CD, Andersen JH. Going ill to work: what personal circumstances, attitudes and work-related factors are associated with sickness presenteeism? Soc Sci Med. 2008;67(6):956-64. doi: 10.1016/j.socscimed.2008.05.022.
14. Paschoalin HC, Griep RH, Lisboa MTL. A produção científica sobre o presenteísmo na enfermagem e suas repercussões no cuidado. Rev APS. 2012;15(3):306-11.
15. Heponiemi T, Elovainio M, Pentti J, Virtanen M, Westerlund H, Virtanen P, et al. Association of contractual and subjective job insecurity with sickness presenteeism among public sector employees. J Occup Environ Med. 2010;52(8):830-5. doi: 10.1097/JOM.0b013e3181ec7e23.
16. Jena AB, Baldwin DC Jr, Daugherty SR, Meltzer DO, Arora VM. Presenteeism among resident physicians. JAMA. 2010;304(11):1166-8.

17. Muckenhuber J, Burkert N, Dorner TE, Großschädl F, Freidl W. The impact of the HDI on the association of psychosocial work demands with sickness absence and presenteeism. Eur J Public Health. 2014;24(5):856-61. doi: 10.1093/eurpub/ckt132.

18. Hemp P. Presenteeism: at work but out of it. Harv Bus Rev. 2004;82(10):49-58.

19. Serviço Social da Indústria (BR). Sistema de avaliação de programas de promoção de estilos de vida saudáveis e produtividade (documento técnico). Brasília, DF; 2001.

20. Koopman C, Pelletier KR, Murray JF, Sharda CE, Berger Ml, Turpin RS, et al. Standford presenteeism scale: health status and employee productivity. J Occup Environ Med. 2002;44(1):14-20.

21. Garber CE, Blissmer B, Deschenes MR, Franklin BA, Lamonte MJ, Lee IM, et al. American College of Sports Medicine position stand: quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. Med Sci Sports Exerc. 2011;43(7):1334-59. doi: 10.1249/MSS.0b013e318213fefb.

22. Ministério da Saúde (BR). Guia alimentar para a população brasileira. 2 ed. Brasília, DF; 2014.

23. Centers for disease control and prevention [Internet]. Washington, DC: U.S. Department of Health & Human Services [atualizada em 2015; cited on Jan 3, 2020]. Available from: http://www.cdc.gov.

24. Coutinho LMS, Scazufca M, Menezes PR. Methods for estimating prevalence ratios in cross-sectional studies. Rev Saude Publica. 2008;42(6):992-8.

25. Rothman, JK. Six persistent research misconceptions. J Gen Intern Med. 2014;29(7):1060-4. doi: 10.1007/s11606-013-2755-z.

26. Bierla I, Huver B, Richard S. Presenteeism at work: the influence of managers. International J Business and Manag Studies. 2011;3(2):97-107.

27. Gustafsson Sendén M, Løvseth LT, Schenck-Gustafsson K, Fridner A. What makes physicians go to work while sick: a comparative study of sickness presenteeism in four European countries (HOUPE). Swiss Med Wkly. 2013;143:w13840. doi: 10.4414/smw.2013.13840.

28. Taloyan M, Aronsson G, Leineweber C, Magnusson Hanson L, Alexanderson K, Westerlund H. Sickness presenteeism predicts suboptimal self-rated health and sickness absence: a nationally representative study of the Swedish working population. PLoS ONE. 2012;7(9):e44721. doi: 10.1371/journal.pone.0044721.

29. Fernandes RCP, Silvany Neto AM, Sena GM, Carneiro CAP, Costa FPM. Trabalho e cárcere: um estudo com agentes penitenciários da região metropolitana de Salvador, Brasil. Cad Saude Publica. 2002;18(3):807-16.

30. Böckerman P, Laukkanen E. What makes you work while you are sick? Evidence from a survey of workers. Eur J Public Health. 2009;20(1):43-6. doi: 10.1093/eurpub/ckp076.

31. Staal JB, Rijk A, Houkes I, Heymans MW. Clinical interventions to reduce work disability in workers with musculoskeletal disorders or mental health problems. In: Loisel P, Anema JR, editores. Handbook of work disability: prevention and management. New York: Springer; 2013. p. 317-33. doi: 10.1007/978-1-4614-6214-9_1.

32. Karoly P, Ruehlman LS, Okun MA. Psychosocial and demographic correlates of employment versus disability status in a national community sample of adults with chronic pain: toward a psychology of pain presenteeism. Pain Med. 2013;14(11):1698-707. doi: 10.1111/pme.12234.

33. Sivertsen B, Overland S, Neckelmann D, Glozier N, Krokstad S, Pallesen S, et al. The long-term effect of insomnia on work disability. Am J Epidemiol. 2006;163(11):1018-24.

34. Vieira MLC. Presenteísmo na enfermagem: repercussões para saúde do trabalhador e organização hospitalar [dissertação]. Rio de Janeiro: Universidade do Estado do Rio de Janeiro; 2014.

35. Umann J, Guido LA, Grazziano ES. Presenteeism in hospital nurses. Rev Latino-Am. Enfermagem. 2012;20(1):[8 screens].

36. 36. Fernandes RCP, Assunção AA, Carvalho FM. Mudanças nas formas de produção na indústria e a saúde dos trabalhadores. Cienc Saude Colet. 2010, 15(Supl.1):1563-74.

37. Boles M, Pelletier B, Lynch W. The relationship between health risks and work productivity. J Occup Environ Med. 2004;46(7):737-45. doi: 10.1097/01.jom.0000131830.45744.97.

38. Pelletier B, Boles M, Lynch W. Change in health risks and work productivity over. J Occup Environ Med. 2004;46(7):746-54.

39. Christensen JR, Overgaard K, Hansen K, Søgaard K, Holtermann A. Effects on presenteeism and absenteeism from a 1-year workplace randomized controlled trial among health care workers. J Occup Environ Med. 2013;55(10):1186-90.

40. Paschoalin HC, Griep RH, Lisboa MTL, Mello DCB. Transcultural adaptation and validation of the Stanford Presenteeism Scale for the evaluation of presenteeism for Brazilian Portuguese. Rev Latino-Am Enfermagem. 2013;21(1):[8 screens]. doi: 10.1590/S0104-11692013000100014.