

Original Article

In the classroom but absent: Evidence of sickness presenteeism among teachers at four public schools



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المخلص

أهداف البحث: الأدلة على الحضور المرضي (الحضور للعمل أثناء المرض) نادرة نسبياً في البلدان المنخفضة والمتوسطة الدخل وفي الفئات الضعيفة مثل المعلمين. لتقديم دليل على هذه الفجوة البحثية، فحصت هذه الدراسة نسبة انتشار وعوامل الحضور المرضي، وقامت بتقدير ضعف الإنتاجية الناتج عن ذلك، بين المعلمين في ليون، نيكاراغوا.

طرق البحث: في هذه الدراسة المقطعية، تم اختيار أربع مدارس عامة في ليون، نيكاراغوا باستخدام عينة ملائمة وضمت العينة النهائية 132 مدرساً. تم تحديد العوامل المحددة للحضور المرضي باستخدام الانحدار اللوجستي متعدد المتغيرات. كما تم استخدام استبانة إنتاجية العمل واضطراب النشاط لتقدير ضعف الإنتاجية بالدولار الأمريكي (1 دولار أمريكي = 31.78 كوردوبا).

النتائج: بشكل عام، كان انتشار الحضور المرضي 65.2% (فترة الثقة 56.53 - 72.87)، ولم يتم العثور على فروق وفقاً للخصائص الاجتماعية الديموغرافية. أظهرت الدراسة علاقة سلبية بين التدبير المباشر أو الدعم والحضور المرضي. علاوة على ذلك، فإن المعلمين الذين ليس لديهم ظروف منزلية مناسبة للراحة تزيد لديهم احتمالية الحضور المرضي بنسبة 1.28 مرة. كان متوسط الوقت الضائع بسبب الوضع الصحي 14.3%. وكان متوسط النسبة المئوية لخسارة الإنتاجية بسبب الصحة 30%. كما كان متوسط تكلفة الحضور المرضي للفرد خلال الأسبوع السابق 20 دولاراً أمريكياً، والتكلفة الإجمالية 1805 دولاراً أمريكياً.

الاستنتاجات: بين المعلمين، ينتشر الحضور المرضي بشكل كبير نسبياً ويرتبط بخسائر اقتصادية عالية. هناك حاجة إلى تدخلات تهدف إلى تعزيز أنماط الحياة الصحية.

الكلمات المفتاحية: الحضور المرضي؛ المدرسون؛ المدارس؛ الصحة؛ العوامل المتعلقة بالعمل؛ نيكاراغوا

Abstract

Objective: Evidence regarding sickness presenteeism (SP) in low-and middle-income countries and in vulnerable groups such as teachers is relatively scarce. To provide evidence addressing this research gap, we examined the prevalence and predictors, and estimated the productivity loss impairment due to SP among teachers in Leon, Nicaragua.

Methods: This was a cross-sectional study. Four public schools in Leon, Nicaragua, were selected, and 132 teachers were included in the final sample. Predictors influencing SP were identified through multivariable logistic regression. By using the Work Productivity and Activity Impairment Questionnaire, we converted the productivity loss impairment to 2018 US dollars (1 US dollar = 31.78 Cordobas).

Results: Overall, the prevalence of SP was 65.2% (95% C.I.: 56.53–72.87), and no differences were found in sociodemographic characteristics. We observed a negative relationship between director/supervisor support and SP ($p < 0.001$). Moreover, teachers without suitable household conditions for resting had a 1.28 times higher probability of SP (95% C.I.: 1.03–1.59). The median percentage time missed for all health reasons was 14.3%.

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The median percentage productivity loss impairment due to health conditions was 30%. The median per-capita cost of SP during the prior week was 20 US dollars, and the overall cost was 1805 US dollars.

Conclusion: Among teachers, SP has a relatively high prevalence and is associated with a high economic toll. Interventions aimed at promoting healthful lifestyles are needed.

Keywords: Health; Nicaragua; School teachers; Sickness presenteeism; Work-related factors

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Introduction

Absenteeism from work has been an indicator used to assess the workers' health within companies or institutions. The evaluations are made on the basis of the assumption that workers in the workplace are fully healthy and productive. However these results provide an imprecise snapshot of overall health status, because workers often attend work while being sick.¹ Sickness presenteeism (SP), defined as going to the workplace while sick,² has gained research interest in recent years, because of its increasing frequency and the consequences on health, public health and labor productivity impairment among workers.^{3,4}

The prevalence of SP, measured as going to work while ill at least once during a 12-month period, has shown a prevalence as high as 70%.⁵ A recent review has indicated that the prevalence of SP ranges from 23% in countries such as Italy, Portugal and Poland, to more than 50% (in countries such as Montenegro, Malta and Denmark).⁶ SP has been associated with organizational factors such as organizational commitment;⁵ the behavior of administrators, supervisors or directors;⁷ the support of colleagues and job insecurity;⁸ and work ethic, and bonuses or incentives rewarding good attendance.⁹ Personal factors such as family life,⁵ financial status¹⁰ and circumstances at home that may prevent proper rest⁵ have also been associated with SP. Given these factors, managers, people with unhealthful lifestyle choices, people with financial problems, "workaholics" and highly skilled white collar workers have been identified as groups vulnerable to SP.¹¹ In addition, workers in education and other social sectors have also been found to be vulnerable groups, with a high average frequency (4.1 times a year) and duration (11.2 days a year) of SP.¹² In line with these findings, a study performed in Germany among teachers working at different types of schools has indicated an SP prevalence of 57%.¹³

The frequent practice of SP has been associated with the spread of communicable diseases.¹⁴ For example, SP among people with acute illness such as influenza may pose

additional risks to organizations, because of the possibility of workplace epidemics, and may affect vulnerable populations, including older people and children.^{14,15} In the worst-case scenario, illness can circulate within workplaces and education settings, and SP can contribute to pandemics.¹⁶ A recent systematic review has highlighted the health consequences of SP on health over time, including worsening mental and physical health; increasing the risk of hypertension and depression; suppressing the immune system; and elevating the risk of coronary heart disease.⁶ Finally, chronic work-associated stress and exhaustion have been associated with working while ill.⁶

The costs of SP may be larger than the costs of absenteeism from work. A systematic review analyzing the effects of SP observed in cost estimation studies and economic evaluations has shown that SP costs exceed absenteeism costs.¹⁷ In Australia, a study has estimated the productivity loss due to 12 common medical conditions by applying data on the prevalence of each condition in the Australian working population to international estimates of the on-the-job productivity losses from each condition. The overall cost of SP to the Australian economy in 2009–2010 was estimated to be \$34.1 billion (nearly four times the cost of absenteeism).¹⁸

Increasing awareness regarding the health risks and economic consequences associated with working while ill suggest that SP should be considered a risk-taking behavior, and should be measured and managed.⁶ Measuring SP would provide a clear picture regarding employee health. Moreover, because many factors associated with SP are modifiable, their identification is key to developing intervention programs that promote healthful lifestyles and mitigate negative effects on workers. Therefore, more research evidence regarding the prevalence of SP is needed, particularly in vulnerable populations for which limited evidence exists. For instance, Nicaragua lacks information on SP among teachers. To provide evidence addressing this research gap, this study examined the prevalence of SP, identified SP predictors and estimated the productivity loss impairment due to SP among teachers in four public schools in the city of Leon, Nicaragua.

Materials and Methods

Study design and setting

This was a cross-sectional study conducted between April and October of 2018 in four public schools in Leon, a municipality 93 km away from the capital of Nicaragua, in the northern Nicaraguan Pacific region. Leon has an estimated population of 194,972 inhabitants, of whom 47.7% are male.¹⁹ This study followed the Reporting of Observational Studies in Epidemiology (STROBE) statement for reporting of results.²⁰

Participants

Study participants comprised teachers of primary and secondary students at four public schools in Leon. The schools were selected on the basis of convenience, with the

aim of capturing the largest student population and teacher staff among all public schools in Leon. The inclusion criteria for participants were working 30 days or more as a teacher at the selected school and voluntarily providing signed informed consent, in accordance with the Helsinki declaration.

Data collection procedures

All staff in this research project were trained before the data collection. We used the freely available digital platform EpiCollect5 (<https://five.epicollect.net/>) to create a digital questionnaire, which was exported to tablets. After consulting with, and obtaining approval from, the directors of each school, we started data collection, which was completed in August 2018. Before the fieldwork, the study instrument was pilot tested to gather information on the performance of the items and the preferred choice of wording, and to assess the length and interpretability of the items. For convenience, in the pilot tests, we selected a group of people with lower

educational attainment than teachers, to ensure the clarity and ease of completion of the digital questionnaire during the fieldwork.

The fieldwork occurred in schools. Interviewers approached each teacher to explain the procedures and read the Assent and Informed Consent form, which contained detailed descriptions of the project and assured the safety, confidentiality and privacy of the data collected. Teachers were surveyed if they had properly digitally signed and returned the form. Completed digital questionnaires were then reviewed and uploaded to a database.

According to the official registries in the four public schools, a total of 184 teachers were eligible to participate in the study. Of them, 37 teachers could not be contacted because they were absent for medical or other personal reasons. Therefore, we approached 147 teachers. Three teachers refused to participate in the study, thus yielding a response rate of 97.9%. After exclusion of 12 observations because of missing data, 132 teachers were included in the analysis (Figure 1).

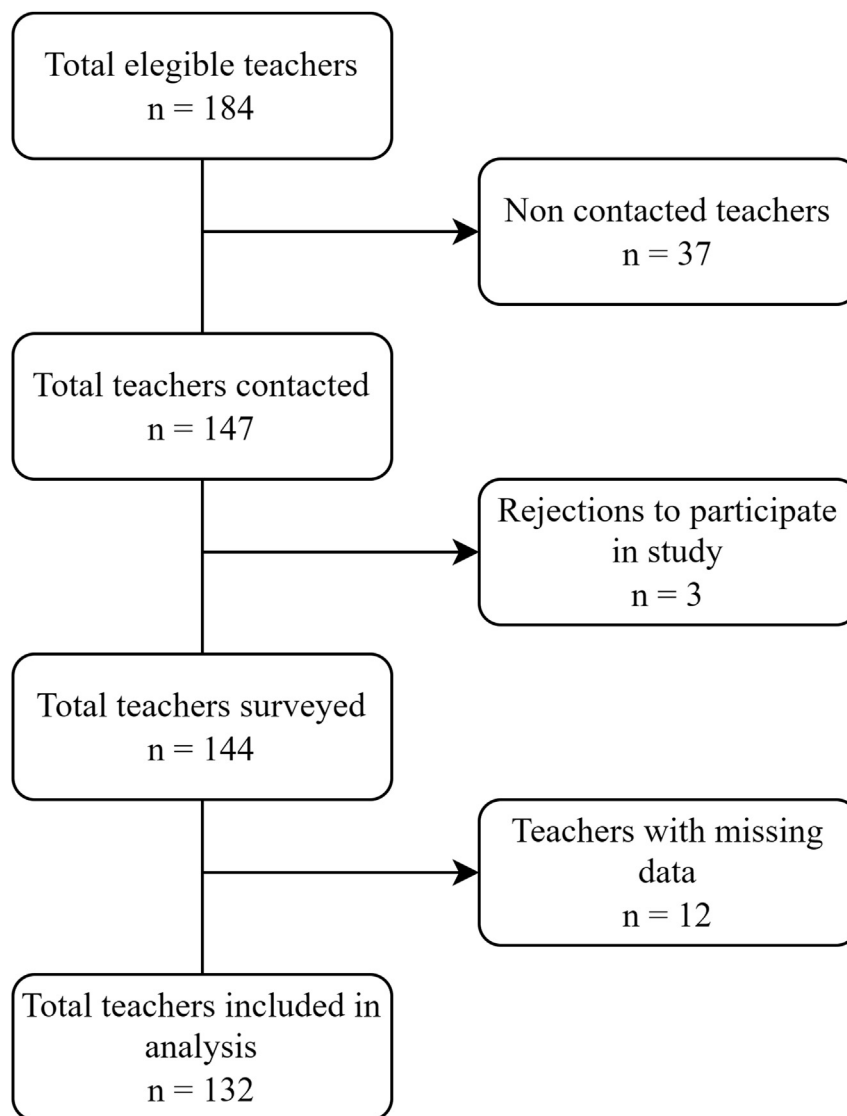


Figure 1: Flowchart of teachers included in the analysis.

Outcomes and measures

The main outcome of the study was the SP, measured by using the item *During the previous 30 days, have you attended work despite feeling that you really should have taken sick leave due to your health (yes/no)?* A second main outcome of the study was the productivity loss impairment due to SP, measured with the Work Productivity and Activity Impairment—General Health Questionnaire (WPAI-GH). We monetized the productivity loss impairment by using teachers' hourly wages. The WPAI-GH questionnaire was composed of six items measuring current employment status, the number of hours missed because of health problems, the number of hours missed for other reasons, the hours actually worked, and the degree to which health affected work productivity and regular activities during the prior 7 days. Higher scores indicated greater work ability impairment and lower productivity. The WPAI-GH has been translated into more than 140 languages, including Spanish, through a harmonization process consisting of several independent translations, back translations, expert review of the back translations and local review by users.²¹

The predictors of SP included in the study were sex (male/female); age in years (18–34, 35–49 or 50–65); place of residence (urban/rural); having children under 18 years of age (yes/no); work ethic (yes/no) meant by "ethics labor", measured with the item *Do you perceive/value taking days off due to health problems as a sign of poor health performance?*; organizational commitment (yes/no), measured with the item *Do you perceive/value the perfect job assistance as a sign of loyalty and institutional commitment?*; suitable household conditions for resting (yes/no), measured with the item *Do you consider that your household is suitable for rest when you are sick?*; a financial difficulties measure; a director or supervisor support measure; a coworker and colleague support measure; work satisfaction; and work related stress. The measures for financial difficulties, director or supervisor support, and coworker and colleague support were based on and adapted from a previous study.¹⁰ All questionnaires were based on a scale of 7 points. The financial difficulties questionnaire was composed of four items, with scores ranging from 4 to 28 points (Cronbach's alpha $\alpha = 0.78$). Higher scores indicated that teachers were struggling financially. The director or supervisor support questionnaire was composed of ten items, and scores ranged from 7 to 70 points ($\alpha = 0.94$). Higher scores indicated that teachers agreed that they perceived their director or supervisor positively and perceived support. The coworker and colleague support questionnaire was composed of four items, and had scores ranging from 4 to 28 points ($\alpha = 0.83$). Higher scores indicated that teachers strongly agreed that their coworkers and colleagues were supportive.

To measure work satisfaction, we used the Andrews and Withey Job Satisfaction Questionnaire,²² which consists of five questions measuring job motivation and satisfaction during the prior 30 days ($\alpha = 0.88$). Finally, to measure work-related stress, we used the Work Stress Scale, developed by the American Institute of Stress and The Marlin Company.²³ The questionnaire consists of eight questions

that assess work stress as low, mild, moderate, severe and very severe levels ($\alpha = 0.67$).

Statistical analysis

Statistical analysis was performed in Stata® v14.2 (Stata Corporation LP, College Station, Texas, USA). A descriptive analysis was performed to characterize the teachers surveyed. To describe the prevalence of SP among teachers, we used absolute and relative frequencies. Differences in prevalence across subpopulations were assessed with chi-square tests. To identify the predictors of SP, we estimated the prevalence ratio (PR), adjusted prevalence ratio (PRa) and their confidence intervals (95% C.I.) through a bivariate analysis. For continuous predictors, we estimated the beta parameters and their 95% C.I. values in the bivariate analysis. PRa, beta parameters and their 95% C.I. values were estimated in predictors with $p < 0.20$ in the bivariate analysis. All estimates were made with a generalized linear model with a Poisson distribution and a log link function.²⁴ Because frailty and fatigue are associated with age, and sex differences may exist, we performed age-stratified and sex-stratified analysis to consider the effects of these characteristics on SP. The findings are reported in the [Electronic Supplementary Material](#). To correct residuals potentially distributed differently from the model's assumption, we calculated all confidence intervals by using 1000 bootstrapping replicates with the normal-based method.²⁵ For all findings, $p < 0.05$ was considered statistically significant.

To describe the productivity loss impairment, we used the WPAI-GH scoring, which has been well described elsewhere.²¹ To monetize the productivity loss impairment, we calculated the weekly wage based on the monthly self-reported wages, multiplied by the percentage impairment while working in the presence of all health conditions. Costs were estimated in Cordobas (C\$) and in US dollars by using the exchange rate as of August 2018 (1 US dollar = 31.78 C\$). All costs were inflated and reported by using the latest monthly consumer price index available from the Nicaraguan Central Bank, from December 2019.²⁶

Results

Most included teachers were women (69%), with a mean age of 43.3 ± 9.11 (mean \pm standard deviation). On average, teachers earned US 314.4 ± 81.7 per month and had 17.8 ± 9.96 years of teaching experience. Additional characteristics of the participants are reported in [Table 1](#).

The overall prevalence of SP among teachers was 65.2% (95% C.I.: 56.53–72.87), and women reported higher values than men (69.2% vs 56.1, $p = 0.143$). Teachers 35–49 years of age reported higher SP than older and younger teachers. No difference in SP was observed according to the teachers' places of residence (68.8% vs. 64.7%, $p = 0.747$). Teachers who had children under 18 years of age had higher SP than those who did not, although no statistical difference was indicated ($p = 0.156$) (see [Table 2](#)).

Table 1: Characteristics of the study population (n = 132).

Characteristics	Absolute frequency (%)	95% C.I.
Sex		
Male	41 (31.06)	23.67–39.56
Female	91 (68.94)	60.43–76.32
Age in years		
18–34	23 (17.42)	11.79–24.97
35–49	68 (51.52)	42.91–60.02
50–65	41 (31.06)	23.67–39.56
Place of residence		
Urban	116 (87.88)	81.02–92.48
Rural	16 (12.12)	7.51–18.97
Children under 18 years of age		
No	55 (41.67)	33.46–50.32
Yes	77 (58.33)	49.64–66.53
Workday		
Morning	67 (50.76)	42.17–59.29
Afternoon	53 (40.15)	32.04–48.83
Other ^a	12 (9.09)	5.19–15.42
Grade of students taught		
Preschool	8 (6.06)	3.03–11.74
Primary	36 (27.27)	20.27–35.60
Secondary	84 (63.64)	54.99–71.48
Other ^b	4 (3.03)	1.12–7.88
Years of teaching experience		
Mean ± standard deviation	17.8 ± 9.96	16.06–19.49
Monthly wage in US dollars ^c		
Mean ± standard deviation	314.4 ± 81.68	300.21–328.67

Notes. 95% C.I.: 95% confidence interval.

^a Including teachers with morning and afternoon workdays, as well as evening workdays.

^b Including teachers of both preschool and primary students, and primary and secondary students.

^c Exchange rate in August 2018: 1 US dollar = 31.78 Cordobas. Wages are inflated and reported according to the December 2019 monthly consumer price index available from the Nicaraguan Central Bank.

Table 3 presents the association between SP and the predictors considered in the study. Overall, in the bivariate analysis, none of the sociodemographic variables showed an association with SP. SP was most strongly associated with having suitable home conditions for resting (non-adjusted $p = 0.002$), director or supervisor support (non-adjusted $p < 0.001$), coworker and colleague support (non-adjusted $p = 0.001$) and work-associated stress (non-adjusted $p = 0.001$). After adjustment for the simultaneous effects of predictors that yielded a non-adjusted $p < 0.2$ in the bivariate analysis, coworker and colleague support and work-associated stress lost their significant association with SP. Director or supervisor support and suitable conditions for rest were strongly associated with SP. We observed a negative relationship between the director support measure and SP (adjusted $p < 0.001$). In addition, a lack of suitable household conditions for resting increased the probability of SP by 1.28

Table 2: Prevalence of sickness presenteeism among teachers at four public schools in Leon, Nicaragua.

Characteristics	Prevalence of SP, in % (95% C.I.)	p
Overall	65.15 (56.53–72.87)	–
Sex		
Men	56.09 (40.48–70.58)	0.143
Women	69.23 (58.88–77.94)	
Age in years		
18–34	60.87 (39.59–78.68)	
35–49	72.06 (60.07–81.54)	0.213
50–65	56.10 (40.48–70.58)	
Place of residence		
Urban	68.75 (42.22–86.88)	0.747
Rural	64.66 (55.42–72.90)	
Children under 18 years of age		
No	58.18 (44.63–70.59)	0.156
Yes	70.12 (58.84–79.40)	
Workday		
Morning	64.18 (51.88–74.85)	
Afternoon	60.38 (46.51–72.75)	0.118
Other ^a	91.67 (55.96–98.96)	
Grade of students taught		
Preschool	87.50 (42.19–98.53)	0.416
Primary	69.44 (52.37–82.44)	
Secondary	61.90 (50.95–71.76)	
Other ^b	50.00 (9.24–90.75)	

Notes. 95% C.I.: 95% confidence interval.

^a Including teachers with morning and afternoon workdays, as well as evening workdays.

^b Including teachers of both preschool and primary students, and primary and secondary students.

times (adjusted 95% C.I.: 1.03 to 1.59). Similar findings are reported in the sex-stratified and age-stratified analysis in the [Electronic Supplementary Material](#).

The productivity loss impairment due to SP during the prior week, according to our survey in teachers, is presented in **Table 4**. Overall, the median percentage time missed because of all health conditions was 14.3%: 12.7% for men and 16.7% for women. The median percentage impairment while working in the presence of all health conditions, corresponding to the median percentage productivity loss impairment due to health conditions, was 30% for both women and men. The median percentage overall work impairment due to overall health conditions was 2.4%, ranging from 1.9% for men to 2.5% for women. The median percentage activity impairment because of all health conditions was 20% for men and 30% for women.

Table 5 presents the costs of SP during the prior week for teachers. Overall, the median cost of SP was 19.96 US dollars (25th and 75th quartiles: 7.88 and 46.25), ranging from 16.45 US dollars for men to 21.23 US dollars for women. We estimated a total loss due to SP during the prior week of 358.79 US dollars for men and 1446.47 US dollars for women, yielding an overall cost of 1805.27 US dollars.

Table 3: Predictors of sickness presenteeism among teachers at four public schools in Leon, Nicaragua.

Predictor	Unadjusted model			Adjusted model ^a		
	PR	95% C.I. ^b	<i>p</i>	PR ^a	95% C.I. ^b	<i>p</i>
Sex						
Men	Ref					
Women	1.23	0.88–1.72	0.221	–	–	–
Age in years						
18–34	Ref					
35–49	1.18	0.80–1.73	0.384	–	–	–
50–65	0.92	0.59–1.43	0.718	–	–	–
Place of residence						
Urban	0.94	0.64–1.37	0.752	–	–	–
Rural	Ref					
Children under 18 years of age						
No	0.83	0.63–1.08	0.174	0.93	0.71–1.19	0.560
Yes	Ref					
Work ethic						
No	Ref					
Yes	1.11	0.82–1.45	0.431	–	–	–
Organizational commitment						
No	Ref					
Yes	0.98	0.60–1.57	0.918	–	–	–
Suitable household conditions for resting						
No	1.45	1.15–1.82	0.002	1.28	1.03–1.59	0.025
Yes	Ref					
Financial difficulties						
Beta parameter	0.01	–0.01–0.02	0.233	–	–	–
Director/supervisor support measure						
Beta parameter	–0.01	–0.01 to –0.00	<0.000	–0.01	–0.02 to –0.01	<0.000
Coworker and colleague support measure						
Beta parameter	–0.03	–0.04 to –0.01	0.001	–0.01	–0.03 to –0.01	0.123
Work satisfaction						
Beta parameter	0.01	–0.01–0.03	0.254	–	–	–
Work related stress						
Beta parameter	0.04	0.01–0.06	0.001	0.02	–0.01–0.04	0.136

PR: unadjusted prevalence rate; PRa: adjusted prevalence rate.

^a Model adjusted for all variables that resulted in a *p* value <0.2 in the bivariate analysis.

^b 95% C.I. calculated by bootstrapping with the normal-based method with 1000 replicates.

Table 4: Productivity loss impairment due to sickness presenteeism in the week prior to the survey.

Indicator	Median	Q1	Q3
Overall			
Percentage work time missed because of all health conditions (n = 37)	14.29	7.41	20.00
Percentage impairment while working in the presence of all health conditions (n = 58)	30.00	10.00	70.00
Percentage overall work impairment because of all health conditions (n = 68)	2.39	0.75	8.33
Percentage activity impairment because of all health conditions (n = 59)	20.00	10.00	50.00
Men			
Percentage work time missed because of all health conditions (n = 8)	12.66	8.47	18.33
Percentage impairment while working in the presence of all health conditions (n = 15)	30.00	10.00	40.00
Percentage overall work impairment because of all health conditions (n = 16)	1.89	1.13	9.83
Percentage activity impairment because of all health conditions (n = 17)	20.00	10.00	30.00
Women			
Percentage work time missed because of all health conditions (n = 29)	16.67	6.25	22.22
Percentage impairment while working in the presence of all health conditions (n = 43)	30.00	10.00	70.00
Percentage overall work impairment because of all health conditions (n = 52)	2.47	0.62	8.33
Percentage activity impairment because of all health conditions (n = 42)	30.00	10.00	60.00

Q1: percentile 25; Q3: percentile 75.

Table 5: Cost of sickness presenteeism during the prior week among teachers at four public schools in Leon, Nicaragua.

	Median	Q1	Q3	Total amount
Overall				
Cordobas C\$	634.19	250.41	1469.79	57,367.33
US dollars	19.96	7.88	46.25	1805.27
Men				
Cordobas C\$	522.84	262.20	1056.61	11,401.67
US dollars	16.45	8.25	33.25	358.79
Women				
Cordobas C\$	674.61	246.68	1676.65	45,965.67
US dollars	21.23	7.76	52.76	1446.47

Exchange rate in August 2018: 1 US dollar = 31.78 Cordobas. All costs were inflated and reported according to the December 2019 monthly consumer price index available from the Nicaraguan Central Bank.

Q1: percentile 25; Q3: percentile 75.

Discussion

This study examined the prevalence and predictors of SP, and estimated the productivity loss impairment associated with SP among teachers in four public schools in Leon city, Nicaragua. SP was a common practice among teachers, particularly those teaching preschool students, or working mornings and afternoons or evenings. SP predictors were director or supervisor support and having suitable household conditions for resting. The productivity loss impairment due to SP and the total costs due to SP were fairly high.

The prevalence of teachers who practiced SP (65.2%) was higher than that reported in German teachers (56.0%)¹³ but in line with the prevalence reported among employees in countries such as Montenegro, Malta and Denmark.⁶ Clearly, for some individuals with minor symptoms or mild diseases, the companionship and self-esteem that comes with the practice of SP can aid in recovery. Nevertheless, our prevalence estimates shed light on the overall health status of teachers, and should raise public health concerns, because of the growing evidence of the damaging and harmful consequences of the common practice of SP on employee well-being. For instance, a systematic review has found that SP may increase the risk of future health problems and absence due to long-term sickness.³ Other consequences including worsening mental and physical health, increasing risk of hypertension and depression, a suppressed immune system, higher risk of coronary heart disease, and elevated risk of chronic work-associated stress and work exhaustion have also been reported.⁶ In addition, the risk to the health and safety of peers and other people due to SP has also been recognized. Attending work may increase the spread of communicable diseases¹⁴ and may be particularly harmful to vulnerable people, such as school-aged individuals. In the context of pandemics, SP is a potentially dangerous behavior for the workplace; therefore, SP is a multivariable issue and a public health concern.²⁷ Hence, promoting healthful workplace policies and periodical surveillance and evaluation of this behavior are crucial, particularly for the subgroups reporting higher SP rates. Interventions may include

implementing educational programs in public schools to prevent undiagnosed, late-diagnosed or misdiagnosed illnesses, and allowing better management of teachers' health status.

Our findings indicated that a lack suitable household conditions for resting was associated with higher rates of SP; a similar finding has been reported in previous research.⁵ Two hypotheses may explain this finding. First, teachers may find that staying in their homes while they are sick is more stressful, because the multiple tasks that they perform at home prevent satisfactory rest. Thus, teachers may feel that the workplace becomes the home, and the home becomes the workplace. Second, teachers may find the workplace more challenging and satisfying than their homes. Because teachers may feel very passionate about teaching and believe that their work is socially beneficial,³¹ they may feel guilty for not attending work even when they are sick.

In line with previous studies,^{1,7,11,13} we found that director or supervisor support was associated with SP. One possible interpretation is that teachers may fail to negotiate days off because of poor communication¹ or because they cannot demonstrate their health problems to their director or supervisor,¹⁰ thus driving SP. Another possible interpretation is that, in public schools, directors or supervisors may serve as role models or examples for their subordinates to follow. Because directors or supervisors are part of the group vulnerable to SP,¹¹ the high rate of labor attendance of directors or supervisors may translate into higher rates of SP among teachers. Regardless of the explanation for this result, this predictor is important to design interventions to address SP. An intervention aimed at enhancing communication from directors or supervisors to subordinates, or identifying signs of illness among teachers, may be useful for the prediction and early detection of SP.

No relationship was found with other factors such as work ethic, organizational commitment or work satisfaction. These findings may be areas for future research in studies with larger sample sizes. Other drivers such as organizational policies or organizational culture have been widely researched in other sectors^{2,10} but are under-researched among teachers. For a more multi-dimensional and comprehensive overview of SP, future research must address the potential relationship between organizational policies or culture and SP. Finally, analysis using other approaches, such as sociological approaches, that can explain SP in relation to medical conditions as well as the inherent meaning of the frequent practice of SP among teachers may serve as another path for future research.

Limitations

Some limitations should be noted as the estimates in this article are reviewed. First, the cross-sectional nature of the data prevented us from establishing causality between outcomes and predictors. Second, the measurement of SP was performed through self-reporting, thus potentially resulting in measurement imprecision because of biases of social desire or interpersonal differences pertaining to illness concepts. Third, self-reporting might have resulted in possible biases in the measurement of productivity loss impairment due to SP.

However, most studies on SP have been based on self-reported measures.² To decrease bias due to self-reporting, trained data collection staff gathered the survey observations during the pilot phase, and this feedback was incorporated into the fieldwork by providing explanations and removing teachers' doubts associated with the items in the questionnaire. In addition, four of five questionnaires showed good internal reliability ($\alpha > 0.75$), whereas one questionnaire had an alpha below 0.70 ($\alpha = 0.67$). Fourth, our approach to monetize the costs of SP followed that used by many studies of converting the percentage decrease in productivity into several hours per week in which the average individual is unproductive. However, calculating the cost of SP is an abstract concept, given the absence of receipts or billing records associated with SP, in contrast to the records for health care costs or other workplace outcomes such as disability or workers' compensation.³² Finally, the final sample size encompassed nearly 72% of the total eligible teachers in the schools selected, and thus our results are representative of those schools. A larger sample size, including both smaller public schools and private schools, would be required to generalize the finding at the city level. Despite the study limitations, our findings are robust and provide the first picture of the epidemiology of SP in Nicaragua.

Conclusion

This study provides evidence that SP is a common practice in teachers among four public schools in Leon, Nicaragua, and the effects on productivity and the economic toll are high. Interventions aimed to promote healthful lifestyles are needed. However, further evidence is needed to confirm this behavior at the city or country level, as well as to identify predictors of SP at multiple more comprehensive levels.

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Conflict of interest

The author(s) have no conflict of interest to declare.

Ethical approval

This study was approved in April 2018 under ethical approval number 66 by the institutional review board of "Dr. Uriel Guevara Guerrero," affiliated with the National Autonomous University of Nicaragua, Leon (UNAN-Leon).

Consent

Not applicable.

Authors contributions

Conceptualization: CRR and ILB. Methodology: ILB. Data curation: CRR. Formal analysis: CRR. Supervision:

ILB. Validation: CRR and ILB. Writing original draft: CRR. Writing, review and editing: CRR and ILB.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jtumed.2022.06.012>.

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