ACTA MÉDICA PORTUGUESA
A Revista Científica da Ordem dos Médicos

# Absenteeism Among National Health Service Workers During the COVID-19 Pandemic in Portugal

# Absentismo Laboral de Trabalhadores do Serviço Nacional de Saúde Durante a Pandemia de COVID-19 em Portugal

Joana ALVES[1], Carolina NUNES[2,3] André PERALTA SANTOS[1]
**Acta Med Port 2024 Dec;37(12):853-857** ▪ https://doi.org/10.20344/amp.21761

**ABSTRACT**

By March 2020, the first COVID-19 cases were detected in Portugal. Anecdotal evidence showed that the National Health Service absenteeism rate rose. The present study aimed to quantify and characterize the absenteeism rate among these healthcare workers during the COVID-19 pandemic in Portugal. This study used data from the Portuguese National Health Service Transparency Portal for the number of National Health Service workers and absence days (2015 - 2021). Absenteeism was compared, before and after the pandemic onset, in absolute terms, and as absenteeism rates. Additionally, we performed an interrupted time series analysis, by fitting a Poisson regression model with level change. We controlled for data seasonality using Fourier terms. The results showed that, between 2015 and March 2020, the average monthly absenteeism rate was of 12.2%, rising to 14.5% in the subsequent period. This represented an increase of 19% in the absenteeism rate. The interrupted time series analysis showed an increase of 10.8% in the National Health Service absenteeism rate after the pandemic onset [relative risk = 1.10; 95% CI 1.10 - 1.11; $p < 0.01$]. When accounting for seasonality in the data, the interrupted time series analysis showed an increase of 11.0% in the National Health Service absenteeism rate [relative risk = 1.11; 95% CI 1.00 - 1.23; $p < 0.05$]. These results suggest an increased number of days of absence rate among the National Health Service healthcare workers during the COVID-19 pandemic.

**Keywords:** Absenteeism; COVID-19; Health Personnel; Pandemics; Portugal/epidemiology; Sick Leave

**RESUMO**

Em março de 2020, foram detetados os primeiros casos de COVID-19 em Portugal. O presente estudo teve como objetivo quantificar e caracterizar o absentismo entre os trabalhadores de saúde do Serviço Nacional de Saúde durante a pandemia de COVID-19 em Portugal. Este estudo utilizou dados do Portal da Transparência do Serviço Nacional de Saúde sobre o número de profissionais de saúde e dias de ausência (2015 - 2021). O absentismo foi comparado, antes e depois do início da pandemia, em termos absolutos e taxas. Realizou-se uma análise de séries temporais interrompidas, ajustando um modelo de regressão de Poisson. Controlou-se para a sazonalidade dos dados. Os resultados mostraram que, de 2015 até março de 2020, a taxa média mensal de ausência foi de 12,2%, aumentando para 14,5% no período subsequente. Isto representou um aumento de 19% na taxa de ausência. A análise de séries temporais interrompidas mostrou um aumento de 10,8% no absentismo do Serviço Nacional de Saúde após o início da pandemia [risco relativo = 1,10; IC de 95% 1,10 - 1,11; $p < 0,01$]. Ao considerar a sazonalidade nos dados, o modelo mostrou um aumento de 11,0% no absentismo do Serviço Nacional de Saúde [risco relativo = 1,11; IC 95% 1,00 - 1,23; $p < 0,05$]. Os resultados sugerem haver um aumento do número dias de ausência entre os trabalhadores do Serviço Nacional de Saúde durante a pandemia.

**Palavras-chave:** Absentismo; Baixa por Doença; COVID-19; Pessoal de Saúde; Pandemias; Portugal/epidemiologia

## INTRODUCTION

The World Health Organization (WHO) declared the novel coronavirus (COVID-19) outbreak a global pandemic on March 11th, 2020.[1] During the pandemic, several non-pharmacological measures were taken to reduce COVID-19 transmission and prevent the collapse of healthcare systems, including formal stay-at-home orders.[2] However, the essential workers, including the healthcare workers (HCW), were required to continue working physically at their workplaces, despite the increased risk of COVID-19 transmission.

Evidence from Portugal and other countries showed that HCW who continued to work in healthcare facilities during the pandemic, particularly frontline HCW, experienced higher levels of agitation, anxiety, sadness, depression, and insomnia, and an increased perception of risk of infection.[3,4] This may have impacted not only work productivity but also the quality of care and absenteeism rates. Furthermore, the increased workload resulting from the pandemic, the changes in healthcare access patterns, and the need to adapt healthcare systems to cope with higher demand from COVID-19 patients might have had increased pressure on HCW while impacting delivery capacity and costs of healthcare. Between March and May of 2020, each hospitalization related to COVID-19 causes represented the loss of further 28 hospitalizations for other causes.[5]

The evidence of absenteeism rates for Portugal during these times is scarce, but anecdotal evidence showed that absenteeism in the National Health Service (NHS) increased. The ability to evaluate the absenteeism rates during a pandemic is paramount to planning contingency plans

1. Public Health Research Centre. Comprehensive Health Research Center (CHRC). NOVA National School of Public Health. Universidade NOVA de Lisboa. Lisbon. Portugal.
2. NOVA National School of Public Health. Universidade NOVA de Lisboa. Lisbon. Portugal.
3. Direção-Geral da Saúde. Lisbon. Portugal.
✉ **Autor correspondente:** Joana Alves. joana.alves@gmail.com
**Recebido/*Received*:** 17/05/2024 - **Aceite/*Accepted*:** 09/09/2024 - **Publicado/*Published*:** 02/12/2024

for future pandemics. Therefore, the aim of the present study is to quantify and characterize absenteeism among NHS workers during the COVID-19 pandemic in Portugal, the disruption in absenteeism rate patterns pre and post pandemic, and the dynamics of different types of absenteeism among HCW in Portugal.

## METHODS

This study used data from the Portuguese NHS Transparency Portal, which collects absenteeism days by month and type for the NHS entities and people working in the NHS entities by month. The dataset includes absenteeism data for all the NHS entities without specific details regarding the working category, thereby including the entire workforce, ranging from administrative to medical personnel. To ensure relevance to the study objectives, we focused the analysis on data from hospitals, hospital centers, regional health authorities, and local health units (summing 48 out of 64 institutions). The final database included monthly information (2015 - 2021), resulting in a sample of 84 observations.

We compared the total and type-specific absences before and after the pandemic onset, in absolute terms, and as absenteeism rates (proportion of absenteeism days relative to the potential workforce days, which were derived by multiplying the number of working days by the number of workers, following the formula used by the Portuguese Strategy and Planning Office). As a sensitivity analysis [Table 1 of the Appendix (Appendix 1: https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/21761/15555)], we performed the same absenteeism rates, selecting only three hospitals (Centro Hospitalar Universitário de Lisboa Norte, Centro Hospitalar Universitário do Porto, and Centro Hospitalar e Universitário de Coimbra).

We also performed an interrupted time series analysis (ITS) by fitting a Poisson regression model. The model accounted for a level change and controlled for data seasonality to isolate the impact of the specific time of the pandemics from predictable seasonal variations by incorporating Fourier terms.[6] The outcome variable was the number of absences, and we included the number of potential workforce days as an offset variable to express the outcome as a rate. As covariates, we included the time elapsed (to capture the trend over the period) and a dummy variable indicating the pandemic onset (zero until March 2020, one otherwise; to capture the immediate impact of pandemics on the level of absenteeism).

## RESULTS

Table 1 presents the analysis of absenteeism among HCW in Portugal (2015 - 2021). Despite the progressively increased number of workers in the healthcare sector, from 111 thousand in 2015 to 138 thousand in 2021, the absence rate increased from 11.41% (SD = 0.86) in 2015 to 13.80% (SD = 1.98) in 2021. In 2020, the absenteeism rate reached its highest level at 14.91% (SD = 3.37). When comparing the periods before and after the onset of the epidemic, before March 2020 the monthly average rate was 12.2% (SD = 1.3), while after March 2020 the monthly average rate increased to 14.5% (SD = 2.8).

The simple ITS analysis (Fig. 1) showed an increase of 10.8% in NHS absenteeism after the pandemic onset [relative risk = 1.10; 95% confidence interval (CI) 1.10 - 1.11; $p < 0.01$]. When accounting for seasonality in the data, the ITS showed an increase of 11.0% in NHS absenteeism [relative risk = 1.11; 95% CI 1.00 - 1.23; $p < 0.05$].

Fig. 1 of the Appendix (Appendix 1: https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/21761/15555) illustrates the temporal dynamics of the absenteeism rate alongside the transmission dynamics of COVID-19, quantified as the time-dependent reproductive number [R(t)] for mainland Portugal. Notably, the peaks in absenteeism rates observed post-2020 closely align with the corresponding spikes in R(t). This was not observed thereafter, possibly due to the effect of vaccination. Fig. 2 displays the mean monthly absenteeism rates for each year from 2015 to 2021, according to the different types of absence.

Table 1 – Descriptive statistics by year

| Year | Workers[a] | Days of absence[a] | Absenteeism rate[a] | (SD) | Monthly absenteeism rate[b] |
|---|---|---|---|---|---|
| **2015** | 110 726 | 264 768 | 11.41 | (0.86) | 12.2 (1.3) |
| **2016** | 113 958 | 287 893 | 12.15 | (0.90) | |
| **2017** | 116 981 | 283 471 | 11.76 | (1.62) | |
| **2018** | 118 746 | 317 511 | 12.82 | (1.45) | |
| **2019** | 123 128 | 327 780 | 12.76 | (1.40) | |
| **2020** | 130 852 | 408 819 | 14.91 | (3.37) | 14.5 (2.8) |
| **2021** | 137 925 | 399 738 | 13.80 | (1.98) | |

a: monthly average
b: before *versus* after March 2020

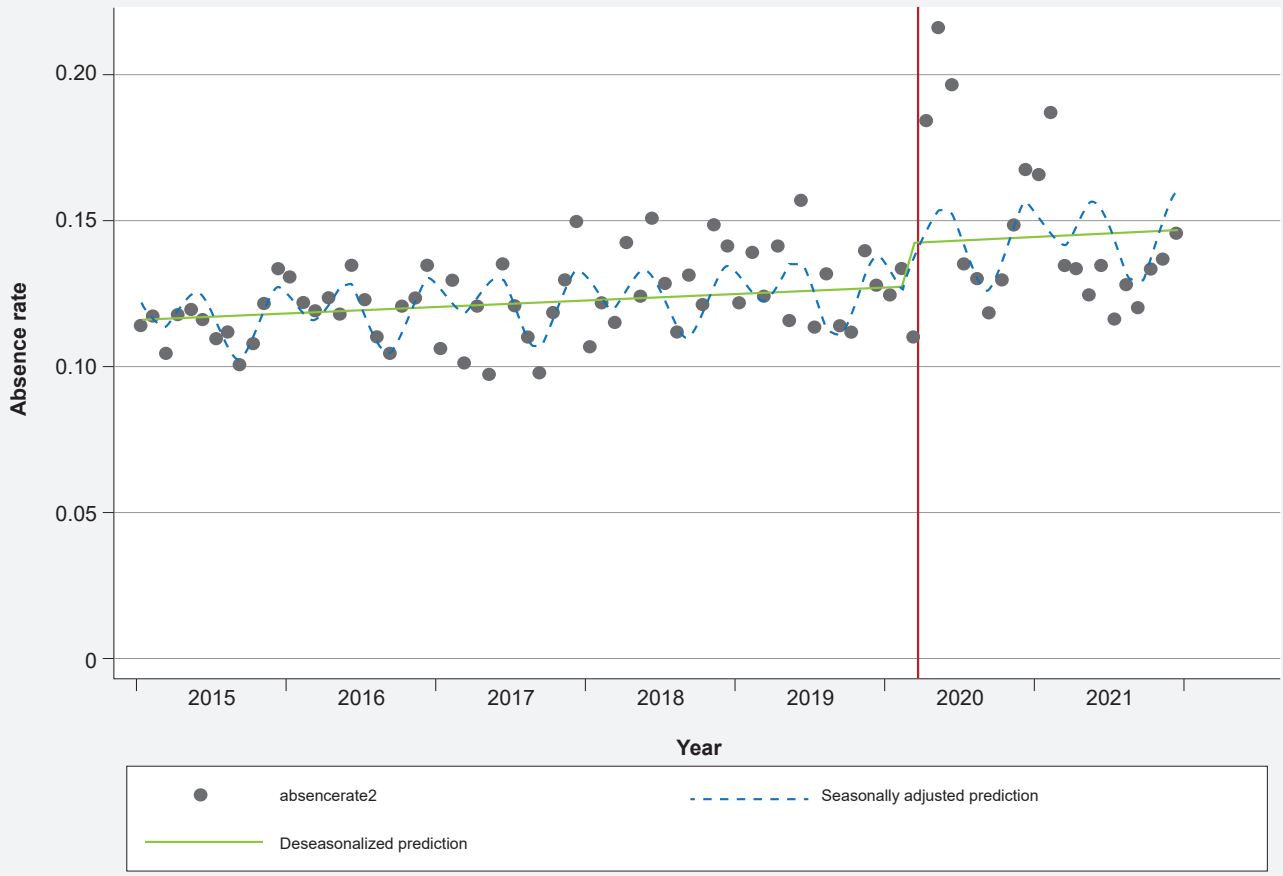


Figure 1 – Evolution of the absenteeism rate before and after the pandemic onset: interrupted time series analysis accounting for seasonality (2015 - 2021)

## DISCUSSION

The ITS found an 11% rise in NHS worker absenteeism following the onset of the pandemic. Notably, this trend was not restricted to Portugal; similar patterns of increased absenteeism following the pandemic's emergence have been observed in various other countries.[7-9]

While this study has contributed with insights into the impact of the COVID-19 pandemic on absenteeism patterns among HCW in Portugal, it is crucial to acknowledge several limitations that must be considered when interpreting our results. One of the primary constraints encountered in our study is the absence of a universally accepted definition for worker absenteeism or absence. This lack of consensus poses a challenge when attempting to compare absence rates between countries. Additionally, the absence categories were broad and predefined, which limited our ability to perform more nuanced comparisons and draw specific conclusions.

The phenomenon of absenteeism is a well-documented concern in the Portuguese healthcare sector, a situation that the COVID-19 pandemic has intensified. Our findings highlight the significant increase in absenteeism among NHS workers during the pandemic period.

## ACKNOWLEDGMENTS

We acknowledge the contribution NOVA SBE Health Economics & Management Knowledge Center members for all the insightful comments.

## PREVIOUS AWARDS AND PRESENTATIONS

This work was previously presented as a poster at the 15th European Public Health Conference Strengthening health systems: improving population health and being prepared for the unexpected Berlin, Germany, 9th - 12th November, 2022. https://doi.org/10.1093/eurpub/ckac130.024.

## AUTHOR CONTRIBUTIONS

JA: Study conception and design, data analysis and interpretation, drafting of the manuscript.

CN, APS: Study conception and design, data analysis

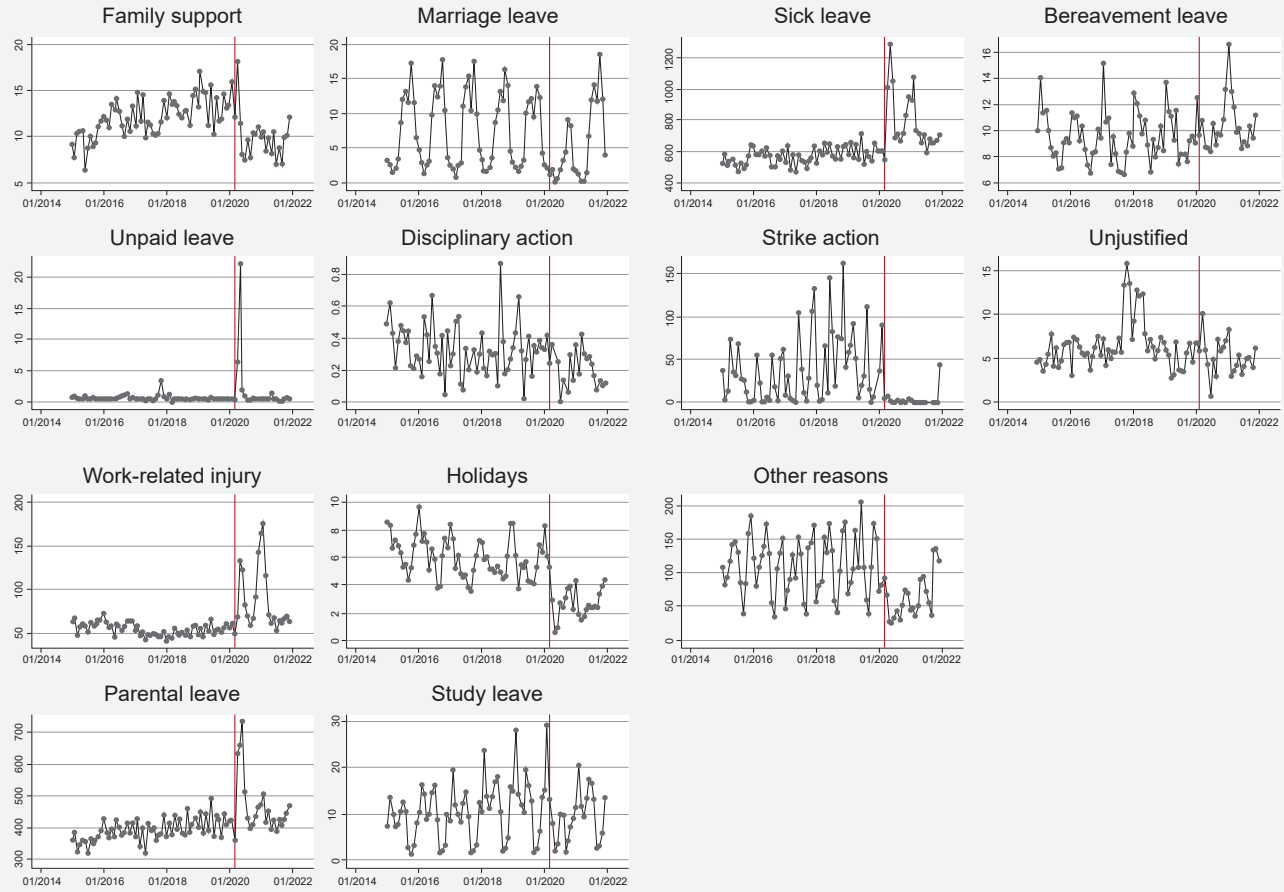


Figure 2 – Mean monthly absenteeism rate per 10 000 workers by year and type of absence
The x-axis represents the years from 2015 to 2021, while the y-axis represents the mean monthly absence rate per 10.000 workers.

and interpretation.

APS: Study conception and design.

All authors approved the final version of the manuscript.

## PROTECTION OF HUMANS AND ANIMALS

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the Helsinki Declaration of the World Medical Association updated in 2013.

## DATA CONFIDENTIALITY

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available in Portuguese National Health Service Transparency Portal (Portal da Transparência do SNS) at https://www.sns.gov.pt/transparencia/.

## COMPETING INTERESTS

The authors have declared that no competing interests exist.

## FUNDING SOURCES

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

## REFERENCES

1. Cucinotta D, Vanelli M. WHO declares COVID-19 a pandemic. Acta Biomed. 2020;91:157-60.
2. Greer SL, King EJ, da Fonseca EM, Peralta-Santos A. The comparative politics of COVID-19: the need to understand government responses. Glob Public Health. 2020;15:1413-6.
3. Gama A, Alves J, Costa D, Laires PA, Soares P, Pedro AR, et al. Double jeopardy from the COVID-19 pandemic: risk of exposure and income loss in Portugal. Int J Equity Health. 2021;20:231.

4. Rossi R, Socci V, Pacitti F, Di Lorenzo G, Di Marco A, Siracusano A, et al. Mental health outcomes among frontline and second-line health care workers during the coronavirus disease 2019 (covid-19) pandemic in Italy. JAMA Netw Open. 2020;3:e2010185.
5. Rocha J, Soares P, Filipe C, Lopes S, Teixeira M, Fonseca I, et al. Inpatient hospitalizations during the first wave of COVID-19 in Portugal. Port J Pub Health. 2020;38:11-7.
6. Lopez Bernal J, Cummins S, Gasparrini A. Interrupted time series regression for the evaluation of public health interventions: a tutorial. Int J Epidemiol. 2017;5:348-55.
7. Edge R, van der Plaat DA, Parsons V, Coggon D, van Tongeren M, Muiry R, et al. Changing patterns of sickness absence among healthcare workers in England during the COVID-19 pandemic. J Public Health. 2022;44:e42-50.
8. Appleby J. NHS sickness absence during the COVID-19 pandemic. BMJ. 2021;372: n471.
9. Groenewold MR, Burrer SL, Ahmed F, Uzicanin A, Free H, Luckhaupt SE. Increases in health-related workplace absenteeism among workers in essential critical infrastructure occupations during the COVID-19 pandemic — United States, March–April 2020. MMWR Morb Mortal Wkly Rep. 2020;69:853-8.