

## SYSTEMATIC REVIEW ARTICLE

## Presenteeism in healthcare workers on a pandemic context by COVID-19 disease: A scoping review

*Presenteísmo nos profissionais de saúde em contexto de pandemia desencadeada pela doença COVID-19: Uma scoping review*

*Presentismo entre los profesionales sanitarios en el contexto de la pandemia desencadenada por la enfermedad COVID-19: Una scoping review*

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### Abstract

**Background:** Presenteeism is becoming increasingly prevalent among healthcare workers due to their dedication to patient care during the COVID-19 pandemic. Countless professionals have carried on working while going through physical, psychological, and emotional changes.

**Objective:** To map the factors inducing presenteeism in healthcare workers during the COVID-19 pandemic.

**Review method:** Scoping review according to the JBI methodology. A search was carried out on databases to find studies published since 2019 in Portuguese, English, and Spanish. Two authors independently selected the studies and extracted the data.

**Presentation and interpretation of results:** Twelve factors were identified associated in inducing presenteeism in healthcare workers during the COVID-19 pandemic.

**Conclusion:** Healthcare managers should develop strategies for preventing presenteeism and raising the professionals' awareness. More primary studies are needed on this concept of interest.

**Keywords:** presenteeism; health personnel; coronavirus infections; pandemics

### Resumo

**Contexto:** Atualmente, o presenteísmo é adotado pelos profissionais de forma ascendente, derivado da dedicação dos mesmos na prestação de cuidados ao longo da pandemia desencadeada pela doença COVID-19. Sendo que inúmeros são os profissionais que exercem funções com alterações ao nível físico, psicológico e emocional.

**Objetivo:** Mapear os fatores potenciadores do presenteísmo nos profissionais de saúde em contexto de pandemia desencadeada pela doença COVID-19.

**Método de Revisão:** *Scoping review* segundo a metodologia do JBI. Foi realizada uma pesquisa em bases de dados desde o ano 2019, nos idiomas português, inglês e espanhol. O processo de seleção de estudos e extração de dados foi concretizado por dois autores de forma independente.

**Apresentação e interpretação dos resultados:** Foram identificados 12 fatores potenciadores do presenteísmo nos profissionais de saúde em contexto pandémico desencadeado pela doença COVID-19.

**Conclusão:** O desenvolvimento de estratégias preventivas da prática de presenteísmo, pelos gestores em saúde, bem como a consciencialização dos profissionais torna-se essencial. Também será necessário o desenvolvimento de mais estudos primários sobre este conceito de interesse.

**Palavras-chave:** presenteísmo; pessoal de saúde; infeções por coronavirus; pandemias

### Resumen

**Marco contextual:** Actualmente, los profesionales adoptan cada vez más el presentismo, derivado de su dedicación en la prestación de cuidados a lo largo de la pandemia desencadenada por la enfermedad COVID-19. Muchos profesionales desempeñan sus funciones con cambios físicos, psicológicos y emocionales.

**Objetivo:** Mapear los factores que fomentan el presentismo entre los profesionales sanitarios en el contexto de la pandemia desencadenada por la enfermedad COVID-19.

**Método de revisión:** Revisión sistemática según la metodología del JBI. Se realizó una búsqueda en bases de datos a partir del año 2019 en portugués, inglés y español. El proceso de selección de estudios y de extracción de datos fue realizado de forma independiente por dos autores.

**Presentación e interpretación de los resultados:** Se identificaron 12 factores que fomentan el presentismo entre los profesionales sanitarios en el contexto de la pandemia provocada por la enfermedad COVID-19.

**Conclusión:** El desarrollo de estrategias preventivas para la práctica del presentismo por parte de los gestores sanitarios, así como la concienciación de los profesionales es fundamental. También son necesarios más estudios primarios sobre este concepto de interés.

**Palabras clave:** presentismo; personal sanitario; infecciones por coronavirus; pandemias

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## Introduction

Presenteeism is a phenomenon characterized by the presence of the workers at the workplace despite their physical, psychological, and emotional discomfort (Martinez & Ferreira, 2012). Although occupational health has expanded over the years, namely concerning the improvement in healthcare professionals' working conditions, specifically their safety (Heuvel et al., 2018), this need is increasing due to the current pandemic context.

In December 2019, the first case of COVID-19 was reported in the Asian city of Wuhan, China (Wang et al., 2020). According to the World Health Organization (WHO, 2020) and the Centers for Disease Control and Prevention (CDC, 2020), the COVID-19 disease is triggered by the SARS-CoV-2 virus. It presents with several respiratory signs and symptoms, having a physical, psychological, and emotional impact on each individual.

In March 2020, WHO (2020) declared this disease a pandemic due to the incidence of 118,000 cases of infection and about 4,000 deaths in more than 100 countries. Therefore, this phenomenon demanded resilience and the capacity to adapt to the changes occurring in health, society, and politics. For example, in the health area, healthcare professionals were asked to work more hours and adapt to a new work environment, which also affected their social and personal life.

According to Chew et al. (2020) and Zhang (2020), during this pandemic, healthcare workers have shown not just physical symptoms, due to extreme fatigue and working overtime hours, but psychological symptoms too, particularly associated with depression and anxiety. The National School of Public Health (2020) reported that 72.2% of the healthcare workers included in their research studies had medium-to-high levels of burnout or emotional exhaustion. According to WHO (2020), countless healthcare workers are infected every day worldwide.

Due to the lack of human resources, the working conditions, and the need to provide care for long periods, these professionals adopt presenteeism. According to

Daniel (2020), a survey found that 83.1% of healthcare professionals had worked while sick. Of these, 95.3% recognized that presenteeism put patients at risk and influenced the quality of care, and 98.7% reported that they continued to work to avoid burdening colleagues. This study also revealed that healthcare managers did not care about this practice. It should be highlighted that a healthcare provider infected with COVID-19 puts patients and coworkers at risk, so it is essential to address this issue.

Therefore, given our current reality, it is essential to identify the inducing factors for presenteeism in healthcare workers during the COVID-19 pandemic to help healthcare managers develop and implement measures for preventing presenteeism and its possible harmful consequences for patients and coworkers.

On 16 November 2020, a preliminary search was conducted on MEDical Literature Analysis and Retrieval System Online (MEDLINE) via PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL) via EBSCO, JBI CONNECT<sup>+</sup>, and Cochrane Library. No reviews were found that mapped the risk factors for presenteeism in healthcare workers during the COVID-19 pandemic. Thus, a scoping review was conducted to map the inducing factors for presenteeism in healthcare workers during the COVID-19 pandemic.

## Review method

This review followed the JBI methodology for scoping reviews and was based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR). This methodology aims to synthesize available evidence with a view to mapping knowledge about a given concept of interest (Tricco et al., 2018). Thus, this review aims to map the inducing factors for presenteeism in healthcare workers during the COVID-19 pandemic.

The review question was formulated using the PCC mnemonic (Population, Concept, and Context; Table 1): What are the inducing factors for presenteeism in healthcare workers during the COVID-19 pandemic?

**Table 1**

*Components of the review question (PCC mnemonic)*

Acronym	Meaning	Components of the review question under analysis
P	<b>Population</b>	Healthcare workers
C	<b>Concept</b>	Inducing factors for presenteeism
C	<b>Context</b>	COVID-19 pandemic

The inclusion criteria were defined based on the PCC mnemonic, study designs, languages, and time frame to be included. Regarding the population, the concept, and the context, studies addressing healthcare workers,

the inducing factors for presenteeism, and the current context triggered by the COVID-19 disease, respectively, were considered for inclusion. Additionally, quantitative/qualitative primary studies, opinion studies, published and unpublished studies were considered for

inclusion. These studies had been published since 2019 [the year in which the first COVID-19 case was reported, according to WHO (2020)] in Portuguese, English, and Spanish.

### Search strategy and study identification

The search strategy was restricted to the period between 2019 and the present time and to studies published in Portuguese, English, and Spanish. In the first phase, a limited search was conducted on MEDLINE via PubMed and CINAHL via EBSCO, with the keywords *COVID-19* and *presenteeism* and the Boolean operator *AND*, to analyze the natural language terms in

the titles and abstracts and plan a subsequent search. In the second phase, on 29 November 2020, a search was conducted on MEDLINE via PubMed, CINAHL via EBSCO, MedicLatina via EBSCO, Psychology and Behavioral Sciences Collection via EBSCO, and Scientific Electronic Library Online (SciELO). A search was carried out on the Open Access Scientific Repositories of Portugal (RCAAP) to find unpublished studies. Table 2 shows the search strategy used in the MEDLINE database via PubMed. The search strategies were adapted to each database. Finally, in the third phase, the reference lists of the included studies were analyzed.

**Table 2**

*Search Strategy – MEDLINE via PubMed - date: 29/11/2020*

#	Search strategy	Resultados
#11	((((COVID-19[Title/Abstract] OR SARS-CoV-2[Title/Abstract]) OR (“COVID-19” [Supplementary Concept])) AND ((“healthcare professionals”[Title/Abstract] OR “health care professionals”[Title/Abstract] OR “healthcare professional”[Title/Abstract] OR “health care professional”[Title/Abstract] OR “healthcare workers”[Title/Abstract] OR “health care workers”[Title/Abstract] OR “healthcare worker”[Title/Abstract] OR “health care worker”[Title/Abstract] OR “healthcare providers”[Title/Abstract] OR “health care providers”[Title/Abstract] OR “healthcare provider”[Title/Abstract] OR “health care provider”[Title/Abstract] OR “Health Personnel”[Title/Abstract] OR nurs*[Title/Abstract] OR doctor*[Title/Abstract]) OR (“Health Personnel”[Mesh])))) AND ((“Presenteeism”[Mesh]) OR (Presenteeism[Title/Abstract])) Filters: English, Portuguese, Spanish	8
#10	((((COVID-19[Title/Abstract] OR SARS-CoV-2[Title/Abstract]) OR (“COVID-19” [Supplementary Concept])) AND ((“healthcare professionals”[Title/Abstract] OR “health care professionals”[Title/Abstract] OR “healthcare professional”[Title/Abstract] OR “health care professional”[Title/Abstract] OR “healthcare workers”[Title/Abstract] OR “health care workers”[Title/Abstract] OR “healthcare worker”[Title/Abstract] OR “health care worker”[Title/Abstract] OR “healthcare providers”[Title/Abstract] OR “health care providers”[Title/Abstract] OR “healthcare provider”[Title/Abstract] OR “health care provider”[Title/Abstract] OR “Health Personnel”[Title/Abstract] OR nurs*[Title/Abstract] OR doctor*[Title/Abstract]) OR (“Health Personnel”[Mesh])))) AND ((“Presenteeism”[Mesh]) OR (Presenteeism[Title/Abstract]))	8
#9	(“Presenteeism”[Mesh]) OR (Presenteeism[Title/Abstract])	1.348
#8	“Presenteeism”[Mesh] Sort by: Most Recent	336
#7	Presenteeism[Title/Abstract]	1.299
#6	(COVID-19[Title/Abstract] OR SARS-CoV-2[Title/Abstract]) OR (“COVID-19” [Supplementary Concept])	75.304
#5	“COVID-19” [Supplementary Concept] Sort by: Most Recent	38.062
#4	COVID-19[Title/Abstract] OR SARS-CoV-2[Title/Abstract]	72.416
#3	(“healthcare professionals”[Title/Abstract] OR “health care professionals”[Title/Abstract] OR “healthcare professional”[Title/Abstract] OR “health care professional”[Title/Abstract] OR “healthcare workers”[Title/Abstract] OR “health care workers”[Title/Abstract] OR “healthcare worker”[Title/Abstract] OR “health care worker”[Title/Abstract] OR “healthcare providers”[Title/Abstract] OR “health care providers”[Title/Abstract] OR “healthcare provider”[Title/Abstract] OR “health care provider”[Title/Abstract] OR “Health Personnel”[Title/Abstract] OR nurs*[Title/Abstract] OR doctor*[Title/Abstract]) OR (“Health Personnel”[Mesh])	1.046.851
#2	“Health Personnel”[Mesh] Sort by: Most Recent	524.402
#1	“healthcare professionals”[Title/Abstract] OR “health care professionals”[Title/Abstract] OR “healthcare professional”[Title/Abstract] OR “health care professional”[Title/Abstract] OR “healthcare workers”[Title/Abstract] OR “health care workers”[Title/Abstract] OR “healthcare worker”[Title/Abstract] OR “health care worker”[Title/Abstract] OR “healthcare providers”[Title/Abstract] OR “health care providers”[Title/Abstract] OR “healthcare provider”[Title/Abstract] OR “health care provider”[Title/Abstract] OR “Health Personnel”[Title/Abstract] OR nurs*[Title/Abstract] OR doctor*[Title/Abstract]	690.775

The studies were selected by two authors independently, using the Mendeley Reference Manager. First, the titles and abstracts were screened, and then

the full texts were analyzed. Any disagreements between authors were discussed/analyzed until a consensus was reached.

### Data extraction

Data were extracted based on an instrument developed by the authors. Data were extracted and synthesized by two authors independently. Any disagreements between authors were discussed/analyzed until a consensus was reached.

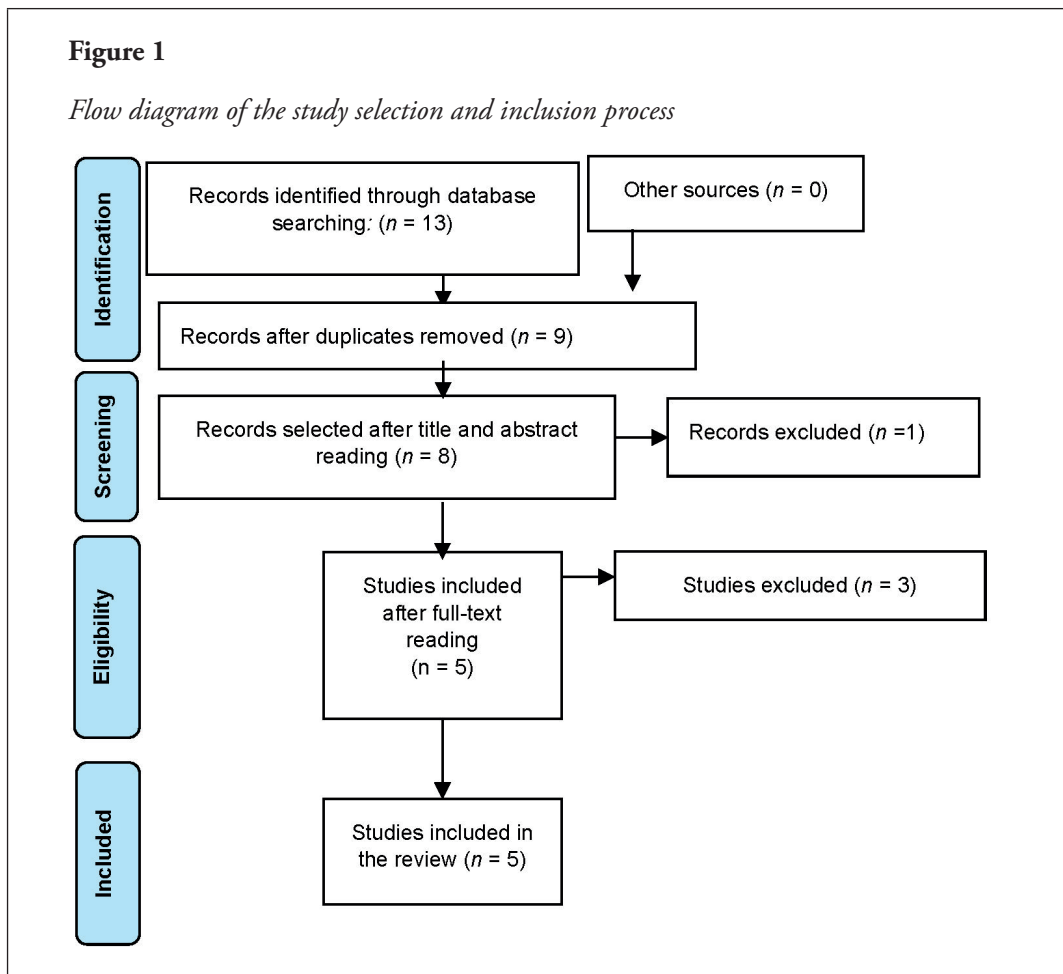
### Data synthesis

Data were synthesized by two authors independently in a narrative way and using tables.

### Presentation of results

A total of 13 records were obtained from searching the databases (eight records on MEDLINE via PubMed,

four on CINAHL via EBSCO, zero on MedicLatina via EBSCO, Psychology and Behavioral Sciences Collection via EBSCO, and SciELO, and one on RCAAP). After duplicates were removed, nine studies remained. After abstract reading and analysis, one study was excluded because it did not meet the inclusion criterion about the population. After the full-text analysis of the eight studies, three of them were excluded because they did not address the population (one study) and the context (two studies) of interest to this review. Therefore, five studies were included in this scoping review. Figure 1 shows the flow diagram of the study selection and inclusion process, based on the PRISMA-ScR (Tricco et al., 2018).



Tables 3 and 4 show a list of the included studies, together with their authors, year of publication, titles, and publication journal (3), as well as the language of publication, the country reported in the study, study design, population, and context (4).

### Authors, year, and journals of the included studies

The authors of the studies included in this review were as follows: Daniel (2020); Grech et al. (2020); Mosteiro-Díaz et al. (2020); Simms et al. (2020); Wee et al. (2020). All studies were published in 2020. They

were published in the following journals: *The American Journal of Gastroenterology* (Daniel, 2020); *Early Human Development* (Grech et al., 2020); *International Nursing Review* (Mosteiro-Díaz et al., 2020); *Occupational Medicine* (Simms et al., 2020); *Infection Control & Hospital Epidemiology* (Wee et al., 2020).

### Language of the included studies

All studies were published in English (Daniel, 2020; Grech et al., 2020; Mosteiro-Díaz et al., 2020; Simms et al., 2020; Wee et al., 2020).

### Countries where the studies were conducted

The studies included in this review were conducted in several European, American, and Asian countries: China and the United Kingdom (Daniel, 2020), the United Kingdom (Simms et al., 2020), Italy (Grech et al., 2020), Portugal, Spain, and Brazil (Mosteiro-Díaz et al., 2020), and Singapore (Wee et al., 2020).

### Design of the included studies

The studies carried out by Daniel (2020) and Grech et al.

(2020) are theoretical articles, and the studies conducted by Mosteiro-Díaz et al. (2020), Simms et al. (2020), and Wee et al. (2020) have a quantitative approach.

### Population and Context

The studies included physicians (Daniel, 2020), nurses (Mosteiro-Díaz et al., 2020), and unspecified health-care workers (Mosteiro-Díaz et al., 2020; Simms et al., 2020; Wee et al., 2020). In all of them, the context was the COVID-19 pandemic.

**Table 3**

*List of included studies*

Authors/Year	Title	Publication Journal
Daniel, 2020	<i>Symptom shame in the COVID-19 era: Battling our instincts</i>	<i>The American Journal of Gastroenterology</i>
Grech et al., 2020	<i>Needed: Less influenza vaccine hesitancy and less presenteeism among health care workers in the COVID-19 era</i>	<i>Early Human Development</i>
Mosteiro-Díaz et al., 2020	<i>Presenteeism in nurses: comparative study of Spanish, Portuguese and Brazilian nurses</i>	<i>International Nursing Review</i>
Simms et al., 2020	<i>The impact of having inadequate safety equipment on mental health</i>	<i>Occupational Medicine</i>
Wee et al., 2020	<i>Containment of COVID-19 cases amongst healthcare workers: the role of surveillance, early detection and outbreak management</i>	<i>Infection Control &amp; Hospital Epidemiology</i>

**Table 4**

*Characterization of included studies*

Authors/Year	Language	Country reported in the study	Study design	Population	Context
Daniel, 2020	English	China/ United Kingdom	Theoretical article	Physicians	Pandemic context (COVID-19)
Grech et al., 2020	English	Malta	Theoretical article	Healthcare workers	Pandemic context (COVID-19)
Mosteiro-Díaz et al., 2020	English	Portugal/ Spain/ Brazil	Quantitative study (cross-sectional)	Nurses	Pandemic context (COVID-19)
Simms et al., 2020	English	United Kingdom	Quantitative study	Healthcare workers	Pandemic context (COVID-19)
Wee et al., 2020	English	Singapore	Quantitative study	Healthcare workers	Pandemic context (COVID-19)

### Inducing factors for presenteeism in healthcare workers during the COVID-19 pandemic

The five included studies were analyzed based on the

central focus of this review: the identification of the inducing factors for presenteeism in healthcare workers during the COVID-19 pandemic (Table 5).

**Table 5***Inducing factors for presenteeism in healthcare workers during the COVID-19 pandemic*

Authors/Year	Inducing factors for presenteeism in healthcare workers during the COVID-19 pandemic
Daniel, 2020	Culture of self-sacrifice
	Avoiding burdening colleagues
	Patient concerns
	Staffing concerns
	managers' lack of concern about presenteeism
	Symptom shame
Grech et al., 2020	Quarantine time involved vacation days and/or pay cuts
	Influenza vaccine
Mosteiro-Díaz et al., 2020	Mild symptoms
	Poor working conditions
Simms et al., 2020	Inadequate personal protective equipment / Increased stress
Wee et al., 2020	Mild symptoms
	Anxiety due to absence from work

Twelve inducing factors for presenteeism were identified. Daniel (2020) identified the following factors among the medical staff: culture of self-sacrifice, avoiding burdening colleagues, patient and staffing concerns, and the management' lack of concern about presenteeism. He also identified symptom shame associated with COVID-19 and the consequences of quarantine/isolation (use of vacation days and pay cuts) as inducing factors for this phenomenon of interest.

Grech et al. (2020) identified influenza vaccination and mild symptoms of COVID-19 disease. Influenza vaccination was considered a phenomenon that created the perception of 100% immunization in healthcare professionals, being considered a precursor of clinical activity with mild symptoms of influenza during this pandemic. Moreover, the fact that patients with COVID-19 may present only with mild symptoms might cause presenteeism among healthcare workers. Wee et al. (2020) corroborated this hypothesis, identifying the mildness of COVID-19 symptoms and the anxiety due to absence from work as risk factors for presenteeism in a pandemic context, such as the current one, where numerous healthcare professionals are needed to meet population needs. Mosteiro-Díaz et al. (2020) identified the poor working conditions as a factor causing presenteeism among nurses.

Finally, Simms et al. (2020) reported that the perception of having inadequate personal protective equipment triggered feelings of stress and insecurity in healthcare professionals, leading to presenteeism.

### Interpretation of the results

The analysis of the included studies allowed mapping the inducing factors for presenteeism in healthcare workers during the COVID-19 pandemic. After applying the inclusion criteria, five studies were included and analyzed. So, this chapter aims to interpret the results

presented above and compare them with other current evidence to answer the review question and establish implications for the practice of healthcare workers and healthcare managers, as well as for future studies.

As previously mentioned, the scientific evidence available to date on presenteeism in healthcare workers during the COVID-19 pandemic identified 12 inducing factors. As shown in Table 5, the following factors were identified in the included studies: culture of self-sacrifice, avoiding burdening colleagues, patient and staffing concerns, the managers' lack of concern about this phenomenon, symptom shame, the consequences of quarantine (Daniel, 2020), influenza vaccination (Grech et al., 2020), poor working conditions (Mosteiro-Díaz et al., 2020), the increase in stress/lack of safety due to the use of inadequate personal protective equipment (Simms et al., 2020) and anxiety due to absence from work (Wee et al., 2020).

More specifically, in relation to the culture of sacrifice as a risk factor for presenteeism (Daniel, 2020), a qualitative study published in 2020 reported that a culture of self-sacrifice triggers presenteeism, particularly among nursing teams, as well as other phenomena (job dissatisfaction, burnout), with a negative impact on the quality of care (Ciezar-Andersen & King-Shier, 2020).

Other authors also identified the inducing factors related to avoiding burdening colleagues, patient and staffing concerns, and anxiety due to work absence as causing presenteeism in healthcare workers outside the COVID-19 pandemic context (Schneider et al., 2018). According to Oliveira et al. (2018), is important to highlight the support of colleagues and healthcare managers reduces concerns/anxiety and, consequently, presenteeism among healthcare workers. According to Daniel (2020), creating a pool of reserve providers reduces presenteeism and the factors mentioned above (burdening colleagues and staffing concerns).

The managers' lack of concern about presenteeism increases its prevalence among healthcare workers (Daniel, 2020). Several studies in the literature reveal that the managers' concern about presenteeism in healthcare workers and the adoption of prevention strategies by healthcare managers are essential to reduce the prevalence of the concept of interest reported in this review (Oliveira et al., 2018; Schneider et al., 2018).

The poor working conditions are often mentioned in the literature in non-pandemic contexts, namely the overtime hours and the unfavorable environmental conditions for delivering quality health care (Mach et al., 2018). According to Mosteiro-Díaz et al. (2020), these factors are aggravated in the COVID-19 pandemic context, resulting in the high incidence of presenteeism among healthcare professionals.

Only one study in the literature (Daniel, 2020), either in this pandemic or extra-pandemic context, reported symptom shame associated with COVID-19 and the consequences of quarantine (vacation days or pay cuts) as inducing factors for presenteeism.

Inadequate personal protective equipment was also mentioned by only one study (Simms et al., 2020) as leading to increased stress and fear of getting infected and, consequently, promoting presenteeism.

Influenza vaccination associated with mild symptoms was correlated with presenteeism in a pandemic context (Grech et al., 2020). The presence of mild symptoms was the only inducing factor reported in two studies (Grech et al., 2020; Wee et al., 2020). According to the authors mentioned above, healthcare workers with mild symptoms choose to work to minimize the consequences of their absence from work, namely burdening colleagues, pay cuts, and the use of vacation days for quarantine, as described by Daniel (2020). However, according to the same author, these attitudes can have harmful consequences for both patients and their coworkers, so healthcare managers and professionals should be aware of this phenomenon to minimize its consequences and increase the quality of health care.

Finally, one of the limitations of this review was that it only included studies published in Portuguese, English, and Spanish, so studies in other languages could also have been beneficial to analyze this concept of interest. Also, given that this scoping review aimed to map the available evidence, the methodological quality of the included studies was not assessed, so the implications for clinical practice put forward in the next section may present limitations.

## Conclusion

Presenteeism is becoming increasingly common, and the COVID-19 pandemic has increased its incidence. The included studies allowed identifying the following inducing factors for presenteeism in healthcare workers during the COVID-19 pandemic: the culture of self-sacrifice; avoiding burdening colleagues; patient and staffing concerns; the administrators' lack of concern about

healthcare professionals' presenteeism; the COVID-19 symptom shame; the consequences of quarantine; influenza vaccination; mild symptoms; poor working conditions; inadequate personal protective equipment; and anxiety due to absence from work.

Based on the analysis of the included studies and the studies used to corroborate the results, it was possible to establish implications for the clinical practice of healthcare professionals and healthcare managers, as well as implications for the development of future studies on this concept of interest. Concerning the implications for practice, healthcare managers should implement preventive strategies to minimize this concept of interest - presenteeism - and its harmful consequences for patients and health teams. Furthermore, raising healthcare workers' awareness of this phenomenon and its consequences is also essential to reduce its incidence.

Concerning the implications for research, more primary studies are needed on this concept of interest in a pandemic context. Based on the knowledge acquired about the risk factors for presenteeism in healthcare workers during the COVID-19 pandemic identified in this scoping review, primary studies should be developed on the effectiveness of possible preventive strategies for reducing presenteeism.

Finally, it can be concluded that there are several risk factors for presenteeism in healthcare professionals in a pandemic context, so health organizations must implement strategies to reduce this phenomenon and its consequences, with a view to maximizing health services in a pandemic context.

## Author contributions

Conceptualization: Santos, D. G., Conceição, A. A., Ferreira, M. M.

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Formal analysis: Santos, D. G., Conceição, A. A.

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Methodology: Santos, D. G.

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Validation: Santos, D. G., Conceição, A. A., Ferreira, M. M.

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Writing - review and editing: Santos, D. G., Conceição, A. A., Ferreira, M. M.

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